

**ADVANCING SCIENCE AND  
SOCIETY INTERACTIONS**

**Seville, Spain, 3-5 February 2005**

**PROCEEDINGS**

**edited by Norbert Steinhaus**





# Advancing Science and Society Interactions

Proceedings of the

2<sup>nd</sup> International Living Knowledge Conference  
Seville, Spain, 3-5 February 2005

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Science Shops are as diverse as the communities they serve. There is no structure of an organisation that can be seen as the ultimate construction. How Science Shops are organised and operate is highly dependent on their context. When establishing a network of Science Shops new contexts may add new organisation structures. What once began as part of the student movement and counter-culture of the early 1970ies in the Netherlands has now spread over Europe and beyond.

With the help of the European Commission Science Shops have managed to organise themselves into a Europe-based global network through which know-how, expertise, experiences and research can be shared. In 2000 SCIPAS, as first transnational project of Science Shops, for the first time articulated and documented the various Science Shop models. The policy of the emerging international cooperation was labelled 'Living Knowledge', knowing that knowledge by being transformed, re-configured and used to solve problems by empowering everyday people. The first Living Knowledge conference "Building partnerships for public access to research", which was held in 2001 in Leuven, Belgium, was the first public output of the SCIPAS project and the arising network.

The second Living Knowledge conference „Advancing Science and Society Interactions“ held in Seville, Spain, now intended to improve the exchange of information and knowledge among all involved in community based research and provided a forum where information on community based research, carried out in both community and academic settings, was shared and developed. The conference not only focused on the Science Shop aspects of community-based research. It had a much broader

scope because Science Shops are just one of the players in the field of science and society interactions. The role of universities, NGO's and public bodies in this context must not be underestimated. With its more than 100 presentations the conference's goal was also to discuss options for improving the interactions between these different stakeholders.

In the proceedings of the second Living Knowledge conference we listed the presentations of the plenary sessions. Those contributions to the parallel sessions which gave additional information to the already published were also taken into account. Some of the listed texts are written in Spanish according to the bilingual concept of the conference.

All speakers' abstracts were previously published in a book of abstracts which was released at the conference. You can find the abstract of every contribution to the conference as well as speakers' submitted additional material on the CD which is enclosed to this publication.

I want to say thank you to everybody who contributed to the success of the second Living Knowledge Conference: To the European Commission who was very supportive in shaping the conference, the members of the EC project ISSNET, who spent a lot of energy in the international organisation committees, and all those who contributed in lectures, discussions or writing for these proceedings. Finally I would like to thank Teresa Rojo and Patricia Rojo and the staff of Pax Mediterranea as well as the University of Seville for the huge amount of work they have spent to organise this international conference.

Norbert Steinhaus

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# WELCOME NOTES

Besides some opening remarks from the conference hosts as well as the local and international organisation, an overview of the regional and local interest for community-based research is given.



# Welcome Note

MONICA MENAPACE

Project Coordinator. Unit Education and Science, Dir. Science and Society, Directorate General for Research, European Commission

The European Commission acknowledges the success of the conference „Advancing science and society interactions“ which attracted a large number of participants from all over the world and made them discussing together a variety of subjects. The richness of these discussions is summarized in these proceedings. The conference falls within the activities of a project financed by the EU „Improving Science Shops networking“, which strongly contributes to the Commission’s aim of bridging the gap between science and society.

The creation of a European Research Area (ERA) is the main objective of the current EU activities in the field of research and technological development. The ERA process has been launched by the European Commission in 2000 and has become one of the main elements for achieving the Lisbon and Barcelona goals.

However, advances in science drive European growth, but sometimes give rise to fears and scepticism among citizens. The European Commission is determined to bridge the gap between the scientific community and society at large. Therefore, its Directorate-General for Research is working to make „science and society“ issues an essential element within the ERA process and the Framework Programmes for Research (6th and 7th). The „Science and Society“ theme supports activities that bring together policy-makers, researchers, and citizens. Initiatives have been brought together in an Action Plan that will mobilise people and resources from across Europe. The Science and Society Action Plan was agreed by the Commission in December 2001. The Plan sets out a common strategy to create a better connection between science and European citizens, alongside 38 specific actions covering all the themes mentioned below. The effort is supported in part through the EC’s Sixth Framework Programme. FP6 includes „science and society“ activities, both as a specific „science“ and society“ programme and as a general theme integrated in the seven research priorities of the „Integrating the European Research Area“ programme.

It is in this framework that the Commission has given its support to the Science Shops through a devoted action in the Science and Society Action Plan (Action 21), the financing of several projects under the 5th and the 6th Framework Programme and by keeping a dialogue with the Science Shops, the universities’ associations and civil society associations on how to further promote Science Shops and develop them in new regions.

Science shops create a direct contact between citizens, students and research institutions and contribute to a dialogue amongst the stakeholders on subjects sensitive for the society and where science play an important role. Moreover, Science shops activities contribute to the universities curricula development and make universities interact with the communities where they are located (the so called 3rd mission of the universities). The Commission is encouraging and will continue encouraging the development of Science Shops as it is an excellent tool to make science at the service of the society addressing practical problems at local level.

# Welcome Note

CASPAR DE BOK

Coordinator of the International Science Shop Network 'Living Knowledge'

As coordinator of the international Science Shop Network Living Knowledge it is a pleasure to welcome you all at the second Living Knowledge conference 'Advancing Science and Society Relations'. It is good to see so many people have taken the opportunity to come to the beautiful city of Seville to meet other experts and people that are interested in community based research and Science Shops. It is clear that the network has grown since the first Living Knowledge conference in 2001 in Leuven, Belgium. Living Knowledge is really advancing science and society relations.

The next two and a half day there will be many opportunities to share experiences and to meet interesting people working in the same field as you. If you think it are just a few lonely souls dealing with the same questions and activities as you, I hope this conference will prove there are many people like you. Here in Seville we bring together researchers, policymakers, representatives of citizens organisations and NGO's and students. The conference participants come from all over the world and from all kind of organisations. Please use this conference as a meeting place. You all do represent many different contexts. But what you all seem to have in common, is your interest in science and society relations and its practises. This conference might be a learning experience that brings you ideas, contacts and support.

I like to thank the members of the local organisation committee for the work they have done to bring you all together in this very nice location, the Salon Paraninfo' of the University of Seville, but also for the rest of the programme. Staff of Pax Mediterranea and the University of Seville have put a lot of work in this, as did many of their local partners. Also the members of the EC project ISSNET, who participated in the international organisation committee and employees of the European Commission have been very supportive to shape this conference. All involved in the organisation have been full of ideas and good intentions. There has been a huge response from participants to contribute to the conference. Thanks for that. Bringing the ideas and contributions together in a conference that only lasts two and a half days, isn't easy. Without the commitment of people in the organisation committees we wouldn't have been here now to have some interesting days.

I hope you will all enjoy this conference, will get many new ideas and a lot of inspiration. I hope you will not only collect paper but also bring home a lot of action and energy to move forward with all the good work you do. Besides that, enjoy Seville.!

# INTRODUCTORY PRESENTATIONS

The general Science Shop concept is introduced as well as the international dimension of the Living Knowledge network with a focus on the European Union.



# Science Shops as Science - Society Interfaces: A basic introduction

HENK MULDER

Chemiewinkel, University of Groningen, Groningen, the Netherlands

Science Shops arose in the Netherlands in the 1970ies and can now be found in many countries. Their development was bottom-up, so there are differences. Some organisations may perform like tasks but not use the name "Science Shop". The goal to give civil society access to research support is the same, however. They are a structural part of research infrastructure, open to civil society. Science Shops as a way of transferring knowledge are innovative and effective and have a positive impact both on universities and on the civil society.

A Science Shop is a unit that provides independent, participatory research support in response to concerns experienced by civil society. For the most part, these units belong to universities, though some are organised as separate NGOs or non-for-profit companies. Science Shops combine research (and teaching where applicable) with service to society. Civil society organisations can simply approach a Science Shop with a problem in which they feel some research would be helpful for them to help solve their problem. The Science Shop staff will then transfer these requests into research projects and find students and/or staff to work on these projects, in close contact with the "client". The results are handed over to the client and the Science Shop staff will support the use of these scientific results by the client and will help to formulate follow-up proposals,

both those relevant to the client and those relevant to further research. This process means that new knowledge is generated, or at least existing knowledge is combined and adapted to context.

Science Shops use the term "science" in its broadest sense, incorporating social and human sciences, as well as natural, physical, engineering and technological sciences. The word "provide" in the definition means that Science Shops make their services available on an affordable basis, free of financial barriers. Furthermore, Science Shops seek to create equitable and supportive partnerships with civil society organisations, hence the word "participatory". The word "equitable" in this mission statement also means that knowledge and ideas from society are used as a cross-fertilisation to the research field; it's a two way street. "Research support" can include educational projects, but makes clear that there is a difference with regular social welfare based support to society. The words "in response to", so it's not a science push type of operation. The word "concerns" makes clear that Science Shops are not there to answer curiosity-driven questions.

As a mission statement, Science Shops seek to: i) provide civil society with knowledge and skills through research and education; ii) provide their services on an affordable basis; iii) pro-

mote and support public access to, and public influence on, science and technology; iv) create equitable and supportive partnerships with civil society organizations; v) enhance understanding among policy makers and education and research institutions of the research and education needs of civil society vi) enhance the transferable skills and knowledge of students, community representatives and researchers.

A variety of other tasks are sometimes performed by Science Shops, such as regular university teaching and research, contract research, education and trainings for civil society, et cetera.

## Demand

Who are the clients of Science Shops? There are some general selection criteria that most Science Shops apply. The first one is that clients may have no commercial aims, and the research results must become public. Second, clients must be able to use the results of the research to achieve their mission – which means having some form of organisation to act within, and for the Science Shops it means that they must produce results that are clear and applicable in context-; and third, the clients may not have the (full) financial (and/or scientific) means to acquire their research otherwise (or they should finance part or all of the project). This distinction is made since there are already many possibilities for governmental organisations and business to have research done. Science Shops are all about balancing the scales.

Their target groups fit well with the EC's definition of civil society organisations as mentioned in the Science and Society Action Plan: organisations whose members have objectives and

responsibilities that are of general interest and who also act as mediators between the public authorities and citizens. They may include trade unions and employers' organisations ('social partners'), NGOs, professional associations, charities, grassroots organisations, organisations that involve citizens in local municipal life; churches and religious communities.

Clients of Science Shops are community/voluntary groups, (environmental) NGOs, local/regional authorities, schools/pupils, patient associations, labour unions, religious groups sometimes individuals.

Other clients might be student organisations, museums, police, parliamentarians/political parties or as in some Science Shops other research institutes, SMEs or larger firms and industry. For help to individuals, Science Shops sometimes apply the criterion that the problem should be of concern to more people. But, sometimes, if time or expertise allows, purely individual problems are solved. Science Shops themselves can try to disseminate the report to similarly interested stakeholders in that case. Sometimes questions are answered from others, such as small and medium enterprises and even industry, depending on the type of question posed and on the other facilities a host institute has or does not have to deal with these questions already.

## Position of Science Shops at Universities

Science Shops have a special place in linking all three university missions: education, research, and knowledge transfer to society (outreach). Universities have many relations with society, which can be structured as shown here. Four generic target groups can be distinguished,

which all have their own dynamics and require specific attention. Towards individuals, there is a supply of existing information from university to society. Concerning service to organisations, Science Shops generally take care of non-commercial contract-research, whereas transfer bureaux or business service centres cover commercial research. The largest sums of money find their own way to national authorities and industry, through public foundations and their funding programmes, or through paid research contracts or by industry paying a professorial chair at university. The entrances for industry and civil social groups are separated and thus the risk for conflicts of interests is diminished. Moreover, serving these different sectors requires different ways of working and likewise requires different persons to do the job properly.

Although they are commercial, Small and Medium sized Enterprises are sometimes

served by Science Shops as well, depending on the organisation of the specific university, and depending on the type of the questions asked by this group of clients. In Romania, Science Shops also accept questions from SMEs, because the current economic situation in Romania makes them a suitable target group as well. In the social segment served by Science Shops there is generally little financial backing and little subsidies exist.

The reasons that Universities do support Science Shops are many. Next to "pro deo" or PR reasons, universities will also support Science Shops as a way to obtain interesting research topics for scientists and students. Even though professors and students are doing what they should be doing anyway (supervising and learning, respectively), Science Shop projects are a little more work to organise than text-book cases, which can give problems within the de-

Table 1: University – Society relations

Target Group	Facility
Individuals (e.g. students, seniors, pupils, journalists, other individuals, general public)	Courses, Public Courses, Higher Education for Seniors, Distant Learning Courses, Public Lectures, Science Week, Open House, High-school desk, University Museum, PR Department
Civil Society Groups NGOs Non-profit sector Local authorities	Science Shop  (Internship Service)
Small and Medium Enterprises Regional authorities	Transfer Bureau (Business Service Centre), Business Incubator (Science Park) (Internship Service)
National + International authorities Industry	Liaison Office Contacts to NSF (National Science Foundation) Contracts, Paid chairs

creasing university budgets and trends towards commercialisation of science. Still, by linking to education and research Science Shops can be implemented at low additional costs.

At Groningen University, the nine Science Shops are paid for 50% by the Board of University and for 50% by their respective departments. For both funders, the amount is quite little. The reasons for the University Board to finance the Science Shop are, next to implementing part of the third mission, the benefits for the regional image of university, and a raised social and political awareness of students. The departments mention, next to an improved regional image, also the practical education to their students and incoming interesting research themes as a reason for their co-financing. Both funders have a sense of „noblesse oblige“ as well.“

For university renewal it is interesting that in principal Science Shops can exist in all university faculties where societal need can be met by university expertise. For instance in the Netherlands there are Science Shops on environment but also law, health, pharmacy, physics, social affairs et cetera.

## Supply

To support the civil society organisations knocking on the Science Shops' door, there needs to be a supply of research. How is this supply harvested? In 71% of the Science Shops, the Science Shop staff itself performs part of the research. The other major sources of scientific research are voluntary students (34%) and students working for their course or diploma (71%) as well as professional scientists or researchers, either on a voluntary base (45%) or paid (48%). Research could be done by all of these actors in one Science Shop). As earlier mentioned students

under staff supervision do much of the research in many Science Shops. Students learn valuable skills, such as communicating with non-experts and solving a problem in context. Students can earn credits for their work, which count towards their degree. There are various ways of including Science Shop projects in the curriculum. One can award credits to projects as such, or students can do projects as part of an existing course or practical period. A much used option is a MSc (or BSc) thesis based on a Science Shop request. To increase the benefits of Science Shop projects for the curriculum, Science Shop cases can be used as example in many other courses. Experiences from Science Shop work can also be used in methodological courses and teaching students in general on science and society. Finally, there are now examples of how Science Shops have advanced new master programs.

Science Shops do have many benefits for modern higher education curricula by providing:

- Case-examples in established courses
- Projects in established courses
- Projects as part of curriculum
- Theoretical and/or methodological courses
- Restructuring curricula

The results are improved student skills and raised awareness. Most university students in Europe will not choose an academic career after graduation. Thus, higher education has to prepare its students in a flexible way, for many different kinds of jobs. Key elements in education thus must be “acquiring knowledge” and the competence “to apply knowledge in context, in a rapidly changing society”.

Science Shop projects range from small student projects, which students either do as volunteer or for credits, to integrated project-courses

and spin-off, such as distant-learning or master programs. Doing Science Shop projects teaches students valuable skills, such as communicative, social, managerial skills and the ability to work in a multidisciplinary setting. All this will help them be able to produce scientific results in response to social concerns, which will be actually useable.

### Mediation tasks

Questions from civil organisations are rephrased to scientific research projects. Students, under supervision of a professor then perform the research, or a researcher does it. Students usually obtain credit points for their research. The research will lead to a report (or another type of product) which is made to be of use to the client. The student will have gained valuable skills (problem definition, project based working, communicating, planning). The professor and/or the researcher will have case material for either future publication or further theoretical analysis. Moreover, for the professor involved this supervision is part of the teaching obligation. So, in fact all actors are doing what they are supposed to do: teaching, learning and researching. This is why a Science Shop can be implemented at relatively low additional costs and why Science Shops can also serve the non-profit sector.

Science Shop staff usually performs these tasks:

1. Receive/solicit clients and (new) societal relevant questions
2. With client, articulate problem (map the situation)
3. Preliminary research, leading to refusal or referral, a short advice and/or a scientific research question
4. Find a scientific (co-) supervisor and/or suitable course/practical/thesis period

5. Find a student (+ options for credit points) or researcher (+ funds if required)
6. Maintain communication and support the process, from start to finish of research
7. Facilitate useable presentation/publication of results (popular report, brochure, website, seminar, press release, etc.)
8. Support client in implementing results and recommendations and formulate follow up actions (stakeholder meetings, legal procedures, conferences, follow-up research proposals)
9. Make inventory of follow-up research or research-themes (options for scientific publications, interesting themes for further research (programs))
10. Evaluation (with student, supervisor and client)

It is clear that there are a number of additional skills required in operating a Science Shop, next to the overview on a specific scientific area, such as communicative, social, managerial skills and the ability to work in a multidisciplinary setting. All to ensure that the answers given in response to social concerns will be useable.

### European Commission and Science Shops

In the recent years, the European Commission has decided to make Science Shop development one of the key-actions in DG Research's Science and Society policy. The EU has financed two studies on Science Shops (SCIPAS and Interacts) and financed the project Improving Science Shop Networking (ISSNET) from 2003, which will establish the International Science Shop Network, "Living-Knowledge". In the 6th Framework Program, Science Shops are sup-

ported further. This is mentioned in Action 21 of the Commission's Science and Society Action Plan. The reasons for the Commission's support were summarised by their Director for Science and Society, Dr. Rainer Gerold:

1. The trust of citizens in science is helped by Science Shops
2. By contacts between the European Science Shops and the Commission there will be shorter communication lines between the citizens and European research policy
3. When they approach a Science Shop, people are open to a scientific approach (Raising Public Awareness)
4. Science Shops have their influence on young researchers and research institutes (Raising Science's Awareness)
5. The themes of research by Science Shops fit well with European ideals

From 2004, the International Science Shop Network is actively supporting new members. A project called TRAMS (Training and Mentoring of Science Shops) has been granted by the Commission, which will start co-operation of existing Science Shops with institutes in countries like Iceland, France, Greece, Spain, Turkey, and the Baltic States.

## Conclusions

Science shops as a way of knowledge and context interaction are an innovative and effective means to advance science and society interactions, and have a positive impact both on universities (students, staff, curricula, research themes) and on civil society groups (media attention, policy influence, legal support). This provides a symbiotic relationship between these two communities. Science shops empower those that would not otherwise be able to

obtain scientific support to do research for their public goals. This support balances the public debates between civil society and government and industry, which both do have regular (paid) access to scientific research and advice. This advances public decision making, because more voices are heard, and better decisions can be achieved.

Moreover, even the UN declaration of human rights already states: Everyone has the right ... to share in scientific advancement and its benefits (Art. 27.1).

And closing with a quote of Dr. Rainer Gerold, Director Science and Society, DGXII – EC from 2001: "Every science – and every society – needs a Science Shop".

# International Science Shop Networking

CASPAR DE BOK

Coordinator of the International Science Shop Network, Wetenschapswinkel Biologie, WBU, Department of Biology, Faculty of Science, Utrecht University, Utrecht, the Netherlands

This conference is part of the project ISSNET (Improving Science Shop Networking) that has been funded by the European Commission (EC). Since 2000 there is a growing interest from the European Union in the concept and activities of Science Shops. The directorate Science and Society of EC Directorate-General Research intends to bridge the gap between the scientific community and society at large. 'Science and Society' supports activities that bring together policy-makers, researchers, and citizens.

Science Shops contribute to bridge the existing gap by their truly interactive approach of science and society interactions. In brief a Science Shop can be defined as an organisation that provides independent, participatory research support in response to concerns experienced by civil society. In the previous presentation you have heard more in detail about the activities and the concept of Science Shops. Over the last few years international interest in the Science Shop model has developed, and similar organisations have been established in a wide range of countries. Because of cultural and socio-economic differences in Europe there is no single structure for setting up and running a Science Shop. The Dutch Science Shop concept has been adapted and modified by many organisations in a way it fits in local contexts. There is an increasing activity towards the development of an international network of Science Shops. I will

tell you more about the international aspects of Science Shop networking and the EC support for Science Shops.

## The EC context

From the Eurobarometer on Europeans Science and Technology (2001) it became clear that Europeans do have conflicting views on science and technology. On the one hand there is hope science can contribute to solve major problems and there is confidence. On the other hand there is a lack of interest in science and even distrust, scepticism or fear regarding impacts of science. There is a lack of mutual understanding between the society and the scientific community.

The directorate Science and Society intends to bridge the gap between the scientific community and society at large. This programme supports activities that bring together policy-makers, researchers, and citizens. One of the guiding instruments for the directorate Science and Society has been the Science and Society Action Plan. With this action plan the EC wants to 'promote the scientific education and culture in Europe', 'bring science policy closer to citizens' and 'put responsible science at the heart of policy making'. 38 Actions are described to achieve these goals. The EC will act as a catalyst to implement the actions mentioned in the plan.

Action 21 of the plan is related to Science Shops: "The networking of Science Shops in the regions of the Union and the candidate countries will be encouraged in particular through the creation of a permanent inventory and a structure for the dissemination of work carried out on behalf of citizens and associations (e.g. database) and by the development of promotional tools."

Since 2000 the unique participatory and bottom up approach of Science Shops gained interest from the EC. The EC is supportive to strengthen the role of Science Shops as a medium to improve public access to, and public awareness of, science and technology. In a EC brochure on Science Shops, Rainer Gerold, EC Science and Society director states of the "By cutting away the layers separating science and society, Science Shops are helping to pave the way towards 'science for society' and 'society for science'." This support has taken a variety of forms, including the financing of in-depth studies to find out how best to support these independent research organisations. Science shops opened opportunities to perform or mediate research activities for civil organisations, give access to research for those outside of academia. Improved networking of Science Shops will contribute to the goals of the science and society programme.

### **International networking**

Cooperation of Science Shops will be beneficial to create opportunities to learn about and discuss current community-based research projects and to share experiences and to learn from one another's failures and successes. There is a need for Science Shops not only to focus on research projects but to focus on strategic issues as well.

In general Science Shops are small and local organisations. They are intrinsically bound to local conditions, thus they are highly diverse in respect to organisation, approach, funding and focus. To enable Science Shops to continue working for and with citizens on a long-term basis, the network will undertake actions within strategic and political settings. Most Science Shops themselves are too small for these activities, therefore the network's role is crucial.

Networking of Science Shops does have an impact on individual Science Shops on a practical and strategic level. On a practical level it is obvious the sharing of expertise (e.g. by mentoring and training) and good practices is useful for new Science Shops. But also existing Science Shops can learn from each other by adopting new processes, procedures and activities. The networking has an impact on a practical level also because it improves the opportunities for dissemination of results. Another important impact is on thematic research cooperation. By facilitating collaboration, the network allows for breaking out of the local by broadening the base of knowledge and experience available on the network. By discussing local citizens concerns or local problems (e.g. on environmental issues, and urban planning) in the network it might become clear the dimension isn't local at all. Thus the network will be able to distinguish 'local' research themes for international research cooperation.

For Science Shops international cooperation does have national and local level spin off as well. Science shops are often seen as local initiatives with local activities. Core activities of Science Shops are local indeed. Nevertheless international networking makes clear similar local initiatives are everywhere and the role of Science Shops is recognised at many places. This international dimension and recognition of

Science Shops does have impact on the recognition at national or local level. International cooperation also offers new opportunities for funding of projects because it brings together expertise and needs on an international level.

## SCIPAS

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The first step to establish an international Science Shop network was made in March 2000 by the start of the project SCIPAS (Study and Conference on Improving Public Access to Science through Science Shops). It was financed by the European Commission. Beyond its intrinsic value, SCIPAS was an indispensable milestone for laying the foundation of an international network of Science Shops. SCIPAS led to seven reports and a scientific conference in 2001 in Leuven (Belgium). This conference in Seville is a follow up of the Leuven conference.

The SCIPAS project was unique in its way it collected and structured the scattered information on Science Shops and their practices. By bringing together good experiences SCIPAS made clear what challenges there are for Science Shop in community based research. It not only showed examples of good practices that can be adopted by individual Science Shops. It also gave an overview of needs and opportunities for existing Science Shops to improve the quality and impact of their activities (e.g. by structural exchange of information, structured documentation). SCIPAS concluded that international cooperation of Science Shops will be beneficial to create opportunities to learn about and discuss current community-based research projects and to share experiences and to learn from one another's failures and successes. There is a need for Science Shops not only to focus on research projects but to focus on strategic issues as well. Because the present position and size of most Science Shops and their common

goals these issues can best be dealt with in close cooperation. SCIPAS concluded that a network of Science Shops will have added value.

SCIPAS initiated new initiatives in international cooperation of Science Shops like INTERACTS (Improving Interaction between NGO's, Science Shops and Universities: Experiences and Expectations) and ISSNET (Improving Science Shop Networking). Both INTERACTS and ISSNET are funded by the EC as well. This conference is part of the EC project ISSNET.

## INTERACTS

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INTERACTS was a EC-STRATA funded project (2002-2003) that examined the experiences and expectations of NGO's towards universities and intermediaries like Science Shops in order to draw out policy implications for future cooperation. The project involved around 18 case studies from six different countries within the environmental field and the social welfare and health field about the impact of NGO interaction with researchers and intermediaries like Science Shops. INTERACTS explored the potential of Science Shops as practice and instrument in future Science & Technology policy.

## ISSNET

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In 2003 the thematic network ISSNET (Improving Science Shop Networking) started within the EC programme Raising Public Awareness of Sciences and Technology. Now ISSNET is part of the Science and Society programme. ISSNET is a consortium of 13 partners, from Austria (2), Denmark (1), France (1), Germany (2), Netherlands (2), Romania (1), Spain (1), United Kingdom (2) and USA (1).

The objectives of ISSNET are based on the conclusions and recommendations of SCIPAS

regarding the added value of an international Science Shop network. The main objective of ISSNET is to give citizens around Europe better access to scientific information and expertise. The demand-driven approach of Science Shops contributes to this objective and offers citizens a tool to contribute in the science and society debate. To achieve this, ISSNET wants to contribute to the improvement of:

- public access to scientific information and expertise in a demand and dialogue driven way
- public understanding of science and technology
- the scientific society's involvement of civil society knowledge and expertise in research
- collaboration and communication among scientific organisations (e.g. universities, Science Shops) and other organisations (e.g. citizen groups, regional representatives, NGOs, science museums, etc.)
- future university graduates' interest in and competence for co-operation with civil society as part of the development of science and technology
- the awareness of scientists and policy makers of research subjects that are of concern to the public

ISSNET will focus on instruments to facilitate citizens access to scientific information and expertise. Therefore it will develop collaborative relationships with Science Shop-like institutions and networks inside and outside of Europe. ISSNET will be responsible for the start, set up and maintenance of the international Science Shop network 'Living Knowledge'

The activities of ISSNET will support the dissemination and exchange of good practices and materials in relation to Science Shops and to

community based research in general. It will also improve the options for citizens' to participate in the dialogue between science and society. The existing Science Shops in the network will share their expertise and support the development of new Science Shops. The international Science Shop network will be an instrument to link or initiate local or regional initiatives. In this way it will advance the outreach, size and impact of the contribution of Science Shops to citizens' access to scientific information, knowledge and expertise. To reach the objectives as described above, the activities of ISSNET have the following specific objectives:

- Developing the strategic capacity of Science Shops by exploring and describing concepts and tools for Science Shops' contribution to the development of the research agenda and research methodology at universities.
- Developing the strategic capacity of Science Shops and civil society by exploring and describing strategies and concepts for obtaining impact on societal discourses and Science & Technology policy through Science Shop projects and community based research.
- Facilitating transnational community based research themes by developing concepts and procedures for transnational community based research co-operation.
- Supporting new Science Shops by developing a number of tools to assist in setting up, managing and developing Science Shops and by developing concepts of existing Science Shops' mentoring of new Science Shops. Improved visibility of Science Shops will also assist in the expansion of the network of Science Shops within Europe, especially into the currently underserved Eastern and Southern European regions.

- Enhancing scientists' capacity to work for and with citizens and thereby increasing the public access to scientific knowledge and expertise, through the sharing of training materials for community based research.
- Supporting the science, society and governance debate by developing interactive forums where organisations and stakeholders involved in Science Shops and other types of community based research can participate in discussing issues and sharing experiences related to community based research (an interactive website, a Science Shop database, magazine and newsletter, conferences)
- Exploring possibilities and concepts for financing of the future international Science Shop network.

An important part of the networking will be facilitated by the activities of ISSNET, like the development of a website (with database, news and discussion group), magazine, conference and a thematic transnational pilot project. The network will function as the international contact point for Science Shops and community based research. In this way ISSNET activities aim at making a start with the implementation of action 21 of the Science and Society Action Plan.

Therefore I'm pleased to present you the renewed and restructured website of the International Science Shop Network Living Knowledge. This renewed website will offer you an agenda of up coming events, an international overview of documentation about Science Shops, the opportunity to meet and discuss with people who work in the field of community based research, links to national or thematic contact points and a database with information about Science Shops and alike organisations. Please have a look at the new website ([www.livingknowledge.org](http://www.livingknowledge.org) or [www.scienceshops.org](http://www.scienceshops.org))

Now over 300 people subscribed the online Living Knowledge news- and discussion group, over 450 people are subscribed to the Living Knowledge Newsletter and around 3000 copies of 'Living Knowledge: International Journal of Community Based Research' are distributed. As a result of these activities new initiatives have been developed to advance science and society interactions from a community based perspective. Members of the network are involved in EC Networks of Excellence and Integrated Projects as well as other thematic research co-operations. A new Science Shop related EC project is will start soon. This project will encourage the development of emergent Science Shops through the provision of training and mentoring support. It will also support the ongoing professional development of existing Science Shops through the sharing of training materials and the experiences from daily practices to update professional development.

### The conference

This conference intends to improve the exchange of information and knowledge among all involved in community based research. It will contribute to build equitable and supportive research partnerships and community based research networks, exchange concepts and tools for community based and participatory action research in order to enhance scientists' and policy makers' awareness and capacity to work with and for citizens. This conference will provide a forum where information on community based research, carried out in both community and academic settings, can be shared and developed. It will reflect the social impact and scientific and democratic value of research from a range of disciplines including social, natural, physical and technological sciences.

The conference will not only focus on the Science Shop aspects of community-based research. It will have a much broader scope. Science shops are just one of the players in the field. The role of universities, NGO's and public bodies will be presented and discussed. It is an important goal of this conference to discuss options for improving the interactions between stakeholders. The main themes of the conference will be experiences and networking on:

- Local demands for research
- Citizen participation in research and the policy process
- Impact of communities' 'living knowledge' on the research agenda
- Infrastructures for mediation, dissemination and communication of community based research

I'm sure we all will hear many interesting examples of community based research activities and interesting and new examples of science and society relations. The conference intends to be a meeting place for community based research activities rather than a scientific getting together. The conference organisations strongly believe it is important to bring together people from different background and with different perspectives. Therefore this conference will offer you a wide variety of presentations and opportunities to network. A network is a flow that only moves with the contribution of its members. Living Knowledge can only facilitate activities of its members. So we invite you all to participate, be active and enjoy the conference. Of course we hope you will get home with many ideas to work on when you back at work.

## References

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- INTERNATIONAL SCIENCE SHOP NETWORK:  
<http://www.livingknowledge.org>
- SCIENCE AND SOCIETY, EC RESEARCH DIRECTORATE-GENERAL: <http://europa.eu.int/comm/research/science-society>
- EUROPEANS, SCIENCE AND TECHNOLOGY. Eurobarometer 55.2, December 2001
- EUROPEAN COMMISSION (2002): Science and Society - Action Plan. EC publication 42-01-222. ISBN 92-894-3025-7
- EUROPEAN COMMISSION (2003): Science Shops: knowledge for the community. EC publication EUR 20877. ISBN 92-894-6246-9

## Plenary Session

# **INTERNATIONAL EXPERIENCES IN SCIENCE AND SOCIETY INTERACTIONS**

This session focuses on the experiences of science and society interactions. It gives examples of perspectives from university politics, NGO's, researchers and a community-based research network.



# Meeting Universities' Obligations to Communities to share, listen and learn from their Experiences

GERRY McCORMAC

Pro Vice Chancellor for Community and Communications, Queens University Belfast

In 2001 Queen's University Belfast appointed, for the first time, a Pro-Vice-Chancellor for Community and Communication. Such a senior appointment in itself signalled a recognition that both engagement with the community and communications with society required a strategic approach from the organisation. Queen's is one of two universities in Northern Ireland and has a unique relationship to the community it serves. It provides most of the graduates to the professions in Northern Ireland; delivers, along with the University of Ulster, about 34% of the research and development in the region; and is a magnet for international engagement.

Queen's is intimately connected in a number of ways to the community it serves, both emotionally and intellectually. Our outreach programmes are directly linked to children in education. The complexity of the Northern Ireland political landscape makes Queen's an important neutral venue for debate and intellectual input. The high offices held by many of our alumni influence the strategic direction of the region; and the importance of the University in terms of research and development ensure that our actions and the consequences are scrutinised and debated.

It is therefore essential that we have a well thought out strategy for community engage-

ment. This should relate to the community and voluntary sector, but also the business community, widening participation activities, lifelong learning and society more generally. It must also ensure that government and elected representatives are aware of our work and worth both directly through our education and research activities and indirectly through areas such as our culture and arts provision and our support for local initiatives.

It's important to have a strategy and positively engage with the wider community but it's also essential that people are aware of what's being done and how to interact with the University. At Queen's we have created a web based Community Outreach Directory, that catalogues the work and provides a shop window for others wishing to collaborate with us. Academics are encouraged to participate in outreach activities and staff promotion profiles have been altered to acknowledge effort in outreach activity.

We have a series of schools programmes such as Medics in Primary Schools and Primary Connexions which help raise aspirations for higher education with primary school children. Medics in Primary Schools is a module in the medical curriculum that allows medical

students to go into the classroom and teach health education to children. The student improves communication skills the children learn about good health. A win-win situation. Primary Connexions is a science conference organised in the University for school children. Other programmes include; art workshops where the University art collection is used to explain the visual arts to children; the outreach element of the Belfast Festival at Queen's which includes a wide range of community based arts activity and the recent CPR programme whereby medical students will be using a sophisticated learning scheme to teach all primary school children in Northern Ireland about cardiac resuscitation techniques.

Universities are a huge resource providing not only the teachers, doctors, engineers and scientists of the future but also an intellectual capacity and willingness to help with the problems society faces. It's important that we listen to our communities and ensure access routes exist to the wealth of expertise.

# ANPED – A NGO's Experience on linking Science and Society

KIRSTEN KOSSEN

Programmes Officer of the Northern Alliance for Sustainability, ANPED, Amsterdam, the Netherlands

Good morning, I was asked here today to present you with my view on the relation between Society and Science from the perspective of ANPED, the Northern Alliance for Sustainability. Three questions were given to me:

1. How do you see the state of the art in science and society interactions from an NGO perspective in general?
2. How do you link science and society in your organisation?
3. What examples can you give of relevant projects (not necessarily in cooperation with Science Shops)

During this presentation, I will do my best to answer these questions. But first I would like to give you an explanation of ANPED, so you will understand the context of our perspective.

ANPED is a democratic network of over 100 local and national NGOs, national NGO networks, and environment, development and consumer groups, located in the UNECE area. We have many members in Western, Eastern and Central Europe, but we are currently exploring how to expand to Southern Europe as our network is not well represented in this part yet.

We work to empower Northern Civil Society in creating and protecting sustainable communities and societies world wide. Obviously, this is a broad mission and therefore our programme

activities can be subdivided in three main inter-linked categories:

- We act as a platform for our members to identify common concerns and to design and implement activities through issue related working groups;
- We offer network support and capacity building activities.
- We represent and participate in international forums and political processes, where we act as a voice for our members;

To provide structure to our work, seven issue-related working groups have been set up where members come together to share their experience and to design common action and advocacy campaigns. It is the aim of each Working Group to help member NGOs do their job better as a result of effective cooperation around their chosen themes. ANPED's current working groups are as follows:

- Sustainable Production and Consumption
- Local Action for Sustainable Development
- Human Rights and Sustainable Development
- Health and Environment
- Agriculture and Biodiversity
- Nuclear Issues
- Water, Pollution and Health

Due to time constraints, I will not go into detail on these working groups, but if you

would like more information, I will be available until tomorrow afternoon. More information is also available in this brochure I brought. By working on cross-cutting issues which fit into various political processes, like the United Nations Commission on Sustainable Development (CSD), the OECD, UNEP, European Union and 'Environment for Europe (Efe), ANPED endeavours to build the capacity of individual NGOs. This is in particular important for smaller, newly established, groups who are not yet part of other regional or international networks.

ANPED links organisations that are active locally and nationally. At the same time, the international activities of the International Secretariat enables links to be made between international processes and the local/national work, and for those working locally to be informed of those international processes, which may affect their work. ANPED has a remarkable track record in facilitating NGO input into global political processes such as the World Summit on Sustainable Development and the Commission on Sustainable Development.

### **How do we see the state of the art in science and society interactions from a NGO perspective in general?**

So, I will now go into answering the first question that was asked to me, how do we see the state of the art in Science and Society interactions? Interactions between science and society to date happens very much on an ad hoc basis, while both sides would benefit more if this interaction could take place in a more systematic manner. The value of research from our perspective is that it could:

- Provide evidence and a background to support and inform policy development and actions

An example of this can be found in the process of the Carpathian Convention. The Carpathians are stretched out over 7 countries and is quite a sensitive area. In the past, each of the seven countries formulated its own policy for their part of the Carpathians. Obviously, a joint policy was needed. Science contributed to this process by defining mountain areas based on digital data and forest cover. Neutral techniques were used to help define the boundaries of a bioregion and in this way science supported the argument that there was a need for an agenda for mountains at the international level, instead of countries dealing with it in isolation from each other.

- Challenge assumptions
- Identify innovation
- Highlight bad practice as well as good practice
- Inform at all levels

This links in very well into what ANPED is offering to its member organisations:

- opportunity to find backing for ideas and actions
- a bridge between the local and the global
- strong voice on the International Level
- Cooperation with colleagues in over 30 nations

We feel that if an organisation like ANPED is able to interact with the scientific community into a more systematic manner the service to society, or in our case our member organisations, could be improved. However, there are some barriers in making this happen.

A big problem for an NGO network like ANPED is financial resources, unlike organisations such as the WWF or Greenpeace ANPED does not have the resources for conducting its own scientific research. Another problem is the

fact that scientific research often works from a long term perspective. A main area of ANPEDs work is building a bridge between the local level and the international political arena. We try to get the local voice heard at the international policy level. In most cases, what we need in order to back up our arguments is scientific data on the short term. Another reason why an organisation like ANPED is working from a short term perspective is the fact that organisations like ANPED work with very uncertain funding and they need research results for this year's events. Therefore, it would be a challenge to place the short term needs for scientific information into a long term framework. There also seems to be a language barrier between the NGO and the Scientific community, so what we need is common language. This is related to the fact that the NGO community finds it difficult to make effective use of scientific research. What is needed is a so-called 'tool box of techniques' that can help make the research available and accessible to a wide range of users.

### **How do we link science and society in our organisation?**

So far, ANPED has not systematically linked science and society within our organisation. However the ANPED network consists of a wide variety of organisations, including science based organisations. ANPED sees this conference as good start in pursuing a more systematic approach in linking science and society. We would like to explore where our network and the Science Shops could find areas to work together in a way that would benefit both.

Furthermore, ANPED is always looking on how it can strengthen and widen its network, especially in Southern Europe as in our membership base this area is not well represented.

As I said before, ANPED is offering several services to its members, such as

- opportunity to find backing for ideas and actions
- a bridge between the local and the global
- strong voice on the International Level
- Cooperation with colleagues in over 30 nations

We would be able to offer these same services to the Science Shops as well.

### **What examples can we give of relevant projects?**

I was also asked to provide you with concrete examples of the link between science and society within our organisation. As I stated before, we have no system in place for linking these two. Therefore I will give you two concrete examples of where science could make a valuable contribution to our work.

One example where science could really make a difference is in our working group Human Rights and Sustainable Development. One of the issues this group is working on is the subject of Environmental Justice. Environmental Justice deals with the issue that it is often the poor and marginalized groups that suffer disproportionately from a bad and unhealthy environment.

In order to make a strong case we would need scientific case studies from different countries that would clearly show the link between poverty and the exposure to a bad and unhealthy environment. Science would then provide us with a solid backing that we can use to convince decision makers at all relevant levels to develop proper policies.

Another example where a network such as ANPED would benefit greatly from science is its work related to the United Nations Commission

on Sustainable Development. This is a functional commission of the UN, that was set up in 1992 to monitor and report on the implementation of the Earth summit agreements at the local, regional, national and international level.

At the 11th session of the CSD, that took place in 2003, it was decided that The Commission will now function on the basis of two-year "Implementation Cycles", including Review and Policy Years. The Review Year will evaluate progress made in implementing sustainable development goals and identifying obstacles and constraints, while the Policy Year will decide on measures to speed up implementation and mobilize action to overcome these obstacles and constraints.

Especially during the review year of each cycle, policymakers would need local case stud-

ies on the state of affairs. Only if policymakers are aware of the real local situation in terms of Sustainable Development, they will be able to decide on the right measures to take.

We are currently in the first cycle, the review session was held in April 2004 and in April 2005 the policy session will take place. The agenda for the following CSD's has been set until 2017. This gives us the opportunity to work with a longer term perspective, as we know for the up coming 12 years with what kind of studies science could help the NGO community.

I think I quite used up the time that was given to me, so I would like to take this opportunity to thank you all for your attention. I am looking for a fruitful 2 days in which we will find ways to effectively work together!

Table 1: United Nations Commission on Sustainable Development: Cycles and Clusters

<b>CYCLE</b>	<b>THEMATIC CLUSTER</b>
2004/05	Water, sanitation, human settlements
2006/07	Energy for Sustainable Development, industrial development, air pollution, climate change
2008/09	Agriculture, rural development, land, drought, desertification, Africa
2010/11	Transport, chemicals, waste management, mining, 10 year framework of programmes on SPAC patterns
2012/13	Forests, biodiversity, biotechnology, tourism, mountains
2014/15	Oceans/ seas, marine resources, small island developing states, disaster management and vulnerability
2016/17	Overall appraisal of implementation of Agenda 21 and the programme of further implementation

**Cross-cutting issues during each cycle are as follows:**

*Poverty eradication, Changing unsustainable patterns of consumption and production, Protecting and managing the natural resource base of economic and social development, Sustainable development in a globalizing world, Health and sustainable development, Sustainable development of SIDS, Sustainable development for Africa, Other regional initiatives, Means of implementation, Institutional framework for sustainable development, Gender equality, and Education.*

# Impactos de los Apoyos Gubernamentales en Poblaciones Rurales de México

ALBA GONZÁLEZ JÁCOME

Universidad Iberoamericana A.C.

## Objetivo

Presentar a discusión los resultados de varios estudios de caso realizados en: Ocotil Chico en Veracruz, Cruz de Piedra y Raíces en el Estado de México y Tuca, Tabasco, donde varios programas gubernamentales han sido aplicados en los últimos años. Los resultados e impactos en las poblaciones locales han sido diferentes e incluyen los siguientes: la relación de las poblaciones con su ambiente, la agricultura tradicional, las formas de organización de la familia, el mercado, la movilidad horizontal, la cultura local y sus relaciones regionales y nacionales.

## Metodología

Los estudios fueron realizados dentro de la línea de investigación Ambiente y sociedades rurales, auspiciada por el Posgrado en Antropología Social de la Universidad Iberoamericana. Se aplicó un modelo de ecología cultural basado en la investigación in situ apoyada con metodología antropológica (etnografía), el manejo de cartografía y aerofotografía, la obtención de genealogías e historias de vida, la investigación en archivos locales y nacionales y metodologías agroecológicas para entender las cuestiones relacionadas con la agricultura y el manejo del ambiente por las poblaciones humanas.

## Resultados

Varían de una a otra localidad estudiada; la gama incluye cambios en la relación de la población con su ambiente inmediato, transformación de la agricultura tradicional en convencional, o en la disminución de la diversidad agroecológica, cambios en la dieta, cambios en la organización de la familia (de extensa a nuclear), incremento de la migración estacional e internacional, pérdida del conocimiento local en el manejo de la biodiversidad y la diversidad cultural, cambios en la producción para el mercado y para el autoabasto y ajuste a las nuevas relaciones con las autoridades municipales, estatales y federales. Estos resultados nos permitirán hacer propuestas que permitan un mejor uso de los apoyos que los programas Oportunidades y Procampo aplican a las poblaciones rurales del país.

# Lessons learned from the Application of Community Based Research in Addressing Migration and Settlement Issues: A North American Perspective

KHAN RAHI

Community-Based Researcher & Management Consultant, NGO Affiliation: Loka-Community Research Network (CRN) USA

I want to first thank International Science Shop Network and the conference organizers for inviting me to be a part of the Second Living Knowledge conference here in Seville. It is great to join everyone and have the opportunity to share with you some thoughts on the critical topic of CBR in the US and Canada.

My presentation is about the status of community-based research in the United States and Canada. The focus of my talk is to capture the lessons drawn from the organizational experience of the Loka Institute and its Community Research Network (CRN), based in the United States. This will be followed by an overview of the status of CBR in the Canadian context. But before I begin my remarks, I should note that the views I express are mine alone, and not those of the Loka Institute and other organizations that will be mentioned here. The analysis and observations made here are based on my role as the CRN Coordinator and later as the Executive Director of the Loka Institute.

The Loka Institute has been the primary advocate and has played a critical role in promoting and framing community-based research (CBR) issues within the United States, providing a forum for dialogue and resources for citizens'

participation to effect public policy and social change. CBR in the United States and Canada is a complex subject that crosses many professional, institutional and national boundaries.

## The Tradition of Citizens' Participation:

Globally we are certainly facing very challenging times, as people all over the world deal with Tsunamis both visible and unreported. Against the backdrop of social and environmental upheaval, communities everywhere are in search of methods, reminiscent of the 70ies when Science Shops, community control of learning institutions and other citizens' sphere of control emerged to give the people back what rightfully belonged to them: their own space. Based on the interpretation of the pioneering work of Alexis De Tocqueville, John McKnight (2002) has appropriately referred to the three powers of ordinary and self-appointed citizens: the power to decide that there is a problem, the power to decide how to solve the problem, and to have the power to solve the problem.

In this larger global and philosophical context, the practice of citizens participation in the United States and Canada seem to reflect some

of the ideals articulated and developed by John McKnight and Meredith Minkler in the US non-profit sector, the Canadian scientist and activist Ursula Franklin and Budd Hall who have inspired and pioneered much of the community-based participatory research practices in Canada and Terry Robson, in the Northern Ireland context. These writers, activists and practitioners have challenged us in our practice to be reflective of the rich North American tradition of voluntary citizens' participation, innovative in our approach in conducting research, authentic in listening to what the people tell us how we would work with them, apply transparency in our approach and critically question funders' intentions when our autonomy and independence is compromised by their financial contributions. What learning has taken place and what lessons have been drawn from our experience in the US and Canada have known no intellectual borders and are all profoundly imbedded within the specific citizens associations and community empowerment framework applied in community based research.

Technological and scientific decisions have increasingly become relevant to community issues and it has become imperative for ordinary citizens and activists to participate and take action on the social impact of these decisions. Community-based organizations and the ordinary citizens have increasingly challenged universities and governments in the U.S. and Canada to direct their research and public educational resources to address „real-life“ issues in their communities. Access to scientific and technical knowledge and information is crucial in order to transform our communities. There is a growing recognition that knowledge resources should no longer be held solely in universities, research and government institutions. This poses a new mode of collaborative problem solving and

knowledge transfer to enable ordinary citizens to take action and engage in a mutual exchange aimed at addressing society's challenges. In order to meet this challenge, however, we must leverage available technical and financial resources, and work to build the capacity of citizens and community organizations to provide an effective vehicle to solve problems that we are facing. In this context CBR has become an effective tool and has a strong track record in making citizens' interventions for social change possible. Promoting the CBR models into the „mainstream“ of scientific and technological decision-making processes is essential to provide the opportunity for participation to enhance the quality of life and to contribute to the development of a more sustainable environment for all.

In the US context, community-based research (CBR) emphasizes the incorporation of ordinary citizens in finding solutions to the impact of scientific and technological decision-making processes. It is a collaborative and participatory process that involves a partnership between citizens, including socially and economically marginalized community members, grassroots activists and university researchers or professional scientists aimed at finding critical solutions to a wide range of social, environmental and economic problems.

Loka was founded in 1987 by a group of activists, community-minded academics and a wide range of people who were active for years in different areas of social and environmental justice projects and publications, such as the San Francisco-based Science for the People, the Radical America, the Insurgent Sociologist, etc. Richard Seclove, who finished his academic work in Massachusetts, is the founder and first director of the Institute who put many of the ideas together in a creative manner and stayed with it long enough to ensure it would work as

initially conceived. Soon other researchers and community activists joined in to share the load and move Loka and the CBR agenda forward.

The Loka institute and indeed the very concept of creating a community-based network within the US, and whatever similar or equivalent initiatives that have been developed in the Canadian context, have collectively and individually been in response to the challenges put forward by the Science Shops and the Danish models in Europe. These models put the average citizen in the position to make public policy recommendations on highly complex scientific and technological issues. This approach to participation has demonstrated that when citizens are given the necessary tools, they can make appropriate judgments and reach a consensus about complex issues with clear guidelines for action.

The idea of bringing citizen input into scientific and technological decision-making processes is shaped by different methods in different parts of the world. Gradually the concept has been wrapped around a movement towards bringing citizen participation and input into the research process within communities. The Dutch have modeled this process through the development of „Science Shops“ within universities that provide research assistance to grassroots organizations, local government, worker groups and other public-interest organizations at little or no cost. Outside Europe the Dutch Science Shops and the Danish „consensus conference“ models have been developed in various forms in other countries, including the United States, Australia, South Korea, Japan, Turkey and Israel.

These methods initially began to encourage citizen input in scientific and technological decision-making processes.

The Science Shops, which began to provide independent participatory research support

in response to concerns experienced by civil society, created the impetus and the practical framework to take action in our communities on a wide range of issues. The magnitude of the Science Shops' influence is multiplied when adding the volumes of issues and community assets that were identified by many communities cross the US and Canada. It's in fact a remarkable achievement in and of itself.

### **The Role Played by Loka and Community-Based Research Network (CRN) in CBR:**

A particular source of inspiration and growth for Loka has been through the work of the Science Shops in Europe, including the Dutch Science Shops and the Danish „citizen panel“ or „consensus conferences“. In 1995, the Science Shops were particularly helpful in providing Loka with the inspiration and essential support to create Community-Based Research Network (CRN) as a grassroots and accessible resource network for organizations and communities involved in participatory, community-based research. The Network linked together academic researchers, grassroots activists, public and private funders, and government officials through annual conferences, a listserv, a web-based database, workshops, and trainings. This initiative put Loka in a unique position, providing it with an effective and cost-efficient organization tool to help you tap into the wealth of expertise and knowledge across the US and also internationally through the Science Shops. This unique blend created more opportunities to promote the application of CBR methods for citizens' actions and also organizational challenges to conduct business as a situation of organization within organization developed as well.

CRN has responded to most of the CBR challenges and developed a number of unique initiatives, including:

- 1) holding an Annual Community-Based Network Conference across the US and not in one region of the country;
- 2) developing an outreach strategy connecting with the hard to reach marginalized communities, rural areas and special community interest groups;
- 3) initiating the regionalization of CRN efforts, initiating a series of regional chapters across the US;
- 4) conducting research and providing technical assistance to link up more directly with the with the community-based organizations and service providers engaged in CBR activities;
- 5) building partnerships with organizations with similar goals; 6) consolidating the CRN international linkages.

We have drawn several lessons from our experience in promoting CBR organizationally at Loka and CRN. It's essential to point out that the application of the concepts and the lessons learned from our experience is culturally distinct, regionally specific and linked to a tradition of community-based advocacy distinctly associated with Loka and its supporters. In this experience, Loka has a story to be told which involves the articulation of the social and environmental impact of scientific and technological decision-making process without civic engagement and involvement of ordinary citizens.

My involvement at the Loka Institute happened to coincide at the time in which Loka and the Community Research Network (CRN) were both at a critical juncture and engaged in a dialogue to identify strategic pathways for their respective mandates.

The most immediate task at hand was to review what the CRN was doing on the ground and what were Loka's intentions as the trustee and sponsoring agency. It seemed awkward and inappropriate for Loka to carry out a national mandate without much direct contact with the rest of the country. It seemed logical to move the Annual Conference from Massachusetts and hold it in another region of the country. The first test of this strategy was to hold the CRN conference in collaboration with the community groups affiliated with the university of Texas in Austin. The conference was organized in collaboration with local groups who were active in citizens' actions on a number of community issues, including the application of CBR on the questions of social inclusion, environmental justice, poverty, digital divide and particularly engaging organizations from the minority communities. A number of community-based organizations and faith centres associated with the Mexican American community and activists in South Texas were involved and contributed immensely.

The subsequent conference within this format was held in Chicago in collaboration with the Center for Urban Research and Learning (CURL), Loyola University. CURL provided us with an enormous amount of logical and organizational support. CRN match CURL's input with the engagement of a number of organizations and individuals from the African American, anti-poverty, artists, public libraries, video makers and street organizers.

The themes and organizational structures of these two conferences reflected the local issues and made sure to have a balance of local and outside involvement to make the conference both a local event but nationally and internationally relevant to CBR practitioners and supporters.

One other significant feature of Loka/CRN was a concerted effort to reflect the racial, cultural and linguistic diversity in all activities. In the two conferences just mentioned, we specifically targeted African American and South East Asian communities to increase their participation in our planned activities and to enlarge the scope of discussion on the question of social inclusion and other issues affecting marginalized communities within the US. We made a concerted effort to address these concerns and include provision in the planning and implementation of all sponsored activities including the annual conferences and regional chapters to be more inclusive and also to make sure specific community interest groups such as the any oppression groups, urban farming communities and anti-poverty alliances are represented and add their voices.

Associated with this was the notion of regionalization which involved organizing regional CBR chapters in the Northeastern and West Coast States. We brought together a number of organizations, researchers and activists to brainstorm strategies to take action on local and regional issues. These regional forums helped us understand regional issues and connect better with organizations operating in these areas. The regional chapters opened up opportunities for collaboration and helped us promote CRN as a method for citizens' engagement on scientific and technological decisions affecting the quality of life locally and regionally. Again these initiative gave Loka/CRN the opportunity to link up directly with community-based organizations on the ground who have achieved remarkable success in fighting different issues. Two examples from the West coast come to mind: The Center for Community Action and Environmental Justice and the Stringfellow Acid Pits. The later group's action against toxic dump galvanized communi-

ty action, resulting in a successful \$114 million settlement with 200 corporate polluters, and construction of a facility to remove the remaining wastes that has a net present value of \$600 million and will be in operation for the next 300 years.

The need to conduct research and to provide technical assistance challenged Loka/CRN to act strategically to engage in research activity directly. This meant that Loka/CRN should seek for opportunity, find financial resources to conduct research and also provide technical assistance to community-based organizations on request. The dissemination of research outcomes through publications encouraged another set of partnerships to launch joint readerships to reach a much wider audience. We undertook a research and facilitation project to engage in providing technical assistance to a large number of community-based agencies engaged in a Local Learning Partnership. We worked in collaboration with a wide range of community organizations, coalitions of data users, providers and research analysts to using data-driven agenda strategically for improving family and neighbourhood conditions, in three cities of Boston, MA, Hartford, CT and Providence, RI. in the Northeastern States. The initiative gave Loka/CRN the opportunity to work closely with community organizations with solid track record in CBR research including the Dudley Street Neighbourhood Initiative in Boston.

In addition to reaching out to work collaboratively on a number of outstanding social and environmental issues, Loka/CRN initiated partnerships to work on specific projects to promote CBR and engage citizens in community action. For example, we worked closely with the Center for Popular Education & Research, University of California, Berkeley, to engage in having joint conferences on specific participatory research

questions. Similarly, at the international level, ongoing consultation and collaboration continued with the Science Shops Network in Europe. A number of colleagues from the Science Shops have attended the CRN conference and have shared their work and strategic insight on how to improve our work. We are specifically thankful to colleagues from the Dutch and Danish Science Shops for their collaboration and information sharing efforts.

In all our efforts, a particular issue that has create a common ground is funding as an ongoing challenge for most of the small, not-for-profit organizations whose mandate is public policy advocacy and/or support for the everyday struggles of local communities who are committed to create positive change. The biggest challenges are faced by community-based organizations engaging in scientific research and technological development, for several reasons. First, the research system is predicated on a separation of experts and ordinary people. The idea that the latter have a positive contribution to make to research is therefore close to a taboo within the established scientific community. Second, scientific research and development are expensive undertakings with uncertain outcomes. Who gets funding falls between the big prestigious institutions (universities, corporate Research and Development labs, etc.) and community groups, which seeks to address larger issues and immediate needs for shelter, food, youth services and the like. This combination of cost and risk causes funders to place primary emphasis on the prestige of those doing the research, while ignoring considerations of a diversity of voices in the research system and the effective outcomes that this diversity can yield. This vulnerability and constant search for core funding potentially jeopardizes the independence of these organizations and create

organizational development challenges as they become increasingly financially dependent or remain on a project-funding treadmill for a long period of time.

Loka and the CRN have played a functional role, reflected on these premises and practiced a loosely defined notion of community-based research with a focus on the democratization of science and technology to create the public space for the science and technological decisions. The CRN as a network promoted the outcome of solved problems on the one hand and kept everyone to stay connected on the other.

The CRN as a network forged links with many problem identification and problem solving initiatives across many disciplines, single issues and local, national and international contexts.

Like any „good“ medicine applied to social, environmental and health problems, the experience at Loka/CRN has been uneven with demonstrated some side effects. There is no doubt that over the year the CRN promoted and popularized CBR in many corners and facilitated interaction across disciplines and contributed in creating a common language for the CBR.

### Lessons Learned:

#### The side effects:

- 1) in going into the actual communities to do our research and provide technical assistance and resources, we were very good at facilitating and identifying the problems. What we learned, however, that it is essential to identify the community assets and to give the communities the tools they needed to do what they had to do and provide capacity building resources. In our experience, we realized that much of the community assets are not recognized and communities, especially the African-American and Latino communi-

ties are subjected to degradation and constantly played against their weaknesses and problems not their strengths;

- 2) Open mindedness pays. We learned much from the communities which were very strong and successful in their level of civic and local participation, demonstrating more firm control over the research outcomes. These communities were clearly linked their community research involvement as an investment in enhancing their daily lives. In these instances, CRB as a tool has been most effective. These categories of community involvement provided us with the much needed practical results from working together and their involvement and gave us the opportunity to produce and grow together as a community. This situation was particularly evident in our work with the Dudley Street Neighbourhood Initiative in Boston and various environmental justice networks across the US;
- 3) Plan outreach strategies and regionalization priorities ahead of scheduled CBR activities. In our experience, we learned and gained enormously from moving the Annual CRN Conferences and from the development of Regional Chapters. This strategy provided us access to resources within the African and Mexican American communities in Chicago and in Austin, Texas and linked us with a host of other minority communities and inner-city communities and activists in a number of cities once we moved CRN from its birth place in Massachusetts. In working with these communities we learned that in order for the Loka/CRN to remain relevant and connected, it was necessary to incorporate and do our advocacy work with the local and regional agenda in mind. The national and international concerns and the imperative

of the local of needs became an immediate source of tension and a challenge to deal with. In these situations, it was essential to learn to listen and working collaboratively help us moving the CBR agenda forward;

- 4) Partnerships, the Loka/CRN initiated and responded to many calls to become a partner in various CBR initiatives with other Ngos on single and collective issues. The toughest challenge for us was to gain the trust of others, establish a working relationship and develop a mechanism for sharing the outcome of what we jointly set out to do. In partnerships we were overwhelmed with the enormity of the tasks ahead of us: huge socio-economic dislocations and the disperse nature of most organizations and neighbourhood groups, poorly resourced to deal with, required multiple CBR methods to help with data collection, reflect the influx of the migration and to help establish common grounds for a variety of communities and inner city groups to work together.

We learned much from recognizing our own limitations and from the discovery of the community assets in all these communities. Further we learned that fostering trust and commitment made partnerships work and helped us incorporate them into enduring features of CBR practice;

- 5) Our experience suggest to us to conclude that CBR will be successful in one field or set of issues and region. Tempting as this conclusion might be, however, we could say for certain that the specificity of a CBR practice and outcomes might not work in another area with similar features. We have learned that CBR approach should be supported in its independent sphere of influence.

### Organizational challenges

There are some organizational issues that are specific to Loka/CRN but they might be useful for others if similar circumstances prevail:

- a) it helps to map out and understand the CBR environment before plunging into any initiative inviting public participation. Without adequate funding, the outcome of CBR initiative could negatively affect long-term civic participation. In our case, in the US and Canada the politics of funding has divided the sector into two camps: the small and grassroots NGOs vs big research and development agencies and universities;
- b) avoid dilemma due to the co-existence of organization within an organization which is essentially a structural arrangement consisted of a supportive system and mutual vulnerabilities;
- c) map out the structural challenges in order to balance out local and regional priorities and national imperatives and global concerns;
- d) identify and develop mutually agreed guidelines and shared values, apply a transparent framework to build trust, learn to work together and to strengthen networking as a strategy to produce, grow and regenerate.

### Conclusion:

We can say that Loka/CRN has contributed significantly to a thriving and expanding CBR culture, demonstrating commitment to citizens' participation and to dissemination of socially relevant research outcomes. This has further contributed to the divide between community-based research applied by community and marginalized groups and the large and prestigious research and development and academic institutions in the US.

From our experience, we can say that although the work of Loka/CRN has influenced the process of redefinition of research, the CBR environment is full of disparities and lacks uniformity. We are also saying that there are a variety of CBR „colonies“ emerging, remain isolated from one another and each one with a different definition of CBR and indeed the notion of community itself. This diversity in the US and Canadian context is the CBR's strength. Our challenge has been, and still is, to find a way to articulate the specificity of our experience to enhance and promote CBR practices elsewhere.

The success of Loka/CRN can be summarized in diminishing the significance of the tradition of what Meredith Minkler (2003) calls the „outside expert“ approach to research. By increasing community demands for authentic and collaborative approach in research, we would be better placed to identify local priorities and research questions that matter to our daily lives.

## The Canadian Context

### An Overview of CBR Issues and Challenges

In the Canadian context, CBR practices have taken a variety of approaches, including initiatives by individual research institutions, most of which has been directly or indirectly initiated by the government through a parliamentary decision-making system.

The Science Shops momentum in Canada has happened differently which consists of a conglomeration of various institutions and dispersed communities. Unlike in the US, in Canada we cannot associate names of a single individual with any nationally significant CBR structural initiative. Canada is a country of regions and linguistic divide. In addition, the parliamentary political system provides Canadians different mechanisms for participation and

for taking structural action. In regards to CBR, there are some notable examples which conduct participatory research and resemble CBR functions in the European Science Shops mode. The most prominent and prestigious initiative is Community University Alliance (CURA) which is initiated by the Social Science and Humanities Research Council (SSHRC) an arms-length government agency. CURA projects are university-based, peer-reviewed research initiatives within a partnership framework between community and universities.

The CURA program began as a pilot project in 1999 with an operating budget of \$8 million with the intent to producing significant multidisciplinary research outcomes, new knowledge, knowledge transfer, and capacity building. The program further intended to opening doors for new research approaches, providing benefits to academia through community partnerships. The community partners stress the positive impact university-based researchers could have on local community issues. These are one university only applications with \$200,000 grants per year stretched over 3 years.

Another partnership initiative with participatory research features is the Canadian Metropolis Project which began in 1997. The project consists of six (6) centres of excellence structured as a consortiums of the non-governmental organizations (NGOs), universities and policy-makers. The Metropolis Project is a set of coordinated research activities carried out participating agencies that share perspectives on immigration policy by means of applied academic research. Its main goal is to improve policies related to migration and ethno-racial diversity by incorporating scientific findings from a multidisciplinary perspective. The centres are funded over a six year period. All operations are university-based.

Other CBR practices and structures in Canada are initiated by individual universities and other research institutes. The University of Victoria in British Columbia has recently made institutional commitment to undertake taken community-based research initiatives within a multidisciplinary framework. Budd Hall, who has pioneered a number landmark community-based participatory research initiatives and Kelly Bannister a locally known community and academic activist are leading the initiative at this university.

In the rural setting, the Trent Centre for Community-Based Education in Peterborough, Ontario has indeed made a number of significant contributions in promoting and sustaining CBR within a smaller urban centre with issues affecting rural life in Ontario.

These are small but significant initiatives with potential to grow and expand their own CBR practices and will eventually become an important source of inspiration for other centres and community groups.

## Plenary Session

# OPPORTUNITIES IN SCIENCE AND SOCIETY INTERACTIONS

In this session some options for the improvement of science and society relations are described. It gives an overview from the perspectives of NGO's, the EC, universities, researchers and Science Shops.



# Science & Society in the EU 7<sup>th</sup> Framework Programme (FP7) for Research and technological Development

MONICA MENAPACE

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The European Commission is currently preparing a proposal for the 7th Framework Programme. The legislative proposal is expected to be presented to the Council and Parliament in the course of 2005. The objectives of this program – all referring to the Lisbon and Barcelona objectives - are to establish a critical mass of resources in key areas, to strengthen excellence through competition and transnational co-operation, to improve co-ordination of national activities and to increase human resources. The content of this proposal is based on:

- The Commission communication "Science and Technology, the key to Europe's future - Guidelines for future European Union policy to Support research" (COM(353)2004)
- the result of a wider consultation on the previous communication
- a thorough assessment of evidence and impacts
- a still ongoing exercise to identify specific research themes which also includes a general consultation (closed on 31 December 2004). The Commission is currently processing the contributions received.

In the mentioned communication the European Commission has proposed orientation for the

development of future European Union programs to support research activities and policies. They imply a significant expansion of the European Community research budget for the period 2007-2013. Six major objectives are identified:

- Creating European centres of excellence through collaboration between laboratories
- Launching European technological initiatives or technology platforms to create a framework where enterprises, universities and financial world authorities work together. Also to define a common research agenda and define legal and regulatory conditions to carry it out.
- Stimulating the creativity of basic research through competition between teams at European level as a support mechanism and not as an obligation for transnational co-operation or predefined thematic constraints. Selection will be based on scientific excellence and an evaluation by peer review.
- Making Europe more attractive to the best researchers
- Developing research infrastructure of European interest with mechanisms such as trans-European networks. Also to support essential services for Europe such as telecommunications.

- Improving the coordination of national research programs

In addition, two new areas for European-level research activities are presented: space and security.

In its plans, the Commission proposes using the most efficient means of implementation, including management through partnership with the Member States and research actors, and “externalised” management.

### Online Consultation

The online consultation “Science and Technology, the key to Europe’s future - Guidelines for future European Union policy to support research” was open to all interested organisations and individuals between 30 July and 15 October 2004. Over 1700 organisations and individuals from across Europe and other countries, and including universities, large companies, SMEs, associations and government bodies responded to the consultation. Major findings from the analysis of the responses are the following:

There is very strong support (over 97% of responses) for the need to strengthen support for research at the European level. Furthermore, there is strong agreement that this would have an important impact on Europe’s research capacities and capabilities (over 95% of responses) and that this would contribute significantly to Europe’s competitiveness, social welfare and sustainability (over 92% of responses).

There is also strong support for the 6 major objectives (over 80% of responses for all objectives) set out in the Commission Communication. Support is particularly strong to make Europe more attractive to the best researchers (over 95% of responses) and supporting tran-

snational collaborative research (over 90% of responses). These actions are established ones with proven European value added. However, there is also widespread support for the new objectives to launch European Technology Initiatives (86% of responses) and to stimulate the creativity of basic research (81 % of responses). Concerning the development of infrastructures of European interest and the coordination of national programmes, the Support was high (86% and 85% of responses respectively).

Concerning other aspects for future European support to research, there is a particularly high importance attached to improving science and society relations (detailed below); to supporting innovation (88% of responses) to support to research by and for SMEs (88% of responses); and the importance of focusing EU efforts on topics of major European interest (88% of responses).

As concerning Science and society aspects, although it was not a specific part of the Guidelines, participants in the consultation were asked to rate the importance of taking into account interactions between science and society in the design of future European research programmes and initiatives. Participants attached a very high level of importance to this aspect and commented on the need to achieve better connections between science and society at large. Many comments highlight the need to focus on young people and science education. Several responses underline the importance of ethical aspects of research and the need for genuine debate. A small minority of respondents express a degree of scepticism or caution. Some stress that ‘societal’ considerations should not take precedence over scientific criteria. A few warn that such considerations tend to increase the amount of paperwork involved for programme participants.

## Science and Society in the 6<sup>th</sup> Framework Programme

In December 2001 the Science and Society Action Plan was agreed by the Commission. The Plan sets out a common strategy to create a better connection between science and European citizens, alongside 38 specific actions covering all the themes mentioned below. The effort will be supported in part through the EC's Sixth Framework Programme. FP6 includes "science and society" activities, both as a specific "science" and society" programme and as a general theme integrated in the seven research priorities of the "Integrating the European Research Area" programme. The work focuses on the following main themes:

- Governance and scientific advice: promoting the effective use of scientific advice, and encouraging interaction between experts, civil society groups, citizens and policy-makers.
- Ethics: helping researchers confront important ethical issues that arise in the course of scientific research
- Scientific awareness: helping to stimulate an interest in science, demonstrating its relevance by improving communication and dialogue with the public.
- Science and education: sparking the interest of young people in science, encouraging a dialogue with universities to promote a Knowledge Based Society
- Women and science: encouraging and supporting gender equality in science.

More information: <http://europa.eu.int/comm/research/science-society>

## Potential Science and Society aspects in the 7th Framework Programme

The Commission is actually preparing a proposal. The science and society directorate which is also managing the current science and society activities, has produced some discussion papers. Please remember that the following is based on internal working papers and does not represent the official view of the Commission.

The general aim is to continue science and society activities as in FP6, integrated and adapted to new needs. Possible fields are:

- "Trust in research" (governance): This includes to promote the debate on science-related issues, respond to public concerns and encourage mutual understanding between different viewpoints as well as developing procedures for an inclusive debate involving scientists, policy makers, industry and civil society groups. Other objectives might be the fostering and supporting of local initiatives networking (e.g. Science Shops) and the improvement of the way scientific knowledge feeds into policy making by defining policy relevant research themes and timely and transparent access to expertise.
- Strengthening the scientific workforce (young people, careers in science, gender equality) through science education in primary and secondary schools by curriculum development, support of science teachers, links with tertiary education, contest for young scientists and participation of disadvantaged or underrepresented groups.
- Communicating science through European Science Events and European Science News Services.

Activities may take the form of

- Networks
- Optimizing national efforts (open method of co-ordination)
- High profile events (prizes, science weeks, conferences)
- Specific research
- Studies, surveys and data collection

One of the related activities will be the “Forum of university based research”, with 18 high level experts in a follow-up discussion on “The role of the Universities in the Europe of Knowledge” and the workshop “The Europe of Knowledge 2020: a vision for University-based Research and Innovation (April 2004), aiming at helping the Commission to define an EU policy framework and formulate recommendations for concrete actions. The report is expected for May 2005 with some input for FP7 and an action plan on university-based research. There will also be a follow-up of the Science Shop workshop “Thinking the future and twinning old/new shops” which was held in November 2004 which had 40 participants from Science Shops (mix on experienced « old » ones and new initiatives), NGOs and universities’ associations.

It will be discussed that FP7 could explicitly envisages specific « community based research projects ». The situation today is that of course civil society organisation are free to submit and participate to all kind of projects in FP6 but an instrument is missing that takes into account the civil society specific needs. On the one hand many of the organisations (in particular at local level) have an increasing need for independent scientific support for effectively being able to carry out their activities and negotiate with stakeholders, on the other hand, they have limited availability of own resources for carrying

out these research activities. Science shops are a possible answer for this problem. How can the EU help? One idea is to transpose the CRAFT instrument for SMEs to a CRAFT for civil society organisations. CRAFT for SME takes into account the specific difficulties of SMEs in carrying out research. Several SMEs with similar problems join and choose a « research performer » (fully paid) to carry out the research for them, guaranteeing that the SMEs become the owner of the results. Civil society organisations could do the same and Science Shops could become the appropriate science performers. It is of interest that civil society organisations could become the initiators of the research which designed on their needs and not only join big projects managed by others.

# From sitting on a Veranda to Valuing the Enrichment of Engagement: A View from the Field.

ROGER O'SULLIVAN

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## Background

My title comes from the famous approach of traditional ethnography - where-by researchers sat on the veranda and studied the locals from afar. It would seem that we have come along way since then. But if we take the veranda as an example of our place of safety, this paper makes the case that to avail of opportunities we must move from each of our verandas as we define them and value the enrichment of true engagement.

In order to advance the debate, this paper outlines the state of play between key players and moves on to discuss how we can address the weakness of this situation by focusing on building on each sector's expertise. It considers some of the challenges that face us but will focus on the opportunities and benefits of moving from our place of safety to a more engaged and partnership approach in advancing the relationship between Science and Society.

## Traditional Position

When considering the way forward for Science and Society the words of the poet John Hewitt come to mind: „you can only know where you want to be when you know where you come from“, so let us explore the present stances. Traditionally Government's function is in the set-

ting of policy and establishment of programmes, Universities focus on intellectually orientated research and teaching while community / non government organisations (ngo) concentrate on actions.

There are of course strengths and weakness with the present approach, for example, when addressing policy. While Government have an understanding of the wide policy agenda, on the other hand they are often disconnected from the issues on the ground. The high quality research and analysis which Universities produce, sadly has a very limited focus/market. The community / ngo sector have real connectedness but with a narrow focus and are too often reactive rather than pro-active.

Each sector has a different mantra in support of their position and approach to work: Government tend to declare „You need to understand the wider EU policy framework within which we are working“, Academia often pronounces that „You need to read all the research literature to understand the complex nature of the issue“ and of course the community/ngo sector claim: „If you see and experience what we have, you would be in a stronger position to act“. Each has elements of truth but they do not tell the whole story or by themselves help to comprehensively address deficits in policy, for example the complexity of rural poverty.

### Promoting Partnerships & Recognising the Challenges

It would be naive to claim that it is easy to establish a partnerships model as a way forward, some of the challenges that face us include:

- Power relationships - usually based upon income and number of staff.
- Creditability - each sector will wish to remain credible within their primary target group, (the community/ ngo sector they will not want to be seen ,palling up' to government).
- Social status - more linked to the academic world - with peer assessment a large percentage of how one is perceived is often dependent on the status of whom they work with and where they publish.
- Taking risks - larger organisations are cautious of doing anything different than what they and their colleagues already do.

### Creating the Climate

For effective working partnerships to be established, rather than interaction taking place, it is necessary to recognise the value of Partnerships. Relations must be built in formal and informal ways. Being invited to take part in a project or programme is unlikely to promote the feeling of partnership in itself. Rural Community Network (RCN) has learned that space and time must be created to allow for a cross fertilisation of ideas, understanding of institutional boundaries and getting to know the people involved.

Regarding the process of engagement it is important to stress that partnership is not about setting up a committee, group or forum which may be its manifestation, but it is a methodology with an underlying philosophy. It is an opportunity to build on valuing the principles of diversity, interdependence and of course equity.

Creating a climate of fairness can also recognise diversity of skills and knowledge and the inter-dependence of each for success.

### Ensuring Ownership

While grounding ourselves in pragmatism RCN have found common to success is the stage at which people are asked to participate. It is necessary to build a group sense of ownership and recognise the appropriate level where partners feel comfortable in participating. In an ideal situation getting ,buy in' (agreement) should take place from the identification and most certainly at the design stage of a programme. Planning the programme is an essential part of ensuring ownership. Of course it is important to recognise that in a partnership there may be different roles and responsibilities in line with the overall

Citizen Control	
Delegated Power	Citizen Power
Partnership	
Placation	
	Tokenism
Consultation	
Informing	
Therapy	Non participation
Manipulation	

**Arnstein's Ladder of Citizen Participation**

agreed terms of reference. From a community / ngo perspective we are very conscious of being asked to take part, often at the latter stages, rather than being involved right from the planning process. Therefore promoting mutual dependency rather than individual expertise and the sum of the resources together helps to build a feeling of group ownership and responsibility. By focusing on an agreed outcome different partners can see where their work and efforts fit within the overall project. What Arnstein's Ladder of Participation has shown is that partnerships are a tool to ensure greater citizen control but as the diagram here illustrates, there can often be a fine balance between tokenism and citizen power.

### Benefits

It goes without saying that the primary purpose for any partnership is to ensure that the issues are addressed/identified. There are a number of beneficial spin-offs from this approach to work. If a partnership is designed with an agreed outcome then it can be a 'win/win' process with relationships built which can have a much longer life span and indeed help to foster creativity and innovation. From a community development perspective partnerships help create an opportunity for networking and the sharing of information and building social capital. The collective process which recognises interdependence leads to a greater strength and a more integrated and holistic perspective taken with strengths built. Finally, partnerships can form part of the process of empowerment which can have not only individual benefit but also wider community implications. Empowering people is not just about saying that people in principle, have a right to a say in how things and decisions are made - it is about addressing power relationship and supporting people in a process of change.

### Reflection

The purpose of a partnership approach is to ensure effectiveness in addressing real needs that exist. But for partnerships to be successful and to bridge the gaps of often mistrust or perceptions that exist between the various sectors, there is a need for real engagement, not tokenism, and risk taking based on active partnership development. Some practical reflections of this process include recognition that workloads often require adjustment: one area may increase with others reducing. Time and space are needed for a partnership mindset and methodology to develop. Buy in from senior staff within each sector is essential. Being open to having your knowledge challenged is necessary as this will most certainly happen! Wanting to be part of a continually learning rather than a stagnant culture should be an underlying approach/attitude. For example partners may need to reflect on their attitudes and behaviours to make the partnership work. Sometimes it is necessary to go slow to make progress and by this I mean, things may take a long time at the start to ensure that everyone is onboard. This could be viewed as time ill spent but it is far from wasted time. Focusing on outcomes rather than outputs ensures the opportunity for agreement and purpose. As way of a conclusion here are some questions you may want to ask yourself and reflect upon:

- o Where is your veranda / place of safety?
- o What opportunities/risks are you willing to take to advance the partnership methodology?
- o What support is needed?
- o How would you rate your organisation's attitude towards effective participative partnerships?
- o Do you recognise how working inter-sectorally can bring added value?

# Bridging Gaps: Empowerment of the Community in Health Action Research

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In order to develop a country's research capacity effectively, we need to prioritize in terms of „how and who“ will be using the research products. Without a concreted effort to focus on the priority problems in health research capacity, people would be trained, organizations built and institutions strengthened with no clear end goal. Countries should look at were capacity is most required and enrich these areas first. (1,2)

In the past, health research in Iran has been characterized by low adherence to priority research, and removal from the communities' real health needs. The situation could cause widening of the gap between the universities and the people's needs. The necessity for empowerment During the past three years, in an attempt to develop equity in health, the modern approach of participatory health research priority setting in the Universities of Medical Sciences in Iran - that they are responsible both for medical education, research and delivery health care to defined the population - pushed them to revise their policies towards shortening the 10/90 gap by building partnership in health research activities. (3)

Qazvin University of Medical Sciences, covering a population of about 1100,000 (64% urban & 36% rural ), also revised and developed its health research policies towards socially accountable goals through involving a broad range

of the main stakeholders and determined the health problems of the people and formulated them into more than 200 research topics.

According to these topics, the versatile health teams led by the academicians, are to launch community based research projects. Now, the lay persons as the member of the research team lag before the experts and this condition leads to misunderstandings. What we could do is to build the capacity to mobilize the resources through continuation of the coalition.

## Bridging gaps

To bridge the cultural gap between the community and the academicians (4), we organized some meetings and assessed the learning needs of the community volunteers for action research. Setting the learning objectives, we prepared a specially designed practical guide book for their training and organized several workshops.

More than 110 people who were NGO's members, housewives and female community health volunteers participated in the workshops to be empowered in critical thinking as well as participating in the community based research projects. After six months, the health volunteers defined 14 health problems and conducted interventions to solve them. Now, they are capable of problem finding and analyzing it, data collecting and processing, and examining the interventions independently and collaborate

with the researcher in progress of nine participation health research projects. Some of them also motivate and train the other volunteers in action research. Our experience is to be generalized to other universities.

## Conclusion

The critical first stage in any participatory process is to lay the basis for the relationship between the project workers and the community and the key issue is the notion of the fact that community participation is not merely an input to the project but the basis upon which it will operate. Keeping this matter in mind, our experience indicate that the community volunteers within the research team can facilitate:

- a) getting entrance to the selected community,
- b) getting to know the community and creating awareness of the project,
- c) gaining the trust of the community,
- d) operational management of the project,
- e) establishing the basis of community participation to develop the project and
- f) mobilizing and pooling the resources.

At the end, our experience in Iran reveals that the empowerment of the community in actions research can develop the skills and abilities to enable people to facilitate and manage the process of the participatory research better and have a say to what is done. People can build partnership in the research that they as a part of the population are the real owners of the results, and they stride towards equity in health. On the other hand, by bridging cultural gaps the researchers' and academics' attitudes are reoriented towards responding the real health needs of their communities - it is a give-and-take process.

## References:

1. COHRED. (2000): The ENHR Hand book. Document 2000.4
2. BOELEN, C. (2001): Towards Unity For Health. Case studies. Geneva: World Health Organization.
3. ASEFZADEH, S. (2003): Building up Partnership: Setting Health Research Priorities. The Network News Letter. TUFH, Dec. 2003: 7
4. RICHARDS, R. W. (1996): Building Partnership, Educating Health Professionals for the Communities They Serve. Jossey - Bass Pubs. 1996:17-21

# Science Shops and Civic Sciences after 'Lisbon'

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## Dutch Science Shops

Science Shops came into existence in the 1970s in The Netherlands<sup>1</sup>. They were places where citizens and civic organizations could go to get help with the technical and scientific aspects of problems they have. Support is provided at a no-cost or low cost basis. In many cases questions was provided on the basis of available expertise and -if needed- the shopkeepers tried to find researchers who could do or supervise a small research project. Most of the work was carried out by students voluntarily or as part of their thesis work or traineeship. Shops had some young academics as professional staff to provide for supervision and continuity. Essential for the functioning of the shops has always been the availability of socially motivated students who would act as volunteers or interns.

In the 1970s and 1980s the Science Shops were an important part of Dutch university policies, often supported and protected by the University Councils that were elected from the academic and administrative staff and the student body. These Councils decided about overall university policy and were in charge of the university budget in those days. At my own university the Science Shop was seen as an indicator of urgent needs that should be integrated in university research policies and funding in a more structural way. Funds<sup>2</sup> were put aside for

this and a committee was formed with members coming from environmental organizations, unions, health groups to analyse the demand for support received by the shop and to come up with recommendations for research programmes on key social and environmental problems. The special fund just mentioned was supposed to grow and encompass some 15% of the university research budget after some years.

Some such programs - f.e. on occupational health - were indeed started under the aegis of this initiative. Yet, the University Councils were already under attack in those days for giving too much power to students and personnel, making the universities difficult to handle as a party of budget cuts and managerial reform. Their role would be curtailed in the mid-1980s and in the 1990ies they would disappear altogether. In the 1980s major budget cuts were imposed on the universities. In combination these two trends led to the marginalisation of Science Shops. A num-

- 1) On the history and current practice of Dutch Science Shops in English see Nicole Farkas, *Bread, cheese, and expertise: Dutch Science Shops and democratic institutions.* (Troy NY: Rensselaer Polytechnic Institute, 2002. PhD Thesis), Corinna Fischer, Loet Leydesdorff, & Malte Schophaus, 'Science Shops in Europe: The Public as Stakeholder', *Science & Public Policy*, 31(3), 2004, 199-211.
- 2) In those days most of the university research budget came directly from the state and was controlled by the university parliament. Only a small amount of the money for publicly funded research was distributed on a project or program basis by national foundations.

ber of them survived, but often with difficulty. In some places they are seen as a way to attract talented students interested in social issues to the science faculties. Some shops have become more commercial, like the Chemistry Science Shop in Amsterdam. When I told a colleague at my university that I was going to a meeting of a European network of Science Shops he looked puzzled and asked: ‚eh...wasn't that something from the seventies? Do these shops still exist?'

While many Dutch academics hold Science Shops to be a relic from the past, the reality is slightly different. My colleague, although he is a politically progressive professor, did not know that Science Shops have become an export product for The Netherlands. And he did not know that Science Shops have become a part of EU policies to open up academic science and to strengthen the civic role of universities<sup>3</sup>.

The support from the EU for the Science Shops is most welcome. Especially in so far as its purpose is to orient academic research to pressing social needs and to open up the science system up to public problems and concerns of ordinary citizens. Yet, there are also reasons to be cautious.

In my view Science Shops can play a more prominent role in the opening up of the science system and in public engagement initiatives. They could become an important nucleus of what one may call civic science, i.e. publicly funded science that serves the needs<sup>4</sup> of citizens and focuses primarily on citizens' concerns. This requires, however, a strengthening and expansion of their current role. Science Shops could also act as (co-)organizers and moderators of public deliberations about new technologies and their consequences, as centres for informal participative technology assess-

ment. They would perform their role alongside their role as ‚shops' were citizens could go to with their questions and concerns. By using the institutional networks among shops already in place, Science Shops could also contribute to the transnationalization of public deliberations so urgently needed.

The suggestion to expand the role of Science Shops to include activities to promote public deliberation has been inspired in part by the STAGE project- a thematic research network funded by the EU- that has analysed the recent experiences with public engagement initiatives in eight European countries and across various domains<sup>5</sup>.

In what follows I will first discuss some recent experiences with public engagement with science. Secondly, I will relate these experiences to the economic and technological reform agenda of the EU. Thirdly, I propose the concept of ‚civic science' to demarcate research and research related activities (like Science Shops) from research as a part of economic innovation policies. Promoting ‚civic science' as defined should be an important goal of EU policies and Science Shops could be a useful instrument in such policies.

### Promoting public engagement with science, technology and innovation

The interest in public participation in science and technology has long roots in EU countries but since the 1990ies there has been a distinct shift towards more deliberate forms of engagement<sup>6</sup>. In part this has happened in response to

4) John Keane, *Global Civil Society?* Cambridge: Cambridge U.P., 2003)

5) See Rob Hagendijk, Peter Healey, Maja Horst and Alan Irwin, *Science, Technology and Governance in Europe: Challenges of Public Engagement*. STAGE Final Report, Oxford: James Martin Institute, University of Oxford. 2005. Final report and case study reports from the STAGE project are available at <http://www.stage-research.net/>

3) [http://europa.eu.int/comm/research/science-society/scientific-awareness/shops\\_en.html](http://europa.eu.int/comm/research/science-society/scientific-awareness/shops_en.html)

an outburst of public unrest about food scandals (BSE, FMD etc) and import of GM food (soya). EU opinion surveys from the late 1990ies showed a very low level of public confidence in governments and regulatory authorities among the general public if it comes to handling such issues. Agricultural biotechnology was seen as one of the fronts of global economic competition, yet it was heavily contested. To attribute the European opposition to genetically modified food to public ignorance and their manipulation, as US representatives use to do at the time, was no option for European leaders. The public opinion surveys suggested that people who had at least some understanding of genetic modification were even more sceptical about it than those who scored the lowest with respect to knowledge and understanding<sup>7</sup>. Furthermore, a whole range of ethnographic studies from the 1980s and 1990ies had shown that lay people are very well able to assess the implications of new technologies for their personal life even if their formal schooling and command of scientific knowledge was limited<sup>8</sup>. On the basis of such research authors like Brian Wynne, Sheila Jasanoff, Robin Grove White, Alan Irwin and

many others, advised policy makers to engage with the public in a more open manner and at earlier stages (‘upstream’ the flow of the innovation process<sup>9</sup>).

The opposition to biotech, data on public distrust of governments and such evidence of citizens’ ability to engage in rational argument about the effects of science on peoples’ lives convinced policy makers that more open forms of engagement with the public were needed. As a result, new policy documents started to appear reflecting these new views on public understanding at least partially and experiments with wider and more open public engagement were launched<sup>10</sup>. In designing such public consultations, the well-known Danish consensus conferences became important examples to be introduced in modified forms in other countries. In various countries (f.e. The Netherlands and the UK) nation-wide debates about GM food and agricultural biotechnology were announced and organized<sup>11</sup>. At the institutional level initiatives were taken to reform the system of food safety regulation. Participation from representatives from civic society was made a part of the consultative mechanisms.

The STAGE project has been part of attempts to assess these changes across eight European countries. The project shows that there has indeed been an infusion in European science policy with deliberative democracy. Yet, it also shows that the changes vary considerably across domains and countries. Developments are contested and it is not always clear whether some of the no doubt well-intended initiatives do not

6) Ibid. and CEC, *Science, Society and the Citizen in Europe* (Brussels: European Commission,

7) EC-DGXII, *The Europeans and Modern Biotechnology. Eurobarometer 46.1* (Brussels: EC-DGXII, 1997), 87. See also John Durant et al., ‘The Public Understanding of Science’, *Nature*, 340 (1989), 11-14; George Gaskell et al., ‘Biotechnology and the European Public’, *Nature Biotechnology*, 18 (2000), 935-938.

8) See Alan Irwin and Brian Wynne *Misunderstanding Science? The Public Reconstruction of Science and Technology* (Cambridge: Cambridge University Press, 1996); House of Lords, Select Committee on Science and Technology *Science and Society*. House of Lords, (available at [www.publications.parliament.uk](http://www.publications.parliament.uk)); Robin Grove-White et al., *Wising up: The Public and New Technologies* (Lancaster: CSEC, 2000). Meinolf Dierkes and Claudia von Grote (eds.), *Between Understanding and Trust: The Public, Science and Technology* (Amsterdam: Harwood Academic Publishers, 2000).

9) James Wilsdon and Rebecca Willis, *See-through Science: why public engagement needs to move upstream*, (London, Demos, 2004).

10) Op. cit. Ibid. note 5

11) See the case study reports on <http://www.stage-research.net>

boil down to just another form of political marketing. As the experience with the Dutch debate about GM food shows, a focus on the views of 'ordinary citizens' may also serve other political goals<sup>12</sup>. The debate was organized in such a way that citizens were asked about conditions under which they would find particular GM products admissible for the Netherlands or not. Principled discussions whether biotechnology should be introduced in agriculture or not were ruled out as politically useless and practically irrelevant. NGOs criticizing this way of framing the debate caused a public row. The organizers, angered by the stubborn attempts by civic groups to challenge the terms of reference for the debate, leashed out in attempts to publicly sideline and delegitimize civic groups and their tactics to dominate civic debate.

The Dutch example may be a little extreme. In the GM Nation debate in the UK did not explode in this way. UK scientists would claim that this debate had been hijacked by critical NGOs that were campaigning against GM food, but these groups themselves were sceptical about the extent to which the government would take the conclusions seriously. Both examples and our other case studies suggest at least three conclusions: First, there is the importance to move beyond mere acclaim for public deliberation and to look critically at the ways in which public engagement is organized and deployed. Secondly, widespread public deliberation about science and technology is still very much restricted to some highly visible cases and issues, like GM food. Partiality is a major characteristic of the move towards deliberative democracy. Our case studies show how deliberative modes of engagement exist alongside

well-entrenched forms of policy-making in which ordinary citizens hardly play a role. Various mixtures of types of governance can be found in the European countries depending on the issues at stake and the specific political and cultural traditions in that country. It is very important to analyse and assess how various types of governance are combined in particular countries and cases and why this is so. To facilitate such an analysis we have drawn up a typology that allows one to look in some details at how various formats are being combined in particular ways depending on national political cultures and the issues at stake<sup>13</sup>. This is helpful not only for analytic reasons, but also because it may encourage reflection how to promote critical and effective public engagement with science in the future. Thirdly, we should be aware of the fragility of attempts to institutionalize public engagement with science and technology, especially if it comes at moments and in forms that does not fit with agenda's of industrial and political leaders.

Overlooking the experience from our case studies one sees similarities as well as divergences between countries and fields of science. Overall there is a distinctive trend towards more public engagement, but it is also clear that the pendulum may shift again in the opposite direction.

## The Lisbon strategy

The interest among policy makers for public participation cannot be adequately understood without paying attention to the innovation agendas governments have developed in response to globalization, radical technological change and

12) Rob Hagendijk, Myrthe Egmond. (2004). The GM Food Debate in The Netherlands, 1999-2002. Stage Report 35. Amsterdam, Universiteit van Amsterdam. See http://www.stage-research.net

13) Rob Hagendijk and Egil Kallerud, Changing Conceptions and Practices of Governance in Science and Technology in Europe: A Framework for Analysis, Stage-discussion paper no 2. Amsterdam, Oslo. 2003. Available at <http://www.stage-research.net/>

international trade and competition. In fields like IT and genomics national governments closely watch one another as they seek to improve the incentives to attract high tech industries and to capitalise on investments in scientific and technological research. In the face of rapid advances in the US innovation agenda, European leaders agreed on the Lisbon strategy in 2001. According to this strategy Europe should become the most competitive knowledge economy in the world by 2010. The Lisbon strategy encompasses major reforms of various sectors including the establishment of the so-called European research area and the standardization of educational systems across Europe. Educating the public about ICT and key technologies is an integral part along with creating new jobs and fostering investment in new high tech companies. To realize the ambitious goals also requires a critical review of regulatory practices including the removal of regulatory obstacles to innovation. For the Lisbon strategy to succeed it was considered essential that the public would understand the urgency of the reforms and developments that were envisaged. This resulted in the endorsement of public engagement as a constitutive principle of innovation policy

Recently and especially in 2004 the EU leaders have become increasingly concerned and skeptical about the realisation of the Lisbon agenda. The US' lead in the field of technological innovation seems to grow, new economic giants like China and India are emerging as global players in the field of technological innovation and the Lisbon agenda is not progressing according to schedule<sup>14</sup>. The documents preparing the installation of a new EU commission stress the importance of stepping up technological innovation and regulatory harmonization. The Kok committee is very critical of the delays and stresses the need to convince everybody of the need

for radical change. Passages about this need to convince and enrol the public stress the need to engage with the public. There is mention of public debates that should take place, but it is hard to believe that these debates are supposed to leave much room for voices that are critical or sceptical with respect to the goals set by the European governments. In the presentation of its agenda the Barroso Commission has made it clear that 'science for growth', 'competitiveness' and 'employment' are the dominant elements<sup>15</sup>. This fits very well with the shift towards stressing science-industry partnerships rather than radical forms of public engagement. That the change is not restricted to the policy discourse at the highest level of the EU is suggested by the framing of the debates about the up coming 7Th Framework Programme of the EU - the program under which science and society activities are funded, including Science Shop activities. In the starting document from June 2004 the whole issue of public participation, which figured so prominent in previous document is not mentioned at all. It seemd that concerns about 'science-industry partnerships' had replaced those about democracy, public unrest and participation<sup>16</sup>.

Obviously the relation between politico-economic agendas and the agenda for public engagement varies over time and across locations. The first may be articulated in response to changes in the external international situation, while the second reflects concerns over internal opposition to policies and lack of legitimacy. In combination, however, they illustrate once again the claim that democracy is not just about principles that should

14) Facing the challenge. The Lisbon strategy for growth and Employment. Report from the High Level Group chaired by Wim Kok. Brussels, November 2004 ([http://europa.eu.int/comm/Lisbon\\_strategy/index\\_en.html](http://europa.eu.int/comm/Lisbon_strategy/index_en.html))

15) José Manuel Barroso, Europe 2010; a European renewal. Speech World Economic Forum, Davos, 29 Januari 2005.

govern public discourse but also about the limits and structural boundaries of what can and what cannot be legitimately put up for debate.

### Civic Science

Debates about the knowledge society and globalization inevitably lead to the question what the future role of citizens and consumers in such societies will be. Obvious questions are: What room is there for civic debate and deliberation about key technological developments? How are such debates to be organized in an increasingly interdependent world? How are the results of such debates translated in political decision-making and what economic constraints limit the options? Somewhat less obvious but equally central questions concern the availability of scientific and technological knowledge and know-how to those participating in such deliberations and their command of that knowledge. It is important that citizens have access to trustworthy knowledge about new technologies and scientific advances and the consequences of new technologies for their everyday lives, for health, for work and jobs, for culture, for the environment, or for social security. Such knowledge and it being trustworthy and independent of vested interests becomes all the more important as state budgets for science shrink and are increasingly tied to conditions about being supportive to industrial innovation. The effect of the emergence of so-called Mode II science<sup>17</sup> is that it becomes less clear whether publicly funded science is sufficiently independent.

16) 7th framework document. Science and technology, the key to Europe's future - Guidelines for future European Union policy to support research. Brussels, 16.6.2004, COM(2004) 353 final.

I am grateful for Peter Healey, James Martin Institute, Oxford University, for his analysis of the framing of issues in this document.

Alan Irwin<sup>18</sup> has introduced the term 'scientific citizenship' to refer to a conception of citizens that are prepared and competent to engage with the scientific aspects of their everyday lives and beyond. From his research and that by others he concludes that citizens are well able to develop that competence especially where it comes to issues that are directly relevant to their everyday concerns. In so-called knowledge societies scientific citizenship is of key importance and needs to be developed and promoted. Especially if one wants to involve the public in 'upstream' decision making with respect to scientific and technological development, however, this requires 'civic science' as a basis for such competences and their public mobilization.

Civic science or citizens' science is used here to refer on the one hand to the engagement of non-specialist citizens in science and technology in order to explore and assess the consequences current and future developments in science and technology for one's everyday life and the public good. On the other hand 'civic science' refers to research that is primarily oriented towards the public interest, is made available to the public and keeps critical distance from private interests and the state as a policy actor. Civic science so defined is an essential ingredient of democratic society and geared to developing knowledge and by making that knowledge publicly available in the context of public deliberations and political decision making. Defined in this way civic science encompasses science education,

17) See Michael Gibbons et al., *The New Production of Knowledge; The Dynamics of Science and Research in Contemporary Societies* (London: Sage, 1994); H. Nowotny et al., *Re-Thinking Science: Knowledge and the Public in an Age of Uncertainty* (Cambridge: Polity Press, 2001).

18) Alan Irwin. *Citizen science : a study of people, expertise and sustainable development.* (London ; New York; Routledge, 1995).

university extension activities and all sorts of campaigns for or against science at large as well as campaigns against or in favour of specific developments in science and technology. The demarcating criterion is whether or not the activities take place in the public sphere as opposed to the world of science as such, the private sector or governmental management. Evidently, Science Shops are by definition part and parcel of 'civic science'.

Civic science refers to 'civil society' or 'the public sphere' as the public that is non-private domain as distinct from the market and the nation state. Citizens, media organizations and voluntary associations of various sorts are the key players in this public sphere. The internet is probably the fastest growing 'agora' of civil society that emerged in early modern Europe in early news magazines and pamphleteering. Public institutions like universities and professional organizations and regulatory agencies have a special responsibility to inform the general public i.e. to inform civil society about science and its implications for society. As such they are constitutive of civil society. If they do not function properly and if they fail to support the public and its representatives, democracy will be in crisis. Science Shops are constitutive elements of that civil society. They not only address the concerns of individual groups or citizens but they normally also report about their work and their findings in the public realm to encourage public debate about science-related public issues.

Civic science stands in opposition to 'private science' and initiatives to promote private appropriation of scientific results and knowledge. Evidently, there are grey areas, especially where state science and technology policy may be geared toward promoting a particular field of science or technology. The science base of the local, regional or national economy is a normal

and accepted part of national economic policy around the globe. However much such activities may be in the national interest and even in the public interest, according to the definition just given such activities do not constitute civic science. They are a part of economic policy.

The distinction just made between 'civic science' and 'private science' serves to highlight the ambiguity in the construction of the liberal democratic state. As Chantal Mouffe<sup>20</sup> has pointed out in her critique of deliberative democratic theory, theorists of deliberative democracy tend to ignore that the liberal democratic state is an inherently unstable historical compromise between principles of economic liberalism on the one hand and citizens rights on democratic representation on the other. As the eminence grise of contemporary political science Robert Dahl puts it:

*„Democracy and market capitalism are like two persons bound in a tempestuous marriage that is riven by conflict, and yet endures because neither partner wishes to separate from the other.... The two exist in a kind of antagonistic symbiosis.“<sup>21</sup>*

A similar observation can be made with respect to the division between the public sphere or 'civil society' and the state. Between the state apparatus and the political elite on the one hand and civil society there is also some, often cultivated distance. Rather obvious are the sometime tense relations between the media and the state. Various civic organizations have ambiguous relations with the state bureaucracy and established political parties. Such tensions are not accidental and to be deplored. They are

19) Jean L. Cohen, Andrew Arato, *Civil Society and Political Theory* (Cambridge: MIT, 1999); David Zaret, *Origins of democratic culture* (Princeton: Princeton University Press, 2000)

20) Chantal Mouffe, *The Democratic Paradox* (London: Verso, 2000).

constitutive to liberal democracy and associated with civil rights.

To acknowledge and integrate such structural differentiation into the analysis is important in my view. Practicing liberal democrats have a tendency to downplay such tensions every now and then when they advocate consensus models as the essence of democracy. Ignoring the constitutive ambiguities and antagonisms of liberal democratic societies leads to a far too rosy picture of what may be achieved through open-minded deliberation and exercises to promote consensus. For Mouffe democracy is not so much about deliberative consensus but about dissensus and agony. Agony about the best way to move forward is characteristic of democracy operating under the structural conditions of economic liberalism and respect for civil rights. Agonizing about the boundaries between the economic and the political domain and between the state and the public sphere is very much a part of that.

To use the notion of civic science and civil society (or public sphere) as structurally differentiated from the political and economic domains implies that one can more clearly delineate what public engagement requires and how to promote it. Civic science should serve civil society and the public interest as it is articulated in the public domain. Civic science should serve the representation of civil concerns in the formal political system. Civic deliberation should independent of the other main actors in the economic and political field. One of the problems of the development of mode II science and regulatory science is that the scientists loose their independence and critical distance from the processes and configurations with state and industry in which

they are otherwise involved. One does not have to be an enemy of private enterprise to see the danger of insufficient review and transparently organized accountability. Government-funded research institutes may provide the independent critical knowledge, but they may also become too closely intertwined with bureaucratic and political interests. Rather the universities and academies of public science may still the best candidates to provide a critical knowledge base essential to the proper functioning of civic society deliberations and critical review of what governments and private interest do<sup>22</sup>.

Against this one may argue that universities are not particularly well-known for their openness to the general public. It is exactly that openness that Science Shops could promote. As such it is fortunate that the EU is supporting the work of Science Shops and their networking across Europe and beyond. Provided the Science Shops remains focused on providing knowledge and support to citizens and groups at low costs and does not become a managerial instrument in serviced of other goals then the public good Science Shops may fulfil an essential function.

Serving as a constituent of civil society should not stop in my view with answering questions of whoever turns to the shop. Certainly that is important and it is a line of work that should be further supported. Yet, Science Shops could also serve civil society in promoting other forms of public engagement. The recent experiences in The Netherlands and other countries, among other things with GM food, suggest that such debates are best promoted and managed by organizations that operate at considerable

21) Robert Dahl, *On Democracy* (New Haven: Yale U.P., 1998), p.166.

22) The public still accords an important role to academic science as a source of advice on critical problems with technology. See *op.cit.* note 7.

distance from the government and its bureaucracies. Science Shops have good antennas for the problem and concerns of normal citizens. They are also trusted by many citizens and NGOs. They are staffed by young people with relatively open minds. To promote the abilities of such people to moderate debates and to get at the heart of problems may be one of the best investments in the future one may make.

### Conclusion

Science Shops are very much alive and thriving. They may play a useful role in promoting EU science policy and may play a role in managing programmes and activities geared towards enhancing public participation in scientific, technological and socio-economic innovation. It has been argued in this paper that the role of Science Shops could be broadened to encompass various forms of public deliberation about changes and about the effects of current policies on citizens' concerns. Through their work the shops have excellent connections with groups and people that are affected but have little opportunities to engage with science.

Over the last five to ten years EU policies have not only encouraged public participation, but also critically reviewed and adjusted the assumptions on which public engagement activities are based. This has been done in response to problems with current innovation policies and scandals, scientific evidence from studies of public understanding and as a part of optimistic economic policy agenda's.

Ideals of deliberative democracy have inspired the policy drive towards participation. An important criticism of such models is, however, that they ignore the tensions between democratic deliberation and decision-making and structural and constitutional differentiation

between economic liberalism and civil society. In designing public participation such tensions should be addressed more explicitly to avoid ill-conceived expectations with respect to the goals and limits of public consultation. Enhancement of lay citizen participation through government initiatives may lead to tensions between NGOs claiming to represent the public and those in charge of such initiatives. In part such tensions have to do with the more structural issues just mentioned, as such limits are at odds with views and agenda's NGOs are pursuing. It is better to acknowledge such problems upfront than to let them simmer in the frustration that comes from encouraging inappropriate expectations with respect to what might be achieved through public deliberation exercises.

Now that the Lisbon agenda appears more difficult to realise, there is concern that enhanced public engagement will be tuned down and become more like public relation exercise and political marketing. If that happens, cynics would be correct to argue that the sudden love affair of policy makers with the public and ordinary citizens is just another Machiavellian ploy to fend off the latest avalanche of massive frustration. The recent shifts in the EU mentioned above may be seen as evidence that the interest for what ordinary citizens think about technological change is already fading. But public engagement may be like tar, once it is on your hands it is hard to wash off. Public involvement of civic society is not something one can put on or off like a switch. Even though the process is fragile and may get stuck temporarily as the Lisbon strategy fails, the European public wants more and not less accountability for their leaders. The debates about the EU constitutional agreement and referenda also may be seen as another signal for this.

# Improving Interaction between NGO's, Science Shops and Universities

MICHAEL S. JØRGENSEN

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The INTERACTS research project ("Improving interaction between NGOs, Universities and Science Shops: Experiences and Expectations") was a cross-national study by Science Shops and institutions with Science Shop experience from seven different countries – Austria, Denmark, Germany, the Netherlands, Romania, Spain, and the United Kingdom. It was conducted in the period from January 2002 to December 2003. The aim was to improve the interaction between small-to-medium non-governmental organizations (NGOs), universities and Science Shops by analysing the experiences of and the future expectations for co-operation between such NGOs and universities through intermediaries such as Science Shops. The project was funded by the European Commission under the programme „Improving the Human Research Potential and the Socio-economic Knowledge Base“.

The focus of the INTERACTS research project was:

- The political and institutional contexts of co-operation between NGOs, Science Shops and universities in the partner countries.
- The experiences of interaction between NGOs, researchers, students and Science Shops and the impact on societal dis-

courses, research agendas and university curricula.

- Dialogue about the expectations for and perspectives on co-operation between NGOs, researchers and Science Shops expressed by stakeholder groups at scenario workshops

The public discourses on science and society in most of the INTERACTS partner countries are connected to the concept of the knowledge-based society. Co-operation between science and society is perceived to be important, but the focus for politicians and university policy-makers is mainly to generate and distribute knowledge with the aim of increasing economic competitiveness. This means that scientific knowledge primarily is seen as a means to achieve economic goals rather than satisfying the needs of civil society.

## Key findings from the national case studies

Twelve of the INTERACTS case studies were based on projects conducted by university-based Science Shops and nine case studies on projects conducted by community-based Science Shops.

The case studies show that when NGOs or citizens approach Science Shops, their need for knowledge can be categorised as one or more of the following 1) Scientific analysis of a problem, 2) Enhancement of knowledge around a certain topic, 3) Research on impact of governmental projects, 4) Development of NGO- community-based solutions, or 5) Evaluation of NGO or community services/projects. To get access to free or low cost research and independent research through the Science Shops is important to the NGOs.

The co-operation with Science Shops can have an impact on the NGOs, such as building up capacity in the NGO for analysis, networking and service delivery, and influencing the public discussion about a topic, sometimes by referring to an analysis as a scientific analysis. The case studies also show that Science Shops contribute to the roles and tasks of the universities by contributing to student competencies and skills through the possibilities for problem-based learning, and by contributing to the strategic societal role of universities. Science shops might act as knowledge repositories ensuring continuity and progress from project to project and act as an antenna for new societal topics, whereby new research and teaching areas might be established.

### Key findings from the national scenario workshops

The future expectations for co-operation and dialogue between NGOs and universities through intermediaries such as Science Shops were discussed through seven scenario workshops held in the INTERACTS partner countries as one-day events with participants representing different role groups: Science shops staff,

university researchers and students, citizens groups and policy makers. The scenario workshops identified a desire among the participants for more networking and continued discussions of how to develop the dialogue between science and society. The scenario workshops further showed a wish among the participants for more open universities, which are willing and interested in addressing problems and issues perceived important by civil society. More democracy in societies' decision-making processes was also an issue, which the participants at the scenario workshops identified as important for the future dialogue between science and society.

### Policy recommendations

The INTERACTS consortium has drawn out policy recommendations for the strengthening of the role of Science Shops in a more democratic form of societal governance. The recommendations relate to five policy issues, which emerged through the project. Concrete proposals were developed for initiatives, which could be taken by universities, governments at different levels, NGOs, the European Commission and the Science Shops and their networks. The five policy issues are:

- How can Science Shops support the role of NGOs in developing civil society?
- How can Science Shops influence the curricula of universities to make them more responsive to the needs and demands of civil society?
- How can Science Shops influence the research agenda to make it more responsive to the needs and demands of civil society?
- What contribution are Science Shops able to make to regional development?

- How can Science Shops become economically sustainable?

Some of the recommendations for universities are:

- Co-operation with citizens and NGOs should be incorporated into the institutional policies and profiles for research and curricula at universities:
- Formal channels for this co-operation should be developed, including dialogue about future curricula and research
- Co-operation with citizens and NGOs should be integrated into the curricula and made a part of the staff tenure criteria
- Part of the local research funding should be available for co-operation between civil society and researchers.

Some of the recommendations for governments and the European Commission are:

- Encourage universities to establish community-based research and learning
- (Co-)finance community-based research and learning, including the establishment of formal mediation channels like Science Shops
- Establish processes of co-ordination among the EU-countries and accession countries in relation to co-operation between science and civil society and the role of community-based learning in curricula
- Invite NGOs to influence the needs, planning and implementation of public and private projects, programmes etc.

# Fondation Sciences Citoyennes: A NGO Perspective

CLAUDIA NEUBAUER

Fondation Science Citoyennes, Paris, France

The Fondation Sciences citoyennes (Citizens' science foundation) is a NGO dedicated to the redistribution of expertise and research capacities towards citizens' movements.

We are living witnessing a transformation of the nature of risks, disparities and dangers created by the dominant modes of production and consumption. The liberal globalisation exacerbates these threats and intends to subject research and technical development to the requirements of solvability. These last years the accumulation of crises (Chernobyl, asbestos, contaminated blood, ESB, GMO...) showed the need for taking into account other interests and risks than those defined by techno-industry and techno-science. They question the actual system of expertise and science, provoke a revival of social mobilisation and lead to the emergence of initiatives concerning the implication of 'profanes' in research, expertise or vigilance, a process which led to a certain opening of science and its institutions.

Facing the merchandising of knowledge and the living, these mobilisation and initiatives embark upon a democratic development and a new social pact for a responsible and solidary citizens' science. Far from being reducible to "a rise of irrational beliefs", to a lack of information or to popularisation of sci-

ence, they affirm that a science for all must be built with all and in the dialogue with formerly devalued knowledge.

Engine of emancipation during several centuries, science, becoming today techno-science, is a wonderful and tremendous strength. But to serve the wellbeing of all the whole of human beings of our planet, this power requires other control than the only mere will to know, the desire of power or the logic of profit. Thus, after the era of the "control of nature" there must thus come the one of the "control of science", of the scientific citizenship.

The Foundation "Citizens' Sciences" aims at supporting and prolonging the current movement of democratic and civil appropriation of science, in order to put it at the service of the common good.

Our objectives are in particular:

- To increase the capacities of research and expertise of the civil society, such as NGOs, consumerists and citizens movements, trade-unions etc. We support the constitution of a «scientific third sector», meeting better increasing social and ecological demands, neglected by the dominant scientific orientation, whether they are defined by the state or by private industry.

- To stimulate the freedom of expression and debates in the scientific world, to support whistle blowers and the development of public controversies and «hybrid forums» on the stakes of strong scientific technicality. Far from fearing interventions of the public and far from technocratic logics, pluralism and controversies constitute sources not only of a better exploration of possible worlds and, therefore, of better decisions, but also of an active appropriation of scientific knowledge by the public.
- To promote the democratic elaboration of scientific and technical choices. We support and organise public debates on public policies regarding research, technology and expertise. We will also carry out the vigilant analysis of new deliberative methods multiplying these last years in order to support those which advance a genuine technical democracy.



## Plenary Session

# **PROCESSES, TOOLS AND INFRASTRUCTURES IN SCIENCE & SOCIETY**

This session views examples of concrete activities to link science and society. Examples range from a strategic to a practical level including a funder, NGOs, researchers, and a community based research organisation.



# Advancing Societies' Influence on Research Agendas – The Role of Science Shops

PETER NIJKAMP

President NWO, Netherlands Organisation for Scientific Research, The Hague, the Netherlands

*Science is a public good that does not only belong to the realm of scholars but has also a broader societal meaning and impact. Consequently, there is a need to position science in an open civil society where the science community has to meet several standards: quality, relevance and accessibility. From these perspectives, science communication and marketing is a strategic vehicle to favour science literacy in a modern society. Science shops have the best seedbed conditions to flourish if they are an integrative part of an academic system that is oriented towards society. They reflect the academic responsibility in a civil society and are one of the means of the university systems to develop an open accountability system to society at large. In this context, Science Shops may offer important role models for societal accountability.*

## Prefatory Remarks

Science is one of the great expressions of the human mind. Just like arts, science seeks to create new perspectives on complex phenomena. It operates at the frontiers of our knowledge. Consequently, scientific progress is a key feature and critical condition for a modern knowledge society. The strategic importance of an advanced knowledge society has convincingly been demonstrated in the EU Lisbon and Barcelona agenda.

It is clear that science cannot be undertaken in isolation from a modern knowledge society. It is a public good supported by the taxpayer's money. And therefore, society at large may ask a justification of fundamental choices made in the actual execution of scientific research. Thus, a dialogue between science and society is a sine qua non for

the construction of a bridge between two – sometimes disjoint or different – worlds. But if science is establishing a dialogue with society, then the question arises: what does society mean for science and what does science mean for society?

Nowadays, it is rather common to speak of a science (or knowledge) paradox in order to indicate that available scientific knowledge is not always properly deployed to tackle important problems in society. In my view, this is a rather superficial description of a complex phenomenon. Indeed, it may happen that existing knowledge is not always timely used, but it may also happen that existing open knowledge is not accessed by the (potential) user or that the (potential) user is not at all in a position to articulate his (or her) knowledge demands. Therefore, to address the knowledge paradox

calls for dedicated action lines. These are in particular:

- popularisation of science
- professional science communication
- interaction and dialogue with the user.

Can Science Shops help to implement these action lines? Europe has witnessed the emergence of several types of Science Shops in the past decades. Science shops offer a remarkable spectrum of diversity in many countries, but they have one thing in common: they are grass-root research institutions aiming at building bridges between science and society – on the basis of a bottom-up approach – in order to facilitate the knowledge needs of local communities. They can act as meaningful vehicles to cope with the above mentioned knowledge paradox, as they address also the three action lines sketched above. Science shops have been rather successful in many countries, but have also a permanent struggle on their profile and mission. Before addressing the latter strategic issue, I wish to elucidate the debate by offering some historical and general notes on the relationship between science and society.

### In Search of Role Models

Scientific inventions – and science in general – call for a sharing of insights with society at large. Science literacy makes up an important social basis for accepting and discussing new knowledge. I would like to invite you to take a short historic journey to the ancient and beautiful Italian city of Padua, a city that still reflects its past grandeur of high society and groundbreaking science. Padua was where the great scholar Galileo Galilei (1564-1642) made his important discoveries on physics and the solar system, and it was the home of the second oldest

university in Italy, after Bologna. Culture, science, economy and science were intertwined in Padua and they formed a strong alliance. Upon entering the oldest building of the University of Padua, you would see in the great hall, directly in front of the magnificent Aula Magna, Galileo's lectern. This historic lectern is made of rough wood and has no intricate carvings or other embellishments. Indeed, science has no need for expensive frills.

But Galileo's lectern has one special characteristic: it stood on four wheels! Whenever Galileo discovered something – after a period of intellectual introspection and experimental research – he rushed to his lectern, which was then pulled through the streets of Padua.

On the street corners and plazas of the old city he told the gathering crowds about his new discoveries and ideas, and engaged his fellow citizens in lively debate. Galileo can rightly be called the founder of interactive scientific communication. Compared to him, our modern Internet is just a ripple in a fast-moving current.

Science is so fascinating that it begs to be passed on. The heart of science beats not only in the spacious halls of academia, but also in the very centre of our society. Scientific research is a search for unknown expanses; it is an expedition to ever-changing horizons that offer an abundance of surprises. Is it not exhilarating to hear about the birth of new stars, the political deceptions of Cleopatra, the use of prime numbers in our information-economy, risk-analyses of new cancer treatments, or the public support for genetically manipulated food? Who would not want to tell more about these subjects; and who would not want to know more? There is no limit to scientific curiosity.

## The Modern Knowledge Society

After the Industrial Revolution, the Service Revolution, the Information Revolution and the Network Revolution, we have now entered the era of the Knowledge Revolution. Knowledge and scientific research have drastically changed our daily life, our economies and our social constellations. We live in an age characterised by an explosive development of knowledge. Our society has developed more knowledge in the time span of one generation than mankind had achieved in the many centuries of human history that preceded it. Whereas only one dissertation was produced in the United States in the year 1870, now there are an average of 40,000 dissertations produced there every year. The Netherlands is also following this trend: at the moment an average of 10 dissertations are defended each day in our country. Scientific development over the centuries has always been characterised by an increase in diversity, specialisation and access to knowledge. Universities have been transformed into multi-versities aimed at the mass production of knowledge. The body of current knowledge is not a permanent collection of immutable insights, but is in itself subjected to unprecedented dynamics. The provost of The Johns Hopkins University in Baltimore expressed this idea brilliantly during a graduation ceremony in which he offered the new graduates the following words of wisdom: 'On the day you graduate half of your knowledge is already obsolete. The problem is that we don't know which half.' Knowledge has indeed become volatile. Nevertheless, it is a critical success factor in modern economic and technological systems.

Science has not only economic and technological value, but also cultural value. We now speak of a knowledge-based economy. Scientific and technological progress are translated

into an increase in labour productivity, which is a prerequisite for economic growth and the creation of a healthy competitive position in the world. Many empirical studies have shown that the quality of human capital plays a crucial role in this process. Reports in the literature have convincingly demonstrated that investments in education produce a high return for the economy. Recent work by the OECD concluded that a 10% increase in the duration of education produces in the long term an extra contribution to the GNP of approximately 4.7% per person. The OECD also concluded that increasing the R&D intensity of businesses by 0.1% of GNP will eventually lead to an extra growth of 1.2% of GNP per person, thanks in part to the resulting technological innovation and more efficient forms of organisation. My own research based on comparative analysis of 123 empirical model studies conducted in many countries also clearly indicated that investments in education and research have a positive impact on economic growth almost anywhere in the world. Unfortunately, such findings about the necessity for citizens to be well educated at each step in the whole education chain stand out in stark contrast to decreasing investments in the Dutch knowledge-based economy.

A study recently published by SPRU (Science and Policy Research Unit) in Sussex demonstrates quite convincingly that the following benefits can be expected from a research culture that is better integrated in society:

- production of new scientific information and socially-relevant insights;
- better education and training of graduates;
- development and utilisation of new scientific networks and international cooperation;
- improvement and expansion of problem-solving capacity in our society;

- creation of innovative activities;
- development of scientific knowledge on behalf of culture and society.

### Knowledge and Networks

The nature of scientific research is changing drastically, including a structural transformation from:

- solitary research to teamwork, particularly based on broad research networks and clusters;
- monodisciplinary research to multidisciplinary initiatives (often with a strong social science component);
- a local tradition to international cooperation and an international orientation.

It would be no exaggeration to say that in our modern network society and network science a nearly genetic transformation has taken place from the lonely office researcher to the open knowledge networker. The distinction is clear: the absent-minded professor locked in his dusty office fights a lonely battle with his overstuffed bookcase, while the network scientist's battlefield is limited to his PC screen through which he can command the world. Knowledge creation and network usage are two interlinked phenomena. Networks are based on knowledge synergy and they lead to greater benefits than solo activities. They are based on voluntary cooperation with the objective of achieving the best results through mutual competitive interests. This is also the case for European networks.

Networks are varied and often completely different in design, construction and use. They are not a goal in themselves, but an instrument; that is, they are directed at achieving a desired result (which can differ per actor) based on the

premise that the whole adds value to each actor or participant. No partner gets a free ride, and there are no losers, only potential benefits for each party involved. Each network is held together by 'matching' interests, as is clearly illustrated by the 'networks of excellence' in the EU framework programmes.

Networks are based on cooperation in a context of competition. A guiding principle is the notion of trust. Without trust no one will succeed. Greater trust offers greater security, and thus a greater willingness to invest, including in knowledge. In order to achieve the 3% Barcelona norm, Europe will have to create and consistently manage a policy framework within which both public and private parties can operate based on synergy of interests and networking. As the name suggests, networking implies getting the work done. If networks don't work, they degenerate into 'not-works', which have no need for.

The scene of knowledge creation and dissemination has thus drastically changed in the past decade. What is the role of Science Shops in this changing environment? The last section will address this strategic question.

### Science Shops in (Inter)action

Science shops have become established institutions in many Western societies. They grew from an informal activity inspired by student movement and counter culture into a non-profit institution embedded in the university system. Their success was largely due to the fact that in a modern civil society many knowledge and research needs cannot be met by conventional channels. They have turned into an important interface in meeting the varied demand for knowledge in our society. Access to knowledge has thus become a basic mission of Science Shops.

They have acquired a good status and image in many countries by the fact that their low-barrier constellation enabled them to provide a better science service to the community. Their action potential is based on interaction and dialogue with society.

Notwithstanding their current successes in many university systems, the position of Science Shops does not remain undisputed. Their recognition depends on several roles that do not always reinforce each other, since Science Shops are often seen as:

- An interesting source of knowledge at low costs
- An effective exchange platform that offers knowledge services to the community on the basis of mediation and brokery functions
- A contributor to the achievement of science literacy in a civil society through the provision of access to knowledge by science communication
- An institution aiming at science accountability to society at large by the interface with citizens through informal or low - threshold communication channels
- A centre for the provision of research training and communication to capable students.

In reality, these different roles show up in various modalities in several countries. There is not a unique and unambiguous model for Science Shops. But whatever the appearance and mission may be, one fundamental condition would have to be met in all cases: Science Shops ought to be professional, high-quality knowledge centres at the service of the community. It should not be a source of cheap research for society, but be driven by regular standard practices of scientific research. Consequently, Science Shops would not have to isolate them-

selves from the mainstream research tradition in an academic institute. It ought to be embedded in common research programmes as defined by research departments in universities, or by the scientific community via their research councils. Due to their bridge function with societal knowledge issues, they may even become vehicles in formulating challenging research questions to research departments or even research councils. A high-quality research environment and a professional (non-amateuristic) research management are therefore critical success factors for Science Shops in a modern civil society.

# Promoting Risk Communication in Japanese Chemical Industry

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## Introduction

The Science Shop, born in the Netherlands in the 1970ies, has now become a worldwide activity. In Japan, the activity has been introduced mainly in the field of science and technology studies (STS). Now it draws much wider concerns, including the policy makers of science and technology. For example, as shown in Fig.1, a governmental document, the Annual Report on the Promotion of Science and Technology of FY 2003 by MEXT, introduces the Science Shop as a citizen-participatory research, responding to the anxieties of civil societies.

Although the Science Shop has not been formed yet in Japan, there are certain moves toward it. The research by the authors is one of them, which is to promote risk communication in the chemical industry. In the following presentation, general aspects of risk communication in Japan are introduced and then the research by the authors is discussed.

## Risk Communication in Japanese Chemical Industry

Japan is the second largest after the U.S. in production of chemical materials. In 2002, it produced nearly two hundred billion dollars of



Fig.1. Growing Concerns for Science Shops

plastics, petrochemicals, pharmaceuticals, cosmetics and so on. Since Japan is a small country with much population (four times as many in the population, four fifth as large in the area as Spain), risk communication has been one of the major concerns for the Japanese chemical industry (Fig.2). Various kinds of risk communication are being taken in each company, as will be informed by its brochure. In addition, the industry jointly formed Japan Responsible Care Council (JRCC) in 1995, following the initiative of Canada in 1985. JRCC, now consisting of

more than one hundred companies, informs the industry's offers to keep the society safe and health (<http://www.nikkakyo.org/English/index.php3>).

Not only in the industry, but also in the public sectors, a variety of actions are taken. For example, Pollution Release and Transfer Regulation Law (PRTR) was enacted in 1999 ([http://www.meti.go.jp/policy/chemical\\_management/law/13.htm](http://www.meti.go.jp/policy/chemical_management/law/13.htm)). Now, a governmental report announces annually the kinds and the amounts of chemical substances produced in each area. An organization named Chemical Substances Advisors is also in work (<http://www.ceis3.jp/adviser/>). The advisors are officially approved specialists ready to answer to citizens' questions on chemical substances. Now there are twenty five advisors. In addition, there are a number of public agencies engaged in risk communication, such as, Chemicals Evaluation and Research Institute ([http://www.cerij.or.jp/ceri\\_en/index\\_e4.shtml](http://www.cerij.or.jp/ceri_en/index_e4.shtml)), Japan Chemical Industry Ecology-Toxicology & Information Center ([http://www.jetoc.or.jp/english\\_index.htmlter](http://www.jetoc.or.jp/english_index.htmlter)) or Japan Environmental Sanitation Centre (<http://www.jeas.or.jp/english/index.html>).

Various types of NGOs are formed with deep concerns for chemical substances or environmental issues, especially for air pollution, dioxins, asbestos or environmental hormones. Their activities are varied; having symposiums, publishing journals, learning by themselves, doing research or measurements, or launching political movements. As far as surveyed by web-site, more than 40 NGOs were counted, among which NGOs doing research or measurement were counted several. The examples are as follows. Environmental Monitoring Laboratory measures the atmosphere, water or

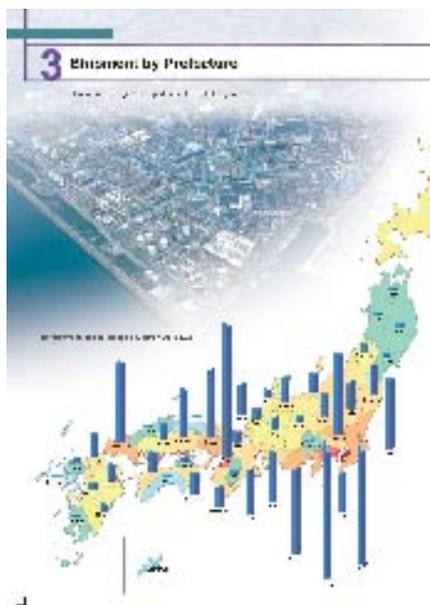


Fig.2. Chemical Industry in Japan (a brochure of Nikkakyo)

soil to answer the questions of citizens (<http://www4.ocn.ne.jp/~kanshi/>). Citizens' Science Initiative carries out a number of research projects, one of which is alarming the electromagnetic waves being radiated from Tokyo Tower (<http://www.csij.org/>). The Japan Institute of Land and Environmental Studies does surveys or advice for citizens or sufferers (<http://ha2.seikyuu.ne.jp/home/kokudo/Eindex.html>).

These research-typed NGOs do not call themselves 'Science Shop'. However, according to the classification by Henk Mulder, there are two types of Science Shop, non-university based and university based. In that sense, they are substantially doing work of Science Shop of the former type, although they are not strongly networked with each other.

### Research for the Promotion of Risk Communication

The authors belong to RISTEX, the Research Institute of Science and Technology for Society. RISTEX was founded in 2001 under the guidance of the Ministry of Education, Culture, Sports, Science and Technology, MEXT. RISTEX aims at solving S/T related problems in our society with an annual budget of about 23 million \$, or 18 million €. Various research projects are being carried out, with periods ranging from three to five years ([http://www.ristex.jp/english/english/top\\_e.html](http://www.ristex.jp/english/english/top_e.html)).

The authors' project is to promote risk communication between the chemical industry and the citizens, as shown in Fig.3. At the beginning of the project (2004), two ways of survey were made. One of them asked to major chemical companies on what kinds of risk communication or environmental protection they took, or what kinds of difficulties they had. 740 answers were obtained. The other asked to citizens on how they were evaluating these activities of the companies. Roughly 19,000 answers were obtained.

### Risk Communication for Chemical Industry by Chemical Process Safety Group

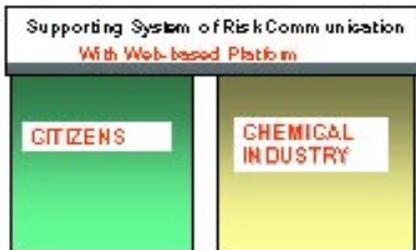


Fig.3. Research by RISTEX

The former survey showed that the industry was worried about how much and on what ways it should take for risk communication. The latter indicated that roughly 90 % of the residents living nearby the plants were anxious for their operations. Then the application of web-site was proposed to meet these problems, because it could provide the risk communications of the industry in a uniformed way. In addition, citizens would be accessible to them quite easily.

The web system is now under construction, which will be operated by a public organization. The system provides general information, such as product uses or responsible cares, or risk communications of relevant industries. In addition, the supposed organization asks chemical, gas or steel companies on such items as the hazards and toxicity of chemicals they have, necessary actions of residents in emergency or safety managements they take. The answers are informed on the web and will be renewed periodically or eventually (now about thirty tentative answers have been obtained).

Citizens are accessible to the web. They may compare the activities of these companies on the web and decide how safe they are or

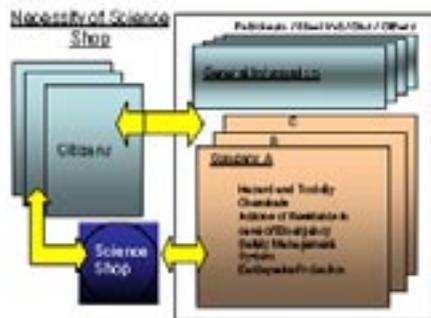


Fig.4. Risk Communication using Web Site

how they should do in emergency. In addition, if they have any questions, they may ask to a corresponding company through the web. If the answers were not satisfactory for the citizens, they would need a different organization to have an independent answer. And vice versa for the companies. That means this system needs a Science Shop.

### Towards the Establishment of a Science Shop

The Science Shop was conceived early in the project. The authors have sought the possibilities in the academic fields. Now, Hideyuki Hiramawa of Kyoto Women's University, who is the main introducer of Science Shops to Japan and devoted to promote citizen participation, is going to set up it in Osaka University next year. It is presumed that the shop by the authors will be networked with relevant NGOs, centering at Osaka University, as shown in Fig. 5.

### Summary

In Japan, where huge amounts of chemical products are produced in highly populated areas, various ways of risk communication are being taken. Besides the efforts of the industry, the governmental sectors and the public sectors are also engaged in risk communication. Especially, there are a number of NGOs doing research works for chemical substances or environmental issues, which will be worthy of the name of Science Shop. However, in general, citizen participation is not sufficient in the communication.

The research project of the authors is to promote risk communication using a web site. The system, now under construction, provides infor-

mation concerning chemical substances, risk managements or safety operations of chemical companies. Citizens are accessible to the information and able to compare each activity of the companies and understand how they are safe. Questions and answers may be corresponded between the two sides on the web.

A Science Shop is conceived in the system to give independent answers. The shop will be networked with other relevant works around a central shop which is to be set up next year in Osaka University.

### Science Shops networked around a University (Osaka Univ.)

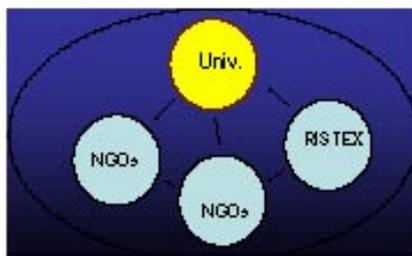


Fig.5. Concept of Science Shop by RISTEX

# Increasing NGO Participation in Research and the Policy Agenda

EURIG SCANDRETT

Head of Community Action, Friends of the Earth Scotland, Edinburgh, UK

I'd like to start with a bit about myself. Like many people here probably, I started out as an academic scientist, conducting research in plant ecology until 1989, when I became a community educator. I've worked for Friends of the Earth Scotland since 1997. I say this because of the influences which led me to make the change from research science to community education. One influence was the radical science movement which in the 1980ies was still relatively strong, including the Science Shops across Europe. The second major influence however was a negative one. In the UK, Prime Minister Margaret Thatcher was in the process of moving public services into private markets, and scientific research was one of her targets. Publicly funded science, she argued, should be 'near market' to feed into the marketable science funded from private sources. It was clear to her that science was not to be for social progress, as I would understand it. It certainly confirmed to me that Science is political, and that as a scientist I needed to make political choices.

But the final event which brought home to me the political nature of science was December 1984, when Union Carbide's Bhopal pesticide factory leaked methyl isocyanide into the community, killing a total of 20,000 people. 20 years later I was honoured to march alongside survivors of that corporate abuse of science to the Mumbai headquarters of Dow (Union

Carbide's successor), continuing to demand justice.

Since the establishment of a devolved parliament for Scotland, Friends of the Earth Scotland (FoES) has made environmental justice its campaign focus. What we understand by environmental justice is encapsulated in the strap line 'no less than a decent environment for all, with no more than our fair share of the earth's resources' thereby combining the social justice with environmental problems. Locally, the poorest and most disenfranchised communities suffer the worst environmental problems. Globally and intergenerationally, the resource consumption of the richest countries, and the richest within all countries, deprives the poor and future generations of access to these resources and the life support systems of the planet.

In support of environmental justice, FoES has focused on the traditional NGO activities of research, lobbying and campaigning, but also developed work in community action and popular education, with groups most affected by pollution and contamination. Such communities have had to react to incidences of acute environmental injustice – an inappropriate development or a polluting incident – or else the degradation of their environment through chronic neglect. Through working with these communities, it was clear that local activists were looking for the skills needed to interpret the problems and plan and execute a campaign, but also the

knowledge to understand the causes of environmental injustices, the better to tackle them at source.

Recognising the need for sustained and intensive learning for environmental justice activists, Friends of the Earth linked up with an academic institution – Queen Margaret University College (QMUC) – to provide an accredited course in environmental justice. Funding was obtained from a variety of sources, including the UK Lottery (Community Fund) European EQUAL programme (Scottish Workforce Empowerment through Lifelong Learning); Scottish Executives' Widening Participation fund (Metropolitan Access and Articulation to Community based Higher Education Delivery (MAATCHED)); and the Royal Society's Committee for the Public Understanding of Science).

The approach which the course took was dialogical, drawing on the educational methodology of Paulo Freire' Pedagogy of the Oppressed and the popular education movement. The curriculum was therefore negotiated – activists brought their own knowledge and experience to the classroom and tutors brought theirs: the NGOs' environmentalism and access to academic knowledge. We also drew on the radical adult education tradition, especially that of Ettore Gelpi, with the focus of the curriculum on social conflict arising in the relations of production.

A further influence was the practice of the 'community agent', a rural development model used in South Asia in which local community leaders are recruited, trained and supported as they mobilise and organise in their own communities. Applying the same model in Scotland, we recruited activists in urban and rural communities, minority ethnic communities and workplace (trade union) communities, to ensure that the wider community benefits from the education

received by those actually studying the course.

Other influences in the project were the radical science movement, with its epistemological approach emerging from political struggles, and the environmental justice movement in the USA and elsewhere in which communities have coordinated their campaigns against environmental racism into a social movement.

The course which formed the core of the project took place over 18 months, through 6 residential schools and community-based support. In collaboration with the University College, it was ensured that the same rigour was applied to campaigning and community development as to academic study. Assessment methods were developed which were relevant to local campaigns, such as running a participatory meeting or influencing the media. At the end of their study, agents received a Higher Education Certificate in Environmental Justice, which is a recognised qualification in terms of access to higher levels of university education and employment in community work and environmental non-profit sectors.

A distance learning version of the course has also been developed utilising printed study guides and webCT technology to replicate the kinds of dialogues which can take place in a group setting. Although no substitute for direct contact, this makes the resources more accessible for community activists in more remote communities, disabled agents and for workplace study by trade union activists.

The curriculum which FoES and QMUC put together included the issues believed to be relevant to diverse environmental justice struggles, including principles of environmental justice and sustainable development, science of the environment, economics, social movements and political change, planning and environmental law, sustainability auditing, community develop-

ment, media and communications, project planning and fundraising, health and safety and the environment and the ecological debt. The issues which the agents brought as being relevant to their communities included Opencast coal mining; waste landfill; quarrying; road building; air pollution from a petrochemical plant; fish farming; wind generation and public participation.

Our understanding of environmental justice has developed through carrying out this project. The economy may be regarded as a through flow of materials and energy, from extraction of raw materials and fuels, through manufacturing and transformation, distribution and consumption and finally disposal of waste. Each of these processes have the negative environmental impacts which economists call externalities – pollution, waste, contamination – which affect the communities living near to the processes, the workers who work in the plants, and the wider environmental systems which affect communities far distant from the source of the problem. What economists call externalities, leads to social conflict: community action, industrial struggles, political campaigns and social movements.

Ettore Gelpi identifies social conflict as a source of curriculum for lifelong education. In this case, the curriculum is derived from an educational response at the point of conflict over environmental resources. This leads to a more profound understanding of environmental justice struggles occurring at the environmental limitations to the capitalist economy. Through this praxis, a political ecology analysis of capitalism is constructed, which contributes to social change for environmental justice.

The agents for environmental justice project was just one of a series of community action projects in which Friends of the Earth has been involved. Particularly in the issue of democratis-

ing scientific knowledge, FoES has collaborated with the Centre for Human Ecology to develop ScienceAid, a clearing house for linking politically committed scientists with communities facing environmental injustice. Although connections are being made, we are far from the kind of role which Science Shops have played in many parts of Europe. In today's Scotland, economic constraints on even sympathetic scientists of good will militate against initiating projects which might have been possible 30 years ago.

A related project which FoES has initiated is Accessing Relevant Knowledge (ARK), which aims to provide scientific expertise in support of communities facing local environmental justice struggles. This includes helping with access and interpretation of public records, working with the Scottish Environment Protection Agency to improve their accountability to local communities exposed to pollution, and developing lay monitoring methods, such as diffusion tubes, and the Bucket Brigades lay air monitoring devices which originated in the USA. The ARK work is being developed by our community science coordinator Heidi Bartlett, contactable through Friends of the Earth Scotland ([www.foe-scotland.org.uk/nation/ark.html](http://www.foe-scotland.org.uk/nation/ark.html)).

# Geo-virtual Reality and participatory Planning: New Technologies for public Participation

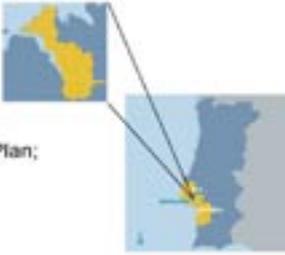
MARINA LOBO

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**Study Case - Barreiro**

Public Participation need it:

1. Polis ;
2. Revision of Municipal Master Plan;
3. Quimiparque Rehabilitation;



2<sup>nd</sup> International Living Knowledge Conference Page 2

**Virtual Landscape**

Users can navigate through real-time data in realistic virtual scenarios over urban or rural areas interacting with a variety of objects to obtain information.

A keyboard, mouse or joystick enable users to move freely in space, increasing/decreasing navigation speed and interacting.



2<sup>nd</sup> International Living Knowledge Conference Page 2

## Virtual Landscape



Virtual flights can integrate many features:

- Location maps;
- Geo-referenced databases;
- Multimedia information;
- Pre-defined paths;
- View points;
- Navigation layers;
- Information layers;
- Orientation tools;
- Audio recording/reproduction of geo-information.

## Barreiro Virtual



### Multimedia kiosk

Implemented for the support of the Barreiro master plan revision.

Users can explore a 3D environment in a specific area and obtain all relevant geographic information using mouse/keyboard or a joystick.



The interactive kiosk has other functionalities, such as geo-sound data input.

## Barreiro Virtual



### Multimedia kiosk

Information available for the Barreiro case-study comprises 3D models of future urban interventions.

In the Barreiro case-study, a 3D model of a new projected urban area, which is integrated in the European urban requalification program called 'Polis' can be visualized.



**Barreiro Virtual**



**Multimedia kiosk**

Users can leave complains or comments using a microphone by indicating a geographical position on the kiosk desktop monitor.



Users can also hear those located comments in sound speakers attached to the system.

**Ideas to explore**



**Mapping of complaints/comments in a Tangible Interface**

Location of complaints or comments using a microphone.

Users can listen complaints and comments using a headphone.



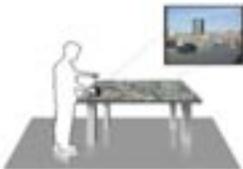
Collaboration ← → Intuitive interaction

**Other ideas**



Municipal Master Plan - Use of physical objects to obtain information about classification and legal restrictions.

Polis 3D objects to see in the real area the impacts.



Users can hear the city noises based on available city noise map: industry, traffic, birds, ....

Simulation in real time of Quimiparque scenarios.

# Quality Research @ Community Prices: A Decade of creating Community-University Partnerships through an applied Sociology Research Center

JEFFRY A. WILL AND CHARLES E. OWENS

Jeffry A. Will, Associate Professor of Sociology and Director, Northeast Florida Center For Community Initiatives, University of North Florida, Jacksonville; Charles E. OWENS, Professor of Criminal Justice and Associate Director, The Florida Center, University of North Florida, Jacksonville, USA

*In this paper, we present a case study of an applied sociological research center at a medium sized urban University in Florida that has been particularly successful in its efforts to combine the academic and service components of the University's mission with the applied, as well as more traditional academic research. Over the past decade nearly \$2.5 million has been obtained in applied contract research, involving a dozen faculty, with over 50 students (undergraduate and graduate) employed on research projects, and over 300 student volunteers participating.*

## Introduction

Public Institutions of Higher Education in the United States are facing a number of challenges, including funding opportunities, massive enrolment growth, and competition from for profit (often on-line) institutions. An increasingly important, and controversial, challenge is the debate over the role of University Faculty and their research on addressing public social problems. While some academic pundits such as Professor Stanley Fish argue that academics should remain focused on more "intellectual" university pursuits, others, including current American Sociological Association President Michael Burawoy argue for a very explicit and actively engaged "Public Sociology." While this debate may appear to be of recent origins, tensions between the "Pure" and "Applied" Soci-

ologies have been present since the pioneering days of August Comte and Herbert Spencer. Much of the debate today is largely one waged "at the coasts" – the regions of the U.S. intellectually dominant because of the prestigious "Ivory Tower" Universities. Smaller, regional (and often urban) Universities, however have not had the luxury, nor the inherent resources to enjoy the debate – many faculty at these universities (particularly from the social sciences) are thrust into the day-to-day realities and social issues facing their communities.

In this paper, we present a case study of an applied sociological research center at a medium sized, urban University in Florida that has been particularly successful in its efforts to combine the academic and service components of the University's mission with the applied, as

well as more traditional academic research. In 1995, three faculty members from the Department of Sociology and Criminal Justice joined forces to establish the Northeast Florida Center for Community Initiatives (CCI). The founding faculty included: A Community Sociologist with extensive work in rural community development in Kansas; A Criminologist with expertise in Social Psychology and the intersection of race and crime; and a Sociologist specializing in Urban Sociology and Evaluation Research.

Over the past decade nearly \$2.5 million has been obtained in applied contract research, involving a dozen faculty, with over 50 students (undergraduate and graduate) employed on research projects, and over 300 student volunteers participating. Typically, research team members work directly with persons directly affected by the research to ensure community participation. Faculty associated with the Center also integrate research projects in classroom based learning activities as well as community service based learning processes. The Center has also played a central role in the development of a new Masters Program in Applied Sociology.

In addition to the University benefits gained through the work of the Center, the local community has also benefited from the availability of the intellectual resources provided through CCI. Research team members from CCI worked with the local Homeless Coalition from 1993-2000, conducting an annual census and survey of homeless persons to ascertain the conditions facing the most needy in our community. Results from this project were used to garner several million dollars in program support from government and private foundations to develop programs for the homeless.<sup>1</sup>

Other major projects within the community include an annual examination of Race Relations in the community, prison reform, program evaluation of a number of programs including juvenile justice interventions, infant mortality reduction, and HIV/AIDS interventions, among others. The work of the Center for Community Initiatives has allowed the University-Community partnership to build, as well as to provide for high quality research at community affordable costs. This experience has been a true "win-win" situation for all parties involved.

## Footnotes

- <sup>1</sup> See the I. M Sulzbacher Center for the Homeless (<http://www.imshomelesscenter.org>) for one of the primary homeless providers who used this information for program development. A comprehensive list of CCI projects can be seen at <http://www.unf.edu/coas/scj/CCI/index.html>.



# CONCLUSIONS



# European Commission should strengthen Citizens' Involvement in Research

CASPAR DE BOK AND NORBERT STEINHAUS

Scientists all over Europe are more and more creative in developing activities to improve the public understanding of science and technology. Science Shops and Community Based Research (CBR) centres have shown that they can facilitate the approach of Science and Society by providing independent, participatory research support in response to concerns experienced by civil society. Sharing the expertise of Science Shops advances citizens' ability to participate in the dialogue between science and society.

With over 100 presentations – not only from an European context but also from North-, Central- and South-America, Africa, Middle East and Far East – the 2nd 'Living Knowledge' Conference offered of a the huge palette of different experiences and interesting examples of community-based research and science and society relations. From the presented concepts in science and society interaction to the specific examples of good practices it became clear that these interactions still need advancements. But the conference also made clear that these advancements can be made, by offering a lot of ideas to take home. It also offered many options for linking initiatives, organisations and people. Advancing science and society interactions is about people and about perspectives.

Juan Maestre, Phil Nyden, Carmen Teodosiu and Caspar de Bok tried to present some general conclusions that can be taken home from

the conference. Because of the wide variety of presentations it will be impossible to include all sessions and presentation in these conclusions. Some general lines can be given however.

Advancing science and society interactions is like democratising the world. In a democracy it is about listening and talking, there is a dialogue. The dialogue between society and science needs to be a two-way street where all listen as much as they talk. To give science and society an understanding of each others needs a different approach for citizens' participation in science is necessary. Within the concept of 'social demand' for knowledge there is an increasing necessity for communication from society to researchers. The dialogue between the public on the one side and researchers and experts on the other side will be more promising, when the public is able to discuss 'science/society' issues in full knowledge and understanding of scientific 'facts', of the results of the research, of scientific action and of the way in which research operates in practical terms. The dialogue also will be more productive when researchers better understand public needs and societal demands.

This 2nd 'Living Knowledge' Conference included themes like 'the impact of communities on the research and policy agenda' and gave ideas on how citizens can participate in research and policy making. The conference encouraged the development of infrastructures for mediation and communication of community based re-

search and discussed local and global de-mands for access to research, science, education and technology. At least three main conclusions can be drawn:

### **Growing need for true participatory activities**

In addition to the demands made on research and development by commerce and industry, 'civil society' organisations have their own research needs. Community based research shows a great and attractive variety in involving societal groups. But there is still a growing need for true participatory activities, having citizen groups and researchers working together in research projects on a base of equality. The 'public' demand to discuss questions on social values, and the risks associated with scientific progress is still emotional but no longer ignorant on technical questions. Citizens more and more refuse the 'traditional' process of passive consumption of a knowledge actively acquired by experts. Facing problems and involved in conflicts on different levels citizens want to be able to take part in the research and decision making process

### **Breaking out of the local**

Science Shops and similar organisations in community based research (CBR) in general are small and local entities, bound to local conditions. And even citizens concerns and needs for research seem to be very local. From the examples given at the conference it became clear that the expressed societal demands are not local at all. At many places all over the world the same needs and the same demands for the sharing of knowledge are expressed. Breaking demands and needs out of the local

facilitates collaboration and research cooperation at an international level. It broadens the base of knowledge and experience and increases citizens empowerment. Community based research cooperation will also give opportunities to develop citizens based research themes within research institutes and research consortia.

### **Strengthening the EC Science and Society programme**

At the 'Living Knowledge' conference there was a strong will to built on the momentum to strengthen the EC Science and Society programme by giving input to its activities. In the 6th framework programme the EC started a process to implement science and society interactions in the European Research Area. This process isn't finished yet and should be continued in 7th framework programme. Looking to the future, the conference participants would like to see Science Shops playing a role in introducing new research themes to the EU agenda driven by the needs of local communities. "In FP7 we would like to see civil society representatives involved in the agenda setting, with sufficient support for small scale themes as well as large", says Caspar de Bok from the Utrecht Science Shop and project coordinator of the EC project called ISSNET (Improving Science Shop Networking). "In science, research and the Lisbon agenda," he continues, "the economy should not always play the leading role – we also need to keep an eye on social capital." The conference participants and all actors in „science/society“ issues are invited to give input to the development of new ways and new activities that strengthen citizens involvement in research.

We cannot communicate without a dialogue. In addition to the demands made on research and development by commerce and industry, 'civil society' organisations have their own research needs. Diffusion of knowledge often focuses on communication from researchers to society, but increasingly there is a demand for communication from society to researchers.

"There is still a tendency to present 'the public' and 'the experts' as two separate monoliths", Alan Irwin, dean of social and environmental studies at Liverpool University wrote in the Living Knowledge magazine. He continued: "We should be aware of the challenges (and opportunities) the new openness for public engagement and scientific citizenship offers for the future".

At the 2nd Living Knowledge conference in Seville many examples have been given to improve citizens involvement in any participa-

tory process. Especially in research projects citizens involvement is more and more important from the very beginning. Of course, there is no ideal way of communication between scientists and citizens, but all experts agree that every country can profit from the experiences of national projects by cooperating on an international level.

The 2005 International Science Shop Conference was obviously an important step in forwarding the Science Shop movement. It did not only present useful approaches in knowledge transfer but also opened possibilities for future cooperation to foster new organisational forms in connecting scientific and civil society. Science shops are still small entities and their activities benefit the local community, but within a network they can reach a critical mass to promote local challenges and experiences to a broader level.



## Parallel Sessions

# INTERNATIONAL EXPERIENCES IN SCIENCE AND SOCIETY INTERACTIONS

In the parallel sessions of this track cases of science and society interactions are presented. The parallel sessions intend to give some concrete examples of interactions between different type of stakeholders. It might give you ideas how to link with stakeholders your not linked with yet or how to improve or continue your links. All 4 parallel sessions in this track focus on different stakeholders; public administrations, NGOs, Research institutes and Science Shops.



## NGO CASES

# Participatory Assessment of Delivery of Public Services

TOM THOMAS AND KARUNA SRIDHARAN

Praxis – Institute for Participatory Practices, New Delhi, India,

The participatory assessment of Government of Orissa's (GoO) delivery of public services was commissioned by the Poverty Task Force of Government of Orissa with support from DFID, India. The findings from this study are meant to feed into the Public Sector Reforms programme underway in Orissa, through policy and planning for poverty reduction, and strategic decision making about allocation of financial resources. The exercise was viewed as contribution to strengthening accountability and democratising governance processes.

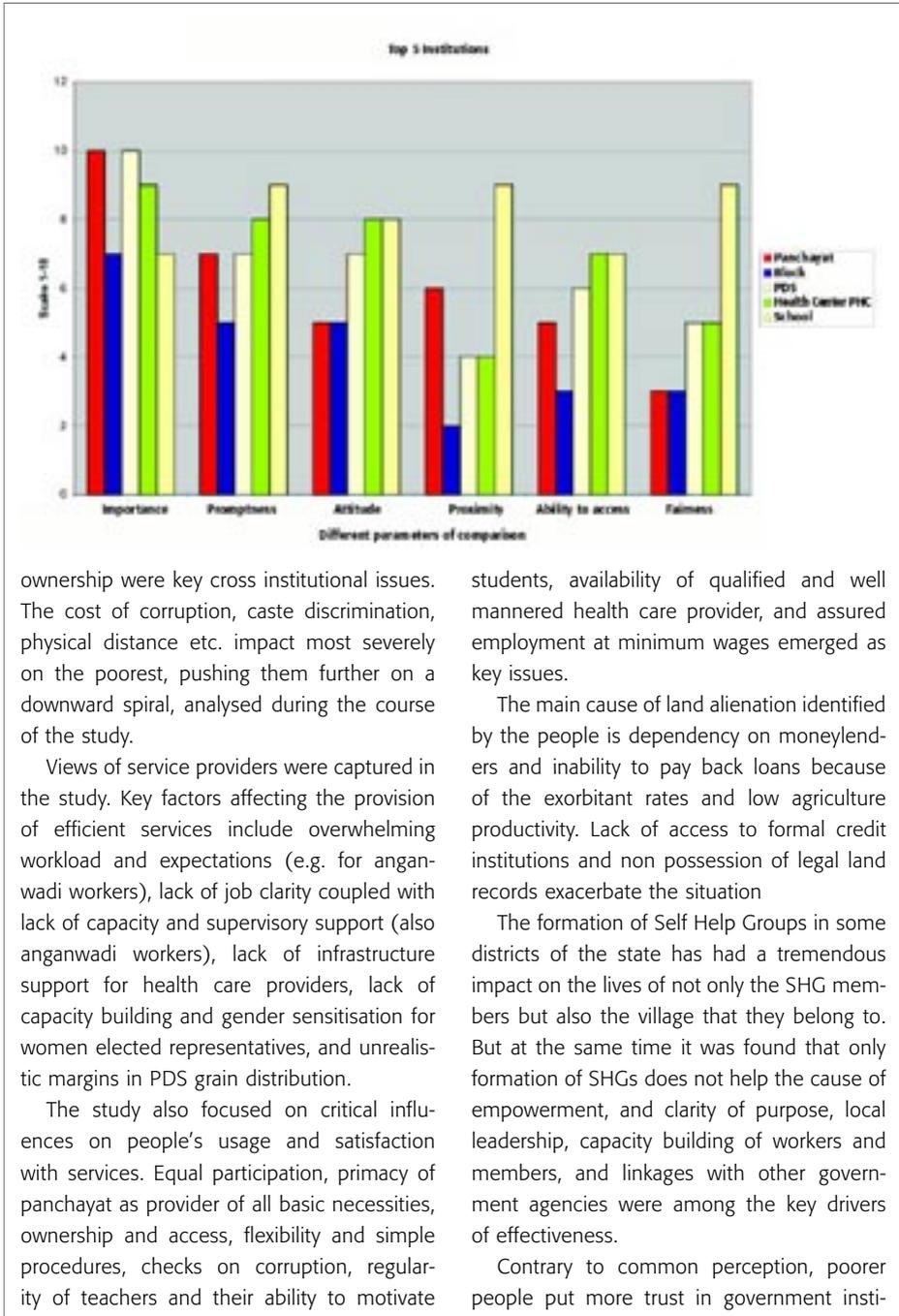
This review, through participatory approaches (implying activity participation of all groups throughout the process of research) sought to provide an insight into people's perceptions about government services, and seeks to understand the constraints of the service providers in ensuring effective service delivery. It is expected to help re-orient the focus of various investments and services, wherever found necessary, for promoting economic and human development. The poverty task force would use the review findings to formulate recommendations for strengthening (1) policy and planning for poverty reduction and (2) strategic decision making about allocation of financial resources.

This step, by the Government of Orissa, of undertaking a review of its poverty reduction

programmes, and giving people the opportunity to evaluate the impact and benefits of the substantial public investments that it has made, is truly commendable. Indeed, if the exercise can traverse its logical and full course, it would stand out as a pioneering effort in public accountability and responsible (responsive as well) governance in the subcontinent. In a wider context, the exercise must be viewed as further democratizing our governance processes.

Across locations and categories of participants, Panchayat was the institution perceived to be most important. The other top most important institutions are the Hospital/ Health Centres, the Block office, PDS and School. Anganwadi, Veterinary services, Agriculture office and the RI/Tahsil office form the middle category while the Forest office, Post Office, Banks and Police form the lowest categories in terms of importance. The five institutions perceived to be most important - with the exception of School - also figure as high on corruption.

While the services do reach the poor, however inefficient it may be, it is the poorest who get disproportionately left out. Corruption, caste discrimination (rampant in almost all institutions and services), physical distance to the services, predominantly male service providers and lack of participation and



**ASSESSMENT OF PROMINENT LOCAL INSTITUTION**

Village-Andharikhol, Gram Panchayat-Adas, Block- Reamal, District-Deogarh

Institution	Importance	Prompt Service	Attitude	Corruption	01.12.2001
					Over All Satisfaction
G. P. Office	██████████	○○	██████	██████████	██████
Hospital	████	██████	██████	○○	████
Block	██████	○○	○○	██████	██████
Police Station	○	○○○○	○	██████	○
Post Office	○○○○	██████	██████		██████████
R. I. Office	██████	○○○○	██████	██████	○○○○
Forest Office	██████	○○○○○○	○○	○○○○○○	○○○○○○
Kendu Leaf Office	○○	○○	○○○○		○○
Dealer	██████	██████	██████		██████

**Index – (Used Free Scoring)**



- Least (worst)



- Better

Participants: Gopabandhu Kissan, Hadibandhu Kissan, Apindra Kissan, Bandhu Kissan, Padma Mohan Kissan, Prasanna Kissan, Airthu Kissan, Bishnu Babari.

Facilitators: Ingaraj & Tushar

tutions than NGOS. Key factors behind this are notions of permanency and ownership (in spite of the physical and social distance experienced by most of the people from the lower categories of well being). Aspects such as flexibility, transparency, accountability and participation imply key lessons that need to be imbibed from the NGO and the private sector.

Source of most of the above suggestions is people’s spirit of hope, optimism and positive engagement with the state. The legitimacy of the State in an underdeveloped third world context like ours cannot be divorced from the survival exigencies of its underprivileged majority. This is the rationale for a ‘welfare’ state that intervenes in the economic life of the nation, designing and implementing

programmes that offer a fair deal to its poor and not leaving them to the harsh realities of social Darwinism that is at work in most third world market places. This State is mandated to arbitrate in favour of its poor, for it realizes that the playing field to which it commits its citizens, sans distinction, is unfavourably tilted against its vast majority. A study of this nature should be treated as yet another mirror that the people are holding to their government. The image reflected there in might not be flattering. But if the aim is to set standards and draw motivation from client feed back, there will be no dearth of pointers here. A state survives because its people need it. The poor need it the most.

CASES UNIVERSITIES &amp; RESEARCH CENTRES

# Aprovechamiento didáctico de algunos fenómenos físicos expuestos, como actividades, en espacios sociales interactivos dedicados a la difusión científica”

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*La difusión de la Ciencia no se encuentra restringida al ámbito educativo escolar, hoy en día la sociedad ha creado espacios de comunicación que permiten una estrecha relación entre ambas (Sociedad-Ciencia). En estos lugares de difusión científica el aprendizaje tiene unas características especiales, es un proceso individualizado que no puede ser impuesto. El individuo que llega a estos espacios lo hace de forma espontánea, influyendo en el aprendizaje sus experiencias, conocimientos previos e intereses particulares. Como reto importante se puede plantear cómo apoyar a la difusión del conocimiento científico desde instituciones de divulgación social. Es difícil seleccionar los contenidos que se exponen y los materiales para que sean los más idóneos y puedan cumplir los objetivos didácticos marcados por los diseñadores de módulos interactivos en estos espacios marcados por la difusión científica a una sociedad vasta y heterogénea. Para nuestro trabajo hemos escogido diferentes fenómenos físicos y la resolución de determinados problemas mediante elementos interactivos que podemos observar en diferentes espacios cerrados dedicados a la difusión de la Ciencia. Estos giran en torno a un tema de crucial importancia: las máquinas. Es fundamental porque desde la Educación Primaria se trabaja la relación entre máquinas y la sociedad en que vivimos.*

*Hemos seleccionado esos temas ya que en los contenidos de las etapas de Enseñanza Obligatoria se incluye el estudio de los mismos. Basamos este trabajo en el estudio realizado para comprobar la posibilidad del aprovechamiento didáctico de dicho material y su relación con los diferentes contenidos reflejados en el Diseño Curricular propuesto por la L.O.G.S.E.*

## Las maquinas y la sociedad

Buscando el significado de máquina, nos encontramos con múltiples acepciones, de las cuales seleccionamos las siguientes:

- Artificio para aprovechar, dirigir o regular la acción de una fuerza.

- Agregado de diversas partes ordenadas entre sí y dirigidas a la formación de un todo.
- Traza, proyecto de pura imaginación.

Si observamos en diversos Museos de Ciencias -centros de difusión de la ciencia- podemos encontrar con aparatos que nos muestran

diferentes fenómenos físicos como el Efecto Venturi, la Presión Hidrostática, Sistemas de Poleas, diversos tipos de Engranajes, Arcos Catenarios, Circuitos Eléctricos, etc. Estos artefactos, normalmente, llevan indicado en unas leyendas ¿cómo funcionan? e intentan conseguir en el visitante una reflexión sobre lo que pensaban que ocurriría al ponerlo en funcionamiento y ¿qué es lo que realmente ha ocurrido?. Estas explicaciones son muy significativas porque, a través de ellas, se pretende cambiar unas actitudes negativas y un tanto hostiles hacia la ciencia.

En los Museos de Ciencias y en los centros escolares se aúnan características -divulgación, difusión de contenidos, experimentación, etc.- que desarrollan y consolidan cambios de actitud favorables hacia la visión de la ciencia y su relación con la sociedad.

Opinamos al igual que afirman Benayas y Marcén (1995) que „El desarrollo de los valores es principalmente un proceso social y se va forjando progresivamente en las personas“, incluyendo en estos valores el cambio de actitudes negativas hacia un positivismo en las actuaciones y reflexiones del individuo.

A edades tempranas es importante que se refuerce este desarrollo en valores y cambio de actitudes con actividades que se realicen fuera del centro escolar, interaccionando con actividades lúdico-científicas que se encuentran en su entorno social.

Lo difícil de dichas actividades es conseguir que estén adaptadas a los distintos niveles de desarrollo psicosocial del visitante. Aunque con bastante frecuencia se consigue despertar el interés suficiente como para provocar curiosidad y la participación del público.

Es una norma generalizada, o debiera serlo, que en Museos y Parques de Ciencia se proponga mediante elementos interactivos la resolución de problemas y la experimentación

de diferentes fenómenos físicos y químicos. Estas experiencias se disponen a medida que tienen un grado de implicación elevado en a conceptos esenciales y desde un punto de vista científico; conceptos tan importantes como la electricidad, magnetismo, temperatura,....

### **Estudio comparativo de los contenidos de „Las maquinas y la sociedad“ propuestos por la L.O.G.S.E. y los que ofrecen los espacios interactivos**

Según el tratamiento que la L.O.G.S.E. da a este tema en Educación Primaria y Educación Secundaria, observamos una presencia amplia de estos contenidos. De tal modo que se han de desarrollar capacidades en los tres niveles de Educación Primaria; en los cuatro cursos de Educación Secundaria en diferentes áreas de conocimiento; en esta última etapa se desarrollan capacidades tanto para la asignatura de Ciencias de la Naturaleza, Tecnología y Física y Química.

Podemos observar los contenidos que se ven reflejados en el REAL DECRETO 830/2003, por el que se establece que la Educación Primaria contribuirá a desarrollar en niños con una edad comprendida entre los siete y los doce años las siguientes capacidades:

- g) Conocer los aspectos fundamentales de las Ciencias de la Naturaleza, la Geografía, la Historia y la Cultura.
- i) Desarrollar el espíritu emprendedor, fomentando actitudes de confianza en uno mismo, sentido crítico, creatividad e iniciativa personal.
- j) Iniciarse en la utilización, para el aprendizaje, de las tecnologías de la información y de las comunicaciones.

Íntimamente relacionada con el desarrollo de dichas capacidades está la tabla que a con-

tinuación presentamos, en ella se refleja una relación entre los diferentes ciclos de Educación Primaria, los contenidos -que se aproximan al tema „las máquinas“- que se deben trabajar en los mismos y las actividades que se plantean, en espacios interactivos cerrados, en conexión con los preescriptivos de la L.O.G.S.E.:

Así mismo, los contenidos que se ven reflejados en el REAL DECRETO 831/2003, por el que se establece que la Educación Secundaria contribuirá a desarrollar en niños con una edad comprendida entre los trece y los dieciseis años las siguientes capacidades:

f) Concebir el conocimiento científico como un saber integrado, que se estructura en distin-

tas disciplinas, matemáticas y científicas, y conocer y aplicar los métodos para identificar los problemas en los diversos campos del conocimiento y de la experiencia, para su resolución y para la toma de decisiones.

h) Adquirir una preparación básica en el campo de las tecnologías, fundamentalmente mediante la adquisición de las destrezas relacionadas con las tecnologías de la información y de las comunicaciones, a fin de usarlas en el proceso de aprendizaje, para encontrar, analizar, intercambiar y presentar la información y el conocimiento adquiridos.

i) Consolidar el espíritu emprendedor desarrollando actitudes de confianza en uno mismo,

DESARROLLO DE CAPACIDADES- EDUCACIÓN PRIMARIA		
CICLO	CONTENIDOS SEGÚN LA L.O.G.S.E.	ACTIVIDADES EN CENTROS INTERACTIVOS
Primer ciclo	10. La ciencia y la sociedad: importancia de los avances científicos para mejorar la calidad de vida. Grandes investigadores, inventores y científicos. Importantes descubrimientos e inventos que han hecho avanzar la Humanidad.	El principio de Arquímedes Máquinas simples Palancas Poleas y polipastos
Segundo ciclo	10. Máquinas y aparatos. La palanca: funcionamiento, tipos de palancas y sus diferentes usos y aplicaciones más frecuentes.	Máquinas simples Palancas
Tercer ciclo	5. La ciencia: presente y futuro de la sociedad. En la cultura y el ocio: el libro (papel, tintas); el arte (pinturas y colorantes); la música (cintas y discos compactos); el cine (fotografía, vídeo y DVD); el deporte (materiales más flexibles y fuertes). En el hogar y la vida diaria: fibras textiles, pinturas de paredes y cosméticos. En el transporte: neumáticos, air bag, nuevos materiales del automóvil a las naves especiales. En la informática y telecomunicaciones: chips, CD-Roms, soportes magnéticos y fibra óptica. En la construcción: materiales aislantes y barnices.  8. Máquinas y aparatos en la vida cotidiana. Tipos de máquinas y sus usos más frecuentes. Utilización de aparatos y compuestos. Electricidad, herramientas mecánicas, medios informáticos, productos químicos, radiactividad. Beneficios y riesgos de las nuevas tecnologías y productos. Medidas de prevención. Primeros auxilios.  11. Concepto de energía. Fuentes de energía y materias primas. Energías renovables y no renovables. Desarrollo sostenible.	Circuitos eléctricos Giroscopio Máquinas simples Palancas Engranajes Poleas y polipastos

el sentido crítico, la iniciativa personal y la capacidad para planificar, tomar decisiones y asumir responsabilidades.

Al igual que en la tabla anterior, en las que a continuación presentamos se relaciona con el desarrollo de las mas arriba mencionadas capacidades, en ella se refleja una relación entre los diferentes cursos de Educación Secundaria, los contenidos -que se aproximan al tema „las máquinas“- que se deben trabajar en los mismos y las actividades que se plantean, en espacios interactivos cerrados, en conexión con los preescriptivos de la L.O.G.S.E.:

Comprobamos, claramente, cómo en Educación Primaria el tratamiento de capacidades hasta conseguir su desarrollo lleva un carácter de interdisciplinariedad implícito, pues no podemos diferenciar determinados artefactos -como los circuitos eléctricos, engranajes, etc.-, en su relación con materias de conocimiento del medio, bien natural o social, y con la ocupación del tiempo libre mediante el ocio y la cultura pues van imbrincados entre sí. Hay muchas maquinarias que se emplean en el desarrollo

de la cultura o en la ocupación del tiempo libre -aparatos de música, televisión, video juegos, ordenador, teléfono,...- y que se fundamentan en una base científica.

En cambio en Educación Secundaria el desarrollo de ciertas áreas de conocimiento, en concreto a la de Ciencias de la Naturaleza o, dependiendo del centro, a Física y Química y a Tecnología (esto, obviamente, atendiendo a los departamentos de los centros escolares).

En cuanto al tratamiento del tema „máquinas sociedad“ en los centros interactivos, es decir, en Parques y Museos de Ciencias, observamos que hay salas muy saturadas de actividades y otras en las que sólo se dispone de zonas de observación. Ambas situaciones, extremas, no son del todo adecuadas ya que en aquellas en las que se exponen modelos de diferentes maquinarias de distintas épocas -dependiendo de la edad del observador-, el resultado se puede volver en contra de los objetivos fijados por los organizadores de la misma. Es decir, si es demasiado joven y no le interesan estos temas casi pasará sin mirar y detenerse en los estantes (o exposición). En ese momento lo relacionan con una sala típica

**DESARROLLO DE CAPACIDADES- EDUCACIÓN SECUNDARIA**

CURSO	CONTENIDOS SEGÚN L.O.G.S.E.	ACTIVIDADES EN CENTROS INTERACTIVOS
Tecnología - 1 <sup>er</sup> curso	<p>3. Estructuras y mecanismos.—Estructuras resistentes: Estructuras de barras. Triangulación. Esfuerzos básicos. Elementos resistentes. Aplicaciones.</p> <p>4. Electricidad y electrónica.—Circuito eléctrico: funcionamiento. Elementos. Circuito en serie y paralelo. Efectos de la corriente eléctrica: luz y calor. Aplicaciones.</p> <p>7. Tecnología y sociedad.—La tecnología como respuesta a las necesidades humanas: fundamentación del quehacer tecnológico. El proceso inventivo y de diseño.</p>	<p>Circuitos eléctricos Arcos catenarios Máquinas simples Palancas Engranajes Poleas y polipastos Presión hidrostática</p>
Tecnología – 2 <sup>o</sup> curso	<p>3. Estructuras y mecanismos.—Mecanismos de transmisión y transformación de movimientos. Relación de transmisión. Aplicaciones.</p> <p>4. Electricidad y electrónica.—Circuito eléctrico: magnitudes eléctricas básicas. Simbología. Efectos de la corriente eléctrica: electromagnetismo. Aplicaciones. Máquinas eléctricas básicas: dinamo y motor de corriente continua.</p>	<p>Circuitos eléctricos Giroscopio Palancas Engranajes Poleas y polipastos</p>

de museo en la que el espectador sólo ha de utilizar su visión. Quizás si se intentase poner paneles en los que se relacionasen fenómenos físico-químicos con la obtención y aplicación en una máquina -junto con su evolución, si la hubiese- cumplirían un objetivo más de estas exposiciones „ampliar y desarrollar la capacidad de relación entre la teoría y su aplicación”.

En aquellas zonas de los parques interactivos en los que hay muchas actividades, bien relacionadas por el mismo fundamento científico, o bien por distintos, el visitante se agota física y mentalmente al realizar tantas actividades en poco tiempo y no se consigue la interiorización de los conceptos, procedimientos y actitudes que se perseguían al diseñar las actividades.

DESARROLLO DE CAPACIDADES- EDUCACIÓN SECUNDARIA		
CURSO	CONTENIDOS SEGÚN L.O.G.S.E.	ACTIVIDADES EN CENTROS INTERACTIVOS
Ciencias de la Naturaleza- 2º curso	<p>1. Los sistemas materiales y la energía.—Sistemas materiales. Escalas de observación macro y microscópica. La energía como propiedad de los sistemas materiales. Variación de la energía en los sistemas materiales: cambio de posición, forma y estado. Tipos de energía. Fuentes de energía. La Tierra: un sistema material en continuo cambio.</p> <p>2. Los cambios de posición en los sistemas materiales. Representación gráfica de movimientos sencillos. Las fuerzas como causa del movimiento y la deformación. Masa y peso de los cuerpos. Energía mecánica.</p> <p>3. La energía que percibimos.—Propagación de la luz y el sonido. Diferencias entre ellas. Otros tipos de ondas. Percepción de la luz y del sonido: el ojo y el oído. El calor: energía en tránsito. Efectos. Calor y temperatura. Los termómetros. Propagación del calor. Aislantes y conductores. Percepción del calor: la piel.</p>	<p>Giroscopio</p> <p>Palancas</p> <p>Poleas y polipastos</p>
Física y Química 3º curso	<p>7. Electricidad.—Cargas eléctricas y su interacción. Campo eléctrico. Conductores y aislantes. Flujo de cargas, generadores y corriente eléctrica. Circuitos eléctricos sencillos. La electricidad en casa.</p>	<p>Circuitos eléctricos</p> <p>Giroscopio</p>
Física y Química 4º curso – opción A	<p>1. Fuerzas y energías.</p> <p>2. Movimientos y fuerzas.—Traectoria y posición. Desplazamiento y espacio recorrido. Velocidad y aceleración. Interacciones entre los cuerpos. Tipos de fuerzas. Leyes de la Dinámica. Tratamiento cualitativo de la fuerza de rozamiento. Gravitación. Peso de los cuerpos.</p> <p>3. Fuerzas en fluidos.—Concepto de presión. Presiones hidrostática y atmosférica. Aplicaciones. Pascal y la multiplicación de la fuerza. Arquímedes y la flotación de barcos y globos. Tensión superficial.</p> <p>4. Trabajo y energía.—Trabajo mecánico. Aplicación a máquinas y herramientas. Potencia. Energía mecánica. Principio de conservación. Energías tradicionales. Fuentes de energía. Energías alternativas. Degradación de la energía.</p>	<p>Potencia</p> <p>Batería Humana</p> <p>El principio de Arquímedes</p> <p>Giroscopio</p> <p>Máquinas simples</p> <p>Palancas</p> <p>Engranajes</p> <p>Poleas y polipastos</p> <p>Viscosidad</p> <p>Presión hidrostática</p> <p>Efecto Venturi</p>
Física y Química 4º curso – opción B	<p>2. Las fuerzas y su equilibrio.—Interacciones entre los cuerpos: fuerzas. Sus tipos. Composición y descomposición de fuerzas de la misma dirección y angulares. Equilibrio de fuerzas. Leyes de la Dinámica. Tratamiento cualitativo de la fuerza de rozamiento. Fuerza gravitacional. Peso de los cuerpos. Concepto de presión. Fuerzas en el interior de los fluidos. Presiones hidrostática y atmosférica.</p> <p>3. Trabajo, potencia y energía mecánica.—Concepto de trabajo. Unidades. Trabajo mecánico. Aplicación a máquinas y herramientas. Concepto de Potencia. Energía mecánica. Principio de conservación.</p> <p>4. Intercambios de energía.—Calor y transferencia de energía. Principio de conservación de la energía. Efectos del calor sobre los cuerpos.</p>	<p>Potencia</p> <p>Batería Humana</p> <p>El principio de Arquímedes</p> <p>Arcos catenarios</p> <p>Máquinas simples</p> <p>Palancas</p> <p>Engranajes</p> <p>Poleas y polipastos</p> <p>Presión hidrostática</p>

## Conclusiones

El aprendizaje de la Ciencia mediante la difusión científica no formal, es decir, mediante la realización de experiencias fuera del aula tras conocer previamente los conocimientos, creencias e intereses particulares del niño, tiene características especiales al ser un proceso individualizado, no impuesto y espontáneo. En función de estas connotaciones podemos afirmar lo siguiente:

- Este sistema para reforzar contenidos científicos tiene un potencial didáctico enorme. El niño de diferentes edades que visite estos centros desarrollan la capacidad de relación entre contenidos científicos y su aplicabilidad en la sociedad en la que viven.
- Existe una fuerte concordancia entre los contenidos reflejados en el Diseño Curricular propuesto por la L.O.G.S.E. y los expuestos en estos centros interactivos.
- El acúmulo y concentración de actividades en un espacio reducido provocan el cansancio y rechazo de su realización por el visitante y didácticamente no se desarrolla la construcción del conocimiento, pretendido, mediante la interiorización de contenidos.
- La información no siempre se presenta en una zona claramente iluminada, en algunos casos es escasa.
- Los contenidos observados en estos espacios interactivos no formales se expresan de forma clara y con un lenguaje sencillo y comprensible para todas las edades.
- Para que la asunción de conceptos sea efectiva se requiere la intervención del profesor, que se prepare la visita previamente y que se trabaje en el aula lo observado y experimentado en los centros interactivos. (Es uno de los objetivos principales que persiguen los Museos y Parques de Ciencias).
- Es acertado el procurar una reflexión sobre el

fenómeno o contenido científico que se aplica en una determinada actividad (se busca una reflexión sobre lo que pensaba que ocurriría el visitante y lo que realmente pasa al poner en funcionamiento la actividad).

- El aprovechamiento didáctico de algunos de los módulos es tal que, podríamos afirmar que, se cumple el siguiente objetivo „Identificar, conocer y valorar la contribución que los recursos tecnológicos prestan al desarrollo del medio, así como la medida en que satisfacen algunas necesidades humanas (alimentación, información, comunicación) formulando en cada caso el juicio crítico más acorde con la realidad, adoptando posiciones favorables hacia su orientación pacifista y obtención de una mejor calidad de vida.

## Referencias bibliográficas

- AGUILERA, I. y QUIJANO, R. (2002). „Adecuación didáctica de los módulos de temática Medioambiental en Museos de Ciencia europeos“. En „Museos de Ciencia ante el público“. Salamanca. Universidad de Salamanca. <http://cienciaantepublico.usal.es>
- ALLEN, S. (1997). Using Scientific Inquiry Activities in Exhibit Explanatios. Science Education. Phoenix. Vol. 81, nº 6. pp.: 715-733.
- BENAYAS, J. y MARCÉN, C. (1995). La Educación Ambiental como desencadenante del cambio de actitudes ambientales. I Jornadas sobre actitudes y educación ambiental. Edit. Perales, F. J.; Gutiérrez, J. y Álvarez, P. Univ. de Granada. pp.: 132-156.
- BROUARD, M. A. y POL MÉNDEZ, E. (1998). La comprensión de los contenidos del museo. Didáctica de las Ciencias Sociales, Geografía e Historia. Nº 15. pp.: 15-30.

CONSEJERÍA DE EDUCACIÓN Y CIENCIA DE LA JUNTA DE ANDALUCÍA. (1992). „Decreto 105/1992, de 9 de junio, por el que se establecen las Enseñanzas correspondientes a la Educación Primaria en Andalucía“. (BOJA nº 56 de 20 de junio de 1992).

FISHER, M. S. (1997). The effect of humor on learning in a Planetarium. *Science Education*. Phoenix. Vol. 81, nº 6. pp.: 703-713.

PÉREZ, C.; DÍAZ, M<sup>o</sup>. P.; ECHEVARRÍA, I.; MORDERNTIN, M. y CUESTA, M. (1998). *Centros de Ciencia. Espacios interactivos para el aprendizaje*. País Vasco. Servicio de la editorial de la Universidad del P. Vasco.

QUIJANO, R. y AGUILERA, I. (2002). „Erosionómetro: Aplicación didáctica en las primeras etapas de la enseñanza obligatoria“. En GÓMEZ y LÓPEZ (Eds.): „La Ciencia en la Educación Infantil y Primaria“. Madrid. CSIC y Grupo de Didáctica del Imaff.

QUIJANO, R. y AGUILERA, I. (2002). „Papel didáctico de los paneles de exposición fotográfica en los Parques de las Ciencias“. En GÓMEZ y LÓPEZ (Eds.): „La Ciencia en la Educación Infantil y Primaria“. Madrid. CSIC y Grupo de Didáctica del Imaff.

QUIJANO, R. y AGUILERA, I. (2003). *Los Museos de Ciencias como herramienta didáctica: el papel de los módulos interactivos en el estudio de las estrategias de adaptación de los seres vivos*. Jaén. Guadalbullón, nº: 11. Pp.: 11-24.

REAL DECRETO 830/2003 (2003). „B.O.E. nº 157, por el que se establecen las enseñanzas comunes de la Educación Primaria“.

REAL DECRETO 831/2003 (2003). „B.O.E. nº 158, por el que se establecen la ordenación general y las enseñanzas comunes de la Educación Secundaria“.

TERRY, C. J. (1997). *Los museos de tecnología del Canadá se ponen en línea*. Museum In-

ternacional. París. UNESCO. Nº 195, vol. 49, nº. 3. pp.: 26-27.

CASES UNIVERSITIES & RESEARCH CENTRES

# Gender and Science Anxiety: Research and Action

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Over twenty five years ago, I coined the term „science anxiety,“ and co-founded with psychologists the first Science Anxiety Clinic, at Loyola University Chicago<sup>1</sup>. Science anxiety usually manifests itself as panic in science classes, but is distinct from test or performance anxiety, and from math anxiety. Techniques developed in the Science Anxiety Clinic reduce science anxiety by blending three separate approaches: science skills learning, changing of students' negative self-thoughts, and desensitization (through muscle relaxation exercises) to science anxiety producing scenarios<sup>2</sup>.

The first studies were carried out with students at the Loyola University Science Anxiety Clinic<sup>3,4</sup>. The instruments were four questionnaires, for math anxiety<sup>5</sup>, general anxiety<sup>6</sup>, test anxiety<sup>7</sup>, and science anxiety<sup>3</sup>. The students' muscle tension was also measured by electromyography while they pictured science anxiety scenarios.

The Science Anxiety Questionnaire asks students to imagine themselves in certain situations and to rate their level of anxiety on a 5-degree scale: „not at all,“ „a little,“ „a fair amount,“ „much,“ and „very much.“ Items are evenly divided between science and nonscience content, with emphasis on analogous situations; e.g., studying for a physics exam vs. studying for a history exam. The Science Anxi-

ety Questionnaire is the instrument used in all of our subsequent research studies.

Typically 2/3 of the Science Anxiety Clinic clientele was female. Studies have shown that science anxiety begins as soon as children start to learn science: age eight or lower in the U.S., and that greater science anxiety among girls begins at the same time<sup>8</sup>.

A group of Danish female physics teachers, under the title Piger og Fysik [Females and Physics] was doing similar work with female students<sup>9</sup>. In 1991, as Guest Professor at Roskilde University, Denmark, I investigated whether science anxiety was (1) related to gender, and (2) varied across national lines, between American and Danish students<sup>10</sup>. In both national groups, females scored higher on a variety of science anxiety measures than did males. Science anxiety proved also to be related to general anxiety and to field of study, with nonscience students having more anxiety. For those students who expressed „acute“ science anxiety; viz., who gave „much“ or „very much“ responses to one or more of the science items, Danish females and males registered lower anxiety than their American counterparts. Furthermore, Danish females registered lower than American males. These results suggest several conclusions. First, there is no „natural“ female tendency towards science anxiety. Second, remediation attempts

that are effective for one gender or nationality should be effective for both. This has been shown to be the case in the American science anxiety clinic<sup>2,3,4</sup> and in the Danish classroom<sup>9</sup>.

Danish gymnasium students gave me written comments on why they had chosen to study humanities („language line“) or science („math line“). The math line in gymnasium is evenly populated by both genders, while the language line is almost all females, many of whom chose it to avoid science. I also interviewed Danish university science students, focusing on gender issues in their educational experiences<sup>11</sup>. Female students still tend toward biology and chemistry, avoiding physics in much greater proportions than do males. From their responses, it appears that females' selection of science study, while increasing, is still made in the face of gender related obstacles, albeit not overt discrimination.

In a subsequent investigation<sup>12</sup> I considered whether the nature of science teaching plays a role in national differences in science anxiety. The American Association of Physics Teachers workshop, Developing Student Confidence in Physics<sup>13</sup> includes a teachers' Personal Self-Inventory questionnaire describing various classroom scenarios, and asking teachers to select their most likely responses. The inventory was administered at national meetings of both the Danish Association of Physics Teachers (Fysikl-Frerforeningen) and the American Association of Physics Teachers. Danish and American teaching practices sampled by the questionnaire did not differ significantly, and therefore could not account for the lower Danish science anxiety. One possible explanation may simply be that the constant exposure to science from the early school years makes Danish students more confident than American students. Ano-

ther possibility is that Danish students keep the same teachers throughout primary school; this relationship itself might build confidence. Note, however, that neither greater exposure nor closer relationship to the teacher reduces gender differences in science confidence. These differences play a substantial role in enrollment differences internationally in science programs of study<sup>14</sup>.

My co-workers and I then examined the effect of an introductory physics course on science anxiety<sup>15</sup>. Our cohort consisted of Loyola University students enrolled in physics courses for nonscience students, for pre-health profession and biology students, for chemistry students, and for physics and pre-engineering students. The science anxiety questionnaire was administered unannounced on both the first day (pre-test) and last day (post-test) of each class. This study reconfirmed that the strongest predictor of science anxiety is general anxiety; the next strongest is gender. Our pre- and post-test results showed that an introductory physics course tended to somewhat reduce acute science and general anxiety. We also found that students in an interactive physics course<sup>16</sup> taught by a person of their own gender reaped some additional benefit. Finally, we discovered that anxious females tended to stay in their physics courses, while anxious males tended to drop out.

Our most recent study examined science anxiety among university nonscience students<sup>17</sup>. We administered the Science Anxiety Questionnaire to several hundred humanities, social science, mathematics, business, education, and nursing students who were taking science courses. Our results show that nonscience students, both female and male,

are more generally anxious and more science anxious than science students, with very high percentages in nursing and in education (our future teachers).

In our current work, we are investigating whether there is a correlation between constructivism and science anxiety and gender. We are designing and testing a 5-degree-scale questionnaire („strongly agree“ to „strongly disagree,“) on constructivist beliefs, to be administered to American and Danish students and teachers. The questionnaire includes, for example, statements such as „Physicists' current ideas about particles that make up the atom will always be maintained as they are<sup>18</sup>“ and „Science reflects the social and political values of the culture in which it is practiced<sup>19</sup>.“ Should constructivist beliefs prove to be correlated with science anxiety, we shall be developing and proposing explicit classroom and external techniques for teachers and advisers to help students examine how these beliefs may affect their feelings toward science. This should lead to implementation of learning strategies that make science more accessible to students, both female and male.

## References

1. Mallow, J. V. (1978). A Science Anxiety Program. *Am. J. Physics* 46: 862.
2. Mallow, J. V. (1986). *Science Anxiety*, H&H Publ., Clearwater, FL.
3. Alvaro, R. (1978). The Effectiveness of a Science-Therapy Program on Science-Anxious Undergraduates, Ph. D. dissertation, Loyola U. Chicago.
4. Hermes, J. (1985). The Comparative Effectiveness of a Science Anxiety Group and a Stress Management Program in the Treatment of Science-Anxious College Students, Ph. D. dissertation, Loyola U. Chicago.
5. Richardson, R. C. and Suinn, R. M. (1972). The Mathematics Anxiety Rating Scale: Psychometric Data. *J. Couns. Psych.* 19: 551-554.
6. Spielberger, C. D., Gorsuch, R. L., and Lushene, R. E. (1970). *STAI Manual for the State-Trait Anxiety Inventory*, Consulting Psychologist Press, CA.
7. Alpert, R. and Haber, R. N. (1960). Anxiety in Academic Achievement Situations. *J. Abnorm Psych.* 61: 207-215.
8. Chiarelott, L. and Czerniak, C. (1985). Science Anxiety Among Elementary School Students: An Equity Issue. *J. Educ. Equity and Leadership* 5: 291-308; (1987); ---- Science Anxiety: Implications for Science Curriculum and Teaching. *The Clearing House* 60: 202-205.
9. Beyer, K., Blegaa, S., Olsen, B., Reich, J. and Vedelsby, M. (1988). *Piger og Fysik (Females and Physics [in Danish])*, IMFUFA Texts, Roskilde University Center, Roskilde, DK.
10. Mallow, J. V. (1994). Gender-Related Science Anxiety: A First Binational Study. *J. Science Education and Technology* 3: 227-238.
11. Mallow, J. V. (1993). The Science Learning Climate: Danish Female and Male Students' Descriptions. Contributions to the Seventh GASAT Conference, Waterloo, CAN, 75-87.
12. Mallow, J. V. (1995). Students' Confidence and Teachers' Styles: A Binational Comparison. *Am. J. Physics* 63: 1007-1011.
13. Fuller, R., Agruso, S., Mallow, J., Nichols, D., Sapp, R., Strassenburg, A. and Allen, G. (1985). *Developing Student Confidence in Physics*, Amer. Assoc. of Physics Teachers, College Park, MD.
14. Mallow, J. V. (1998). Student Attitudes and

- Enrolments in Physics, with Emphasis on Gender, Nationality, and Science Anxiety. In Jensen, J. H., Niss, M., and Wedege, T. (eds.) *Justification and Enrolment Problems in Education Involving Mathematics or Physics*, Roskilde U. Press, Roskilde, DK, 237-258;
- Seymour, E. and Hewitt, N. (2000). *Talking About Leaving: Why Undergraduates Leave the Sciences*, Westview Press, Boulder, CO;
- Tobias, S., Urry, M., and Venkatesan, A. (2002). Physics: For Women, the Last Frontier. *Science* 296: 1201.
15. Udo, M. K., Ramsey, G. P., Reynolds-Alpert, S., and Mallow, J. V. (2001). Does Physics Teaching Affect Gender-Based Science Anxiety? *J. Science Education and Technology* 10: 237-247.
16. Hake, R. (1998). Interactive Engagement vs. Traditional Methods: A Six-Thousand Student Survey of Mechanics Test Data for Introductory Physics Courses. *Am. J. Physics* 66: 64-74.
17. Udo, M. K., Ramsey, G. P., and Mallow, J. V. (2004). Science Anxiety and Gender in Students Taking General Education Science Courses. *J. Science Education and Technology* 13: 435-446.
18. VASS, Views About Sciences Survey (1996). <http://modeling.la.asu.edu/R&E/Research.html>
19. NOS, Views of Nature of Science Questionnaire (2002). [http://www.flaguide.org/tools/diagnostic/views\\_of\\_nature\\_questionnaire.php](http://www.flaguide.org/tools/diagnostic/views_of_nature_questionnaire.php); [http://www.flaguide.org/tools/tools\\_discipline.php](http://www.flaguide.org/tools/tools_discipline.php)

CASES SCIENCE SHOPS OR CBRs

# Environmental Protection and Democracy: The Eco-Social Studies Centre of the University of La Laguna (Canary Islands)

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Tenerife, an island of ecological diversity and varied landscapes, is under enormous environmental pressure from the development of transport infrastructures, coastal pollution and mass tourism, among others. The current situation is the result of territorial interventions often responding to obsolete development models. The situation is further aggravated by the fragility of its singular bio-geographical conditions. After years of relative impasse, environmental concern among large social sectors is reacting forcefully, materialising in a series of actions addressed to halting environmental deterioration associated to the insufficiently democratic decision-making process. Representatives from different NGOs, associations and platforms are addressing the University for the start-up of research which would provide valid information to improve citizens' participation processes in the resolution of environmental problems.

This demand would grant institutional form to the academic scientific community's mesh of concerns and initiatives. Growing citizens' demands similarly affect aspects of the research agenda and the development of mediation and communication mechanisms. Consequently, research underway is beginning to impinge on policy agenda, as it is used by environmental groups as basis for arguing against certain environmental projects.

The creation, at the beginning of 2003, of the Eco-social Studies Centre of the University of La Laguna (CEES), falls within this scenario of change in the relations between the community and the University. The CEES is conceived as an interdisciplinary research centre whose objectives include spreading the knowledge acquired and fostering eco-social values within the university, and also among institutions and civil society. Primarily, the Centre endeavours to act as an institutionalised crossroads between the university community, institutions and civil society. The Centre is currently in a consolidation process; its members are training on community-based research methodologies, transmitting these, in turn, to students interested in socio-environmental issues, and enacting, with the expected difficulties, different activities.

The main activities organised specifically by the Centre (or in which it has co-operated directly) include:

- Three editions of the "Environmental Policies and Interdisciplinary Research" courses. Various Spanish experts have been invited to participate in these and to relate their experiences on the issues at hand, with a subsequent debate with the participants (researchers, students, civil servants and NGO members, mainly).

- A series of symposiums by CEES members on their respective specialities and concerns
- Two seminars: one by the Canadian philosopher Thomas Heyd ("Ethics and Aesthetics of Nature"); and another by Silvio Funtowicz, from the European Commission Joint Research Centre in Italy ("Models of science & policy: from expert demonstration to extended participation")
- Conferences by non-academic exponents, for example, representatives of Greenpeace or other NGOs, or by the Canary Director for the Environment
- Round table on environmental problems on the island of Tenerife
- A legal strategy workshop on eco-social conflict with representatives from the main Spanish environmental groups (Ecologistas en Acción, Seo-Birdlife, Greenpeace, Fundación Nueva Cultura del Agua)
- Public-participation forums on two important public projects: the construction of an industrial port and an incinerator in the south of the island. Experts from the University and Public Administration were invited to express their viewpoints and the public participated through workgroups, questions and recommendations. Co-ordination was by Laura Zurita, of the Danish Board of Technology

In regard to these initiatives, a crucial aspect is the development of research projects addressed to the community. One of these is PROTEA (Environmental Protection and the Quality of Democracy). In tackling directly the problem of democratic quality in environmental issues, PROTEA is especially pertinent because it systematically highlights the difficulties in influencing the policy agenda through research and social participation. The aim of the project consists in the evaluation of local environmental

public policies in terms of: a) the quality of the public decision-making process; and b) the degree of accomplishment of the environmental tasks. This evaluation is being carried out from different perspectives: a) furthering democratic quality through the study of actual public participation during public exposure period of the document and of the use of community bill initiatives contained in the Spanish Constitution; b) determining the degree of accomplishment of the regulatory frameworks through the study of the conflict between the ceremonial functions (maintenance of the status quo) and the instrumental ones (real solution of the problems) that are performed by those frameworks.; c) comparing the scientific and technical quality of the results obtained through public decision-making processes that take into account the different stakeholders' interests and those in which the decision-making process does not.

Environmental degradation, in this circumstance, is not only a result of ignoring, or misunderstanding, the relationship between economics and environment. It is also a result of the way decisions are made. Most of them are made under authoritarian schemes: the solution comes before the public definition of the problem; a single option that has been previously decided and is justified in retrospect; the weight of the evidence falls on the citizens; the solution is legitimised by non-independent experts; there is no documented public debate (Aguilera 2003). Due to this situation, citizens reject decisions on account of what Aguilera and Sánchez (2005) call NIMBY extended criteria: a) they say no to authoritarian solutions b) they say no because they broaden the notion of the backyard to a region or a country, c) they say yes to another way of decision-making relying on people and d) they say yes to a proper definition of the problem to be solved. By ques-

tioning the traditional expert counselling model, not only for ethical and political reasons but also bearing in mind mere instrumental effectiveness, a new horizon of extended evaluation and responsibility is opened up. Evaluation and decision-making gives way to participation and admission of responsibility on the part of civil society, especially by those citizens potentially affected by an action or situation.

In this context the most widespread result of the promotion process for community-based research is the start-up of a feedback mechanism where environmentally-aware groups are receiving specific and acceptably documented information. Information which these groups had been demanding and which they subsequently use to defend the causes they consider just.

Below we highlight some aspects of the CEES constitution process which we consider important:

- The convergence of NGO demands for support and counselling from the University with the existence in the university community of environmental sensitivity and projects related with the creation of debate platforms and improved communication vehicles for specialised information addressed to civil society, as well as receptivity on the part of academia to social concerns.
- The twofold condition of a significant number of people as university professors and NGO activists (or, more generally, stakeholders).
- The encounter between the University and society is produced principally around the strong issues, regarding the development of large infrastructures.
- The acceleration of infrastructure projects has triggered off, in turn, the organisation of citizens' protests, involving CEES in a spiral of rapid response to a multitude of issues (with

hardly sufficient resources)

- The question of the future consolidation of CEES is subject to overcoming a series of difficulties: in addition to the insufficiency of resources, there persists disciplinary deficit given the social science background of the majority of CEES members. There needs to be an increased link to biological and physical sciences and to engineering. There also exists the need to integrate more efficiently the efforts of experts in different fields. The institutionalisation of the CEES is incomplete because, although a legally recognised centre within the university, it would have to be converted into a Research Institute in order to carry out its tasks more effectively. Simultaneously, the lack of participatory tradition, coupled with the distrust and even hostility on the part of certain political and business circles (important stakeholders) has to be faced. In our opinion, this situation is similar to those found in the rest of the country, with some exceptions
- Despite the difficulties, we wish emphasize that there are many past university experiences in Tenerife which somehow involve co-operation and exchange with different social groups before the creation of CEES. This experience has generated an accumulation of know-how obtained by the university community in a series of interactions with social movements during at least two decades.

Lastly, and in view of the above, a possible involvement of CEES with a more extensive network of centres with similar objectives and functions has to be considered. Living Knowledge magazine (No. 2, March 2004) already featured a short article on the CEES, representing a first step towards making it known in this

field. However, a lot more could be done. For example, the centre could acquire further know-how from more consolidated experiences, and could become familiar with new opportunities to reinforce its functions and obtain resources. Moreover, in keeping with its possibilities, CEES can contribute towards processing and interchanging the acquired know-how, to a greater or lesser extent, in all the centres involved in community-based research.

### References:

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AGUILERA-KLINK F (2003), "Gestión autoritaria versus gestión democrática del agua" Archipiélago, nº 57, pp. 34-42.

AGUILERA-KLINK F. AND SÁNCHEZ-GARCÍA J. (2005), "Environmental degradation as a result of democratic disruption: the Case of the Canary Islands", Proceedings of the 6th International Conference of the European Society for Ecological Economics, Lisbon, 14-17, June 2005.

## Parallel Sessions

# OPPORTUNITIES IN SCIENCE AND SOCIETY INTERACTIONS

In the parallel sessions of this track thematic examples of community based research projects are presented. Not all research themes do have the same opportunities for research co-operation. The parallel sessions intend to describe concrete examples of community based research and discuss options to improve thematic co-operations.

All 5 parallel sessions in this track focus on different research themes; environmental sciences, social sciences, urban regeneration, technology, and health.



OPPORTUNITIES IN ENVIRONMENTAL SCIENCES

# Visualisation of Land-Use Changes in the State of North Rhine-Westphalia, Germany

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In the previous decades, cities have shown the tendency to grow continuously, and general land-use patterns have tended to change according to people's needs, political changes, as well as economic developments. The current project involving the Bonn Science Shop („Wissenschaftsladen Bonn“), the University of Bonn, and additional partners vividly shows the dramatic loss of green areas within the last thirty years, and the project suggests alternative forms of land-use. At the end of the year 2004, an extraordinary Website will be constructed and working: Using satellite images and aerial views, processes of change will be visualized via a central web Interface. In order to make comparison possible, land development at three distinct points in time (1975, 1984, 2001) can be put side by side. Users can get information on the development of a distinct place. The Website provides information on current best-practice projects and scopes down to some areas of special interest. These areas are typical for specific problems because of changed land-use patterns. In general, these problems are not directly caused by urbanization but by human interaction. Altogether, more than ten areas have been chosen for detailed presentation. These areas are good examples of land-use change and its consequences. Within the next years, these areas could be starting points for testing the Website issues outside the

State of North Rhine-Westphalia. The project is outlined in such a way that the largest number of citizens will have direct access to an abundance of information. The only prerequisite for participation is access to the Internet.

## The project's goal

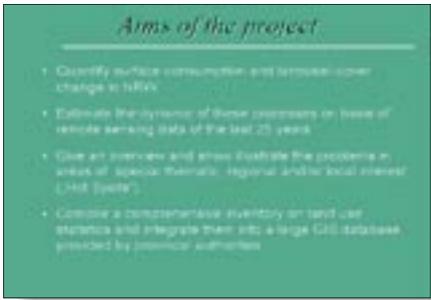
On the one hand, the Website will provide citizens easier access to scientific findings and satellite-mediated information; on the other hand, it will spark off a dialogue encouraging alternative forms of land-use. That alternatives to current land-use policies are possible is exemplified by several examples, ranging from the unsealing of school-yard land surfaces all the way to communal programs for the enhancement of rain-water absorption & seepage.

This is the idea of the project: The massive sealing up of the surface of the land will not be stopped only by the proclamation of a national strategy of sustainability. Rather, this reduction can only be realized when people become conscious of the consequences that follow from distinct forms of land-use. Only they who comprehend how much their homeland has changed over the past years, who comprehend the specific consequences for human beings, animals and plants – they who comprehend these facts will act, so we hope, against further excessive exploitation. To this end, the project will

provide visual material and discussion?initiating material.

The project is meant to initiate a broad discussion about sustainable forms of land?use, and it should encourage new forms of urban planning. Concerned citizens, administrations, and local politicians will be provided with a web?communication platform whereby discussions can be provoked and discussion

participants can remain in dialogue with each other. Another web?based service, called „What to do?“, suggests ways to engage, where to get Information, and what to do in one’s personal area. Altogether, the Website has been designed to motivate people to participate and to inform them thoroughly to allow qualitative decision?making ? the base for successful participation.





OPPORTUNITIES IN ENVIRONMENTAL SCIENCES

# Valuing Crop Biodiversity on a Farm in Hungary

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This paper presents results from a qualitative, policy-oriented participatory research about farmers seed choice and management of crop biodiversity on Hungarian family farms. The paper is the first attempt to reflect upon the social impact as well as the scientific and democratic value of the research.

Research findings presented in the paper emerged from focus group discussions with small-scale farmers living in rural Hungary Environmental Sensitive Areas and producing local crops and landraces (maize and /or beans) for their own needs. The three study sites are buffer zones of Environmental Sensitive Areas of rural Hungary (Szatmár-Bereg, Dévaványa, Orség) representing micro-agroecosystems with semi-subsistence and small-scale farms and home gardens, containing altogether 32 landraces and cultivars of maize and beans. Our previous study described the basic values farmers themselves attach to agricultural biodiversity, and enhanced policy understanding of the role of Hungarian small farms and home gardens in agri-environmental programs. The analysis aimed at mapping the indigenous knowledge of seed saving farmers in relation to local production traditions, work culture, consumption habits, social conditions of autonomy (seed exchange networks in the local community). The rural community settings provided appropriate frame not only to

identify the important traits in seed choice and to value the crop biodiversity perception of the local farmers, but also enabled us to understand how an effective conservation program for landraces in the local economy could be designed. There are clear incentives for commercially-oriented farmers to use varieties released by the formal seed industry, but these do not fully serve the needs of small-scale farmers who also grow crops for home consumption. Trade-offs between profitability and public attributes embodied in farmers' seed are less visible. The seed choice of local farmers is asymmetric concerning various crops, maize and beans. As for maize, market oriented cultivation is dominant because local varieties decreased since the introduction of high yielding varieties. Only a few farmers engage in experimentation with landraces. In case of beans, private-purpose cultivation is dominant and satisfies family consumption needs. The traditional folk varieties and the locally adapted cultivars are favoured and valued for its inheritance (patrimonial) value as being part of the cultural heritage.

By identifying these motivations behind farmers' seed choice and by ranking the important traits of landraces, this policy oriented research process will contribute to the empowerment of local informal seed systems.

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**Exploratory case study research**

**Problem: erosion of agro-biodiversity**

Crop biodiversity embodied in seeds is eroded in most of Europe. In Hungary there are only a few other remaining local varieties of any crops on farms other than maize or beans.

**Aim:** Exploring crop biodiversity management and conservation with special regard to the perspective of the stakeholders with the most to lose and the least power to influence

→ **Giving voice** to local, marginalised, poor, old farmers living in rural areas

**Conclusion: Genetic and cultural erosion**

- landrace replaced with modern varieties
- Irreversible process of losing TEK
- Immediate costs: disappearing cultural cohesion, loss of biological and socio-cultural diversity

**IN NEED**

- Comprehensive **public policy** on CGR
- Financial **resources** for conservation of CGR
- Subsidiarity:** local competence in management
- **Empowering** local decisions in breeding + local seed systems on the national policy agenda

**Focus: traditional Hungarian home gardens in marginalised rural areas**

complex human-environment systems contributing to sustainable management of biodiversity

privately owned during collectivisation era

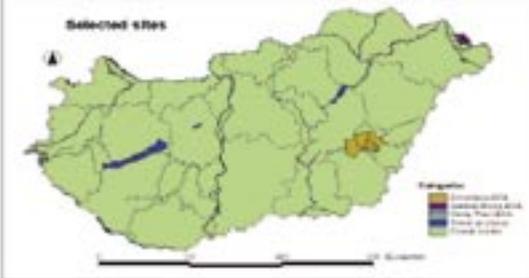
labour intensive, traditional production

rich agro-biodiversity

private benefits: food quality, security

public benefits: conservation of agro-biodiversity, cultural heritage and rural lifeworld

**Study sites:** buffer zones of Environmental Sensitive Areas of rural Hungary (Szatmár-Bereg, Dévaványa, Órség) representing contrasting levels of socio-economic development and agro-ecological features



**Complex methodology based on the paradigm of transdisciplinarity**

Organisations with significant impact on the seed choice, actors with whom policy makers are able to work with

→ **Institutional analysis, stakeholder mapping**

stakeholders' perceptions, interests and values

→ **Stakeholder interviews**

Policy understanding

→ **Legal analysis**

Practices, management

→ **Farmer interviews**

narratives and understandings, perceptions and management styles, practices and motivations behind seed choice, private and public values, benefits assigned to landraces

→ **Group discussions in farmer communities**

**Nature of research**

**Exploratory transdisciplinary background:** law, economics, ecology, agriculture and sociology

**Mutual learning process:** enhance the transferable skills and knowledge of researchers, students, farmer communities and stakeholders: what can we learn from each other?

**Equitable and supportive partnership** of university researchers (+students) with local communities

**Policy orientation:** Home gardens excluded from national and EU level agri-environmental programs (EU CAP, NAEF, SAPARD)



**Deliberative, participatory research techniques considering farmers as equal partners in negotiating the process and the outcome of the research**

**Farmers' seed choice**

- good attributes associated with old varieties
- landraces cultivated for yielding costs savings through minimizing herbicide usage as well as for the recreational function of gardening
- Maize: market-oriented cultivation, clear incentives for the formal seed industry
- Beans: private-purpose cultivation for family consumption needs
- non-use values: traditional folk varieties and the locally adapted cultivars are favored and valued for their bequest value and considered as a part of the national cultural heritage

**Future plans: further development towards action research**

- Publicise results: Workshop for policy-makers on developing effective and comprehensive public policy for financially encouraging in situ conservation
- Implementing the program of rural seed festivals (bean and maize days) in collaboration with Institute of Agrobotany on the study areas
- **Supporting collaborative community conservation on-farm**

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- understanding of cultural, political and economic dimensions, consequences and ethical aspects of environmental processes
- dialogue of disciplines: integrating analysis of nature and social sciences
- public policy-oriented and participative research, action research approach and methodology
- synergic use of educational and research activities
- community outreach



## OPPORTUNITIES IN SOCIAL SCIENCES

# La Formación de Competencias investigativas en la Educación superior de Colombia: Un análisis hermenéutico de la política de calidad estatal

SERGIO TOBÓN AND ARIEL CÉSAR NÚÑEZ ROJAS

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*Se presenta una investigación de tipo documental y de análisis del discurso sobre la formación de competencias investigativas en Colombia. Se expone como principal resultado que la formación de competencias investigativas en Colombia carece de coherencia teórica, pedagógica y epistemológica.*

## Introducción

La formación con base en competencias en la educación superior de Colombia emerge a finales de la década del 90 dentro del marco de la reflexión en torno a cómo evaluar los aprendizajes y mejorar la calidad de la educación (Jurado, 2003), buscando con ello superar las metodologías tradicionales basadas en la memorización, la acumulación y la repetición mecánica de datos, para privilegiar los procesos cognitivos, las habilidades y la resolución de problemas. Es así como la formación basada en competencias se ha venido implementando con un alto grado de publicidad sobre sus beneficios, pero con una escasa mirada reflexiva y crítica en torno a su coherencia epistemológica y teórica, así como sobre las dinámicas sociales, políticas y económicas que animan, facilitan y promueven su uso (Bacarat y Graziano, 2002). Acorde con esto, el objetivo de la presente investigación ha sido analizar críticamente el empleo del enfoque de formación de competencias investigativas en la educación superior de Colombia.

## Metodología

Se ha analizado la forma cómo se emplea el concepto de competencias dentro del marco de la formación en investigación en los diferentes documentos públicos en los cuales se establece la política de calidad para la educación superior de Colombia. La técnica ha sido el análisis del discurso, a partir del planteamiento de hipótesis orientadoras.

## Resultados y discusión

1. La formación de competencias investigativas se está llevando a cabo en Colombia sin tener claridad frente a las condiciones históricas que la determinan y la legitiman en el plano académico y pedagógico: „Gran parte de la comunidad educativa no se pregunta por qué aparece la palabra, ni por qué antes no era importante, sino que cree descubrir con ella una falta en el pasado, incluso la explicación de por qué ciertas fallas siempre habían persistido...hasta hoy, que felizmente serán

superadas, pues ya hemos puesto a circular la palabra" (Bustamante, 2002, p. 13). De esta forma, se emplea un discurso que oculta sus condiciones históricas de producción.

2. La formación de competencias investigativas ha llegado a la educación superior de Colombia y su uso prácticamente se ha hecho irrenunciable, puesto que se habla todo el tiempo de ellas y con ellas. Este enfoque ha entrado a la educación superior y se ha ligado a una serie de discursos imperantes de gran impacto en la sociedad, tales como: modernización, desarrollo económico y competencia global. Es por ello que hablar de competencias en Colombia es hablar del texto legítimo y, por lo tanto, los proyectos pedagógicos y las transformaciones curriculares se están implementando en ausencia de análisis conceptuales y epistemológicos de éste enfoque. Basta mencionar la palabra competencias para captar la atención de cualquier auditorio y tener éxito en la venta de libros. Esto explica la notable ausencia de estudios e investigaciones críticas frente al ingreso de este enfoque en la educación superior del país y la manera como viene poniéndose en práctica.
3. En los documentos que dieron origen al ingreso del enfoque de las competencias a la educación superior se menciona que éste partió de la lingüística (Bogoya, 1999) teniendo como base los conceptos de competencia lingüística y competencia comunicativa. Sin embargo, no hay una explicación clara, lógica, epistemológica y teórica de por qué un concepto sacado de las ciencias del lenguaje se ha integrado a otras áreas disciplinares disímiles como las matemáticas, las ciencias naturales, las ciencias sociales y humanas, etc. ni tampoco por qué puede

ser el fundamento de la evaluación de los estudiantes, la capacitación de los docentes y la transformación de los currículos. Tampoco hay claridad de la relación entre el actual enfoque de competencias (empleado en las políticas públicas de la educación superior colombiana) y otras fuentes de éstas mencionadas, a veces, en este ámbito, como por ejemplo, la teoría de la inteligencia en psicología, la teoría crítica de Habermas o el enfoque de las competencias laborales.

## Conclusión

Es necesario establecer un enfoque claro y coherente en torno a qué se entiende por competencias investigativas e integrar dicho enfoque en la política de calidad de la educación superior de Colombia, buscando un marco transdisciplinario que permita la construcción de una metateoría congruente de esta perspectiva.

## Referencias bibliográficas

- Bacarat, M.P., y Graziano, N.A. (2002). ¿Sabemos de qué hablamos cuando usamos el término competencias? En G. Bustamante et al. (Eds.), *El concepto de competencia II: Una mirada interdisciplinar*. Bogotá: Sociedad Colombiana de Pedagogía.
- Bogoya, D. (1999). *Hacia una cultura de la evaluación para el siglo XXI*. Bogotá: Universidad Nacional de Colombia.
- Bustamante, G. (2002). La moda de las competencias. En G. Bustamante et al. (Eds.), *El concepto de competencia II: Una mirada interdisciplinar* (pp. 11-35). Bogotá: Sociedad Colombiana de Pedagogía.
- Jurado, F. (2003). El doble sentido del concepto competencia. *Magisterio, Educación y Pedagogía*, 1, 14-16.

## OPPORTUNITIES IN SOCIAL SCIENCES

# La ciencia social al servicio de la gobernanza en la sociedad del conocimiento.

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Las autoras apoyan las siguientes reflexiones en su experiencia de más de diez años en un centro de investigación (Observatorio Local de Empleo de la Universidad de Huelva) que trabaja en proyectos de investigación-acción relacionados con diferentes aspectos del desarrollo sostenible en el marco de acciones territoriales de ámbito local, regional, nacional y, o, europeo. Durante este periodo se han podido observar profundas transformaciones en la acción territorial promovida por los poderes públicos debidas a los procesos de descentralización de la acción del Estado y de transferencia de competencias a regiones y comunidades locales, a la sectorialización de las políticas públicas y al desarrollo de la gestión por proyectos con base territorial. El proceso de integración europea, también ha traído consigo importantes cambios, especialmente en los territorios receptores de fondos, en los que se ha producido cierta confluencia en torno a los principios y métodos de acción propuestos por la UE. Así los principios de multidimensionalidad (enfoque equilibrado), partenariado y participación han ido calando con mayor o menor intensidad en las prácticas sobre el terreno.

Una consecuencia importante de esto es que el desarrollo de estos principios ha dado una mayor entrada a agentes privados de muy diferente naturaleza en la gestión de los asuntos públicos (empresas, sindicatos, organizaciones

no gubernamentales, comunidades vecinales, etc.). Así pues, los procesos mediante los cuales la acción pública promueve el desarrollo territorial se han hecho más complejos: sobre un mismo territorio actúan diferentes niveles de gobierno cuyas competencias y funciones a menudo no respetan el principio de subsidiariedad; por otro lado, aparecen nuevos actores y correlaciones de fuerza produciéndose un fuerte desarrollo de redes decisionales mixtas de geometría variable entre lo público y lo privado.

Esta mayor complejidad remite al concepto de gobernanza, entendida ésta como el sistema de reglas procesos y prácticas que determinan cómo los poderes son ejercidos. Instituciones internacionales como la OCDE o la propia UE han dedicado bastantes esfuerzos al análisis de esta cuestión durante los últimos años, coincidiendo en que para satisfacer los requerimientos de una sociedad democrática, logrando que los ciudadanos se identifiquen con las soluciones ofrecidas por los poderes públicos y que los intereses dispersos de los actores sociales se conviertan en cauces de acción cooperativos, la gobernanza debe cumplir los principios de transparencia, participación, responsabilidad, coherencia y coordinación.

Uno de los principales retos a los que se enfrentan las ciencias sociales hoy día es la de satisfacer la demanda social de conocimientos y tecnologías aplicables que faciliten el desarrollo

de esta gobernanza en el contexto de la actual Sociedad de Conocimiento. Esta necesidad ha de ser cubierta al menos en dos niveles: en primer lugar, se trata de esclarecer, a partir de la experiencia de las prácticas de investigación-acción ya realizadas, cómo la investigación en ciencias sociales y humanas contribuye a mejorar la gobernanza de un territorio (mediante el impulso de los principios previamente discutidos) promoviendo con ello el desarrollo territorial sostenible. Pero también, en sentido inverso, se trata de precisar, cómo el respeto a estos principios condiciona los procesos de investigación, los métodos, la utilización de los instrumentos de análisis de las informaciones territoriales y comunitarias, así como los resultados logrados.

En este último punto, la idea de partida del análisis es que para favorecer modos de gobernanza que potencie la ciudadanía en una sociedad democrática, no es suficiente que las ciencias sociales y humanas generen producciones teóricas que satisfagan todos los criterios de calidad científica, ni herramientas de impecables cualidades técnicas. Es necesario, además, que estos conocimientos y estas herramientas se desarrollen a la medida de las necesidades y proyectos de los actores; han de convertirse en instrumentos facilitadores de sus procesos, que se integren plenamente en sus cursos de acción, evitando que aparezcan, como es habitual, de forma yuxtapuesta o como constreñimientos y factores limitantes de la acción.

De aquí, que una investigación que pretenda establecer las oportunas sinergias con los actores del desarrollo territorial sostenible ha de realizarse con principios equivalentes (o al menos compatibles) con los preconizados para favorecer a estos últimos. Estos principios pueden ser enunciados como sigue:

- Pluridisciplinariedad: un enfoque equilibrado a la hora de abordar los problemas, transcen-

diendo la mera yuxtaposición de visiones, muy poco reveladora, falta de transparencia y que hace ininteligible los resultados de la investigación para los que los deben usar.

- Concertación: la investigación ha de planificarse, concebirse y diseñarse en función de las necesidades territoriales previamente concertadas con los actores públicos y privados. El análisis pluridimensional ha de ser realizado sobre una base científica, pero interpretado y reevaluado a la luz de las distintas perspectivas y necesidades de los actores implicados en el desarrollo territorial. La producción científica social (teórica, aplicada, técnica) directamente aplicable al desarrollo sostenible no sólo ha de probar su pertenencia y utilidad, además ha de lograr generar visiones compartidas recogiendo la formulación de expectativas y estrategias de los actores y agentes. Esto facilita la resolución de conflictos por parte de actores estratégicos relacionados, permite fijar agendas y fortalecer las coaliciones. El desarrollo de procesos de investigación-acción que impliquen a partenariados más o menos amplios se hace imprescindible desde esta perspectiva.
- Cooperación: por último, pero más importante, la producción científica social y humana que pretenda contribuir al desarrollo territorial sostenible y muy especialmente las tecnologías desarrolladas a tal efecto tienen que situar las necesidades de los ciudadanos (a los cuales denominamos beneficiarios, usuarios, clientes, consumidores, habitantes, según los contextos profesionales) en el centro de su actividad. Por esta razón la implicación de estos últimos en los procesos de diseño y desarrollo resulta de crucial importancia como mecanismo de garantía de que el producto resultante no sólo cumple las especificaciones científicas y técnicas, sino también

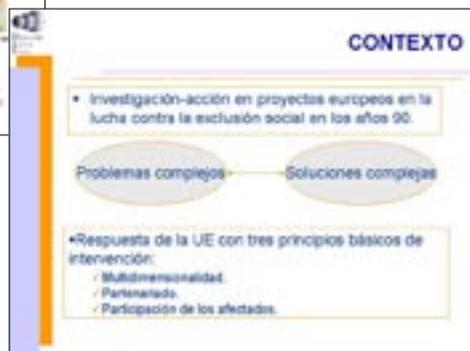
aquellas relacionadas con la accesibilidad (costes, inteligibilidad) para los usuarios y aquellas que favorecen la apropiación por parte de los mismos de las herramientas desarrolladas para su uso, así como su autonomía en la utilización cotidiana y en el desarrollo futuro.

Los tres principios enunciados remiten a una filosofía participativa en la investigación (entre investigadores de diferentes disciplinas, entre éstos y los actores territoriales, entre investigadores y usuarios finales) cuya puesta en práctica plantea un desafío de gran dificultad, a saber: la participación no viene dada, es un elemento de la investigación que se ha de construir removiendo los factores limitadores que impiden o dificultan su desarrollo. Esto último condiciona todo el proceso investigador (objetivos, diseño, metodología, tipo de resultados obtenidos) y supone para todos los implicados un proceso de aprendizaje

cuya evolución depende:

- del contexto político-institucional y socio-cultural y del tejido de actores implicados en cada caso,
- de la eficacia y de la capacidad de movilización de los métodos y herramientas utilizados por los equipos de investigación y de las competencias previas de los actores y usuarios,
- del marco científico en el que se desarrolle la investigación.

Con respecto a este último aspecto, el desarrollo de este tipo de investigación sólo es posible en la medida en que se favorezcan estructuras de investigación integradoras más flexibles y en contacto con el terreno. E implica, a su vez, la reformulación de los criterios de validez y baremos de calidad científica que ha de satisfacer la investigación en la actual sociedad del conocimiento.



### REFLEXIÓN

- Sobre el objeto de la investigación:
  - ¿Debemos cambiar el mundo o reflejarlo?
- Sobre el papel del investigador:
  - ¿Observador o Investigador-Autor?
  - ¿En qué consiste el saber experto en este contexto? *¿Felicidad para Davidson?*
- Sobre el papel de los actores en la investigación:
  - ¿En qué consiste esta participación?
  - Campo de observación/experimentación: *Insustituir a la ciencia (2014-2015)*
  - Entorno de investigación: *tejer el mundo local*
  - Objeto político (modificación de las relaciones poder): *¿Se investiga para el actor o con el actor?*
  - ¿Felicidad para Lyotard?

### Gobernanza y sociedad del conocimiento

- Estas reflexiones cobran aún más pertinencia con la preocupación actual por mejorar la gobernanza (el concepto es nuevo, la problemática no), que exige el desarrollo de:
  - Nuevos modos de cooperación entre actores (vertical y horizontal).
  - Nuevos modos de concertación (ampliación de la concertación social).
  - Nuevos modos de articulación de actores y políticas.
- En un nuevo contexto de Sociedad del Conocimiento:
  - El conocimiento como fuente directa de creación de riqueza.

### Cambian las exigencias sobre la investigación social

El problema de la gobernanza y la emergencia de la sociedad del conocimiento cambian las exigencias sobre la investigación social

- Sobre su contenido: ¿cuál es el conocimiento ORF?
- Sobre su dimensión socio-política: ¿qué posición juega el investigador en la red?
- Sobre la creación y transferencia de tecnologías aplicables: ¿qué herramientas diseñar? ¿cómo transferirlas?

### Refuerzo del papel de la participación en la investigación

- Esto refuerza el papel que ha de jugar la participación en la producción científica.
  - Creación de visiones compartidas de la realidad (mutualización del conocimiento).
  - Institucionalización de la articulación con la acción.

### POTENCIALIDADES

Los enfoques participativos presentan importantes potencialidades:

- Mayor capacidad de captar la complejidad: enriquecimiento de las perspectivas, apertura...
- Plantamientos más contrastados con la realidad.
- Mayor pertinencia de las tecnologías aplicables.
- Revalorización del papel de la investigación social.

### LIMITACIONES

Pero tiene sus límites:

- Hay que fijar nuevas reglas sobre la relación "objetividad-subjetividad". No todo vale, y hay que saber qué vale.
- El problema de la diferente lógica de los tiempos de la acción y de la investigación. La retroalimentación es difícil porque los tiempos son distintos.
- Necesita un ejercicio de humildad académica: la respuesta no es única, la respuesta puede venir de los otros, también del terreno.
- No puede hacer esta investigación quien quiere sino quien puede el contexto es muy importante). Se requiere trabajo en equipo.

### CONCLUSIONES

PARA POTENCIAR EL PAPEL DE LA CIENCIA SOCIAL AL SERVICIO DE LA GOBERNANZA EN LA SOCIEDAD DEL CONOCIMIENTO

- Necesitamos otras estructuras de investigación integradoras (equipos, enfoques) más flexibles y en contacto con el terreno (aunque sean esquizofrénicas).
- Necesitamos nuevos baremos para evaluar la producción científica en el campo de las ciencias sociales.

### LA CIENCIA SOCIAL AL SERVICIO DE LA GOBERNANZA EN LA SOCIEDAD DEL CONOCIMIENTO



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## OPPORTUNITIES IN SOCIAL SCIENCES

# Afirmación identitaria y Saberes indígenas: Un Proceso en la Sierra Norte de Puebla (México)

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Las acciones indígenas de rebelión, de protesta o de simple auto-afirmación, ayer mismo consideradas como el canto del cisne de culturas en vías de extinción, se han multiplicado, durante la últimas tres décadas. Esta tendencia, paradójica en apariencia, se fortaleció a la vez que se producía una notable expansión de la penetración de las estructuras educativas nacionales y de los medios de comunicación masiva en las comunidades y los hogares indígenas. Hasta el punto en que, actualmente forman también parte de este « movimiento por la diferencia » que es uno de los aspectos propios a la globalización – como lo señala Castells (1997) .

La paradoja expresa una tensión, una contradicción real y profunda entre dimensiones opuestas de un proceso complejo que se observa en pueblos indígenas tanto en América del Norte como en América latina : entre un modernismo de corte universalista y una voluntad de mantener una identidad cultural propia. En relación con culturas nacionales subordinadas, como la quebequense, la catalana o la vasca, por ejemplo, las culturas y étnias indígenas se caracterizan por la ausencia o por el carácter muy embrionario de un aparato político propio y por su integración correspondiente a estructuras políticas ajenas. Por eso, la afirmación

identitaria implica necesariamente sustraerse a esta dependencia del Estado y producir una auto-definición propia (Kearney 1996 : 143)

En este contexto, la producción y difusión de un saber propio se inscribe necesariamente dentro del problema general de las relaciones con el poder, cuestión que atraviesa el pensamiento occidental moderno desde Marx y Weber hasta Foucault. En una primera parte, propongo que atraviesa también la historia de esta disciplina menor, que se sitúa en la frontera entre la antropología : la etnobiología. Después, ilustraré estas relaciones entre el saber y el poder a partir de mis observaciones de un proceso en el que participé en un pueblo indígena de México, los nahuas de la región de Cuetzalan, en la Sierra Norte de Puebla. En particular, me interesa la tensión permanente entre el saber universal y los saberes locales, la que se manifiesta, en particular, en las relaciones entre agentes exteriores (funcionarios, ONGs, antropólogos, biólogos...) y agentes locales (autoridades, cooperativas o simples individuos).

## Saber y poder en la etnobiología : una contienda solapada

Las relaciones de poder subyacen a toda la historia de lo que llamamos « etnociencia

».Aclaro desde un principio que no hay acuerdo entre los estudiosos sobre la definición de la etnociencia ni sobre una periodización clara de su desarrollo (Veanse Clément 1998, Beaucage 2000). Por mi parte, la defino como « el estudio de los contenidos y de la organización de los saberes sobre la naturaleza en las sociedades tradicionales ». (Beaucage 2000 : 49). Uno de sus campos más importantes está constituido por la etnobiología o sea los conocimientos acerca de los seres vivos, plantas, hongos, líquenes y animales. Dejo en suspenso por el momento el áspero y prolongado debate sobre la correspondencia entre estos conocimientos y la ciencia occidental moderna. Veremos más adelante como estos desacuerdos y debates son particularmente relevantes para el tema que nos interesa aquí, o sea las relaciones entre saber y poder.

Podemos distinguir tres grandes etapas en el desarrollo de la etnociencia y de su hija predilecta, la etnobiología. Las llamaré el utilitarismo-pragmatismo (1860-1954), el relativismo-cognitivismo (1954-1990) y lo que Víctor Manuel Toledo llamó la « etnoecología » (1990 hasta ahora) (Toledo 1992).

#### **Utilitarismo y pragmatismo (1860-1954)**

El primer período está dominado por la recolecta de plantas útiles o « económicas » por parte de biólogos, agrónomos y médicos que trabajan en contextos campesinos e indígenas, tanto en Europa y en América del Norte como en Asia y en América latina. Harsberger, un biólogo norteamericano, inventa en 1896 la palabra ethnobotany para designar el estudio sistemático del conjunto de la flora conocida por cada cultura del presente y del pasado, para reemplazar la ya tradicionales monografías de tal o tal planta (maíz, tabaco, etc.). A este estudio, le asigna como fin, además de conso-

lidar nuestros conocimientos de la prehistoria, una finalidad práctica o sea « sugerir nuevas líneas de manufactura » y « nuevas maneras de obtener materias primas ». (Harsberger 1896 : 146-152). Tanto la definición de Harsberger como toda esa línea de investigación establecen una clara jerarquía entre dos tipos de saberes, que corresponde a la jerarquía del poder entre los pueblos del mundo en un período de apogeo del capitalismo imperial : por una parte, estamos nosotros, los occidentales modernos, depositarios de la Ciencia, y nuestra tarea consiste en recoger y sistematizar los pedazos de conocimientos dispersos entre los pueblos primitivos o atrasados y ponerlos al servicio del progreso tecnoeconómico de la humanidad. Cuestiones como el significado de estas plantas para los que las conocen y emplean y de la estructura de sus saberes, importaban muy poco, salvo si eso conducía a identificar las propiedades reales de un antipirético como la quinina o de un halucinógeno como el peyotl, por ejemplo. Porque el único saber válido es la Ciencia moderna, esa es una, y universal y reemplaza definitivamente sus balbucesos anteriores, entramados en mitos y supersticiones.

Estas fueron las consideraciones que presidieron, durante casi un siglo, a la construcción del primer acervo de datos sobre conocimientos y prácticas tradicionales relativas a plantas y animales. Hasta que, en 1935, E.F Castetter inventó la palabra ethnobiology para designar globalmente este nuevo campo de conocimientos (Castetter 1944 : 161).

#### **Relativismo y cognitivismo**

La antropología, por su parte, abandonó a partir de principios del signo XX la perspectiva evolucionista y la mayoría de su producción hasta los años 60 fue marcada por un nuevo paradigma : el relativismo cultural. En síntesis, todas las

culturas se equivalen, puesto que todas logran satisfacer las necesidades de sus miembros : cada una define de una forma específica estas necesidades y los medios adecuados para satisfacerlas. Así se presentaban las condiciones para una reorientación de la etnociencia. Sin embargo, el encuentro de la etnología con este nuevo campo fue tardío. En parte, porque muchos etnólogos carecían de la formación científica necesaria para apreciar e investigar la amplitud de los conocimientos indígenas sobre la naturaleza. Y en parte por las posiciones ultra-relativistas de los primeros etnólogos en indagar temas como el de las « clasificaciones primitivas » en una síntesis prematura, Durkheim y Mauss concluyeron, que la « función clasificadora» de los humanos, partía de una « indiferenciación completa » (Durkheim y Mauss [1903] 1968 : 165) y que los humanos solamente empezaron a distinguir y clasificar los animales a medida que distinguían y clasificaban los diferentes segmentos de su sociedad. (ibid. : 169). La coexistencia contradictoria entre el relativismo cultural y una concepción aún positivista de la ciencia, es evidente en la primera definición oficial que se da de la etnociencia, la de George Murdock (1965)<sup>2</sup>.

Desde los años 50, sin embargo, dentro de la perspectiva del relativismo cultural se producían, estudios que povocarían una revolución conceptual en campo de los conocimientos y prácticas sobre el mundo natural. En primer lugar, con el término de ecología cultural, Julian Steward, propuso la existencia de unas relaciones simbióticas, equilibradas, entre cada cultura y su medio ambiente (Steward 1955). Más impacto sobre la orientación futura de la etnociencia como « nueva etnografía » tuvieron los estudios de Harold Conklin sobre los Hanunóo de Filipinas. A parte de mostrar como un pueblo de agricultores itinerantes distinguía y clasificaba

más de 2000 plantas distintas (Conklin 1954), proponía por primera vez que las categorías lingüísticas tiene una impacto directo sobre los sistemas nativos de clasificación (Conklin 1955) en la dirección de la llamada « hipótesis de Sapir-Whorf ». Fue entonces cuando, fundándose en este nuevo tipo de estudios, Claude Lévi-Strauss, en *La pensée sauvage*, afirmó que todos los pueblos humanos tienen sobre la naturaleza conocimientos abundantes, y sistemáticamente ordenados (Lévi-Strauss 1962). Los desarrollos teóricos y metodológicos posteriores fueron precisando el campo de la etnobiología, como rama autónoma y la más dinámica de la etnociencia, fruto de relaciones dialécticas entre el análisis lingüístico, la descripción etnográfica y el estudio del mundo vegetal y animal según los criterios de la biología occidental moderna (p. ej. veanse Berlin, Breedlove y Raven 1974; Hunn 1977).

El resultado global de esta nueva perspectiva (que se dividió a su vez en varias escuelas y doctrinas – Beaucage 2000) fue indudablemente una revalorización de los conocimientos y de las prácticas relativas a la naturaleza entre los pueblos nativos. Se puede decir que la etnociencia, al igual que muchos otros sectores de la disciplina, pasó en los 60-70 de reflejar un punto de vista exterior (etic) a un punto de vista « desde adentro » (emic) utilizando la división propuesta entonces por Kenneth Pike (Pike 1956). Los indígenas participaron, como individuos y grupos, a esta nueva clase de estudios. Simbólicamente, se difundió la costumbre de incluir los nombre de los « colaboradores indígenas dentro de los autores de las monografías (p. ej Vázquez et al. 1985; Taller de Tradición Oral y P. Beaucage, 1987, 1990). Para mí, es bastante obvio, en primer lugar, que esta rehabilitación de los saberes tradicionales tenía lugar paralelamente a la contestación del poder occidental

colonial en el Tercer Mundo, por una parte, y del indigenismo « etnocida » en las sociedades americanas, por otra parte. Reivindicar un valor para sus conocimientos propios hace parte de la afirmación de sí necesaria para contestar al orden social y político que atribuía a los pueblos no-occidentales una posición de atraso y subordinación en la historia cultural mundial; por eso se hace hincapié en saberes que revelan relaciones más armoniosas con la naturaleza o una medicina « holística ».

Si bien, en apariencia, la etnobiología pareció, a partir de los 1970, colocarse del lado de las fuerzas emergentes del tercermundismo y del indianismo, un examen más detallado revela una situación muy diferente. Por ejemplo, los diversos libros y artículos que constituyen la obra de Brent Berlin, destacado etnobiólogo, apuntan sin duda a una revalorización del conocimiento indígena. Pero lo hace asemejando los sistemas tradicionales de clasificación de plantas y animales a los de la botánica y de la zoología moderna, tanto en su monografía sobre los tzeltales de Chiapas (Berlin et al. 1974) como en la síntesis que propuso después (Berlin 1992). En realidad, después de acumular un número impresionante de datos, selecciona lo que más se parece a la categorización occidental y concluye que es lo mismo (ver también Hunn 1977 : 48). Y tiene que ser lo mismo puesto que corresponde al « Plan de la Naturaleza » (Berlin 1992 : 9). Aunque esto implique, metodológicamente, barrer el resto en la categoría de « casos ambiguos » - que llegan a ocupar más del 20% del conjunto de plantas tzeltales! (Berlin et al. 1974)<sup>3</sup>. La combinación del relativismo cultural y del universalismo elimina completamente la especificidad del Otro cultural; sí tiene valor este saber, porque es igual al nuestro. Sólo falta agregar : y, como tal, nos pertenece. Estamos de regreso al etnocentrismo imperialista que ca-

racterizó el periodo anterior, pero más insidioso, porque disfrazado bajo la « igualdad de culturas »<sup>4</sup>. Propongo que esta corriente de pensamiento corresponde al nuevo imperialismo de la era desarrollista, el cual, en vez de inferiorizar al dominado en su diferencia, elimina esta para incorporar a los Otros en un planeta homogeneizado y hegemonizado por la superpotencia económica, política y científica actual, Estados Unidos. De ahí que las transnacionales farmacéuticas consideren muy natural apropiarse no sólo las plantas de las selvas tropicales, sino los saberes indígenas para incorporarlos al acervo mundial que esta bajo su custodia.

#### **Saber y praxis : una nueva diferenciación (1980- )**

Sin embargo, para muchos investigadores de buena fe, tanto la asimilación del conocimiento tradicional al nuestro, como su consecuencia práctica, la biopiratería organizada, eran posiciones inaceptables. A nivel teórico, se volvieron a considerar otras formas de pensamiento que coexisten con la « función clasificatoria », por una parte, y sobre todo la relación dialéctica que existe entre las representaciones y la práctica, por otra parte. Scott Atran mostró como no hace falta forzar los saberes tradicionales en el molde de las categorías occidentales modernas (y, menos, aludir a un Plan de la Naturaleza) para explicar las similitudes que se observan en las categorizaciones tradicionales : estas se fundan sobre el sentido común, que sintetiza las percepciones sensoriales y, por lo tanto, es « fuente de verdad para conocer el mundo local fácilmente perceptible, pero es falible como fuente de intuiciones sobre el universo científico. » (Atran 1986 : 12). Por eso, la ciencia moderna dejó hace tres siglos de fundarse sobre el sentido común para construir su mundo propio de conceptos y experiencias.

Philippe Descola fue más allá, cuestionando la dicotomía Naturaleza-Cultura, propia de la sociedad occidental moderna y « candidamente » extendida al conjunto de sociedades no capitalistas, donde carece totalmente de sentido<sup>5</sup>. Para entender las representaciones tradicionales, proponer desbordar el marco del « sentido común » y rehabilita, redefiniéndolo, el concepto de animismo<sup>6</sup>. Y plantea que las representaciones sobre la naturaleza no se expresan verbalmente (o en forma muy parcial), sino « contextualmente, en acciones e interacciones diarias, conocimiento vivo y técnicas corporales, decisiones prácticas y breves rituales. » (Descola 1996 : 86). O sea, en lo que llama los « esquemas de la praxis » (schèmes de la praxis). Esta perspectiva corresponde también con lo que Víctor Manuel Toledo llama « etnoecología » (Toledo 1992); desemboca sobre una nueva división del trabajo entre antropólogos e indígenas, en la que estos últimos dejan de ser simples informantes para ser participantes del propio proceso de producción del saber. Para ser emic de veras, el discurso debe ser asumible como discurso propio por los integrantes de la cultura de la que se trata; y, más que un simple discurso, debe tener sentido en sus vidas.

En cuanto a las relaciones entre poder y saber, esta nueva perspectiva me parece, en sí indeterminada, tanto como el « etnodesarrollo » de la que es contemporánea y, a menudo, parte (Bonfil et al. 1982). Una posibilidad es que sea un simple refinamiento y una recuperación de la línea teórica anterior : frente al reforzamiento de movimientos indígenas potencialmente peligrosos, y al surgimiento de intelectuales indígenas, se busca incorporar a estos a un proceso de revalorización de sus culturas que antes quedaba circunscrito a los medios académicos. Desde un principio, ha

sido muy claro para los organismos estatales o las fundaciones privadas que apoyan estas iniciativas que sólo hay dos situaciones posibles :

a) Los conocimientos que se explicitan y se sistematizan con la participación indígena no presentan ningún interés para el capital y se archivarán como etnografía o folklore; b) En la medida en que siglos de práctica con plantas y animales silvestres y domesticados hayan producido algunos conocimientos de valor, estos serán transferidos y almacenados por las transnacionales de los sectores agro-alimenticio y farmacéutico para su futura utilización. En esta segunda situación, se consideran los pueblos indígenas, por su aislamiento y conservadurismo, como excelentes guardianes de una biodiversidad que el funcionamiento mismo del capitalismo oblitera . Es obvio que esta expropiación intelectual, con o sin compensación financiera, no hace más que continuar

La otra posibilidad es – sería - que la recuperación de los conocimientos y prácticas indígenas por los propios indígenas, les pueda servir, material o simbólicamente, para la reapropiación de sus condiciones materiales de existencia, dimensión esencial del proceso actual de autonomía.

La diferencia entre las dos posibilidades reside obviamente en las relaciones de poder. Sin una cuota de poder real, los indígenas continúan siendo simples ejecutantes en el etnodesarrollo y en su faceta intelectual, que es la etnocencia. ¿En qué condiciones el proceso de apropiación moderna del saber tradicional propio (porqué de eso se trata en la participación indígena en la etnocencia puede desembocar o no sobre un « empoderamiento » (empowerment). Es lo que trataré de ilustrar a partir de la experiencia de la Sierra Norte de Puebla.

### Dialéctica de las representaciones y de la praxis en la Sierra de Puebla (1973-2004)

En el 1972, después de realizar un estudio de antropología social en la Sierra Norte de Puebla (Beaucage 1973), inicié un estudio comparativo sobre los conocimientos botánicos en cuatro pueblos indígenas de dos totonacos y dos nahuas), en la perspectiva teórico-metodológica recién desarrollada por Brent Berlin y sus colaboradores. Por varios problemas técnicos y financieros, se tuvo que interrumpir sin concluir. La relación de poder que se establecía entonces entre el antropólogo y sus « informantes » se caracterizaba por el respeto ... y el miedo. Después de presentar sus credenciales a las autoridades municipales (mestizas) y a las del pueblo auxiliar (indígenas), el antropólogo podía tocar a cualquier puerta y el jefe del hogar no tenía otra opción que responder a sus preguntas. El « espacio de resistencia » indígenas consistía en guardarse unas informaciones « delicadas » para sí, o mentir, simplemente<sup>7</sup>.

### Un movimiento indígena y sus organizaciones (1973- )

A partir del 1973, nació en la Sierra un movimiento indígena que tuvo dos principales vertientes : una organización agraria revolucionaria y clandestina, localizada sobre todo en la sierra alta (la Unión Campesina Independiente - UCI) (1973-1979) y la Unión de Pequeños Productores de la Sierra (UPPS) iniciada en 1975 y que se transformaría a principios de los 80 en Sociedad Cooperativa Agropecuaria Regional Tosepan Titataniske (SCARTT). Contrariamente a una explicación corriente y fácil, estos movimientos no fueron una simple « respuesta a la crisis » que azotaba entonces a la agricultura mexicana, sino que, por limitarnos al último, más amplio y du-

radero, resultó de la interrelación entre actores locales y externos (Beaucage 1992). En la Sierra baja, estos formaban dos grupos : unos jóvenes agrónomos izquierdistas que trabajaban dentro del Plan Zacapoaxtla y una ONG, formada en San Miguel Tzinacapan, pueblo nahua de la Sierra baja, animada por jóvenes católicos comprometidos (Sánchez et al. 1983;).

Tanto los actores externos como los campesinos tenían en común una idea : el « desarrollo », lo que en el contexto local significaba : salir de la miseria. En cuanto a los actores externos, los agrónomos del Plan Zacapoaxtla tenían de este una visión mucho más unilateral : se trataba de crear una agricultura integrada al mercado, utilizando la técnica moderna, apoyada en los conocimientos científicos. Sin embargo, se marcaban de la política del mismo Estado que los empleaba – por su rechazo del monocultivo comercial, por la creación de una organización independiente y por su apoyo a una agricultura campesina mixta, eso sí « tecnificada ».<sup>8</sup>

En cuanto a los católicos comprometidos de San Miguel, tenían una visión que luego sintetizarían como de « auto-, etno- y eco-desarrollo » (Sánchez y Almeida 1986). Su acción, a escala comunitaria, se fundaba sobre un conocimiento del idioma y de la cultura local, desde la fiestas y las creencias hasta la producción de café y de artesanía. Se crearon varias organizaciones locales en torno a la salud, a la comercialización aunque la ONG puso el acento sobre la cultura y la educación, con la fundación de una Telesecundaria y del Taller de tradición Oral, destinado al « rescate, publicación y difusión de la tradición indígena » (con este trabajé yo). A la organización regional promovida por los agrónomos, oponían una visión algo idealizada de la « comunidad indígena », la cual correspondía a la de la « teología india ». Para los campesinos, el « desarrollo », significaba tanto asegurar su abasto de productos de

primera necesidad como el maíz, (en los que esa región cafetalera ya no era autosuficiente) y aumentar su ingreso monetario obteniendo mejores precios por sus productos. Así que participaban a la vez en las unidades de producción propuestas por la agencia estatal INMECAFÉ (por los subsidios y el precio de garantía para el café), a la cooperativa regional Tosepan Titaniske (para obtener insumos baratos y vender su pimienta) y, en San Miguel, a las asociaciones fomentadas por la ONG.

### **Los actores frente a los saberes indígenas sobre la naturaleza**

En función de sus posiciones distintas, los diferentes actores tuvieron actitudes divergentes frente al acervo impresionante de conocimientos de la naturaleza que poseen los indígenas de la región : saberes agropecuarios, botánicos, medicinales. Para los técnicos del Plan, las creencias erróneas o muy parciales que fundaban las prácticas rutinarias de esta economía de auto-subsistencia, tenían ser remplazadas, en el plazo más breve, por el conocimiento y uso de insumos químicos, de variedades mejoradas de café. Sin embargo, rescataban unas plantas locales « útiles » es decir comercializables, como la pimienta gorda (*Pimenta dioica* [L.]Merrill), el mamey (*Pouteria sapota* [Jacq] H.B. Moore & Stern) y las variedades locales de cítricos (*Citrus spp.*)(Aguilar Ayón 1986). Su actitud se asemejaba mucho a la de la primera escuela de etnobiólogos con la « recolecta de plantas útiles ».

Por su parte, los miembros de la ONG centraron su trabajo en una comunidad indígena. Varios aprendieron el idioma nahuatl y desarrollaron una visión más matizada de la cultura local y de sus transformaciones posibles. Unos miembros de la ONG y varios jóvenes indígenas formaron el Centro de Estudios y

Promoción Educativa para el Campo (CEPEC) que se propuso, entre otros fines « afirmar y dinamizar la cultura nahuatl. » (Vázquez et al. 1985 : 122) Esta revalorización coincidía con un período caracterizado por la reafirmación general de las identidades indígenas en México, una sociedad que se reconoce ahora como multicultural. Frente a los saberes como al conjunto de la cultura, tenían una perspectiva relativista y cognitivista, cercana a la segunda escuela de etnobiología.

En cuanto a los campesinos, adoptaron una estrategia mixta, a la vez pragmática-utilitarista y relativista. Por una parte, entre 1975 y 1989, se apoyaron en los agrónomos del Plan para resistir a la estrategia de monocultivo del INMECAFÉ. A la vez que aceptaban los fertilizantes químicos en las tierras desgastadas, siguieron con una agricultura mucho más diversificada que la que les proponían los agrónomos, combinada con una recolección extensa de plantas silvestres para usos alimenticios, medicinales y artesanales, con la cría de animales de traspatio y algo de cacería y de pesca. Esta explotación tradicional, aunque sea menos productiva, cuantitativamente, que la moderna, pero no requiere ningún insumo comercial pero sí, el manejo de una gran diversidad vegetal, en el monte y en las huertas, de donde se obtiene leña, madera, frutas, materias primas para la artesanía y plantas medicinales (xiujpajmej). Este manejo requiere, a su vez, conocimientos precisos sobre las propiedades y los ciclos vegetativos de un gran número de plantas, así como de sus compatibilidades e incompatibilidades entre sí. En eso coincidían más con la ONG y con el antropólogo. Además, al ver extranjeros interesarse por su idioma, elaborar una forma de escribirlo<sup>9</sup> y recopilar mitos, leyendas<sup>10</sup> y conocimientos, los indígenas, que se sentían tradicionalmente despreciados por la población mestiza de la cabecera, construyeron

una percepción mucho más positiva de sí mismo, de su « dialecto », que ya era idioma (« porque se escribe ») y de su cultura, que ya no eran « costumbres atrasadas ». La revalorización del saber fue indisoluble de mejores cuotas de poder. La joven generación, en particular, exigió un trato diferente de parte de los mestizos de la cabecera; « Ya hay que tratar a todos parejo. »

### **Mi colaboración con las organizaciones indígenas (1984- ) : investigación, saber y poder**

#### **Con la Tosepan Titataniske : ¿Quién define el objeto de investigación?**

En 1984, con ocasión de una sabática, regresé a la Sierra, con el fin de estudiar el movimiento indígena regional. Mi primera reunión con la directiva de la Tosepan Titataniske, confirmó la impresión que la situación del poder había cambiado en la Sierra. Mi estudio no interesaba para nada a los dirigentes indígenas; pero sí un estudio sobre comercialización de productos alternativos al café y a la pimienta. Me pedían producir conocimientos que les fueran útiles a ellos. Y creo que lo fueron. Aplicando la metodología de la antropología económica, pude mostrar que la producción maicera, aún no rentable en términos monetarios, se inscribía dentro de una optimización de la fuerza de trabajo campesina. También pude fijar el costo de producción aproximado y el rendimiento de varios productos, como las naranjas y la miel, apoyando su reivindicación de una alza de precios. Satisfechos de este primer estudio, me pidieron otro, sobre la « conciencia cooperativa ». Mis observaciones y entrevistas me llevaron a la conclusión de que la línea economicista que prevalecía en la organización se traducía por una ignorancia general de los que era el cooperativismo y carecían de un sentimiento de pertenencia a la organización.

Mi estudio sirvió de base para la campaña de educación de 1985.

A la vez, ellos no me impedían estudiar el movimiento al que yo iba participando. Al contrario, me proporcionaban abundantes datos : pero eso era mi estudio y el otro tenía prioridad. El hecho de que el investigador (yo) acepte que una organización indígena proponga el objeto de su investigación implicó un cambio radical en la relación de poder : el « informante » indígena individual se transforma en un sponsor colectivo. Pero eso no implica una supeditación del contenido de la investigación a este « poder popular ». A nivel metodológico, yo exigí definir mis instrumentos y mis fuentes de investigación en función de las exigencias científicas, aunque eso implicara hacer contactos con gente no políticamente correctas, como comerciantes mestizos y miembros de facciones disidentes; fue aceptado, aunque de mala gana. A nivel ético, este tipo de investigación presupone que uno está fundamentalmente de acuerdo con los objetivos que persigue la organización. Cuando esta se alejó de lo que me parecía una orientación deseable para los miembros, para acercarse de las autoridades políticas, yo me aparté también. No quise ni seguir proporcionando datos, ni aportar el capital político de la presencia de un « experto extranjero ».

#### **Con el Taller de Tradición Oral : una dialéctica prolongada**

Mi toma de contacto con el Taller de Tradición Oral, grupo establecido en un pueblo indígena de la región, fue más representativa aún del nuevo estado de cosas : en una vereda, un joven indígena me saluda y luego me dice : « ¿Eres antropólogo, verdad? » Después que asentí, continuó : « Pues soy del Taller de San Miguel y hemos recogido relatos que son como vivencias de la gente. No sabemos muy bien

qué hacer con ellos. ¿Nos quieres ayudar? » Acepté colaborar y los resultados de una investigación ampliada, efectuada en 1984-1985 sobre el mismo tema fueron publicados después por el INAH (Taller et al. 1994): las « vivencias » se habían convertido en etnohistoria!

### **Las nuevas reglas del juego : coautoría e investigación autogestionada.**

Esta primera experiencia llevó al establecimiento de una relación de colaboración duradera con el Taller de Tradición Oral. Cuando les sugerí que hicieramos juntos un estudio sobre la flora y la fauna regional, aceptaron con entusiasmo. Como lo declararían después :

Los jovenes nos dábamos cuenta de que, a la vez que habíamos mejorado nuestro nivel de vida con la especialización en la producción de café, estábamos perdiendo muchos de los recursos que nos proporciona la naturaleza para subsistir [...] Muchas familias ya no van diario al monte, y compran los productos alimenticios en la cooperativa[...] Ya piensan que el quelite [hierba comestible] es pasto y lo único que le agregan a la olla es alguna cebolla. Lo mismo pasa con las plantas medicinales, o xiujpajmej. Ahora, cuando se enferma uno, o una criatura [...] nos receta el médico remedios de botica que a veces son buenos, a veces no, y suelen ser bastante caros. Mientra nuestros ancianos, nuestras ancianas y nuestros curanderos o tapjiani conocen muchas yerbitas que a veces se dan en al misma orilla del camino y a veces curan igual, o mejor, y no cuestan nada [...] (Taller de Tradición Oral y Beaucage 1993 17-18)

Sin embargo, durante nuestra primera reunión, una intervención de uno de los participantes apuntó directamente a la situación de poder que imperaba en la producción del saber antropológico :

Hasta la fecha, nos han visitado antropólogos, nos han pedido datos, hemos sido infor-

mantes, intérpretes...Y luego se van para sus tierras y escriben sus libros. Y ni nos enteramos de lo que dicen de nosotros. Ahora queremos escribir los libros nosotros.

En otras palabras se negaban rotundamente a seguir siendo objetos de un saber definido por otros : querían se sujetos. Establecimos entonces, por escrito, las nuevas reglas del juego. Lo más importante para ellos : un principio de coautoría para todas las publicaciones que haríamos juntos<sup>11</sup>, principio que se respetó hasta la fecha. ). Acordamos que los resultados serían publicados localmente, en español y nahuatl, según la costumbre del Taller, y también en revistas mexicanas y extranjeras. (vease Taller de Tradición Oral y Beaucage 1987, 1988, 1990, 1993, 1997a, 1997b, 2003). Yo me comprometía a buscar fondos para financiar el estudio, y el Taller proporcionaba el local, los contactos, y sobre todo, su fuerza de trabajo contra una remuneración modesta. En cuanto al funcionamiento interno, la investigación se hizo a medio tiempo para que los integrantes pudieran efectuar sus labores en la agricultura y la artesanía, conforme al principio de « articular el trabajo productivo, el trabajo intelectual y la creatividad artística » (Vázquez et al. 1985 : 122)

Puedo decir que el período central de mi labour con la Tosepan Titaniske y el Taller de Tradición Oral (1984-1991) constituyó uno de los períodos más interesantes y provechosos de mi vida de investigador. En nuestras reuniones del domingo al amanecer, yo aportaba elementos de teoría y de metodología antropológica que les parecían de interés, y los integrantes del Taller traían del campo informaciones de una calidad y en una cantidad tal como no había recogido yo en toda mi carrera anterior. La causa era muy sencilla el hecho que tanto los jóvenes indígenas como los mestizos participantes hablaran perfectamente el idioma y

tuvieran relaciones de parentesco y de amistad con una amplia red de hombres y mujeres indígenas en todos los caseríos de la zona, creó una atmósfera de confianza que permitió alcanzar niveles profundos de la cultura, mucho más allá de la identificación de plantas y animales útiles o dañinos, como la dimensión sobrenatural en las relaciones con el medio ambiente (Taller de Tradición Oral y Beaucage 1997b, 2003). Partiendo de nuestra libro sobre las plantas medicinales (Taller de Tradición Oral y Beaucage 1988), un grupo de mujeres hizo una encuesta complementaria que reveló una etiología de las enfermedades y una farmacología que unen íntimamente el cuerpo humano y el cosmos (Taller de Tradición Oral, Grupo Youalxochit, Beaucage y Tabares 1997; Taller de Tradición Oral y Beaucage 2005).

#### **Los problemas de la difusión escrita.**

Ahora bien, la difusión impresa no tuvo el alcance que se esperaba, en una sociedad donde todavía impera la oralidad, y eso a pesar de que se distribuyeran gratuitamente o casi, dentro de la comunidad. Quizás la causa principal fue que, en una cultura todavía esencialmente fundada sobre la oralidad, lo escrito es algo precioso, que se atesora más que se consulta, y esto a pesar de la generalización de la alfabetización: sobre la típica tabla, colgada por cuerdas a las vigas del techo, se almacenan y se empolvan los textos escolares, los folletos de extensión agrícola, los cuentos nahuas y los pequeños compendios de etnobiología! Más que el uso diario del contenido, sin embargo, el mero hecho que se recuperan como texto impreso, es decir en forma moderna, prestigiosa, relatos y conocimientos, contribuyó a modificar las relaciones simbólicas con la sociedad mestiza hispanófono, que antes lo despreciaba. La élite regional mestiza empezó a adquirir estos textos

discretamente y a leerlos avidamente. El hecho que los conocimientos indígenas tradicionales fueran apreciados por gente de la capital y del extranjero, que trataban directamente con los indígenas en vez de pasar por la intermediación antes obligada de los mestizos locales ayudó al cambio de apreciación, en el que se mezclaba una buena dosis de envidia!

#### **Los canales reales de difusión del saber**

En los pueblos indígenas, la difusión real se hizo por dos canales la escuela y la clínica. La ONG PRADE A.C., de la que formaban parte varios pedagogos, impulsó la creación de un centro preescolar (Inchankonemej, « la casa de los niños »), de una telesecundaria (Tetsitsilin « la piedra que canta ») y de la educación de adultos; a los tres niveles se privilegió la enseñanza bilingüe, en nahuatl y en español – este último predominando en la telesecundaria. Si bien los mestizos « fuereños » predominaron en la enseñanza en los primeros años, algunos jóvenes indígenas de San Miguel se incorporaron poco a poco al personal docente. Los cuentos, primero, y los materiales de etnobiología y de etnoecología, después, sirvieron de textos de base (Reynoso 1988). Por ejemplo, una maestra de preescolar tomó como base de su enseñanza un texto sobre ecología y toponimia y recorrió con sus alumnos la zona aledaña a la escuela, explicitando con ellos el significado de los topónimos, muchos de los cuales se refieren a la flora, a la fauna, además de elementos propiamente topográficos (Argueta 1999).

En el caso de la difusión de los conocimientos etnobotánicos, pasó algo semejante. Dos mujeres, miembros del Grupo Youalxochit que participó a la encuesta sobre plantas medicinales, eran a la vez promotoras de salud en la clínica local Tapajtiloyan. Decidieron invitar a jóvenes madres para unos encuentros sobre

salud infantil. Como lo relataron después :

[Las madres] no lo aceptaban. Decían : « ¿Qué saben Uds, si son unas mujeres tan jóvenes? » Y de allí se explicó como conocimos las plantas, por medio de estudios y sus usos para las enfermedades. Y después se fueron animando. Llegó un total de quince o veinte señoras [...] y les enseñamos como hacer los tés y los jarabes. (Taller de Tradición Oral y Beaucage 1993, anexo 1)

Este ejemplo muestra un reacomodo de las relaciones de saber/poder dentro de la comunidad indígena. El prestigio asociado a la posesión de los conocimientos se extendió internamente de los ancianos a los jóvenes que realizaban el estudio; más cuando sus nombres aparecieron como autores de los folletos y libros. En este caso, fue una extensión y no una sustitución los ancianos (cuyos nombres también se mencionaban en las monografías) siguieron siendo considerados como la fuente privilegiada del saber tradicional.

La situación fue diferente en lo que se refiere al liderazgo en las organizaciones y en la comunidad. Si bien los primeros líderes de las organizaciones fueron ancianos dotados del prestigio tradicional (tatatsitsin), la multiplicación de los trámites y del papelorio que exigió su funcionamiento exterior hizo que se elegiera progresivamente a una nueva generación de líderes, más preparada a nivel escolar y que supiera manejar tanto el discurso tradicional indígena como el vocabulario especializado de la burocracia mexicana en muchos casos, se acudió a gente de San Miguel Tzinacapan. Un efecto indiscutible de la interacción prolongada entre los mestizos de PRADE y muchos miembros de la comunidad (en el Taller pero también en las otras organizaciones que habían nacido durante estos años) fue de familiarizar a esos con el lenguaje y los modales del mundo de los

koyomej. Es decir, el manejo del saber tradicional en formas modernas, les preparó a manejar saberes modernos y a ocupar, como varios lo hacen ahora, puestos claves, a nivel regional o local, en la Radio indígena, en un organismo de derechos humanos (Takamachilis), en la clínica de salud (Tapajtiloyan), en instituciones de enseñanza y en el Instituto Nacional de Educación de Adultos (INEA).

### **Balance luces y sombras**

Saberes tradicionales y desarrollo sostenible

Para quien conoció la Sierra Norte de Puebla hace treinta y cinco años, como yo, no cabe duda que la sociedad indígena ha vivido una transformación profunda no sólo en sus condiciones materiales, sino también en su relación con el saber. A ambos niveles, llama la atención, en primer lugar, la apropiación selectiva, por los indígenas, de elementos externos. Materialmente, la inmensa mayoría de los indígenas viven hoy en comunidades dotadas de carreteras o brechas, de luz eléctrica, de agua entubada (que no quiere decir potable) y tienen acceso a servicios básicos de salud. A nivel del saber, lo primero que llama la atención es la generalización la enseñanza primaria y secundaria aunque la calidad de esta deje mucho que desear en muchas partes. El arranque de esta transformación se dió entre 1975 y 1985, cuando la combinación de mejores precios internacionales para el café coincidió con la intervención estatal, (creación de INMECAFÉ) y la formación de la Tosepan Titataniske, que por primera vez organizó en torno a sus intereses más de 5 000 miembros en 50 comunidades indígenas.<sup>12</sup> El rescate y la difusión de los conocimientos tradicionales coincidían con la revalorización cultural emprendida por la ONG PRADE y con la estrategia de diversificación agrícola apoyada por la cooperativa. Este camino hacia un desar-

rollo sostenible, sin embargo, se vió truncado 1989 con la reducción de la intervención estatal (cierre de INMECAFÉ) junto con el abandono del Acuerdo Internacional de Café por Estados Unidos, provocando la ruina de muchos pequeños productores y el estancamiento y progresivo decaimiento de ese cultivo. Solamente gracias a la emigración masiva de los jóvenes a las ciudades, primero, y, cada vez más, a EE.UU, y a algunas políticas asistenciales (PRONASOL, PROGRESA, PROCAMPO...) pudieron subsistir las familias campesinas. En los años siguientes (1993-), la Tosepan, abandonó la diversificación y promovió una tecnificación acelerada de la cafecultura para rebajar los costos de producción : esfuerzos anulados por una nueva baja de los precios del café (1998). Mientras tanto, la organización, después de que su candidato haya ganado duramente el poder municipal durante un trienio (1986-1989), se reorientó después hacia una las fuerzas políticas tradicionales, en concreto, el PRI (Beaucage 2003). En este nuevo contexto donde predomina el trabajo asalariado migratorio y el monocultivo a base de fertilizantes, herbicidas y pesticidas, el interés por los saberes tradicionales pasó a un segundo plano, entre los indígenas<sup>13</sup>.

### Saberes y « empoderamiento » indígena

Sin embargo, la posición nueva lograda por los indígenas frente a los no-indígenas en el universo simbólico y político regional, se mantuvo, realizando la visión de un cuento antiguo que relata como el pequeño pero astuto tlacuache (*Didelphis virginiana*) logra vencer al coyote (*Canis latrans*) y adueñarse otra vez de su bosque (Beaucage 1994). La experiencia económica, política y cultural adquirida por muchos indígenas, durante estos años y después, extendió en el campesinado indígena la percepción de su fuerza colectiva, a pesar de la crisis económica.

Parece que el eterno tlacuache tenga todavía más de un truco en su bolsa. Una anécdota para terminar. En noviembre pasado, en Zautla, donde doy clases, hablaba con Florentino, un estudiante mío, de su trabajo de etnobotánica y de la elecciones municipales recientes. Y él me contó como en Cuetzalan, acababan de echar al PRI que dominó la política local, de forma casi ininterrumpida, durante 70 años. Gracias, entre otras cosas a una coalición de más de diez organizaciones indígenas de base, desde la asociación de artesanas hasta grupos de defensa de derechos humanos. Después, le pregunto a mi compadre ¿Sabes quién es ese Florentino? » Me contestó riendo : «¿No recuerdas este niño que nos miraba con grandes ojos mientras entrevistábamos a su padre, cerca de Tixapan. Pues, le entraron ganas de estudiar y implicarse y ahora es un joven líder del movimiento indígena acá... » La relación entre apropiación del saber y empoderamiento indígena es, definitivamente, una relación compleja...

### Notas

<sup>1</sup> Quiero expresar mi gratitud a mis amigos y compadres de San Miguel Tzinacapan y Cuetzalan, gracias a los cuales pude participar en el proceso iniciado en la región desde los años 70. Por otra parte, pude realizar esta reflexión sobre la etnocencia y la etnobiología de los nahuas con motivo de dos seminarios de doctorado titulados La perspectiva etnocientífica en historia de la ciencia, y Cuerpo, trabajo y medio ambiente entre los nahuas de la Sierra, que impartí en el Departament de Història de la Ciència i Documentació de la Universitat de València, del 28 de enero al 10 de abril 1999. Esta ponencia retoma y profundiza unas reflexiones publicadas hace diez años sobre el tema de la investigación participativa (Beaucage 1994b)

<sup>2</sup> Por una parte, el relativismo cultural del autor le hace colocar

a la cultura occidental junto a las culturas entonces llamadas «primitivas». De tal suerte que el rubro « etnobotánica », por ejemplo, incluye «Venenos para flechas» y «Desarrollo de la botánica científica» (1965 : 129). Sin embargo, Murdock no evita por tanto una forma insidiosa de etnocentrismo, pues jerarquiza los saberes de unos y otros en el rubro #81, llamado « ciencias exactas » (exact knowledge), Murdock menciona la lógica, la filosofía, la ciencia pura y aplicada (todo lo nuestro, pues) y manda al lector al #82 para ver « ideas no sistematizadas sobre la naturaleza y el hombre » (ibid. : 127, cursivas mías). Además, subdivide estas « nociones especulativas y populares » de la misma manera que la ciencia occidental, simplemente agregándoles el prefijo «etno-», a pesar de que nada permite suponer, a priori, que otros sistemas de conocimientos tengan la misma estructura interna que el nuestro. Como lo hemos comprobado en nuestras investigaciones, las nociones nativas correspondientes a « enfermedad », por ejemplo, no se dejan encerrar en alguna « etnofisiología », sino que nos pueden remitir tanto a lo sobrenatural como a fenómenos del medio ambiente (Beaucage et al., 1997).

<sup>3</sup> C. H. Bwown, que también propuso síntesis universales opera de la misma manera (1977, 1979).

<sup>4</sup> Se observa esta misma tendencia universalista e integracionista en la definición de la etnocencia que proporciona Daniel Clément en un texto de síntesis sobre la evolución de la disciplina. Equiparando conocimientos y ciencia, dice : « La etnobiología es el estudio de las ciencias biológicas tal como se practican en las varias étnias estudiadas por los antropólogos. » (Clément 1998 : 8)

<sup>5</sup> En otro trabajo, hemos mostrado como, entre los nahuas de México, el lugar de la « naturaleza », en el universo simbólico, está ocupado por un conjunto muy heterogéneo de representaciones, donde se articulan lo material, lo social y lo sobrenatural, con un énfasis especial sobre las relaciones de género (Beaucage y Taller de Tradición Oral, 2003).

<sup>6</sup> [Los pueblos estudiados] no sólo atribuyen comunmente disposiciones y comportamientos humanos a las plantas y a los animales, sino que expanden el campo de los que son para nosotros organismos vivos no humanos para incluir espíritus, monstruos, objetos [...]» (Descola 1996 : 82)

<sup>7</sup> Tengo todavía en mi archivo unas – excelentes - entrevistas de etnobotánica con un señor « Francisco Fuertes » que nunca existió...

<sup>8</sup> Por ejemplo se estudió detalladamente un árbol de la región, la pimienta gorda (Pimenta dioica [L.] Merrill) que goza de un mercado interesante en la perfumería. Se creó una amplia y eficiente organización de campesinos para su recolección y exportación. (Aguilar Ayón 1986)

<sup>9</sup> A fines de los años 1970, las lingüistas francesas Sybille Toumi y Duna Troianni estudiaron la variante del nahuatl de San Miguel. S. Toumi publicó un léxico del nahuatl de San Miguel (Toumi 1984).

<sup>10</sup> En 1979 se formó en San Miguel Tzinacapan, a iniciativa de un maestro local, Alfonso Reynosos, el Taller de Tradición Oral, para recopilar y difundir relatos y leyendas nahuas de la zona (Ver Taller 1982-1991)

<sup>11</sup> El Taller acababa de tener una experiencia muy negativa con un antropólogo italiano al que reprochaban de haberse llevado datos recogidos por el Taller para publicarlos en su nombre. (Vease Beaucage 1992b)

<sup>12</sup> Un estudio comparativo de tres comunidades en 1970 y en 1980 permite ver que mientras los campesinos antes trocaban un kilo de café cereza por un kilo de maíz, llegaron a conseguir 5 kilos de maíz por el mismo. De la misma manera, el jornal que permitía comprar a penas 5 kilos de maíz en abril 1970, llegaba a 20 kilos diez años más tarde (Beaucage 1974, Beaucage y Montejo 1984)

<sup>13</sup> Como me lo decía un amigo, con un humor nahuatl muy característico :: « Fue bonito el estudio, compadre, escribir en nahuatl y todos los nombres de los animalitos, y de las hierbitas. Pero mejor nos hubieras enseñado inglés. ¡Así podríamos ir a trabajar del otro lado! »

## Referencias

AGUILAR AYÓN, Alvaro, 1986. La comercialización de la pimienta gorda a través de la cooperativa agropecuaria „Tosepan Titataniske“ en la Sierra Norte de Puebla. Xalisco (Nayarit), Escuela Superior de Agricultura,

- Universidad Autónoma de Nayarit, Tesis profesional.
- AGUILAR AYÓN, Alvaro. 1987. Participación de la Cooperativa Agropecuaria regional Tosepan Titataniske en la lucha por el poder. Cuetzalan, ms.
- ARGUETA, Yolanda, 1999 : Los toponímicos como estrategia de apoyo en el proceso de adquisición de la lengua materna en tercer grado de preescolar. Tesis de grado, Universidad Pedagógica Nacional.
- ATRAN, S., (1986). Fondements de l'histoire naturelle. Pour une anthropologie de la science. Paris, Editions Complexe.
- BEAUCAGE, Pierre, 1974 : « Comunidades indígenas de la Sierra Norte de Puebla. » *Revista Mexicana de Antropología*. 36 (1) : 111-146.
- BEAUCAGE, Pierre, 1992a: « Crise des subsistances ou des modèles d'interprétation? A propos d'un mouvement social indigène dans la Sierra Norte de Puebla (Mexique). » *Famines et crises de subsistance* (André Lepage, dir.) *Anthropologie et sociétés*, Vol 16 (2): 67-90.
- BEAUCAGE, Pierre, 1992b: « A qui appartient le patrimoine autochtone. Débat à propos d'un livre au Mexique. » *Recherches amérindiennes au Québec* 22 (1): 33-37 (article repris sous le titre „Ciencia y ética“ dans la revue mexicaine Ojarasca, (6) 85-8)
- BEAUCAGE, Pierre, 1994a: « The coyote and the opossum: ethnic identity and ethnohistory in the Sierra Norte de Puebla (Mexico). » *The concept of Latin American identity*. Minneapolis, University of Minnesota Press (Amaryll Chanady, dir.) 149-186.
- BEAUCAGE, Pierre, 1994b « Un ethnologue et un mouvement autochtone au Mexique. Critique d'une coopération à long terme. » in *Tradition et universalisme* (F.R. Ouellette et C. Bariteau, dir.) Montréal, Institut québécois de recherches sur la culture 367-378.
- BEAUCAGE, Pierre, 2000 : « La etnociencia su desarrollo y sus problemas actuales. » *Cronos. Cuadernos Valencianos de Historia de la Medicina y de la Ciencia*. 3 (1) 44-92.
- BEAUCAGE, Pierre, 2003 : « Espace et politique à Xiliapan. Représentations et mouvements sociaux dans une région rurale du Mexique. » in *Hommage à Vincent Lemieux. La science politique au Québec*. (Jean Crête, dir.) Québec, Les Presses de l'Université Laval : 87-110.
- BEAUCAGE, Pierre, 1992 (dir.): *Voces de Tzinacapan. Dimensiones de la cultura nahuatl de la Sierra Norte de Puebla (México)*. Montréal, Université de Montréal, Cahiers du Groupe de recherche sur l'Amérique latine (con I. Chávez, R. Sierra, P. Valderrama, E. Zamora).
- BEAUCAGE, Pierre y María Elisa MONTEJO, 1984: « Rapports fonciers et rente foncière: une étude de cas dans la Sierra Norte de Puebla » in *Le café au Mexique et en république Dominicaine* (P. Beaucage, A. Corten, M. E. Montejo et M.-B. Tahon), Montréal, Université de Montréal, Cahiers du Groupe de Recherches sur l'Amérique latine: 4-30.
- BEAUCAGE, P.; TABARES, E.; TALLER DE TRADICION ORAL del CEPEC y GRUPO YOUALXOCHIT, 1997 : « Le savoir ethnopharmacologique des Nahuas de la Sierra Norte de Puebla (Mexique) structure et variations. » *Recherches amérindiennes au Québec*, 27, 3-4, 19-30.
- BERLIN, B., BREEDLOVE, D.; RAVEN, P. (1974). *Principles of Tzeltal Plant Classification. An Introduction to the Botanical Ethnography of a Maya people of Chiapas*. New York, Academic Press.
- BONFIL BATALLA, G. et al. 1982 : *Etnocidio y etnodesarrollo en América latina*. San José. FLACSO.

- BROWN, C. H., 1977 : « Folk-Botanical Life-Forms Their Universality and Growth. » *American Anthropologist*, 79 : 317-342.
- BROWN, C. H., 1979 : « Folk-Zoological Life-Forms Their Universality and Growth. » *American Anthropologist*, 81 : 791-817.
- CASTELLS, Manuel, 1997 : *La era de la información*. (3 vol.) Madrid, Alianza Editorial. Vol 2. El poder de la identidad.
- DURKHEIM, É.y M. MAUSS, ([1903]1968) : « De quelques formes de classification - contribution à l'étude des représentations collectives. » En: M. Mauss, *Essais de sociologie*. Paris, Editions de Minuit, pp. 162-230.
- CASTETTER, E.F., 1944 : « The Domain of Ethnobiology. » *The American Naturalist*, 78, 774, 158-170.
- CLÉMENT, Daniel, 1998 « L'ethnobiologie / Ethnobiology. » *Anthropologica*, 40 (1) : 7-34.
- CONKLIN, H. C., 1954 : *The relation of Hanunoo Culture to the Plant World*. New Haven, Yale University, Ph. D. Thesis.
- CONKLIN, H. C., 1955 : « Hanunoo Colour Categories. » *Southwestern Journal of Anthropology*, 11, 339-344.
- DESCOLA, Ph., 1996 : « Constructing Natures. Symbolic Ecology and Social Practice. » in *Nature and Society* (Ph. Descola y G. Pálson, dir.). Londres, Routledge : 82-102.
- HARSHBERGER, J. W., 1896 « Purposes of ethnobotany. » *Botanical Gazette* 21 146-154.
- HUNN, E., 1977 : *Tzeltal Folk Zoology. The Classification of Discontinuities in Nature*. New York, Academic Press.
- KEARNEY, Michael, 1996 : *Reconceptualizing the Peasantry*.
- LÉVI-STRAUSS, C., 1962 : *La pensée sauvage*. Paris, Presses Universitaires de France.
- MURDOCK, G., 1965 : *Outline of Cultural Materials*. New Haven, Human Relations Area Files.
- PIKE, K. L., 1956 : « Towards a Theory of the Structure of Human behaviour. » in *Estudios antropológicos publicados en homenaje al doctor Manuel Gamio*. Mexico, Universidad Nacional Autónoma de México : 659-671.
- REYNOSO RÁBAGO, Alfonso, 1988 : *Educación, revalorización cultural y etnodesarrollo. Interpretación de una experiencia en tres comunidades indias de México*. Montréal, Université de Montréal, Département d'anthropologie (mémoire de maîtrise).
- SÁNCHEZ, María Eugenia, Blas SOTO, Eduardo ALMEIDA y Luis FELIX, 1983 : « Investigación participativa en el proyecto de San Miguel Tzinacapan. » en *La organización de los campesinos y los problemas de la investigación participativa*. Morelia, IMISAC L 121-156.
- SÁNCHEZ, María Eugenia y Eduardo ALMEIDA, 1986 : « Desarrollo regional y participación. » *Boletín Trimestral, El Colegio de Puebla*, 2(1) : 15-41.
- STEWART, J., 1955 : *A Theory of Culture Change*. Urbana, University of Illinois Press.
- TALLER DE TRADICIÓN ORAL DEL CEPEC, 1982-1989 : *Maseualxiupajmej / Cuentos indígenas de la región de San Miguel Tzinacapan*, Pue. San Miguel Tzinacapan, Taller de Tradición Oral (12 fascículos).
- TALLER DE TRADICIÓN ORAL DEL CEPEC et al., 1994 *Tejuan tikintenkaliyayaj in toueytatajuan / les oíamos contar a nuestros abuelos*. Ethnohistoria de San Miguel Tzinacapan. Mexico, Instituto Nacional de Antropología e Historia.
- TALLER DE TRADICIÓN ORAL DEL CEPEC y PierreBEAUCAGE, 1987: "Catégories pratiques et taxonomie: notes sur les classifications et les pratiques botaniques des Nahuas (Sierra Norte de Puebla (Mexique))" *Recherches Amérindiennes au Québec*, 17 (4): 17-36.

- TALLER DE TRADICIÓN ORAL DEL CEPEC y Pierre BEAUCAGE, 1988: Maseualxiujpajmej - plantas medicinales indígenas. (avec le Taller de Tradición Oral) Puebla, Mexique, DIF.
- TALLER DE TRADICIÓN ORAL DEL CEPEC y Pierre BEAUCAGE, 1990 : „Le bestiaire magique: catégorisation du monde animal chez les Indiens maseuals (nahuats) de la Sierra Norte de Puebla (Mexique) Recherches Amérindiennes au Québec, Vol XX (no 3-4): 3-18.
- TALLER DE TRADICIÓN ORAL DEL CEPEC y Pierre BEAUCAGE, 1993 : Del estudio a la práctica : reflexiones sobre los alcances y las limitaciones de una experiencia en la Sierra Norte de Puebla (México). Ponencia presentada en el simposio Pueblos Indígenas y Recursos Naturales (Coord. Biol. Arturo Argueta, INI) en el XIII Congreso Internacional de Ciencias Antropológicas y Etnológicas, México, 31 de julio.
- TALLER DE TRADICIÓN ORAL DEL CEPEC y Pierre BEAUCAGE, 1997a «The Traditional Indian Coffee Orchard of Eastern Mexico» Journal of Ethnobiology. Vol. 17 (no 1) 45-68.
- TALLER DE TRADICIÓN ORAL DEL CEPEC y Pierre BEAUCAGE, 1997 « La bonne montagne et l'eau malfaisante. Toponymie et pratiques environnementales chez les Nahuas de basse montagne (Sierra Norte de Puebla (Mexique) » Anthropologie et Sociétés, Vol 20 (3) 33-54.
- TALLER DE TRADICIÓN ORAL DEL CEPEC y Pierre BEAUCAGE, 2003 : « Una mirada indígena sobre naturaleza y cultura. La mujer el oso y la serpiente en dos mitos nahuas ». Cuadernos del Sur 9 (19) : 59-74.
- TALLER DE TRADICIÓN ORAL DEL CEPEC y Pierre BEAUCAGE, 2005 : « Las yerbas y la llamada (tanotsalis). Etnofarmacología des nahuas de la Sierra Norte de Puebla (Mexique). » in El mestizaje cultural en etnofarmacología. De los saberes indígenas a los científicos. (Carla P. Aguirre marco, dir). Valencia, Intituto de Historia de la Ciencia y de la Documentación. (en prensa).
- TALLER DE TRADICIÓN ORAL DEL CEPEC, GRUPO YOUALXOCHIT, PierreBEAUCAGE Y Elizabeth TABARES, 1997 « Le savoir ethnopharmacologique des Nahuas de la Sierra Norte de Puebla (Mexique) structure et variation. » Recherches Amérindiennes au Québec, 27 (3-4) 19-30.
- TOLEDO, Víctor Manuel, 1992 : « What is ethnology? Origins, scope and implications of a rising discipline.» Ethnoecologia 1 : 5-22.
- TOUMI, Sybille, 1984 : Vocabulario mexicano de Tzinacapan, Sierra Norte de Puebla. Paris, Association d'ethnolinguistique amérindienne. (Supplément au numéro 9 d'Amerindia)
- VÁZQUEZ, Antonio, Virginia PÉREZ, Miguel OSORIO, Javier MORALES, Sixto MARTÍNEZ. Mariano LOBATO, Lilia GONZÁLEZ, Luis FÉLIX, Ismael CHÁVEZ, Isauro CHÁVEZ, Eduardo ALMEIDA, Anastacio AGUILAR, 1985 : « La perspectiva de una experiencia local (La experiencia de participación popular en San Miguel Tzinacapan) in El trabajo en la tierra baldía : La participación popular y la formación en la investigación y la acción social. México, PRADE / PRAXIS : 89-142.

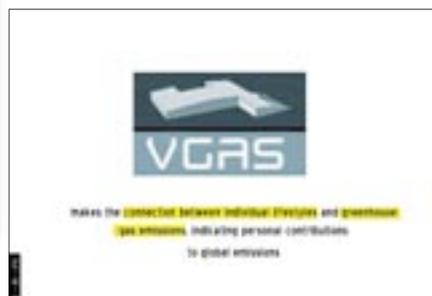
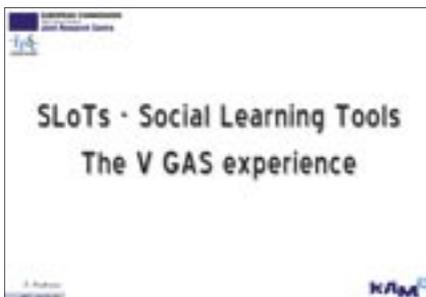
OPPORTUNITIES IN SOCIAL SCIENCES

# SLoTs - Social Learning Tools: The VGAS experience

TIAGO DE SOUSA PEDROSA, ÂNGELA GUIMARÃES PEREIRA

EC - Joint Research Centre/ IPSC, I-21020 Ispra (VA), <http://alba.jrc.it/vgas>

*SLoTs is the name we gave to ICT based tools purposefully developed for learning initiatives in public settings about issues that concern society. They are not educational tools in the sense that they are not a one-way learning opportunity. They are meant to social learning, meaning that those engaged in a situation where they are deployed are all learners from each others walks of life. These tools are designed for discovering information, making relations, exploring challenges, questioning and eventually promote learning and empowerment. V GAS aims at making the connections between individual lifestyles and greenhouse gas emissions, gauging personal contributions to global emissions. V GAS will try to help the user to answer the question ‚how does my lifestyle relate to the global problem?‘, as well as ‚what options are there to reduce my contribution to the global problem?‘ VGAS is a game built in virtual reality. It consists of a virtual home that the player(s) has to manage in order to keep sustainability parameters in acceptable values from the point of view of emissions of 3 greenhouse gases (carbon dioxide, methane and nitrous oxide), as well as other equity and lifestyles indicators such as home comfort and functionality and economic aspects. It can be played in multi-player mode, where equity issues can be discussed and illustrated. This game can be played during the session, the best way to illustrate its functionality.*





## Principles of design

- ▣ **quality of information:** reliability of sources, outline of data uncertainty and ignorance
- ▣ **quality of the calculation core:** outline of uncertainty of modelling, transparency of the calculation core;
- ▣ **quality of the user interface:** intuitive, easy to use, compliance with non-scientific audiences.



## Quality Assurance

- Great potential to initiate the debates it was designed for
- More interesting for certain age groups than others
- Help users reflect "Where do these emissions come from,?"
- Do not mirror exactly individual lifestyle
- Some apprehension regarding the 3D world
- Playful interface but trustful
- Usable in several contexts



## Final remarks

- ▣ **New concepts of communication** of science to non-scientific audiences, integrating natural sciences and social behaviours in a tangible way (TIDCO);
- ▣ **Contributes for individual's awareness process**, helping users to reflect about new situations.
- ▣ **Empowerment on sustainability issues** – ordinary citizens in possession of all relevant facts can engage in high-quality dialogue with the experts to resolve issues characterised by conflict and uncertainty, thus enhancing governance processes.



OPPORTUNITIES IN URBAN REGENERATION

# Participative Approach to the Research Experience on Local Processes Towards Sustainability

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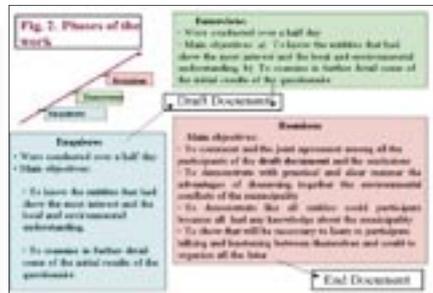
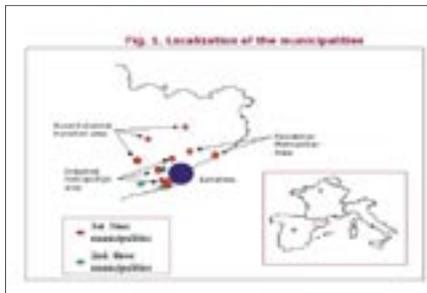
Our contribution is focused on the participative experiences and results of the research that was carried out by our research group between 1999 and 2004. Where by we studied 13 towns in the metropolitan area of Barcelona. This group comprises of different territorial types (rural, urban, those in urban transition, large, medium and small towns) in the Barcelona area.

The methodology of work is based on action participation. This model is characterised by a process of work that was proposed by the citizens that were involved from the beginning. It had two principal objectives:

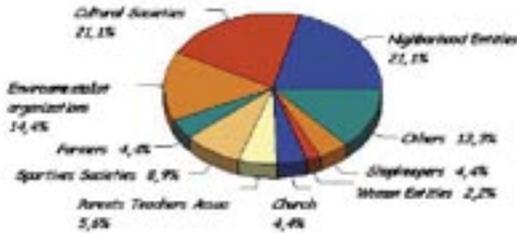
- a) The citizens involvement in the process of the realization of the work and their objectives.
- b) The generation of self education processes, through their experiences of active participation which was carried out in every town

The aim of all the research was to demonstrate the convenience, the instruments, possibilities and obstacles, that the town management encountered when it was faced with challenges. Of which were necessary to bring about change through sustainable policies (including the A21L). It is also noted that for this reason we have to incorporate the citizens in the consultation process, debates and decision-making.

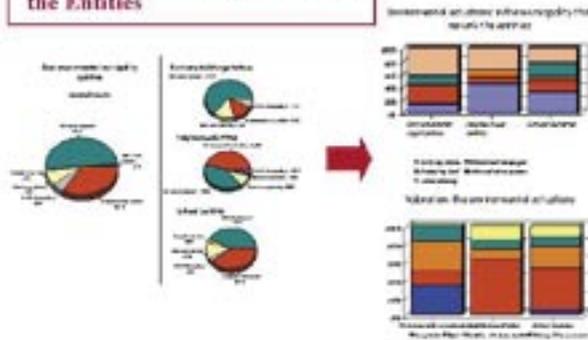
The presentation will consist of 3 parts: The first will be based on the methodology used and the explanations about the territorial and the sociological studied objectives. The second will be a presentation of the more important results of the participation process obtained. The third that will be offered is a valuation of the benefits that was thought to be useful in this participative methodology of the advanced perspective of the sustainability model and the implications of the local scale.



**Fig. 3. Participants Citizen Entities**



**Fig.4. Environmental Cultures of the Entities**



<b>Nature</b>	The natural value as a local heritage. Until the reunions, in most towns, the only groups interested in the natural values were the ecologist associations. These values were conserved in the reunions and the improvement of the environmental quality is mainly conserved to regional forests.
<b>Local Sustainability</b>	The sustainability model concerns all local features. For instance: -Local economy. People start to think that economy growth is not enough; they wonder which works will be appropriate for a sustainable local project. -A meeting is the perfect place to share worries and concerns on their municipality. People start to think that the future of their municipality could be different. -A new local model. In the urban systems, municipalities are subordinated to a central place development. However, in a sustainable model, municipalities have a more equitable relevant role.
<b>Urban and Regional Planning</b>	What kind of urban planning? What kind of local policy for the next future? During our meetings, people talked and started to accept that: -It is necessary to change the urban-local planning -The local and regional planning are connected, and regulations of the supra-local system establish the conditions for the future development of municipalities. -They have to play an active part to promote changes.

OPPORTUNITIES IN URBAN REGENERATION

# A Curricular Framework for Sustainable Equitable Community Reinvestment

PHILIP NYDEN, DAVID AND IRENE HALL, SAM MARULLO, TERESA ROJO, SARAH JANE KNOY AND NANCY AARDEMA

Philip Nyden, Loyola University Chicago, USA; David and Irene Hall, University of Liverpool, UK; Sam Marullo, Georgetown University, USA; Teresa Rojo, University of Seville, Spain; Sarah Jane Knoy, Organization of the NorthEast (Chicago), USA; Nancy Aardema, Logan Square Neighbourhood Association (Chicago), USA

The cycle of neighbourhood regeneration, and its displacement of the low-income families who had been living in the neighbourhood, are common to many developed nations around the world. While such reinvestment produces „showcase“ communities in many cities, it does not allow low-income individuals to share in the benefits of better housing, better stores, safer streets, and improved services among other tangible improvements. Regeneration may help the overall quality of life or immediate local economy of the improved communities, but it often does little to provide opportunities to low-income families. It often just shuffles poverty around a city or a region, but does not really reduce the overall regional level of poverty.

Our international project is an effort to document existing successful alternatives to this reinvestment and displacement cycle. What reinvestment models both improve the overall economic vitality of deteriorated neighbourhoods, at the same time as they provide opportunities

for current low-income residents to benefit from these improvements? What are the existing or potential sustainable equitable community development strategies that do or could benefit all sectors of the population? What equitable development models are effective in increasing economic independence of all individuals and families? This is the focus of our project.

The Curricular Framework for Sustainable Equitable Community Reinvestment builds upon the experience of university researchers and community activists in four cities in the U.S. and Europe: Chicago, Washington DC, Liverpool, and Seville. Specifically, the partners in each city are: the Center for Urban Research and Learning (CURL) at Loyola University Chicago; the CoRAL Network coordinated at Georgetown University in Washington, DC; the Department of Sociology, Social Policy and Social Work Studies at the University of Liverpool; and the Sociology Department of the University of Seville. The project coordinators in each city are: Dr. Philip Nyden (Loyola University Chicago), Dr. Sam Marullo (Georgetown, Washington DC), Dr. David Hall (University of Liverpool) and Dr. Teresa Rojo (University of Seville). We are developing a curriculum that can be used either by faculty and students in the university classroom or by community leaders and resi-

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dents in city and suburban neighbourhoods.

In addition to drawing from experiences in four different cities in three countries, we are drawing from the knowledge of university-based research and community activists. All of the partners are actively involved in university-community partnerships. We are strengthening these local activities by forging an international network that links „community-based knowledge“ with „university-based (discipline-based) knowledge.“ This represents a practical application of a growing movement of university-community research and teaching partnerships.

We are creating, and piloting in all four universities, courses in „equitable and sustainable neighbourhood reinvestment.“ Each city partner is using different teaching approaches, but all courses include: a) hands-on training in community-based participatory research methodology; b) student involvement in an equitable re-development project; c) a detailed system of web-based communications; and d) visits among faculty and community leaders in the four cities.

The Curricular Framework for Sustainable Equitable Community Investment builds upon experience gained by growing international networks that link „community-based knowledge“ with „university-based (discipline-based) knowledge.“ Innovation - in both theory and practice - typically occurs at the boundaries between disciplines, between institutions, and between cultures. Therefore, a project that crosses national boundaries, institutional boundaries, and university-community boundaries enhances innovative course content and innovative pedagogy in higher education. This project focuses on social science research, community development, and urban planning. However, the model and its application could reach into additional areas of higher education vocational

training, e.g. business, health care, government, education, social service, law, criminal justice, environmental protection, social sciences, and the natural sciences.

### Elements of the project

The project formally brings together participants in the growing university-community partnership movements in both the U.S. and Europe. The „Science Shop“ movement in Europe and the „university-community partnership“ and „service learning“ movements in the U.S. are visible manifestations of these trends. These efforts are demonstrating that integration of „university knowledge“ and practical „community knowledge“ better equips university students to address pressing technical and social problems once they enter the work world. Closer linkages between higher education and community practitioners in knowledge production and in training democratize the educational process, helping to strengthen civil society. Such cooperative endeavours to serve an „antenna function“ for universities. University-based researchers can more effectively „pick up“ on emerging needs and knowledge in the broader community. University-community cooperation also provides information on ongoing and emerging training needs that can be used in making professional programs more responsive to community and broader society needs.

The substantive focus of the project is aimed at sustaining and preserving precious human and physical resources in our cities. Equitable urban redevelopment focuses on revitalization of the quality of life and economies of our cities while at the same time insuring that „excluded“ or low-income population are provided with housing, educational, employment, and other opportunities that will insure future self-suf-

iciency. Second, there is a need to better utilize practical knowledge and professional expertise outside our universities in the process of educating our students and completing research. By tapping this practical, community-based knowledge, curriculum inside the university is strengthened. Students are better grounded in the challenges facing urban redevelopers, and in how community members' knowledge can be used in creating innovative solutions to what have been long-term urban problems.

The cross-national character of the project weaves together broad policy, cultural, and community-based organization expertise relevant to solving pressing urban problems. In addition to cross-national understanding of policy approaches, university pedagogical practices themselves vary in Europe and the U.S. A cross-national sharing of teaching and training approaches is valuable to faculty and students on both sides of the Atlantic. Sharing substantive experiences in equitable urban development as well as innovative teaching approaches helps all involved avoid „reinvention of the wheel” in environment with limited resources.

### **The four university partners**

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The four partner university centres and programs have a strong track record in using integrated university-community approaches to training students in equitable urban redevelopment strategies. The partners are: the Center for Urban Research and Learning (CURL) at Loyola University Chicago; the CoRAL Network (housed at the Center for Social Justice Research, Teaching and Service at Georgetown University) in Washington, DC; the Department of Sociology, Social Policy and Social Work Studies at the University of Liverpool, UK; and the Sociology Program at the University of Seville, Spain. Fur-

thermore, the connections of the partners to existing or developing international networks - the European Commission-funded International Science Shop Network (ISSNET) and the Community Based Research Network (CBR) in the United States - means that outcomes of the project will be communicated and used well beyond the four partner organizations.

University centres and departments closely involved in a new university-community partnership movement on both sides of the Atlantic are being used as the primary organizational vehicles for this project. These programs integrate active community initiatives into classroom teaching. On the U.S. side, Loyola University Chicago's involvement in the collaborative model dates back to its leadership in creating a multi-university, multi-community organization network funded through the U.S. Department of Education Urban Community Service Program (UCS) in the early 1990ies. Both Georgetown University and Loyola University have been involved in more recent work funded by the Community Outreach Partnership Center program of HUD (COPC). On the European side, faculty at the University of Liverpool are active participants in the new European Commission-funded International Science Shop Network (ISSNET) as well as INTERACTS, a project aimed at improving interaction between non-governmental organizations and universities. The University of Seville has helped to develop and test participatory methodologies for community-based projects, such as BASIS (a methodology used to transfer technical knowledge to local communities). European Science Shops have functioned in a number of European countries, formally linking university curriculum and research capacity with research and training aimed at having practical outcomes for local communities.

In its support for networks such as ISSNET

and INTERACTS, the European Commission has firmly indicated its interest in furthering the development of stronger links between university activities and community priorities as a way of being more responsive to community needs. In Britain, funding councils for higher education are explicitly developing outreach to business and the community as the „third leg“ of the university mission. Also the Active Community fund in the UK has encouraged development of volunteering programs in universities. In Spain, the Social and Economic Councils created inside the universities are committed to creating links between universities and local communities; although links to private enterprise have been strong, connections to community associations remain underdeveloped. In the U.S. the „service learning“ movement which has now involved virtually every American university, has created a similar mandate. From the UCS and COPC programs to service learning initiatives promoted by national organizations such as Campus Compact and the American Association for Higher Education, there is substantial interest among U.S. universities to promote closer university-community partnerships.

Following are more detailed description of the centres and collaborative university-community networks involved in the project:

**The Center for Urban Research and Learning (CURL) at Loyola University of Chicago:** Through training programs and classroom-based research CURL ([www.luc.edu/curl](http://www.luc.edu/curl)) is dedicated to the development of innovative and practical approaches to community change that bring about perceptible improvement in the quality of life of the people of Chicago's city and suburban communities. To accomplish this mission, CURL promotes cooperation among faculty, students,

community-based organizations, city wide organizations, social service agencies, health care providers, and government. By fostering collaborative relationships with organizations outside the university, the Center recognizes the importance of working with communities and organizations in seeking new solutions to pressing urban issues. The Center is grounded in a new model of teaching and learning that stresses knowledge exchange between the university and community that builds capacity while drawing on the strengths of both the community and university. „Research“ at CURL is not traditional research, but rather an integrated process where „research“ is directly connected to classroom and community partner learning.

Founded in 1996, CURL has an endowment of approximately \$8 million that provides support for undergraduate and graduate fellowships, faculty fellowships, and community fellowships. Currently CURL has nine faculty and non-faculty staff members and more than 50 graduate, undergraduate, and community fellows. Teaching and classroom-based research projects are based on a team-approach that involves students, faculty, staff, and community leaders. More than 15 projects are active at any one time. These include work on affordable housing, innovative models of early childhood education, employment training for low-income job seekers, culturally-sensitive domestic violence prevention models, maintaining stable racially and ethnically diverse communities, and effective micro-enterprise development in economically diverse communities.

CURL has received funding from many foundations and government agencies including: the U.S. Department of Education, the U.S. Department of Housing and Urban Development, the McCormick Tribune Foundation, the John D. and Catherine T. MacArthur Foundation, the Fannie

Mae Foundation, the Sara Lee Foundation, the Woods Fund, the Joyce Foundation, the Ford Foundation, BP, and AT&T.

**University of Liverpool:** The Department of Sociology, Social Policy and Social Work Studies at the University of Liverpool is one of the oldest of its kind in the country. Established initially in the early years of the 20th century as the first social work school in Britain, it has expanded to include a range of teaching and research in theoretical and applied sociology and in social policy. The Department provides undergraduate BA programs in Sociology, Sociology and Social Policy, and Criminology and Sociology, together with a range of postgraduate programs in social policy, social work and social research, including the MSc in Applied Social and Community Research. The Department has a current yearly intake of 180 undergraduates in its BA programs, 60 in postgraduate programs, mostly in social work, and a cohort of approximately 30 PhD students. It is also involved in the Community Based Learning Teamwork network ([www.hope.ac.uk/cobalt](http://www.hope.ac.uk/cobalt)), a multi-university consortia which has developed curricula for community-based participatory research.

The Department has a thriving and expanding research culture, committed to critical and socially relevant research. This is undertaken within two broad areas. First, The City, Community and Policy is centred on the analysis of contemporary poverty and the associated rise of social stress and social exclusion, as well as more broadly to embrace many topics concerned with modern urban life and state welfare policies. Second, Globalisation, Regulation and Citizenship addresses developments in the world economy and politics, their impact on nation states, on labour markets, and on concepts and practices of citizenship. A distinctive feature

of undergraduate and postgraduate programs is the ability of students to choose to engage in community-based learning through service learning and applied social research. The University of Liverpool has an active „volunteering program“ that is linked to this work. The Department is also a participant in ISSNET and INTER-ACTS (a consortium of Science Shops in seven European countries that developed case studies of Science Shop-community interaction).

**Georgetown University:** The CoRAL Network ([www.coralnetwork.org](http://www.coralnetwork.org)), based at Georgetown University, is a collaborative effort of DC's universities, community-based organizations (CBOs), and civic organizations. Participating universities include American University, Catholic University, Georgetown University, George Washington University, Trinity University, the University of the District of Columbia, and the University of Maryland. The CoRAL network also includes the Perry School Community Service Center, the Urban Institute, George Mason University Non-profit Studies Program, the Washington Council of Agencies, and the Washington DC Office of Partnerships and Grants Development.

It is designed to meet the research and information needs of the CBOs by matching up students and university faculty to work with CBOs for progressive social change. In the four years of its existence, the CoRAL Network has undertaken over 30 collaborative research projects, several of them in the Columbia Heights community focusing on the problems surrounding gentrification and displacement. The CoRAL Network links and supports faculty and community organizations to support their projects and develop long term partnerships that build capacity of the organizations and empower the residents of disadvantaged communities. Other CoRAL-sponsored projects have evaluated the

impact of the replacement of public housing with HOPE VI mixed-income housing, examined the barriers to higher education among immigrant youths, and have tracked and analysed the quality of life indicators and challenges faced by the largely Latino immigrant population concentrated in the community.

While the CoRAL Network benefited from a \$35,000 per year three-year start up grant from the Bonner Foundation to provide training and staff support, it also depends heavily on volunteer faculty participants who integrate community-based research into their courses. For its administrative and development work, the CoRAL Network relies on two faculty members and four student assistants based in Georgetown University's Center for Social Justice Research, Teaching, and Service. Dr. Marullo is directing this project from the university side, recruiting and training students and supervising their work in the community. He has long been involved in community-based research and has pioneered the development of community-based research within the sociology curriculum.

**University of Seville:** Since 1997 the Sociology Department of the University of Seville ([www.us.eu](http://www.us.eu)) has provided expertise on participatory research methodologies for different efforts organized by local authorities or political parties for the promotion of sustainable urban reinvestment strategies in Seville. These have been done in accordance with EC policies related to the region-policies expressed through the European Campaign for Sustainable Cities and its conferences; the Innovation Programme promotion of participatory methodologies like EASW since 1995; and the ONU Agenda 21 Statement. Results have been compiled in the book *Seville 2010: A Sustainable Metropolis*, published by the Department. Past work by

the Department has created regular lines of communication with non-governmental organizations and community leaders, as evidenced by the Department's answering their specific requests for training and technical advice in recent years.

### Description of the local community partnerships in each city

**Chicago:** Sustaining stable diversity in some of the most racially, ethnically, and economically diverse communities in the United States is the focus of this project. For more than ten years, CURL has been working with community-based organizations in three community areas along Chicago's northern lake front, containing a population of 180,000 and surround one of Loyola's three Chicago campuses. CURL has documented this diversity through a number of projects that have involved collaborative teams of students, faculty, and community leaders. While using a collaborative participatory research model, these past activities have been integrated into graduate and undergraduate courses at Loyola University. Most prominent among the outcomes of these collaborative learning/research projects was a component of a national report published by HUD documenting characteristics that produce stable diverse communities. Most recently, the State of Illinois Department of Commerce and Community Affairs supported further collaborative university-community projects to document changes in availability of affordable housing in the local community.

CURL is working with two community partners in: 1) examining the dimensions of gentrification and displacement in two Chicago community areas with population of approximately 60,000 each, and 2) exploring effec-

tive city wide strategies for insuring effective interventions supporting equitable community development. The Organization of the Northeast (or ONE) in the Uptown neighbourhood and the Logan Square Neighbourhood Association (LSNA) in the Logan Square community area are working with CURL to share best practices and lessons learned from their work in equitable community develop and to develop priorities in an equitable development curriculum.

Founded in 1974, today ONE has over 80 diverse institutional members, including congregations, ethnic associations, businesses, and non-profits. ONE is a United Way agency and does not seek nor receive any governmental funding. ONE's ongoing mission is to building a successful multi-ethnic, mixed-economic community on the northeast side of Chicago, in the neighbourhoods of Uptown, Edgewater, Rogers Park and Ravenswood. In 2001, ONE's work was recognized by the Woods, Weiboldt, New Prospects, and The John D. and Catherine T. MacArthur Foundation as they named the organization Community Organization of the Year.

The Logan Square Neighbourhood Association (LSNA) was founded in 1962 as nonprofit 501c3 corporation. Its mission is to ensure that the community is an excellent place to live, work, play, raise children, run a business, and worship. It is an umbrella organization currently composed of over 40 member institutions to include schools, churches, block clubs, social service agencies, and multi-unit apartment buildings. Collectively, its membership represents thousands of families in the Logan Square community. LSNA's organizational action plan sets forth its priorities in the areas of affordable housing, education, health, economic development, jobs, safety, parent leadership, senior citizens, youth, and the arts.

**Washington, DC:** The Columbia Heights Action Research Project is linking community activists with university faculty and students in order to discover the impact of urban redevelopment on a low-income neighbourhood in Washington, DC. It trains faculty, students, and community residents to work together on: 1) analysing census data about the neighbourhood, 2) studying property sales transactions, and 3) interviewing current and former residents and business owners who face the risk of or have been forced out of the neighbourhood. Participants in the project learn about the impact of redevelopment on low-income communities; find ways of maintaining neighbourhoods like these as livable communities without displacing long-time community residents; and work to maintain the current racial, ethnic, economic, and age diversity existing in Columbia Heights and other similarly affected neighbourhoods in Washington, DC. The project particularly seeks to examine and support effective tenant and community organizing as a strategy for resisting displacement and maintaining diversity. The developing curriculum will be integrated into a multi-university course, Project DC, a community-based research seminar.

**Liverpool:** The university is working with the Dingle Regeneration a project focusing on an inner city area with a significant level of regeneration activity. This is part of Liverpool 8, but is less ethnically-mixed than adjacent neighbourhoods. The community is closest to the south docks which have now closed and have been turned over for redevelopment as commercial premises and new residential areas. However, Dingle is separated from this new development by physical barriers, and has not shared in the gentrification of the part with the view of the River Mersey - mixture of Victorian housing and small

new estates. The focus of this project would be on how Dingle can share in the economic benefits of the nearby River Mersey regeneration. The proposed curriculum will be integrated into the Applied Social and Community Research masters degree program.

**Seville:** The present project addresses recent demands expressed by community associations working on the regeneration of the old Seville neighbourhood of San Luis - San Gil - Pumarejo, by integrating the training and research activities into the undergraduate course on „Public Opinion“ as well as into the postgraduate course on „Deviation, Society and Urban Change“, offered by the Sociology Department of the University of Seville. Through these courses students gain hands-on experience in the use of community-based participatory research methodologies, make use of information technologies for group work and teaching systems, engage in international exchange of experiences and techniques.

The neighbourhood of San Luis - San Gil - Pumarejo is located inside the old town of Seville. It is a disinvested area, very close to other old town neighbourhoods that have been recently revitalized through work of the Municipality, private investors, and an URBAN program funded by EC (1997-1999). The neighbourhood of San Luis - San Gil - Pumarejo lacks social services and employment for residents. Social changes are taking place through recent five years housing renewal for young professionals, foreign poor countries migration flows to remaining poor quality housing.

Local community associations like „Plataforma Pumarejo“, „Ecologistas en Acción“, „Ateneo Verde“, „Mujeres sururbanas“, „Foro Social de Seville“, and others are working to revitalize the area. They have already obtained large support both from residents and Seville intellectuals and

artists through the concept of recovering a half-empty and very deteriorated 300 year palace for a multi-functional activity center. The General Plan under approval at the moment has integrated some of the demands of the Plataforma and a the Housing Plan for the city has also projects for the area. Local leaders have requested support for a systematic study of the issues as well as support for communicating and relating with other relevant actors in the process of change of the neighbourhood.

### Focus of the project

Using the experience in 1) developing urban policy curriculum; 2) conducting internships based on a university-community partnership model; and 3) training students in community-based participatory research methods, we are creating a variety of courses models in equitable community development. In the pilot phase of the project, classes at the four sites are using web-based communications, primarily a blog, to facilitate communication among faculty, students, and community partners.

The project is still in process. However outcomes will include development and completion of courses that use different pedagogical approaches in examining Collaborative university-community approaches to sustainable and equitable neighbourhood reinvestment. Specifically we have developed, or are developing: 1) a 14-week course on equitable urban development; 2) integration of an international equitable development thread into an undergraduate urban studies course the includes both seminar and team community-based research components; 3) graduate courses; 4) multi-university seminars with a service learning component; and 5) multi-disciplinary courses which include equitable development as one area of focus.

Included in our models are the following components:

- a) Hands-on training in community-based participatory research methodology (CBPR). CBPR is a well-developed methodology that integrates community expertise into both the design of research, e.g. evaluation research and needs assessment, and the analysis of research data. The advantage of CBPR is that incorporates community-based knowledge into the research process, while keeping up rigorous scientific standards of research. This makes it more responsive to community needs and more usable by clients, e.g. social service providers, health care providers, government agencies, or businesses.
- b) Student involvement in an equitable re-development project that will be the substantive focus in each city
- c) A system of computer-based communication among students, faculty, and community partners at the four participating universities

A written manual will also be produced, providing teaching and community-based participatory research case studies of the projects in each of the four cities. Critical elements of this manual will be explanations of how to:

- a) enhance classroom efficacy through integration of cross-national experiences and best practices models into the classroom;
- b) use web-based distance learning software;
- c) apply this model to other disciplines/substantive areas;
- d) establish and maintain partnerships among universities and community-based partners.

## Conclusions

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The urban equitable development project is in the process of expanding the knowledge base of both university faculty and community partners. This represents a significant step forward in using Science Shops and university-community collaboration experience to further the quality of life in local neighbourhoods in multiple countries. At a time when „global“ is often used to describe a process of decision making beyond the reach of local communities, we are actively developing knowledge and a communication system to link local activities in different cities and different countries. Our hope is to increase the control of local residents, particularly lower-income residents, in the future of their communities.

## OPPORTUNITIES IN HEALTH SCIENCES

# Diagnosing Distraction: Society's Influence on Prescribing Methylphenidate

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*Little is known about the long-term effects of methylphenidate (Ritalin.) Several tests on lab specimens, human children, and human adults have been administered to find short-term effects and predict long-term effects of the relatively new drug. The question is raised of whether the administration of psychostimulants during the critical period development during childhood will lead to negative changes in adulthood (Gomez et al. 2004).*

*The safety of methylphenidate is indeed questionable. Although many physicians see the effectiveness of stimulant drugs for treating symptoms of ADHD in children, many would prefer nonstimulant medication (Stockl et al. 2003). Still, methylphenidate remains the most prescribed medication for ADHD. There are several social factors contributing to the diagnosis of behavioral disorders resulting in this high rate of prescription. Certainly the need exists for scrutiny of physicians' guidelines for prescription as well as the drug methylphenidate itself.*

*This study examined the effects of society on the prescription of methylphenidate to pre-adolescents, adolescents, and adults. Interviews were conducted with the professionals associated with institutions including elementary schools, high schools, and medical practices. It was found that several social factors contributed to diagnosing and prescribing including parent/patient-physician pressure, direct-to-consumer advertising, prescribing as a coping device for physicians, family background and socioeconomic status, as well as the structure of education. Assessing the positions of patients, physicians, and pharmaceutical companies in the social structure is crucial for truly beneficial patient care with the use of prescription drugs.*

The recent increased appearance and treatment of behavioral/mental disorders in the United States may seem like an epidemic. The sharp rise, occurring in the 1990ies, in diagnoses of Attention Deficit Hyperactivity Disorder's reveals that disorder is more than an ingenious medical discovery. 900,000 children and adults were diagnosed with ADHD in 1990, a figure that rose to nearly five million by 1998. Additionally there was a 700% increase in the production of Ritalin, the most common drug used in treating

ADHD, during the same period (Diller 1998). An analysis of cultural and societal aspects in addition to the systematics of medicine and marketing reveal that the diagnosis and treatment of ADHD is not entirely medical in nature.

## Literature Review

Physicians are held in high esteem in America; their knowledge of modern science in conjunction with an intimate contact with people pro-

vides them with a certain authority (Starr 1982). As the United States developed into an industrial society, physicians became an integral part of the social order. Illness, childbirth, and death became more segregated from normal events of everyday life. British philosopher John Stuart Mill believed that society urges that pain be hidden from public view (Starr 1982). As American culture has entered a more progressive era, the demand to be well is even greater. Several factors, labelled as progressive, have affected the way medical authorities and patients view illness and how medical authorities prescribe treatment. Since it is common practice in American society to hide illness and pain from public view, the medical prescription model has reached new heights.

Recently, people of lay status (patients) have presented challenges to the authority of general practitioners particularly in the area of demanding prescription drug treatment. Interviews conducted by Weiss and Fitzpatrick (1997) reveal that general practitioners identified expectations of their patients as a key influence on their prescribing:

*I am susceptible to patient pressure or I'm certainly very willing to negotiate with patients about what they feel they want to do with the treatment. I think that... if you cooperate and the patient gets what they want then there's certainly a lot of psychological (benefit).*

Patient expectations for prescription drug treatment often create problems with general practitioners' desires to prescribe based on a scientific model of the prescriptions effectiveness:

The patient's expectations would certainly play a role and so there are occasions where one might end up prescribing maybe even against one's better judgment (Weiss and Fitzpatrick 1997).

The question is thus raised, what drives this patient demand to be medicated?

### **Factors Associated with Prescribing: Direct to Consumer Advertising**

Historically, patent drug companies used advertising to their advantage, speaking out against physicians (Starr 1982). Later, physicians used the same tactics to regain their authority. Today the tables are turning again. Direct-to-consumer advertising expenditures climbed from \$47 million in 1990 to \$2.5 billion in 2000. Product-specific broadcasts are not required by the U.S. Food and Drug Administration (FDA) to provide complete risk information about prescription drugs. Instead drug companies are required to have a supplemental summary included with the drug containing detailed information about its side effects and effectiveness (Kaphingst et al. 2004). Studies by Kaphingst et al. (2004) show that consumers would require a college reading level to understand the implications of the drugs indicated by these summaries.

Regardless of consumers' insufficient understanding of prescription drug risks, Woloshin et al. (2001) argues that direct-to-consumer advertising has boosted patient demands for certain prescription drugs producing a negative effect on physician-patient relationships., Stivers (2002) found that physicians receiving patient/parent pressure are more likely to inappropriately prescribe antibiotics.

### **Prescribing as a Coping Mechanism**

Prescribing medicine today is clearly more complex than simply a treatment for patient ailments. Weiss and Fitzpatrick (1997) argue that in the medical field, „a relatively easy source of cost savings is prescribing.“ Since the patient population is growing at a faster rate than the physician population, prescribing has become a coping device. In Weiss and Fitzpatrick's study (1997), several general practitioners were interviewed about prescribing in relation to the

clinical environment. Numerous physicians agreed that scrawling a prescription and opening the door for the patient was sometimes the only sane way to deal with a busy clinic. Others stated that prescribing was a way to reduce medical uncertainty. One general practitioner admitted that he or she (the identities of the interviewees were kept anonymous) usually prescribed more towards the end of the day than earlier as a direct result of stress rather than based directly on patient ailments.

Direct-to-consumer advertising when combined with stresses faced by general practitioners clearly results in increased prescribing. Medical doctors are using prescriptions more than ever to treat patients. It can thus be inferred that many of these prescriptions are unnecessary and that patients lack the knowledge of what the treatment they are receiving is actually doing.

#### **ADHD: Diagnosis and Treatment with Methylphenidate**

The psychostimulant Methylphenidate, a derivative of amphetamine, was first approved by the FDA in 1955 for the treatment of mild depression, narcolepsy, and drug-induced lethargy. Acquiring its familiar trade name, Ritalin, in 1960 it was marketed as a drug to improve memory performance in the geriatric population as well as for treating various behavioral problems in children. The use of Methylphenidate raises concern among many because of its close relation to amphetamine; their chemical structures are very similar as are both the way they are metabolized and their clinical effects. The simple fact that Ritalin is not seen as an amphetamine along with its quick action and lack of major side effects leads most to believe that treatment with the patented drug is fairly safe (Diller 1998).

According to Gomez et al. (2004) an overproduction of synaptic connections and receptors followed by their natural reduction occurs during childhood development. Many behavioral disorders may be attributed to this overproduction and elimination during pre-adolescent and adolescent years. Methylphenidate specifically acts on presynaptic receptors, inhibiting reuptake of dopamine which then collects in synaptic areas.

Attention deficit hyperactivity disorder (ADAH) affects 3%-5% of all school-aged children, according to Stock et al. (2003). More referrals for the treatment of ADHD exist than any other behavioral/mental disorder in pre-adolescent and adolescents. Schenk and Izenwasser (2002) note that Methylphenidate is the most prescribed treatment for ADHD. Many medical professionals feel, however, that ADHD is underdiagnosed. According to Jensen (2000), only 50% of American children with ADHD are being treated with stimulant medication and of those, inadequate treatment is common. The Multimodal Treatment Study of Children with Attention Deficit Hyperactivity Disorder conducted by the National Institute of Mental Health (1999) provides evidence that psychostimulants are more effective than behavioral therapy and when used together, they do not prove any more effective than when patients are treated by the drug alone.

Still others believe that ADHD as a biological disorder is not a legitimate diagnosis in all cases, that both biologically-based ADD and culturally-based ADD exist. Edward Hallowell terms the latter „pseudo-ADD“, stating that the fast paced society in which we live fosters many of the core symptoms of biologically-based ADD: high levels of impulsivity, an ongoing search for high stimulation, a tendency of restless behaviour and impatience, and a very active, fleeting at-

attention span. Hallowell states, „We are, as the cliché has it, wired-stimulated and speeded up day and night, constantly sending and receiving messages...“ (DeGrandpre p. 17, 1999). Regardless of its origin, biological or cultural, people are suffering from attention deficit. Matthew Dumont suggests:

*The hyperactive child is attempting to recapture the dynamic quality of the television screen by rapidly changing his perceptual orientation. I also wonder if it is possible that amphetamines control his behaviour by producing a subjective experience comparable to the fleeting worlds of television (DeGrandpre p. 126, 1999).*

Little is known about the long-term effects of methylphenidate. Several tests on lab specimens (namely Sprague-Dawley rats) human children, and human adults have been administered to find short-term effects and predict long-term effects of the relatively new drug (see Brandon et al. 2003, Gomez et al.2004, Carlezon et al. 2003, Rapport and Moffitt 2002, Volkow et al. 2003, & Schenk and Izenwasser 2003). Gomez et al. (2004) question whether the administration of psychostimulants during the critical period development during childhood will lead to negative changes in adulthood. Studies examining somatic complaints showed that children receiving methylphenidate therapy had appetite reduction, sleep disturbance, headaches, stomachache, and dizziness as well as elevated heart rates and blood pressure (Rapport and Moffitt 2002). It has been suggested that short-term treatment with high dosages of methylphenidate increases vulnerability to cocaine abuse (Schenk and Izenwasser 2002). In a recent study, it was reported that 16% of students reported they had tried methylphenidate recreationally, 12.7% of which had taken it intranasally (Schenk and Izenwasser 2002).

The safety of methylphenidate is certainly questionable. Although many physicians use

stimulant drugs for treating symptoms of ADHD in children, studies by Stockl et al. (2003) show that many would prefer nonstimulant medication. Still, methylphenidate remains the most prescribed medication for ADHD; the question here is why?

Perhaps the pressures on physicians from adult ADD patients and/or parents of children diagnosed with ADHD create demand for this high rate of prescription? Or perhaps a physician treats a person with symptoms of ADHD and quickly writes a prescription to relieve the stress of an overburdened clinic? These and other social factors may impact a physician's unwritten guidelines for prescribing methylphenidate. This study was designed to examine the effects of social factors rather than health needs on prescription of methylphenidate to pre-adolescents, adolescents, and adults.

### Theories: Marx and Engels

Conflict theorists view the establishment of medicine as a social institution shaped by the economic base of capitalism. Disparities among class, race and gender are inherent in the capitalist structure and unequal positions in society are reinforced by the relationships created through the division of labour. When treating patients, doctors embody the ideology of capitalism. Therefore, as Shepard (1993) argues, through the capitalist power structure doctors are able to maintain their prestige by monopolizing medical services. Because of their authority in society, doctors come to be experts on „normalcy.“ Patients with „mental disorders“ are, as Marx would argue, labelled deviant because of their „abnormality“ preventing them from ideal labour. Through their prestige and expertise, doctors are then able to set standards for society. The theories of Karl Marx and Frederick Engels regarding the division of labour,

ideology and social control are aligned with the effects of society on diagnosing mental and behavioral illnesses and conditions.

### Division of Labour

In *The German Ideology*, Marx and Engels (1964, p.31) express that humans distinguish themselves and are distinguished from animals by consciousness, the awareness of personal productivity. Through the production of their „means of subsistence“, individuals consciously build a material life. This production, followed by reproduction, becomes, for humans, the means of self definition. The nature of the individual depends on the material conditions (what and how) of his or her production. Through the life processes of production and reproduction, the once self-defined individuality of humans loses meaning; material production becomes material intercourse as a result of human social interaction. To live and produce „means of subsistence“, humans must work together in the „division of labour“. Termed „herd-consciousness“ by Marx and Engels (1964, p.42), the individual consciousness becomes collective as persons recognize the necessity of association with other individuals. Humans are only distinguished from animals, then, because consciousness takes the place of what is normally known as animal instinct or, rather, because human individual instinct is a conscious one. Consciousness, the awareness of productivity, although it still exists, is no longer personal and is governed by a structured system of social interaction.

The development of production is itself a product of history, developing from generation to generation:

*But that in it (history) at each stage there is found a material result: a sum of productive forces, a historically created relationship of individuals to nature and to one another,*

*which is handed down to each generation from its predecessor; a mass of productive forces, capital funds and conditions, which, on the one hand, is indeed modified by the new generation, but also on the other prescribes for it its conditions of life and gives it a definite development, a special character (Marx and Engels, 1964, p.50) This development requires cooperation, division of labour and social organization in order to persist.*

### Capitalism and the Division of Labour

In *Capital*, Karl Marx (1906, p.163) describes capital as the production of commodities, the circulation of those commodities and the transformation of these processes into money. Capitalism, the system through which these processes operate, is defined by Marx as having attributes including the pressure of individuals to accumulate capital (capitalists) and the pressure of laborers to produce capital (workers). The product does not belong to laborer but instead to the capitalist (p.641). Production and accumulation along with reproduction and additional accumulation serves to widen the division between capitalist and laborer more with each transaction, a perpetual cycle which maintains the „division of labour“:

*...under capitalism, where the social wealth becomes in an ever increasing degree the property of those who are in a position to appropriate to themselves again and again the unpaid labour of others (Marx, 1906, p.643).*

Stated as empirical fact, Marx and Engels (1964, p.48) claim that individuals have „become more and more enslaved under a power alien to them“. It is through the emergence of private property, class division and alienation that the „division of labour“ has come to be (Jary and Jary, 1991, p.226). The division of labour in the capitalist society serves to alienate the individual from

him or herself. For as long as the individual exists in a society structured by a division of labour, and as long as activity is remains involuntary, the action of the individual as a means of production is no longer his or her own but, instead, serves to control the him or her (Marx and Engels, 1964, p.44). It is through the division of labour that ideologies become distinguished.

### **Ideology**

According to Marx and Engels (1964, p.62), societal norms are determined the ruling/upper class of a society. Aligned with the division of labour, this ideology is distorted as it disregards the needs of the subordinate „non-ruling“ classes who are exploited by the ruling class. As the division of labour comes to be through a reformative and oppressive process, so does ideology:

*The ruling ideas are nothing more than the ideal expression of the dominant material relationships, the dominant material relationships grasped as ideas; hence of the relationships which make the once class the ruling one, therefore, the ideas of its dominance. The individuals composing the ruling class possess among other things consciousness, and therefore think (Marx, 1964, p.60).*

Marx and Engels suggest here that the ruling class is not naturally superior but that ideologies set forth by the ruling class are self-propagating. Because their consciousness is legitimate, those individuals subordinate to them are subject, then, to oppression by these ideologies.

### **The Division of Labour and Ideology in Medicine**

The medical doctor, a prime example of a hegemonic<sup>1</sup> center in a capitalist society, preserves the division of labour through his or her interactions with patients. Belonging to the capitalist class, doctors have the authority to certify

when a patient is physically or mentally disabled. Therefore, ideological structures are preserved through doctor-patient interaction. As defined by Waitzkin (1989), health is „the capacity to work productively“ (p.222). Mentioned above, the consciousness of the individual is based on his or her ability to be productive. Labeling a person as either able or unable to work productively even further from them, placing it in the hands of the hegemonic actor-the doctor. Medical encounters, therefore, convey ideology that is supportive of the current social order.

### **Medical Encounters' Consequences on Social Control**

Social control refers to the mechanisms by which individuals are forced to subscribe to the standard behaviors of a society. This term is tied closely to ideology in regards to the medical field (Waitzkin, 1989, p.225). Through advice, diagnosis and prescription, doctors convey ideologic messages to patients, reinforcing social norms and controlling socially appropriate behaviors. According to Waitzkin (1989), problems outside of the realm of technical medicine have gradually come under medical control. This has resulted in the „medicalization“ of a wide range of economic, social, political and psychological problems including sexuality and family life, work dissatisfaction and difficulties arising from the educational system (e.g., learning disabilities, maladjustment, student psychological distress) along with many other fields. It may be argued that doctors, when responding to non-technical problems, may fail to differentiate between problems arising from societal issues

<sup>1</sup> The ideological/cultural domination of one class by another, achieved by engineering consensus through controlling the content of cultural forms and major institutions (Jary and Jary, 1991, p.207)

and individual troubles (Waitzkin, 1989, p.225).

When patients consciously seek help from doctors to alleviate problems affecting their productivity, situational constraints (social factors) often leave medical social control below the level of consciousness. The true root of the problem is not technically medical and solution, therefore, lies beyond the capabilities of medical roles. Because medical practitioners are not trained in treating problems stemming from an institutional context, social change is often not an option in treatment (Waitzkin, 1989, p. 227). To doctors and patients alike, non-treatment is not an option. Therefore, the social deviation of the individual becomes medicalized and a condition, regardless of its legitimacy, is diagnosed and treatment options are provided.

### Mental Health in Society

Jahoda (1980) argues that the definition of mental health varies by society and depends upon „underlying value assumptions“ (Borgatta and Borgatta, 1992, p.1260). The definition of mental health within a society is therefore influenced by certain assumptions of the class defining societal norms. In reference to Jahoda's explanation of mental health definition within society, Borgatta and Borgatta (1992) state:

*While there is continued debate on how to characterize the mentally healthy person, researchers agree that mental health is more than the absence of mental illness; it represents the enhancement of human potential (p.1260).*

According to Marx and Engel's theory of ideology, individuals in society who are not part of the ruling class are subject to the scrutiny of those who have defined societal norms. Because mental health depends upon the underlying value assumptions of the ruling class, any outliers are not only prone to be diagnosed as mentally ill because of social deviance, they

are likely as well to be lacking full mental health if their productivity does not indicate human potential by ideological standards.

### Methods

For this study data was collected by conducting interviews based on, but not restricted to, a set of questions intended to promote discussion. This method was selected in order to analyse perceptions of individual professionals involved in diagnosing and treating persons with ADHD. Qualitative assessment allows for the emergence of key themes among participant interviews that, when combined with previous research and sociological theory, result in personal yet clear conclusions.

All participants were interviewed using surveys approved by the Institutional Review Board at Saint Mary's College. The survey questions were used simply for the facilitation of dialogue between the interviewee and interviewer. In an effort to contextualize the specific effects of society on prescribing, interviews with adult patients prescribed Ritalin as youths were conducted to provide a broader perspective. These interviews, however, are not part of the data set presented.

The sample consisted of twelve individuals who have professional contact with persons diagnosed with ADHD including: two child and adolescent counselors, one former elementary school teacher, four licensed college counselors, three board certified psychiatrists/psychologists, and two Mental Health Technicians (employed by a Mental Health Facility). The sample was obtained by referral from both interviewees (a.k.a. „snowball sample“) and from personal referrals. Three of the participants were parents of children with ADHD in addition to their professional positions, two had spouses with ADHD, and one referred to herself as having an „undiagnosed case of adult ADD.“

All interviews were tape recorded and lasted, on average, between thirty minutes and one hour. Of the recorded sample, seventy five percent were female, one hundred percent were Caucasian, one hundred percent had at least a college degree, about sixty percent were estimated to be between the ages of twenty and forty-five and about forty percent were over forty-five.

Informed consent forms were reviewed and signed by all participants. The option to terminate the interview at any time was presented. All interviews were transcribed and the data were analysed using the Weiss and Fitzpatrick (1997) model for the analysis of qualitative research. Quotations were categorized based on the discussion of similar themes and subcategorized based on certain distinctions within the broad categories. Categories were then compared to and integrated with one another to provide conclusive links between different quotations.

Institutions which support capitalist ideologies preserve the established orders and the class which dominates it. As they objectify and define ideologies in society, doctors-with inherent prestige-are perhaps the most sympathetic of authority figures. Institutions such as schools, the mass media and family reinforce medicine's impact on ideology and its role in defining norms by suggesting deviance of individuals and encouraging those individuals to seek medical explanation for it. Statements coming from the patient in regards to his or her own marginalization, because of ideology, serve to objectify his or her symptoms, that is to medicalize what may be a societal issue. The consciousness of the laborer-suppressed already in daily life in a capitalist society-is further subdued when such social symptoms are treated as individual problems.

## Findings

Fifty five quotes were extracted from the interviews and categorized as biological or social factors of diagnosing/prescribing. A quantitative assessment of categorical placement in relation to participant occupation can be found in Appendix I.

### Biological Factors

The legitimacy of diagnosing ADHD as a chemical imbalance in the brain comes into question because clinical diagnoses are based on the analysis of behavioral characteristics, not on the patient's brain chemistry. ADHD's comorbidity with other conditions also presents questions of legitimate analysis of the disorder. Conversely, genetic components of the disorder provide more validity for diagnosing ADHD.

### Comorbidity

Comorbidity refers to medical conditions that exist concurrently with but often independently of one another. Several of the interviewees commented on the comorbidity of ADHD and other conditions, particularly mental health conditions.

The comment by Mental Health Technician 1 that ADHD is the „litmus test“ for admittance to the mental health facility suggests possibly that the symptoms of ADHD are perhaps products of other mental illness as opposed to a true form of the disorder itself. This conjecture is supported further by the subsequent quote from Clinical Psychologist 1 concerning comorbidity.

You almost always find that with them that's kind of the litmus test to get in (to the mental health facility); you start with ADHD and then kind of work your way up (Mental Health Technician 1).

It's hard to tell sometimes because it exists with so many other mental health issues, it over-

laps with depression, it overlaps with anxiety, it overlaps with bipolar disorder, so it's teasing out what really is the central issue. Sometimes if its depression and you treat it, the ADHD portion disappears. Sometimes, though, it's the ADHD that's causing the depression and anxiety so if you treat that, those disappear (Clinical Psychologist 2).

### Brain Chemistry

Interviews noted that a significant number of studies have been conducted involving the brain chemistry of persons with ADHD. Clinical Psychologists 1 & 2 and Psychiatrist 1 were both in agreement that ADHD is in fact due to a chemical imbalance in the brain.

It's a neurologic (sic) condition. There are differences in various areas of the brain of people who have ADHD and in fact, there is a psychiatrist, Daniel Amen, who does SPECT studies (Single Photon Emission Computerized Tomographs,) he takes pictures of the brains of patients with ADHD. And there are differences. It is not as helpful in the individual case as it is when you have series of patients and he actually differentiates different types of ADHD based on those SPECT studies (Psychiatrist 1).

Also, the belief exists among many of the interviewees that the disorder is genetic:

It is a familial and genetically determined disorder and so there's (sic) often multiple members of the family that have ADHD. I suspect that most young people who have it have one or the other parent who has it, probably untreated because we didn't recognize it when they were children (Psychiatrist 1).

You also do a significant family history. A lot of times again our female students will tell us, oh my brother was diagnosed with ADHD when he was in second grade. Many students today are also telling us, I was tested but they decided

that I didn't have it. That's a real interesting issue because that's a gender issue (Clinical Psychologist 1).

### Social Factors

#### Abuse and Addiction

People are often wary of taking prescription drugs, especially psychotropics, for the fear of addiction. It is also common belief among parents that the use of prescription drugs during childhood will lead to drug abuse later in life. Several experiences and viewpoints were expressed by the interviewees.

Another issue was that if we treated kids with Ritalin or Adderall or other stimulants would we lead them into substance abuse? There's excellent recent literature that just the opposite is true; if we don't treat children who have ADHD for their ADHD, they are much more likely to end up utilizing marijuana, alcohol, cocaine and other abusive substances so there's really very good reason to go ahead and treat their ADHD. There is a very high incidence of substance abuse in persons with ADHD. And I think in my experience the drugs of choice are marijuana and alcohol (Psychiatrist 1).

There has also been a rise in the selling of Ritalin and other psychostimulants as a street drug. Abuse, as pointed out by participants, exists within and outside of the ADHD population

We've got kids all the time selling their meds and not taking them (Child/Adolescent Counselor 1).

#### Authority: Direct-to-Consumer Advertising and Doctors

Direct-to-consumer advertising is proven to increase sales of prescription drugs (see Kaphingst et al. 2004). Quotes from Psychiatrist 1 and Clinical Psychologist 2 support this evidence, as they have personally witnessed this effect.

ADHD has been largely a disorder researched in children and adolescents. Now, as pointed out by Psychiatrist 1, adults are being targeted, as it has recently been discovered that ADHD is not something that can be „outgrown.“ Eli Lilly has begun advertising for the new non-stimulant drug Strattera and sales are expected to rise significantly as a result.

Strattera is big for adults because it is a non-stimulant and it doesn't interfere with adult activities like alcohol consumption. Now that adults are being diagnosed more with ADD and the truth is out there, Eli Lilly (the manufacturer of Strattera) is going to educate people and we're going to see a huge rise in sales of Strattera for treating adult ADD (Psychiatrist 1).

My husband is a surgeon and he really hates the ads. He wishes there were no ads because, as he puts it, the advertising is part of the public cultural characteristic of education and persuasion (Clinical Psychologist 1).

Patients instill trust in doctors based on their prestige and esteem in society therefore tagging them as authority figures. The positive effect of Direct-to-consumer advertising on prescription rates is related to patient pressure on authority figures. To maintain their authority, as noted by Weiss and Fitzpatrick (1997), physicians are more likely to give in or negotiate with patient's desires. Thus, if a patient impacted by Direct to Consumer advertising they are more likely to push for prescription drug treatment and more likely to receive it.

I would say that [the consulting psychiatrist] is quick to diagnose, but he has a lot of experience (College Counselor 1).

### **Family and Socioeconomic Status**

A unanimous consensus among interviewees was that ADHD's existence and treatability is directly correlated with individuals' upbringing and

familial support. Children from higher income families are more likely to be diagnosed with ADHD because their parents are more likely to seek and follow through with treatment.

Parents tend to become weary with hyperactive kids... This young generation of parents is largely concerned about their child's success and there is this push at such a young age to achieve highly; kids must be predisposed to going to Yale (Clinical Psychologist 1).

I noticed that kids who had specifically ADHD as their diagnosis were the kids that we sent home to parents that appeared to be from upper-middle class background. They were the parents who drove big SUVs, the kids went to private school. I know the town so I know what neighbourhoods they were from and what the neighbourhoods were like. It seems like the more diagnoses the kids have, the worse family background they come from (Mental Health Technician 2).

A clear relationship between diagnosis and class status exists. This is especially apparent with interviewees who worked with adolescent mostly from lower-middle class backgrounds.

Kids are least often sent by parents, most often by the Juvenile Justice Centres and the courts (Mental Health Technician 1).

The unit I work on, they are the 12-18 year old boys who are also sexual offenders... at least 80% of them have ADHD (Mental Health Technician 1).

In upper-middle class families there is usually high pressure for academic success. Therefore, if a child of this upbringing acts out or does not fit the mold of a potentially successful student, parents are more likely to take measures to remedy the deviance. These families have the means to see doctors when behavioral and mental problems arise. It can be inferred that because most adolescents in the sex offender

wards of the Mental Health Facilities have been sent by Juvenile Justice Centres by court order, they are, as crime statistics show, more likely to be from lower class backgrounds. Because these „deviants“ are sent to facilities by government funding they are able to receive treatment. A clear division, as pointed out by Mental Health Technicians 1 and 2, exists between lower and lower-middle class deviants: a) those who act out and are noticed based on intolerable behaviour or isolated incidents and b) those who act out but go unnoticed because of several other factors (i.e. their deviation is non-violent or they receive a lack of attention because of other more prominent commotions existing within their environment.) The latter case, consequently, are the children who go undiagnosed and untreated because either their family cannot afford to take them to the doctor, provided the problem is recognized, or their case is not severe enough to require government aid and intervention. Therefore, the children of higher socioeconomic status are being diagnosed as medical deviants and children of lower socioeconomic status being labelled as criminal or social deviants.

### **Educational System**

A socially constructed institution, the educational system mimics the hierarchy and structure of society. Children with ADHD, diagnosed or undiagnosed, do not thrive in most academic environments. Structural adjustments in education are rarely made to fit the needs of these students; instead students are usually either treated with prescription drugs or they slip through the cracks.

As far as society goes I really think the way our school system is set up is not adequate and kids with ADHD do not fit into it. I think that it's a shame that we can't look at each person, pull out what their strengths are and allow them to feel

good about who they are based on their strengths instead of having to have medicine to fit into this tight little space (College Counselor 1).

It's a disorder in relation to the way we teach in this culture. It's a brain condition; if you were a pioneer woman it might be an enhancement, not a disability (Clinical Psychologist 1).

Stress-specific incidents, especially in institutions of higher learning, cause students who are overwhelmed to seek treatment.

I probably see five to ten individuals a month, new cases. There are kind of hot months that people tend to go in, September being one because of first years trying to adjust and making that huge transition and then also seniors taking in the reality of, „oh my goodness here we go, I need to make some major life changing decisions,“ and then again towards midterms tends to be a very stressful time and then also roommate within that time frame as well (College Counselor 2).

Often there are students who cannot or refuse to be treated with psychostimulants. Alternative treatments to promote functionality as well as positive attributes to the conditions were discussed.

People with ADHD tend to be creative, good with their hands, artistic, musical, if they can move toward occupations, and hobbies and interests that involve using their hands and their creative gifts, they're a lot better off than if they're stuck in a classroom trying to listen to a teacher about a subject that they're not particularly interested in (Psychiatrist 1).

It may be suggested that the rigidity of most educational systems in light of the fast pace of today's society (see DeGrandpre 1999) serves as encouragement for the appearance of the symptoms of ADHD.

Kids need downtime, time to be stimulated and time to sit down and process (Former Elementary School Teacher).

## Analysis

### Biological Factors

Studies have proven that significant differences in brain chemistry exist between people with and without ADHD. However, scientific analyses of brain chemistry are rarely conducted on the everyday patient, as tests are expensive and still in preliminary stages of development. Instead, patient behaviors are assessed in the diagnosing process and are not usually observed firsthand by doctors in a clinical setting where most diagnosis occurs. Most diagnoses are determined by a series of somewhat ambiguous questions usually answered by the patient or parent of the patient. Additionally the high comorbidity of ADHD indicates that what may appear to be characteristics of ADHD could be symptoms of a different condition. Extensive family histories often conducted by clinicians provide more legitimacy, on the other hand, in attempting to identify ADHD. Thus, the disparity between a scientific case and a behavioral case of ADHD exists though they are considered one in the same by the medical profession.

### Social Factors

#### Abuse and Addiction: Ritalin Kids

Ritalin is the hottest street drug of middle school through college-aged students. As a derivative of amphetamine, abuse of the drug could lead to serious side-effects similar to those of cocaine. Though Methylphenidate does not prove to be an addictive substance, its abuse is widespread as are significant side-effects. The first children regularly treated with Methylphenidate, labelled by many as the first generation of „Ritalin kids“, are now growing into adulthood. Permanent physiological changes as well as mental affects should be examined to provide important long-term results of the drug's use.

#### Authority: Direct-to-Consumer Advertising and Doctors

Direct-to-consumer advertisements tend to present symptoms to the consumer that are often comorbid or that could be considered everyday characteristics of „normal“ people (moodiness, lethargy, impulsivity, etc.) The marketing of certain drugs taps into the emotions of consumers presenting the idea that they are in some way flawed if they exhibit these symptoms. People as a result seek advice, if not directly requesting prescription treatment, from medical personnel. As the theory of Mills suggests, the individual in this instance has put him or herself in the position of deviance, that is he or she has given him or herself up to the authority of medicine. His or her „private troubles“ have essentially become „public issues“ as a result of direct-to-consumer advertising. Upon witnessing an advertisement suggesting that a consumer may have ADHD they trust the physician to mark them as well or unwell; being labelled unwell the individual as unable to work and function as a productive member of society. There lies the manifestation of Karl Marx's conflict theory, labeling these deviants as outcasts based on their abnormality preventing them from ideal „mental labour.“ Only by seeking proper treatment, Strattera as Eli Lilly would have it, may they function properly.

#### Family and Socioeconomic Status: Ideology of Economic Success

The push for functional mental labour and success among people who are not elites but not too poor for hope is significantly higher, as correlated with Marx's conflict theory. To fit the ideologies set forth by society, immense pressure to achieve highly is often placed on children in these socioeconomic categories. The fast paced society in which all persons are expected to be

up to par is one of inequity. It is society defining the norms and any outliers are considered deviant. Those deviants of lower socioeconomic status often become criminalized deviants, as is apparent in the high number of ADHD cases (80%) in the sex-offender population of the mental health facility. These people have gone untreated for their ADHD and thus have been ostracized from the mainstream class of producers. Because of inequalities of diagnosis and treatment in different socioeconomic classes, it can be surmised that ADHD is in fact a social construction.

Stress triggers the symptoms of ADHD in institutions of higher learning; there are „hot months“ (during finals and times of academic overwhelm) during which numbers of diagnoses rise. Again, while an ADHD diagnosis is based heavily on communication from patient to physician, during stressful times especially, almost anyone may exhibit the characteristics of an ADHD patient. It is those people who do not receive treatment that slip through the proverbial cracks.

Persons of higher socioeconomic standing usually have more familial support and involvement in treatment. As indicated emphasized by Mental Health Technician 2, these are the patients with the highest improvement, often regardless of whether there is prescription or cognitive behavioral therapy. In regards to family and socioeconomic status, it may be hypothesized that treatment of ADHD with psychostimulants is a stress reliever for the higher socioeconomic class. For people with difficulties functioning mentally in a rigid societal system who are of lower classes, the prevalence of ADHD symptoms, often due to stressors in their environment, is higher but significantly overlooked. The problem therefore lies in the hierarchical and unyielding set up of society.

### **Education: An Unfair Playing Field**

Participants agreed unanimously that persons with ADHD are often some of the brightest and most thoughtful persons in relation to their peers. These people are energetic, good with their hands, and tend to be very creative by nature. As suggested by Psychiatrist 1, if these people, especially those who cannot be treated with psychostimulants, can go into fields where they can use these strengths and be active in their work they are likely to be happier and more successful. The education system in the U.S. emulates the structure of society in which mental labour that is economically rewarding reflects true success. Thus there is little room for „deviance“ in academic settings. Especially in public schools in urban settings, lower class students with ADHD are often neglected and their strengths are not seen or properly channeled to allow them to be productive. Thus they stray from education as a result of diminished self esteem and their lower class standing is perpetuated. A study of differences in children with ADHD in Montessori schools versus public schools would be an excellent way to assess the systematics of education in relation to the disorder.

Theories of Mills and Marx support the idea that medical encounters with ADHD patients tend to convey the ideological messages on which society is built. The medicalization and criminalization of deviance in regards to ADHD serve to support the current social order. Many questions are suggested from these analyses: Can equality in medical diagnoses be attained by no longer including personal troubles as contextual elements of medical analysis? Moreover, can the social construction of ADHD be remedied by making accommodations in the educational system thereby decreasing the amount of persons being treated with psy-

chostimulants? Studies must move beyond the current position of medicine in society and into the facet of social problems for a truly pervasive assessment of ADHD.

## References

- Borgatta, Edgar and Marie Borgatta. 1992. *The Encyclopedia of Sociology*. Vol. 3. New, York: Macmillan Publishing Company.
- Breggin, Peter R. 1998. *Talking Back to Ritalin: What Doctors Aren't Telling You about Stimulants for Children*. Maine: Common Courage Press.
- Brewer, Anthony. 1984. *A Guide to Marx's Capital*. New York: Cambridge University, Press.
- Carlezon, W., Mague S., Anderson S. 2003. „Enduring Behavioral Effects of Early, Exposure to Methylphenidate in Rats.“ *Bio Psych* 54: 1330-37.
- Carlson, E., Jacobvitz, D., Sroufe, L. 1995. „A Developmental Investigation of, Inattentiveness and Hyperactivity.“ *Child Development* 66: 37-54.
- Cho, H., Hong, S., Park S. 2004. „Knowledge and Beliefs of Primary Care Physicians, Pharmacists, and Parents on Antibiotic Use for the Pediatric Common Cold.“ *Social Science & Medicine* 58: 623-629
- DeGrandpre, Richard. 1999. *Ritalin Nation: Rapid-Fire Culture and the Transformation, of Human Consciousness*. New York: W. W. Norton & Company.
- Diller, Lawrence H. 1998. *Running on Ritalin: A Physician Reflects on Children, Society, and Performance in a Pill*. New York: Bantam Books.
- Gomez, B., Benitz, M., Vazquez-Alvarez, A., Yang, P., Vazquez, C., Dafny, N. 2004. „Dopaminergic Ventral Tegmental Neurons Modulated by Methylphenidate.“ *Life Sci* 74:1581-1592.
- Jary, David and Julia Jary. 1991. *The Harper Collins Dictionary of Sociology*. New York:, Harper Perennial.
- Kaphingst, K., Rudd, R., DeJong, W., Daltroy, L. Forthcoming. „Literacy Demands of, Product Information Intended to Supplement Television Direct-to-Consumer, Prescription Drug Advertisements.“ *Patient Education and Counseling*.
- LeFever, G., Arconoa, A., Antonuccio, D. 2003. „ADHD Among American, Schoolchildren.“ *The Scientific Review of Mental Health Practice* 2: 1.
- Macionis, John. 1995. *Sociology*. 5th ed. New Jersey: Prentice Hall.
- Marx, Karl. 1906. *Capital*. New York: The Modern Library.
- Marx, Karl and Frederick Engels. 1964. *The German Ideology*. Moscow: Progress, Publishers.
- Miller, Anton R., Lalonde, Christopher E., McGrail, Kimberlyn M., Armstrong, Robert, W. 2001. „Prescription of Methylphenidate to Children and Youth, 1990-1996.“ *CMAJ* 165: 1489-1494.
- Morris, Louis A., Brinberg, D., Klimberg, R., Millstein, L., Rivera C. 2002. „Consumer, Attitudes About Advertisements for Medicinal Drugs.“ *Social Science &, Medicine* 22: 629-638.
- Neuman, W. Lawrence. 1994. *Social Research Methods: Qualitative and Quantitative, Approaches*. 2nd ed. Boston: Allyn and Bacon.
- Rapport, Mark and Catherine Moffitt. 2002. „Attention Deficit/Hyperactivity Disorder, and Methylphenidate: A Review of Height/Weight, Cardiovascular, and Somatic, Complaint Side Effect.“ *Clinical Psychology Review* 22: 1107-1131.

- Schenk, S., Izenwasser, S. 2002. „Pretreatment with methylphenidate sensitizes rats to, the reinforcing effects of cocaine.“ *Pharmacol, Biochem & Behav* 27:651-57.
- Schommer, Jon C., Doucette, William R., Mehta, Bella H. 1998. „Rote Learning After, Exposure to a Direct-to-Consumer Television Advertisement for a Prescription, Drug.“ *Clinical Therapeutics* 20: 617-632.
- Shepard, Jon M. 1993. *Sociology*. 5th ed. New York: West Publishing Company.
- Sleath, Betsy and Shih Ya-Chen. 2003. „Sociological Influences on Antidepressant, Prescribing.“ *Social Science & Medicine* 56: 1335-1344.
- Starr, Paul. 1982. *The Social Transformation of American Medicine*. U.S.A.: Basic Book.
- Stivers, T. 2002. „Participating in Decisions About Treatment: Overt Parent Pressure for, Antibiotic Medication in Pediatric Encounters.“ *Social Science & Medicine* 54, 1111-1130.
- Stockl, K., Hughes, T., Jarrar, M., Secnik, K., Perwien A. 2003. „Physician Perceptions, of the Use of Medications for Attention Deficit Hyperactivity Disorder.“ *Journal, of Managed Care Pharmacy* 9: 416-423.
- Waitzkin, Howard. 1989. „A Critical Theory of Medical Discourse: Ideology, Social, Control, and the Processing of Social Context in Medical Encounters.“ *Journal of, Health & Social Behaviour* 30: 220-239.
- Weiss, Marjorie and Ray Fitzpatrick. 1997. „Challenges to Medicine: the Case of, Prescribing.“ *Sociology of Health & Illness* 19: 297-327.
- Whalen, C., Henker, B., Collins, B., McAuliffe, S., Vaux, A. 1979. „Peer Interaction in a, Structured Communication Task: Comparisons of Normal and Hyperactive Boys, and of Methylphenidate (Ritalin) and Placebo Effects.“ *Child Development* 50, 388-401.
- Woloshin, S., Schwartz, L., Tremmel, J., Welch, G. 2001. „Direct-to-consumer, advertisements for prescription drugs: what are Americans being sold?“ *Lancet*, 358:1141-46.

OPPORTUNITIES IN HEALTH SCIENCES

# Community-Campus Partnerships for Health: Promoting Health Through Partnerships Between Communities and Higher Educational Institutions

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## Learning Objectives

Through this session, participants will be able to:

1. Describe Community-Campus Partnerships for Health's history, mission, programs and lessons learned;
2. Explore similarities, differences and opportunities for collaboration between CCPH and other networks around the world; and
3. Envision the future of community-campus partnerships and strategies for realizing that vision

Community-Campus Partnerships for Health (CCPH) is an American nonprofit organization that promotes health through partnerships between communities and higher educational institutions. Founded in 1996, CCPH is a growing network of communities and campuses throughout the United States, and increasingly the world, that are collaborating to promote health through service-learning, community-based participatory research, broad-based coalitions and other partnership strategies. These partnerships are powerful tools for improving health professions education, civic responsibility and the overall health of communities. CCPH's goals in-

clude: building the capacity of communities and higher educational institutions to engage each other as partners; incorporating service-learning and community-based participatory research into the education of all health professionals; recognizing and rewarding community-based teaching, research and service; and developing partnerships that balance power and share resources among partners.

As a young organization, CCPH has quickly positioned itself as a valued and credible source of evidence-based information, professional development and advocacy for health-promoting community-campus partnerships. We have established a learning community among our members and have achieved successes in advancing service-learning and community-based participatory research. As we look ahead to the future, we believe a number of features are likely to characterize new models of community-campus partnerships. Community-based organizations will emerge as centres of learning, discovery and engagement, establishing partnerships with a wide variety of disciplines, degree programs and departments in colleges and universities. Community-campus partnerships will be more coordinated and strategic,

involving multiple community-based organizations and academic institutions. There will be a growth in intermediary organizations to facilitate and support community-campus partnerships, with governance structures and financing mechanisms that equitably distribute power and resources among the partners. Already a global phenomenon, community-campus partnerships around the world and the organizations that represent them will be more deliberate and strategic about collaborating and sharing lessons learned.

Achieving and sustaining these new models depends on a number of factors. First, communities and campuses must view these partnerships as mission-critical, not as add-ons to their work. Documenting and disseminating lessons learned and outcomes in diverse formats and venues will help to demonstrate the mission-critical nature of the partnerships to both communities and higher education. Supportive policies are needed at multiple levels. Key underlying issues of power, control, history of town/gown struggles and institutional racism need to be tackled head-on. Finally, community-based organizations and programs need to receive explicit support for their academic roles; for example, coordinating student service-learning and volunteer assignments, supervising students and collecting data for research.

### CCPH at a Glance

For a complete description, please visit our website at [www.ccpb.info](http://www.ccpb.info)

CCPH is distinct among organizations in the health professions in that we are interdisciplinary and involve all constituents in higher education, including students, and serve both academic and community-based organizations. We advance our mission primarily through information

dissemination, training and technical assistance, research and evaluation, policy development and advocacy, membership development and coalition building.

### Highlights of OF CCPH programs and services

- CCPH Consultancy Network- CCPH's training and technical assistance network provides customized consultation to community-based organizations, campuses and grantee networks.
- Training Institutes and Web Conferences- CCPH offers intensive training in service-learning, community-based participatory research and other topics
- Research and Development Initiatives- CCPH contributes to greater understanding of community-campus partnerships by sponsoring research, conducting program evaluations, reviewing literature and collecting and disseminating best practices. For example, the NIH Office of Behavioral and Social Sciences Research recently commissioned CCPH to prepare a report on the infrastructure needed for successful community-university research partnerships. With support from CDC, we are developing an evidence-based curriculum for community-based participatory research partnerships.
- Electronic Discussion Groups- CCPH moderates several listservs related to current CCPH projects and topics of interest including community-based participatory research, community-engaged scholarship and health institutions as economic anchors in communities. To subscribe to the CBPR list, go to: <https://mailman.u.washington.edu/mailman/listinfo/cbpr>. To subscribe to the list about supporting community-engaged scholarship

in the academic review and reward system, visit <https://mailman1.u.washington.edu/mailman/listinfo/comm-engagedscholarship>.

- Information Clearinghouse- CCPH produces print and web-based publications and the biweekly e-newsletter Partnership Matters
- Conference- CCPH sponsors the premier training and networking event for community-campus partnerships
- CCPH Annual Award- CCPH recognizes extraordinary community-campus partnerships through an annual award
- CCPH Fellows and Senior Consultants- CCPH supports community-based and academic professionals with significant expertise in building and sustaining community-campus partnerships to work on mission-critical projects of national significance
- Commission on Community-Engaged Scholarship in the Health Professions- with funding from the WK Kellogg Foundation, the Commission is taking a leadership role nationally to advance support for service-learning, community-based participatory research and other forms of community-engaged scholar-

ship

- Community-Engaged Scholarship for Health Collaborative- with funding from the US Department of Education's Fund for the Improvement of Postsecondary Education, this collaborative of 10 health professional schools is working to align faculty review, promotion and tenure systems to maximally support community-engaged scholarship.

### CCPH Membership

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CCPH members are a diverse group of individuals and organizations committed to improving the health of communities through community-campus partnerships. CCPH members are affiliated with colleges and universities, community-based organizations, health care delivery systems, foundations and government, and represent the full scope of health professions disciplines. CCPH members are from 48 states, the District of Columbia, and more than a dozen countries around the world.

To be added to the CCPH Monthly E-News, email your request to [ccphuw@u.washington.edu](mailto:ccphuw@u.washington.edu)

## OPPORTUNITIES IN HEALTH SCIENCES

# Involving Citizen Participation in Allergic Pollinosis Prevention

DIANA CUPSA, ILIE TELCEAN, ZOLTAN ELLENES

Partners: Science Shop InterMediu, University of Oradea, Faculty of Sciences, Department of Biology (Romania), Clinical Hospital of Bihor County - Allergology-Immunology Laboratory, Children's Clinical Hospital of Bihor County - Allergology-Immunology Laboratory, Public Health Directorate Bihor

In the latest years medical doctors signaled an increasing number of allergic pollinosis affections due to the ragweed (*Ambrosia*) between the populations of the city, especially children. The persons allergised by pollen in the most of the cases become in time allergic to other factors (dust, feathers, and aliments).

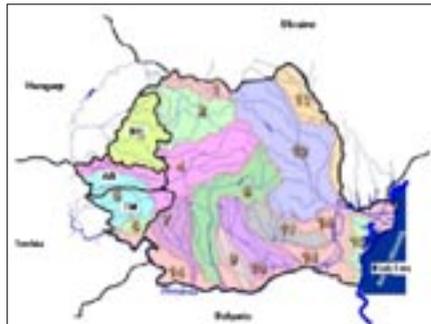
The ragweed (*Ambrosia artemisifolia*) has its origin in Northern America and it is an invading plant in Europe, and recently reached Romania. Our city being situated next to the western border of the country is one of the first affected together with Arad and Timisoara. That's why the prevention of the *Ambrosia* plants spreading must be started in the western part of the country. The main request received from the Public Health Directorate: How can we reduce the ragweed pollen allerg risk between the citizens from Oradea?

## Main activities performed by our Science Shop

- Mapping the spreading of *Ambrosia* plants in the city
- Contacting the mass media to inform the citizens
- Starting the decontamination actions
- Policy making - elaborate a Local Council decision project
- The student where involved in the *Ambrosia*



The ragweed plant in early stage of development (right) and with flowers (left)



The map of Romania and the most affected counties from the western part

mapping program and in the decontamination of the most affected areas of the city

## In what kind of place does that plant grow?

The plant lives in arid regions on sandy or gravelly soils, for example on river dams, near the railroad,



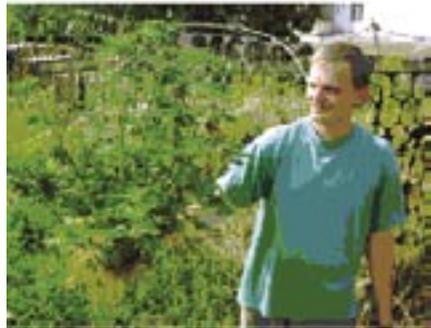
These are the places where the plant are founded most frequently



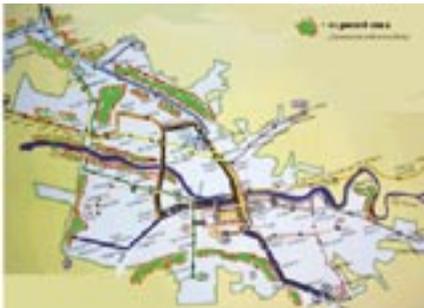
Students involved in the decontamination actions.

spapers concerning the pollen allergy risks and about the ragweed decontamination actions. TV short films with the volunteers' actions were presented in the news programs

As a result of the mass media publicity concerning the decontamination actions organized by the Science Shop, many voluntary citizens participated to the ripping off the plants. The citizens asked questions about the pollen allergies and the medical doctors involved in the project answered to them. The volunteers received informative leaflets.



Volunteers involved in the decontamination actions.



The city map with the most affected regions with ragweed (Green areas bordered with red colour)

etc. The plants start to grow at the end of May, the bloom in June July and this is the period when the most pollen allergy complains start.

**Involving the local media:**

News articles were published in the local new-



The medical doctors gave details about the pollen allergies to the citizens.

**Involving the local authority**

Elaborating a Local Council Proposal Decision

- recommendation to the land owners and owners association to eradicate the Ambrosia
- request to the railroad company to eradicate the Ambrosia near the rail road crossing the city
- involving people who have to do work in the benefit of the society to tear out the plants from the greens and the parks of the city

At the end of the year 2004 the Local Council took a Decision to support the project Allergy during 2005.

**The brief contain of the Local Council Decision:**

- financially support of the project with 50.000.000 lei (approximate to 1.250 Euros) for informative materials
- supporting the decontamination of the greens by involving social assisted people until the flowering period begin
- warning the land owners and owners association to eradicate the Ambrosia
- contact the railroad company to support the eradication of Ambrosia near the rail road crossing the city
- the City Hall web site ([www.oradea.ro](http://www.oradea.ro)) will host a special link named pollen info (operating from march 2005) which will contain information about the flowering periods of the most allergenic plants

**Present and future actions**

- Contacting:
  - Social and Communitarian Administration of Oradea
  - the rail road company
  - land owners and owners association
- Information and training activities
- Multiplication and dissemination of the leaflets and posters (both in Romanian and Hungarian languages)

- Offering to the volunteers pressed and desiccated Ambrosia plants
- Installing 2-3 semi quantitative pollen counter devices in the city and put weekly the pollen information on the web site.
- A training program was offered to the rail road company

**The next steps of the allergy project:**

- locating a quantitative pollen counter devices in the city
- making a pollen catalog necessary in the laboratory analyses of the pollen
- set up the basis of a local laboratory for monitoring and informing about the allergenic airborne pollen

**Conclusions:**

- The presence of the Ambrosia pollen in the air was pointed out to be a real health problem in the city of Oradea especially for the children
- As a consequence of the Science Shop actions the Local Council elaborated a Decision which will contribute to the decrease of the allergic pollinosis risk?
- The citizens where informed about the risk to became allergic to the pollen and they heard about this plant (Ambrosia) which is not very widespread in the country at the moment.
- The mapping of the ragweed in the city of Oradea was done also the decontamination actions are running.

## SOME WAYS OF PREVENTING GIARDIA AND OTHER PARASITOSIS TRANSMISSION TO THE HUMAN HOST

Authors: Dr TILCEAR, Diana CUPSA, Lenka BERON  
 Science Shop InterMedia, University of Osnabrück, Faculty of Sciences, Department of Biology

### Motivation

Many of the parasitosis are transmitted to the human host from the environment. To the spreading of the parasitic diseases in the population two factors are involved: the habits concerning the pets and the neglecting of the personal hygiene rules. In fact the faeces (pigs and cats) for this kind of parasites can contribute to their spreading in the environment. The resistant faeces (cysts) can occur in the water, already at domestic subjects. As a consequence neglecting the hand washing or the fruits and vegetable washing can increase the possibility of contracting the parasitosis.

Which are the most frequent parasites:

- Giardia (Giardia lamblia - Protozoa)
- Ascaris lumbricoides (Nematode)
- Schistosoma mansoni (Trematode)
- Cestode

Giardia is the one of the most frequent parasite and the most resistant to the treatment. The pilot project named „How to prevent Giardia between the children population from the city of Osnabrück“ of our Science Shop achieved in cooperation with the Public Health Directorate was focused on finding out the spreading of the parasite between the children population of the city of Osnabrück and reducing the risk of giardiasis in the population of the city.

### Results:

- The faecal col that the contamination is widespread in the urban population of the city. The cause of this fact is that the recreation of the citizens at the age in school and the young children get easily contaminated. They consume already in childhood animals, interact with them, the water is oligotrophic and is directly used by home contact.
- We also find out that the parasites often inhabit the population of the city, not just by age, regardless of the size by the different neighbourhoods in the city (in the statistic results collected) (see the laboratory analysis data).
- The treatment is enhanced to reduce the disease rate (reduce after the treatment and the cause modification is done for the human organism).
- The citizens affected by the parasite have an increased sensitivity to the other infections (allergic reactions).

The reason of the spreading of the parasite neglecting of the personal hygiene rules (contaminated of the environment) and the contamination of the water resources.

A primary application for some of the diseases in the presence of the parasite cycle in the stool from the park (dogs and cats excreta).

Some habits of the pet owners also increase the presence of their animals (especially in the children playground). The cause of it: transmission of the parasite in all these cases the children or pets represent the source reservoir of the parasite.

Another problem is that the cleaning of the human population has no chance to be complete because the parasite can re-emerge any way the cycle which are present at the end of the life cycle and are associated from this faeces together with the faeces material from the animals. The pollution (water reservoir) is already located in the urban part of the urban drainage (sewerage) and they are not collected.

### Solutions:

- It is necessary to inform the educational staff about the spreading of the parasitosis.
- reducing the risk of getting ill by washing laboratory (parasitological) analyses by the persons who manifest the symptoms of the giardiasis. This measure prevent the contamination of other persons.
- for people who are consuming water from a potential contaminated source (wells, pipe system in which penetrate contaminated water from the soil, an easy way to recommend the boiling of the water but substitute the contaminated dish.

### Future actions:

- set up laboratory methods for identifying the cysts from the environment (water, dirt)
- developing a data base together with the Public Health Directorate with the goal of monitoring the evolution of the number of diseases
- analyzing the causes which have determined the unequal distribution of the source of the diseases on age categories and in the different neighbourhoods of the city

## Parallel Sessions

# PROCESSES, TOOLS AND INFRASTRUCTURES IN SCIENCE & SOCIETY

In the parallel sessions of this track examples of tools and infrastructures for community based research are presented. The sessions intend to give an overview of good practices, do's and don't in organising CBR and the use of existing expertise.

It might give you some concrete examples to take home.

All 5 parallel sessions in this track focus on different tools and infrastructures; networking, participatory tools, infrastructures for CBR, management of CBR, and communication.



NETWORKS

# The REVOS Project: An European Network for Voluntary Services

MIGUEL PRESENCIO AND ALAIN LABATUT

Junta de Andalucia, Seville, Spain

*The EUROPEAN NETWORK OF SOCIAL VOLUNTARY SERVICE (REVOS) is an EU-funded project of the Interreg IIIC South Zone Initiative. The project started in January 2005, has two years duration and involves 16 EU-organisations<sup>1</sup> from 9 European countries.*

The so-called European civil society is self constituted by the sum of activities of non profit organisations, which organisation and services are mostly on volunteering base. Working in parallel with the public administrations at national, regional and local levels, they work for the improvement of many sectors of the European contemporary society.

The public administrations are now strongly implied in the development of policies and of services to support these entities, promote their action and compensate certain lacks, due to the growth detected the last years of the voluntary service in the social action in Europe. The project REVOS contributes thus to the creation of a cooperative network around 16 European partners and to the production of methods and instruments required by the public social services.

## Goals

Aware of their respective isolation, these administrations wish to use ICT to create a durable network, by identifying and disseminating good practices and allowing reciprocal exchanges and professional links with the local actors. The program Interreg IIIC was considered

as an adequate support since it implies first the cooperation between administrations (regional, provincial and local but also academic organizations and NGO) to promote the regional development of administrative services and improve the role of the voluntary service in the social action.

According to the Interreg IIIC South Zone Programme, the following sub-objectives are also settled down:

- To reinforce the co-operation among European regional administrations.
- To promote the dialogue among the NGOs and public organisations.
- To spread the good practices and successfully projects made.

## Expected results

The creation of a European network to reinforce the voluntary service in the social action will stand on a Web site, facilitating the cooperation and coordination between the partners. This portal will also be used by each of these administrations to work with the other regional actors implied in the services of social interests.

It is therefore a work tool, having news generated at the European level but also at local and regional levels for the promotion of voluntary service for exchange services and the dissemination of resources and of good practices between the regions.

Exchanges of technicians linked to social voluntary services and of volunteers as well as thematic studies will be launched to promote the interregional relations within the network. Activities of dissemination at the European level will allow the participation of other administrative European authorities to this network.

The REVOS activities developed the following 5 working components:

- Component 1 - Management and Co-ordination – A specific structure (Steering Committee and Workgroups) have been created for the management and co-ordination of the project and to follow the management of all the activities related to the REVOS network.
- Component 2 – Technology – this component is mostly focusing on the conception, design and development of the network Website.
- Component 3 – Territory - It represents the application of the network in the territory of each partner and includes the study of the associative networks activities, and the involvement of volunteers and staff exchanges between different countries.
- Component 4 - Editorial - The editorial component consist in the production of contents for the website and the development and publication of thematic studies.

- Component 5 - Communication - It refers to activities of diffusion and communication of the REVOS project (public presentations, organization of seminars, advertising and diffusion actions towards the organisms locally interested in the social voluntary service, etc.).

#### Footnotes

- <sup>1</sup> Nº1.- Council for the Equality and Social Welfare of the Andalusian Government (Spain), Nº 2.- AICIA / Research and Industrial cooperation Association of Andalusia (Spain), Nº 3.- Granollers City Council (Spain), Nº 4.- GAMAL / Great metropolitan area of the Algarve (Portugal), Nº 5.- Faro City Council (Portugal), Nº 6.- Cooperative School (France), Nº 7.- Unis-Cité (France), Nº 8.- Piemonte Region (Italy), Nº 9.- Province of Venice (Italy), Nº 10.- Province of Campobasso (Italy), Nº 11.- Dacorun Borough Council (UK), Nº 12.- Donegal County Council (Ireland), Nº 13.- South East Regional Authority (Ireland), Nº 14.- Poviats of Leborg (Poland), Nº 15.- Eastern Attica Prefecture (Greece), Nº 16.- University of Helsinki, Palmenia Centre for Research and Continuing Education (Finland)

## NETWORKS

# Building a Constituency: A Strategy to Empower Science Shops

DR. MAUREEN E. BUTTER

Science Shop Biology, Groningen University, Groningen, the Netherlands

As working for marginal groups incurs the danger of being marginalized ourselves, I'd suggest to strengthen our position by strengthening our political impact. The Science Shops' greatest strength is that it generates knowledge at the local level. As such knowledge frequently addresses the implementation gap between national and international decision-making, it follows that such knowledge is highly relevant at national and international policy level. Yet, at the moment our results hardly have any political impact beyond the local level. Below, I will propose a strategy to achieve a stronger political impact, benefiting both communities and our own position.

Having worked over 20 years as coordinator for the Science Shop Biology at the Groningen University, the frequently-encountered complaints about funding problems, low status and lack of support hardly surprise me. Groups without the power and the means to fund their own research needs are not exactly notorious for funding prospects. Although it is good for a university's reputation to support one or more Science Shops, they will not want us big, unless there is money coming along. Now, where to find it? Current Science Shops' lobby relies heavily on the science and society part of the 7th Framework, but real Science Shop work is not about the ethics of decision-making, it is about the real problems of real people. I expect that philosophers and science & society research groups will benefit from the science and society part, and probably the Living Knowledge Network itself. On

behalf of my clients, I would be more interested in the money for environment and health research, especially vulnerable groups such as children, which will also be part of the 7th Framework.

Money for community-based research has to come from public funds or charity foundations, and there should be a good reason to channel it towards Science Shops. That means that we have to demonstrate our value, by making a stronger impact at society. We can do that, by engaging in partnership with NGOs that use our information in their lobby at the international level. Not just any NGO, but NGOs that serve the same constituency the Science Shops do AND have an impact at the international level.

## NGOs and the international political arena

For the past seven years I have been involved in the international lobby of NGOs, mostly at global UN level but also in the regional and EU processes. There is an international political agenda, following the major UN conferences. Most comprehensive is Agenda 21 from the 1992 Rio Conference on sustainable development, meaning both environmental and social sustainability. Processes like the Beijing Conference on the position of women, the Cairo Conference on population and development, the Social Summit etcetera belong to the social sustainability track, the POPs convention, the Environment for Europe process, the WHO-led Health and Environment processes and the World

Water Forum are more relevant to the environmental track. At the WSSD in Johannesburg 2002, the Rio agenda was updated and a time schedule was set for evaluation and implementation. Since the major UN processes follow a cycle of 10 years, with a mid-term evaluation, the CSD (Commission for Sustainable Development, the UN agency responsible for implementation of the Johannesburg summit) has scheduled its annual meetings in some detail for the first 5 years and more generally for the second 5 years. The EU agenda is scheduled by the European Commission, but it often works in synergy with the UN agenda.

NGOs with consultative status are involved in preparatory meetings and are invited to participate at the main events. Near the end of the preparatory process, large coalitions are formed, as NGOs are only allowed a limited opportunity for interventions. The larger NGOs nowadays are highly professionalized organizations with either their own research facilities or excellent contacts with reputed research institutions. Their strategy is to target specific campaigns to the political agenda and to collect information about implementation gaps and emerging issues by employing consultants. After the conference, they drop the subject and rush on to the next topic. They have to, their funding depends on the political agenda. Moreover, most NGOs cannot plan ahead for long, because there is generally little time between the (annual) decision on their project funding and carrying out the project.

### **The role of research**

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The research agenda too follows the political agenda, but with considerable delay. For example, at the WHO-led ministerial conference on health and environment (June 2004, Budapest), health of children was the central topic. Parallel to and in synergy with the Budapest process, the EU arrived at an Environment and Health Action Plan, the SCALE

initiative, based on Scientific evidence, focused on Children, meant to raise Awareness, improve the situation by use of Legal instruments and ensure a continual Evaluation of the progress made. This process involved four DGs: environment, public health, research and economic affairs. The main result from SCALE is a research and monitoring effort, for which no funding was available at the time of the decision. During the follow-up meeting in December 2004, member states agreed to reserve the necessary funding. Which means, that results will be available in 5 years time or longer. When the subject is on the agenda again, which may take 10 years or more, the by then outdated results will probably serve as input for the next conference.

### **Opportunities for the Science Shops**

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Science shops have one major asset: they address the local level, the place where the real problems are, many of which are addressed in international decision making. As the political field is compartmentalized, politicians and NGOs alike are compartmentalized. They specialize in a certain field, for example energy and scarce resources. They may know everything about energy and nothing about health. That's why we are stuck with energy and material efficient houses, poorly ventilated and made from recycled materials, that are not exactly conducive to good health. Similarly, the Budapest Conference stressed the need for adequate house warming in poor regions, without any reference to the type of energy preferably employed. A good recipe for future problems!

In real life, that is, at the local level, environment, health, infrastructure, social rights and economic opportunities are all intertwined, as we from the Science Shops are well aware. The implication is, that local level knowledge, addressing the contingencies between sectors, in so far as they are not

yet an issue, have the best chance to yield politically relevant information. For example the intersection between gender, health and environment is interesting as well as research, addressing both social rights, mechanisms and outcomes in terms of health and environment. But we need NGOs to bring our results to the political arena.

### Suitable partner NGOs

The natural partners for the international Science Shop network are NGO networks that basically serve the same constituency as we do: community groups. They should be interested in issues of integration, thus cover a broad array of issues. They should have a great number of members, involved with the local level. And they should have influence on international decision-making. I invited two networks meeting this specification to the Seville Conference, ANPED and WECF.

ANPED, the Northern Alliance for Sustainability, is a democratic network of over 100 local and national NGOs, national NGO networks, and environment, development and consumer groups. ANPED works to empower Northern Civil Society in creating and protecting sustainable communities and societies world wide. It provides a platform for its member organisations, where they can identify common concerns, take advantage of each others expertise and develop a common position. It helps to build capacity in a broad range of issues and it represents its members in processes of international decision-making.

WECF, Women in Europe for a Common Future, is a similar network of 63 organizations in 27 countries, focusing on achieving real improvement in the daily life of citizens. They adopt a strong gender perspective and are very much aware, that local sustainability involves a lot of integrating effort, linking up issues of health, environmental degradation, poverty and economic opportunities

in a host of settings. Apart from the advocacy and capacity building activities, which are quite similar to ANPED's, they also engage in a broad range of practical projects with local partners, like ecosanitation in Rumania and Ukraine, improving local democracy in Russia, organic agriculture in Uzbekistan and many others. They often take local NGOs to the political platform (for example the UN World Water Forum), thereby enormously empowering these NGOs.

NGOs like WECF and ANPED can help to get us more political support, to empower researchers doing relevant work by inviting them to high level meetings and to raise funds for specific projects. But even more important: they can have an impact to the research agenda, since the research agenda follows the policy agenda. So, if we think some type of research is important, for example green technology in a variety of settings (urban, rural, Eastern European, arctic, U.S. and EU), we can do some student projects in these areas and ask WECF and ANPED to lobby for green technology at the CSD and the Environment for Europe agenda. That will place us in an excellent position for larger projects as soon as it is in the research programmes.

### Developing common ground: The next conference

The next conference provides an excellent opportunity to build such partnerships. It should not only address the current research policy agenda, but two or three other policy platforms as well. It should not only involve a skill share and networking between Science Shops, but also a skill share between NGOs, and between NGOs and researchers.

We should not only aim at a joint research agenda, but also to making joint policy recommendations for the research agenda and the political platforms in which the NGOs are involved.

NETWORKS

# Knowledge in Living Networks

DR IR EELKE WIELINGA

Link Consult, Agricultural Economics Research Institute (LEI) / Wageningen University and Research (WUR), The Netherlands

## Linking innovative networks of animal farmers to science

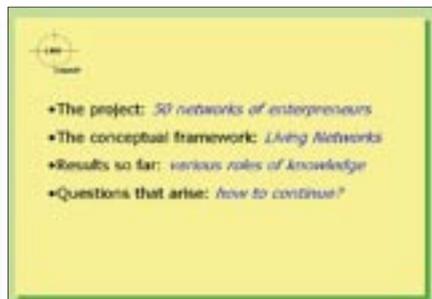
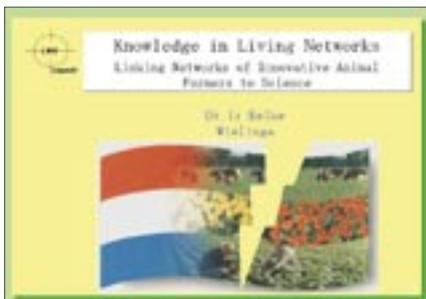
In an effort to stimulate sustainable innovations in The Netherlands, 50 networks of animal farmers (450 entrepreneurs in total) have been selected, to be supported by 30 process facilitators, in order to link farmers initiatives to sources of knowledge. After various attempts of the Ministry of Agriculture to stimulate individual farmers, this experiment focuses on networks that are believed to be more powerful in initiating changes and creating new arrangements with knowledge institutions for acquiring appropriate knowledge. The experiment started in 2004 and is expected to be expanded in 2005.

The 'Living Networks Approach' is being used as a tool for analysis and for coaching of the process facilitators. In this approach human networks are seen as living organisms that can be healthy or sick. In a healthy network people take up leadership and do what is needed to create 'vital space' where there is room for exchange, collaboration and mutual learning. If this does not occur sufficiently, facilitators

must be able to identify where the interaction is blocked and intervene appropriately to clear the way.

This approach sheds new light on the role of knowledge and knowledge transfer. Contrary to more common concepts of knowledge such as the objective truth, the best way, or a valuable product for sale, in this view relevant knowledge emerges from healthy interaction and leads to the capacity of individuals or networks to respond effectively to changes in their environment.

Although it will be too early to present final outcomes, one preliminary observation is already interesting. Whereas it was expected that access to knowledge would be a major limitation to be addressed by the project, many networks appear to struggle with other limiting conditions that hampers change. For them validated knowledge is needed as a weapon to improve their position in relation to other stakeholders in the rural arena. The author would like to share the first outcomes of the experiment and to bring home the results of reflections of the international audience on pertinent questions that arise: reflections from which the ongoing project can benefit.



**ambitions**

- from technology push to demand driven
- resilient farmers
- sustainable innovations
- new "knowledge arrangements"

50 networks (450 farmers)

- + sustainability (3)
- + labour productivity (4)
- + animal / arable cooperation (5)
- + animal nutrition (6)
- + biogas (4)
- + ICT (10)
- + mutual learning (study clubs) (4)
- + specific animal health problems (4)
- + nitrogen management (2)
- + production chain logistics and market (3)

**ambitions**

- from technology push to demand driven
- resilient farmers
- sustainable innovations
- new "knowledge arrangements"

50 networks (450 farmers)

action research team  
5 pers.

30 facilitators /  
researchers

**Living Networks**

healthy sick

**ecological rationality**

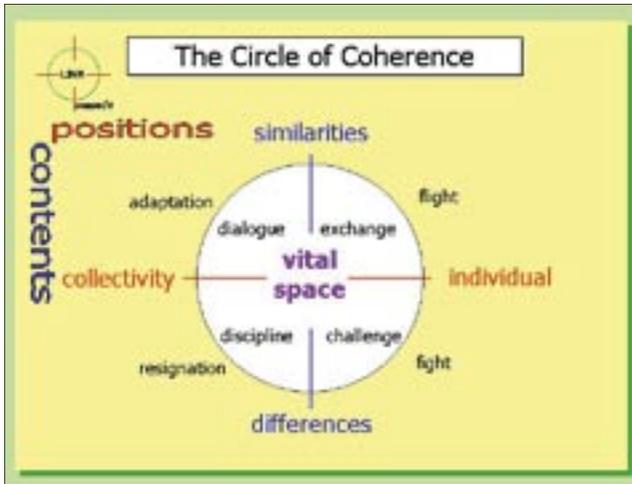
- self-organising
- responsive capacity <-> connection
- loss of responsive capacity <- blockages
- leadership = removing blockages > restore connection

**instrumental rationality**  
objective expertise  
solid knowledge

**strategic rationality**  
market / power struggle  
relative knowledge

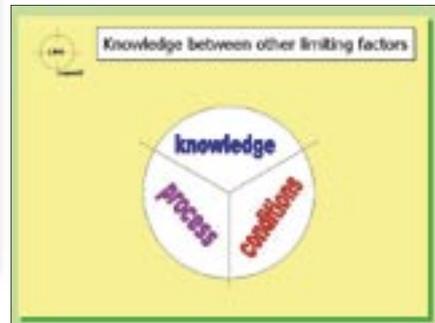
**communicative rationality**  
mutual learning process  
accepted knowledge

**ecological rationality**  
responsive capacity  
connectivity  
effective action



### desired insights

	group dynamics	innovation processes
recognise	interaction patterns	typology [ ] [ ] [ ] [ ] subject
intervene	roles of leadership	biotope [ ] [ ] [ ] [ ] subject



- ### Different purposes of knowledge
- knowledge as production factor** 2/3
  - knowledge as tool for transition** 1/4
  - knowledge as weapon** 1/4
  - knowledge permanent learning process** 1/3

- ### Questions that arise
1. Innovative farmers?  
Is this the way to find them?
  2. Strengthening the power of networks?  
How to include actors that can make things move?
  3. Farmers as researchers?  
Should farmers be paid as researchers?

## NETWORKS

# EU Research Networks and Civil Society Organisations

MICHAEL S. JØRGENSEN

Associate Professor and Co-ordinator, The Science Shop c/o Department of Manufacturing Engineering and Management, Technical University of Denmark, Lyngby, Denmark

The experience with community-based research shows that universities often are more interested in „big projects“ with a high amount of external funding and co-operation with business and governmental institutions than in small NGO-related projects. The 6<sup>th</sup> EU Framework Programme (FP6) with its new research concepts for so-called Integrated Projects (IP) and Networks of Excellence (NoE) might reinforce this strive for big projects and excellence. It is, however, also a part of the concepts of IP and NoE that they should develop interaction with policy makers and the general public. The international network of Science Shops, Living Knowledge, is co-operating with one of NoE's, ACCENT (Atmospheric Composition Change Network of Excellence). The experience so far shows that these obligations to develop interaction with policy makers and the general public could, depending on the members of the IP and NoE, lead to more co-operation between civil society organisations and researchers.

The ACCENT network comprises 32 research institutions and has as its aims:

- To promote a common European strategy for research on atmospheric composition change
  - To develop and maintain durable means of communication and collaboration within the European scientific community
  - To facilitate the research and to optimise two-way communication with policy-makers and the general public
- The co-ordinator of the ACCENT work package on „Integration scientific activities with policy-making and public awareness“ approached the Living Knowledge network, at a conference on Science Society interaction and invited the network to become affiliated to ACCENT as a mediator to NGO's. The Science Shop at Technical University of Denmark has become member of the Steering Group of this work package. The activities in this co-operation have so far been:
- E-mail based survey of air pollution related activities in the Living Knowledge network
  - Joint planning of a workshop about the interaction of ACCENT with the policy makers, NGO's and the general public: »Are we listening enough?«
  - Dialogue with NGO's in Central and Eastern European countries utilising the relations to NGO's at the Science Shop at Technical University of Denmark
  - Presentation about Science Shops and NGO activities at the workshop
  - Dialogue about possible activities in the ACCENT network supporting the interaction with policy makers, NGO's and the general public and a work plan for next year.

ACCENT has its primary focus monitoring air pollution and to some extent also air pollution related policy. The air pollution related activities among Science Shops and NGO's vary but include also a focus on the health impact of air pollution, the sources of air pollution and preventive strategies towards air pollution like reducing the pollution from the energy sector and the transport sector. This implies that Science Shops and NGO's could contribute to the broadening of the future activities of ACCENT. One of the future activities to be explored is co-operation between one of the ACCENT research institutions and the network of Science Shops about Science Shop and NGO activities and needs related to air pollution. The dialogue so far shows that there is something to build the future co-operation upon, since

- Some ACCENT researchers apply participatory methods in data sampling
- Some ACCENT researchers already have relations with NGO's
- Some NGO's already co-operate directly with air pollution researchers

Some of the possible future activities in the co-operation between the ACCENT network and the network of Science shops are

- Dialogue about the implications of the ACCENT research (health impact; policy needs)
- Dialogue about future research needs related to air pollution: societal driving forces behind the air pollution, pressures on the environment from different air polluting sources, monitoring of the state of the environment and the impact on health, and the policy needs
- Research co-operation within some of the above mentioned topics

The co-operation between the ACCENT network and the Living Knowledge network and NGO's can be seen as an „easy“ and obvious co-operation, since ACCENT deals with environmental issues. It might be more critical and difficult for the Science Shops and NGO's to develop co-operation with IP's and NoE's that deal with so-called high technology, which might not have the support of NGO's. This scepticism is based on the fact that these technologies often are launched as necessary for economic and sometimes also social and environmental achievements and at the same time researchers and businesses are not willing to engage in real dialogue. However, some researchers and business leaders know that broad societal legitimacy is crucial to market development for products based on these technologies and are willing to engage in dialogue. Some general issues to consider for Science Shops and NGO's, when analysing whether to approach an IP or a NoE or whether to accept an invitation from them are:

- What stakeholders and topics are included and excluded from the research and the co-operation?
- How is the balance between the legitimacy the research seems to get from the interaction with NGO's and Science Shops and the influence of the NGO's and Science Shops on the research?
- Is the interaction primarily based on communication of research results to NGO's or is dialogue and co-operation also part of the interaction?
- What resources are available for community-based research done by Science Shops and NGOs?

A Danish so-called green technology foresight about nano, bio and ICT aims at identifying environmental potentials and risks related

to these three technology areas. In the project group we are aware that such a project might be legitimating these technology areas and have therefore developed a methodology based on stakeholder involvement, since we believe in policy making as a discursive and not a bureaucratic process solely building on experts' views. The scope of the environmental assessments is discussed through stakeholder involvement, since none of these technologies are inherently „green“. Different solutions to environmental problems are compared so that more simple solutions are not forgotten. This comparison goes beyond a simple comparison of chemicals and resources and includes the possible impact on our understanding of nature. For example, the development of small and cheap sensors might be used for an environmental policy based solely on measurements and neglecting the need to prevent environmental problems at the source. For those environmental potentials that go beyond „green hype“, we analyse strategies for the implementation of the potentials through governance of research, development and application of the technologies.

NETWORKS

# Unraveling the Web: How to improve the International Network of Science Shops

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The international network of Science Shops is vulnerable, because only a small group of Science Shops is active to very active in the network: These Science Shops have numerous ties to other Science Shops. The loss of one of these highly linked Science Shops would disrupt connections and harm the network's continuity. This conclusion was reached in a study carried out by the Science Shop of Economics, Business and Organizations of the University of Groningen in the Netherlands. The research was carried out at the request of the Improving Science Shop Networking project (ISSNET). ISSNET aims to create an active network to exchange experiences and expertise between Science Shops. This resulted in the following research question: how can one improve the effectiveness of cooperation within the international network of Science Shops?

Literature concerning networks was studied to gain insight into the features of networks. Next, a questionnaire was held among Science Shops and similar organizations. The data obtained by the questionnaire were analysed visually and statistically. The visual analysis provides an overview of the actual network and the statistical analysis identifies the main actors in the network. Based on the conclusions of the visual and statistical analyses an alternative network structure for ISSNET will be suggested

## Theory

Motives to participate in networks vary: participants can gain legitimacy and status, improve their economic performance, and learn new skills or acquire knowledge<sup>2</sup>. Hence, organizations whose employees are members of a network learn more efficiently than organizations whose employees are not members of a network; the quality of the information is higher among network members. Theories on network structures demonstrate that actors with well-structured networks perform better than others<sup>3</sup>. Such networks are structured to maximize any information benefits derived from a network. The information benefits of a large, diverse network are larger than the information benefits of a small, homogeneous network. However, increasing network size, without considering diversity can have negative side effects.

Networks are particularly well suited in an environment with a highly skilled labour force, where participants possess knowledge that is not limited to a specific task but applicable to a wide range of activities. Therefore, networks are most likely to arise and grow in fields in which knowledge and/or skills do not lend themselves to either monopoly control or confiscation by the highest bidder. Network relations are based on trust, and are therefore particularly suitable

when there is a need for reliable information. The type of exchange likely to occur in networks is the exchange of distinctive competencies, such as knowledge or skills<sup>4</sup>. Exchanging these kinds of intangible goods typifies the contact between Science Shops. Therefore, a network structure seems to fit the characteristics of exchange between Science Shops.

### Actual network structure

To analyse the actual network structure of Science Shops a questionnaire was distributed among 66 Science Shops and 200 members of an ISSNET mailing list. The response rates of these target groups were 89% and 10%, respectively. The analysed network consists of 85 actors: all 66 Science Shop (seven of which did not fill in the questionnaire) and 19 subscribers to the mailing list. Of the actors 11 were involved in the SCIPAS project<sup>5</sup> – the so-called partners – and another 11 were isolated for various reasons. The data obtained by the questionnaire were analysed visually and statistically.

### Visual analysis

The respondents were asked to indicate the Science Shops with which they have contacts. The results are shown in figure 1, which provides an impression of the actual international network of Science Shops. Each actor in the figure has an identification code, with letters referring to the country of origin<sup>6</sup>. The number(s) in the codes are used to distinguish different actors in a country. The layout of the figure is such that groups of nodes that are in contact with and positioned close to one another, and the nodes with relatively the most contacts between the different groups are placed at the center of the figure. Finally, each country is labelled (with) a different colour. The actors positioned in the upper left-hand corner of the figure are the 'isolated' actors; they do not have contacts with other Science Shops.

In addition, the respondents were asked to indicate the type of contact – information exchange, social, advice, mutual research projects, and meetings – and the frequency of the contact. A visual analysis of the responses to these

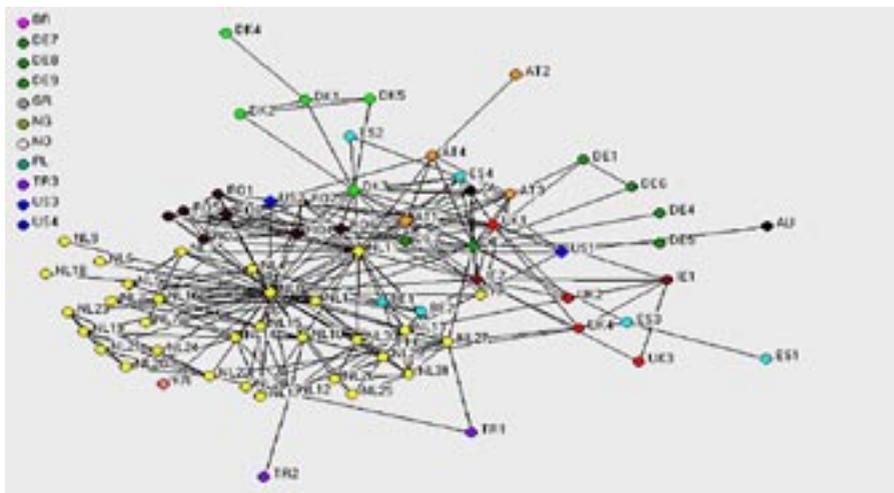


Figure 1 Overview of the actual network

questions demonstrated as follows:

- Science shops use the network mainly for information exchange.
- Information exchange occurs mainly between national clusters of Science Shops in The Netherlands, Belgium, Denmark, Austria, Ireland, and Romania and within four sub-clusters of Science Shops in The Netherlands. Finally, the actors with the largest amount of ties in the network are the SCIPAS partners.
- Most participant contacts take place at the national level. Of the respondents, 86% indicated that they have national contacts, and about half of the respondents indicated that they have international contacts. The most mentioned reasons for the absence of foreign contacts were: 'regional task is more important', 'no priority' and 'no time'. The 'partners' are the Science Shops that maintain the most foreign contacts.
- The two principal actors are the Science Shop of chemistry in Groningen (NL8) and the Science Shop of biology, Utrecht (NL11). Both are partners; both are located in the Netherlands.

### Statistical analysis

The statistical analysis aims to point out which actors are important in the network with the help of four measures. Out-degree is a measure of how influential the actor may be. Influential actors act as communicators and facilitators in the network, they are able to exchange with many others, or make many others aware of their views. Actors NL8 (45 contacts) and NL11 (28 contacts) have the highest out-degrees by far, and might be regarded as the most influential actors in the network. Eight partners are within the top-ten of highest scores for the out-degree. In-degree measures the prestige of an actor. If an actor receives many ties it is said to be prominent, or to have high prestige. The actors

NL11 (26 contacts) and NL8 (23 contacts) are the most prestigious actors. Six out of 11 partners are among the top-ten of highest scores. Betweenness centrality measure views an actor in a favoured position depending on the extent the actor falls on the geodesic – or the shortest possible – paths between other pairs of actors in the network. Consequently, the more people depend on an actor to make connections with other people, the more influence this actor will have. The actors that consequently control most information and are the most influential are NL8 and NL11. Furthermore, the calculation shows that 11 actors control most of the information in the network.

Finally, the flow betweenness centrality measure is a more refined version of the betweenness centrality measure; it measures the proportion of the entire flow of information between two actors (that is, through all the pathways connecting them). Thus, this measure indicates how involved that actor is in all of the flows between all other pairs of actors. For each actor then, the flow measure adds up how involved that actor is in all of the flows between all other pairs of actors. According to the flow measure of betweenness centrality, actors NL8 and NL11 are again the most important mediators. The calculation also shows that about 13 actors control most of the information in the network. Furthermore, actor AT1, who seemed unimportant when we considered exclusively geodesic distances, gains in importance when we consider all pathways.

### Network tasks

One purpose of the questionnaire was to analyse the actual network. Another purpose was to identify opinions of Science Shops related to the benefits and costs of maintaining a network.

It turned out that almost three quarters of the respondents felt that some sort of central coordinating organ is needed to guarantee the continuity of the international network of Science Shops. The respondents were also asked to rate the importance of 12 activities an international network should offer. This resulted in the following top three activities: creating a database for Science Shops (indicated by 92% as important to very important), lobbying (indicated by 76%) and building a knowledge database (indicated by 70%). According to the respondents, the most important advantages of an international network are the increased visibility and accessibility of Science Shops (indicated by 70%), learning among Science Shops (indicated by 70%), and lobbying, fund raising, and public relations (indicated by 68%). If the international network were to carry out the assigned tasks and realize the advantages mentioned, almost 80% of the respondents would become a member of such an international network. One-fifth of the respondents are prepared to pay an annual membership fee of between €100 and €200, 17% would pay more than €300, and the majority would be willing to pay a fee of between € 0 and € 100.

### **Proposed improved network structure**

The analysis shows that only a small group of actors is active to very active in the network: These actors have numerous ties to other Science Shops. The loss of one of these highly linked actors would disrupt connections and harm the network's continuity. While the network benefits fall to the most active actors, they have incentives to keep active or become even more active. The reverse process applies to the large group of less active actors. This group doesn't take advantage of the network

benefits and is probably not willing to invest in the network and becomes less and less active. These counter working processes could also endanger the network's continuity. To stop these processes ISSNET should involve the less active Science Shops more in the network.

As a start, ISSNET can increase the cooperation between Science Shops by communicating the advantages of the network to the participants – as pointed out in the literature – and by enhancing solidarity and mutuality. Solidarity can be enhanced by adopting a communication program that highlights the achievements of Science Shops that are related to the network. Mutuality can be enhance by stressing that benefits have to be derived from an ongoing relationship, rather than from each individual transaction.

If a new contact of a Science Shop provides the same information benefits as the old contacts, this contact is called redundant. Maintaining contacts takes time and energy. To save costs and increase efficiency ISSNET should minimize redundant contacts of Science Shops. This can be accomplished by transforming ISSNET's actual centralized organizational structure into a decentralized organizational structure. Since a network is a spontaneous organizational form, which develops in a natural way the alteration has to be based on the actual network structure of Science Shops.

First, ISSNET should distinguish primary contacts from secondary contacts. A primary contact is defined a Science Shop that receives and sends information to all Science Shops – the secondary contacts – in its national cluster. To select the primary contacts ISSNET, can apply criteria that define actors in control of a substantial number of information flows through the network. These actors are able to filter and select useful information, subsequently distributing it among other Science Shops within the

cluster. The betweenness and flow betweenness measurements can serve as such criteria. The actors well suited to be primary contacts have high betweenness and flow betweenness scores. Figure 2 shows the primary contacts in the proposed efficient international network structure for ISSNET based on these criteria.

Next, the primary contact should be connected to all other primary contacts, so that each primary contact can function as a liaison between foreign Science Shops and Science Shop within its national cluster. Therefore, each primary contact should inform the Science Shops within its cluster of the importance of passing certain types of information to him or her: namely, information that might interest either the other Science Shops within the cluster, or all Science Shops in the network. Finally, to increase the effectiveness of the network, the number of clusters should be increased. This leaves ISSNET with three questions to resolve:

1. How should the primary contacts be selected?
2. Which tasks should be assigned to which primary contact?

3. How should the contacts and liaisons of primary actors be enhanced and facilitated?

**Footnotes**

- 1 This paper is based on a master thesis of C.J. Kuijvenhoven. 2005. Unraveling the web: How to improve the International Network of Science Shops, Science Shop of Economics, Management & Organization, University of Groningen, The Netherlands. It can be ordered by sending an email to: ebwinkel@rug.nl.
- 2 Podolny & Page, Podolny, J. & Page, K. 1998. Network forms of organization. *Annual Review of Sociology*, 24: 57-76.
- 3 Burt, R. 1992. *Structural Holes: The Social Structure of Competition*. Cambridge, MA: Harvard University Press. Burt, R. 2000. 'Structural holes versus network closure as social capital'. In N. Kin & K. Cook & R. Burt (Eds.), *Social Capital: Theory and Research*, Aldine de Gruyter. Uzzi, B. 1997. 'Social structure and competition in interfirm networks: The paradox of embeddedness'. *Administrative Science Quarterly*, 42: 35-67.
- 4 Powell, W. 1990. 'Neither market nor hierarchy: network forms of organization'. In Staw, B. & Cummings, L. (Eds.), *Research in organizational behaviour* 12. Greenwich, Conn: 295-336.
- 5 SCIPAS is the precursor of the ISSNET project.
- 6 The country codes are in accordance with the country identification of the International Organization for Standardization (ISO).

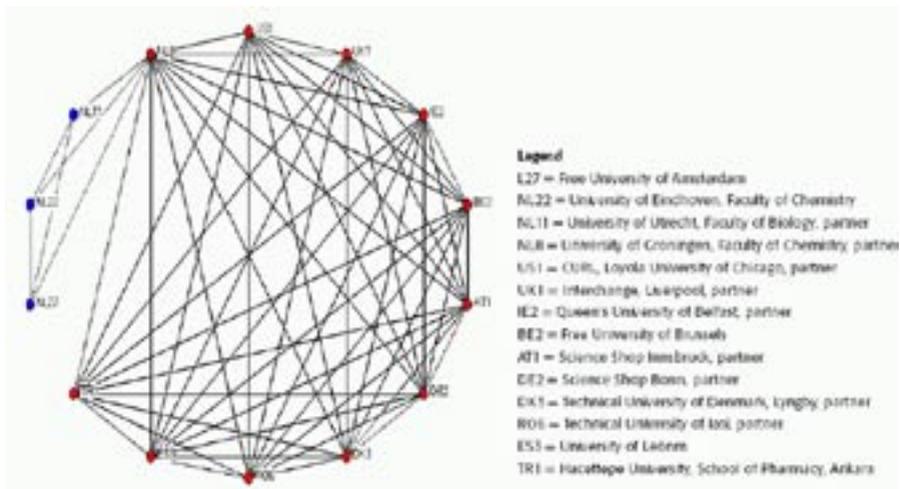


Figure 2 Basic structure with identified primary contacts

PARTICIPATORY TOOLS

# Tratamiento de los Contenidos del Módulo de Gestión del Agua, Desertización y Basuras y su Adecuación didáctica en Entornos cerrados

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La educación y concienciación medioambiental constituye, hoy en día, una parte importante de la realidad social y, por lo tanto, ha de verse reflejada en los currículos de la enseñanza obligatoria de nuestros niños. Así comprobamos como, además, las distintas administraciones presentan una clara preocupación por el medioambiente, que se ve reflejada en la presencia, cada vez más importante, de experiencias extraescolares relacionadas con este tema, como ocurre, por ejemplo, en los Parques y Museos de las Ciencias. Partiendo de la base de que los centros escolares son el centro neurálgico que permite poner a disposición de los futuros ciudadanos los conocimientos necesarios para adquirir y consolidar cambios de actitudes que se traduzcan en el desarrollo de acciones y de comportamientos relacionados con la conservación y mejora del entorno natural, es obvio que este aprendizaje no sigue una única vía y que, cualquier otro procedimiento que permita a los alumnos afianzar y ampliar los conocimientos, actitudes y valores conseguidos debe ser también utilizado. Es, en este punto, donde adquieren gran importancia los museos de ciencias, ya que de una forma lúdica y amena pueden llegar a ser ámbitos influyentes, con un importante papel en la divulgación, ampliación y enseñanza de

estas actitudes y contenidos. Uno de los mayores retos que enfrentan estos museos es el de presentar actividades asequibles a un público heterogéneo, tanto en edad, como en conocimientos; ya que es realmente difícil preparar un material didáctico adecuado a diferentes edades, niveles y condiciones de aprendizaje; teniendo en cuenta, además, que es esta adecuación didáctica la que va a conseguir despertar en los visitantes el grado de atención necesario para que los contenidos reflejados en cada actividad sean adecuadamente interiorizados. Es bajo esta perspectiva que consideramos a los Museos de Ciencias como algo más que un cúmulo de objetos y experiencias dispuestos de manera más o menos llamativa; al contrario, pensamos que ofrecen una gran posibilidad para realizar aprendizajes significativos de contenidos, actitudes y valores y que su metodología es específica, debiendo ser especialmente cuidadosa en el diseño de los mismos. El presente trabajo es una propuesta en la que se intenta poner en contacto a los alumnos de las diferentes etapas de la Enseñanza Obligatoria con el problema de la desertización, la generación y el tratamiento de residuos y basuras, y la gestión del agua, como medio de preservar nuestro entorno.

### Tratamiento de los contenidos de «Desertización, Basuras y Gestión del Agua» en el currículo educativo

La L.O.G.S.E, Ley Orgánica 1/1990 de Ordenación General del Sistema Educativo, en su preámbulo expone que «Los sistemas educativos desempeñan funciones esenciales para la vida de los individuos y de las sociedades. Las posibilidades de desarrollo armónico de unos y

de otras se asientan en la educación que aquéllos proporcionan.» ... Y que «En la educación se transmiten y ejercitan los valores que hacen posible la vida en sociedad, ...», por lo que, visto que la problemática de la desertización y de la gestión de los residuos y del agua es una realidad que preocupa gravemente a los miembros de la sociedad, ha de verse reflejada en el currículo educativo. Es por esto, que en este apartado del presente trabajo se ha realizado

**Tabla 1: Contenidos del Área de Ciencias, Geografía e Historia en E. Primaria**

<b>ÁREA DE CIENCIAS, GEOGRAFÍA E HISTORIA</b>	
<b>Objetivos de Área</b>	
2. Recoger, seleccionar y procesar información básica sobre el entorno natural, social y cultural, a partir de fuentes diversas y las aportaciones de las tecnologías de la información y la comunicación. 4. Conocer y valorar la aportación e importancia de la ciencia y la investigación para mejorar la calidad de vida y bienestar de los seres humanos. 5. Conocer el patrimonio natural, histórico y cultural, respetando su diversidad y desarrollando la sensibilidad artística y el interés por el medio ambiente y la naturaleza Contenidos	
Primer ciclo	6. El agua. Composición, características e importancia para los seres vivos. El ciclo del agua: aguas superficiales y subterráneas. 9. La conservación del medio ambiente. Los riesgos de la contaminación del agua, de la tierra y del aire.
Segundo ciclo	8. El clima y su repercusión en el paisaje. 9. La actividad humana y el paisaje.
Tercer ciclo	1. Funcionamiento y cuidado de nuestro cuerpo. Principales enfermedades que afectan a los aparatos y sistemas del organismo humano. Hábitos saludables y prevención de los trastornos alimentarios. Avances de la ciencia que mejoran la salud y la alimentación: medicamentos y antibióticos; potabilización del agua; la higiene; fertilizantes; aditivos, química del frío y salud animal. 3. Las relaciones entre los seres vivos. Cadenas alimenticias. Asociaciones intraespecíficas e interespecíficas. Poblaciones, comunidades y ecosistemas. 6. Las capas de la tierra. Atmósfera, hidrosfera, corteza, manto y núcleo. Minerales y rocas. Los componentes del suelo. Catástrofes naturales: volcanes, terremotos e inundaciones. 11. Concepto de energía. Fuentes de energía y materias primas. Energías renovables y no renovables. Desarrollo sostenible.

un estudio de los contenidos relacionados con la desertización, residuos y gestión del agua, que podemos encontrar en los currículos de las distintas etapas de la Educación Obligatoria. El REAL DECRETO 830/2003, de 27 de junio, por el que se establecen las enseñanzas comunes de la Educación Primaria, en su artículo 3, establece que la Educación Primaria contribuirá a desarrollar en los alumnos las siguientes capacidades:

- g) Conocer los aspectos fundamentales de las Ciencias de la Naturaleza, la Geografía, la Historia y la Cultura.

m) Conocer y valorar la naturaleza y el entorno, y observar modos de comportamiento que favorezcan su cuidado.

Estos objetivos se ven reflejados en los siguientes contenidos (Tabla 1).

Asimismo, en artículo 5 del REAL DECRETO 831/2003, de 27 de junio, por el que se establece la ordenación general y las enseñanzas comunes de la Educación Secundaria Obligatoria, se establece que los alumnos deberán alcanzar a lo largo de la Educación Secundaria Obligatoria las siguientes capacidades:

**Tabla 2: Contenidos del Área de Biología y Geología en E. Secundaria**

<b>ÁREA DE BIOLOGÍA Y GEOLOGÍA</b>	
Objetivos de Área	
<p>3. Interpretar científicamente los principales fenómenos naturales, así como sus posibles aplicaciones tecnológicas, utilizando las leyes y conceptos de las Ciencias de la Naturaleza.</p> <p>7. Aplicar los conocimientos adquiridos en las Ciencias de la Naturaleza para disfrutar del medio natural, valorándolo y participando en su conservación y mejora.</p> <p>8. Reconocer y valorar las aportaciones de la ciencia para la mejora de las condiciones de existencia de los seres humanos y apreciar la importancia de la formación científica. Contenidos</p>	
<b>Cuarto curso</b>	<p><b>I. La dinámica de la tierra.</b></p> <p>1. El modelado del relieve terrestre. Concepto de relieve. Agentes y procesos externos: meteorización, erosión, transporte y sedimentación. Factores externos del modelado del relieve: Litológicos, estructurales, dinámicos, climáticos y antrópicos. El modelado litoral. El modelado kárstico. Los sistemas morfoclimáticos. Clasificación. Los sistemas morfoclimáticos de zonas templadas y de zonas desérticas</p> <p><b>III. Ecología y medio ambiente.</b></p> <p>7. Los seres vivos y el medio ambiente. El medio ambiente y sus tipos. Conceptos de especie, poblaciones y comunidades. Las adaptaciones a los diferentes medios. Ecosistemas terrestres y acuáticos.</p> <p>8. Dinámica de ecosistemas. El flujo de la energía en un ecosistema. El ciclo de la materia. Principales ciclos biogeoquímicos. Cambios naturales en los ecosistemas. Cambios producidos por el hombre. Impactos ambientales. Su prevención.</p>

**Tabla 3: Contenidos del Área de Ciencias de la Naturaleza en E. Secundaria**

<b>ÁREA DE CIENCIAS DE LA NATURALEZA</b>	
Objetivos de Área	
<ol style="list-style-type: none"> <li>1. Iniciarse en la observación de los fenómenos naturales.</li> <li>3. Interpretar científicamente los principales fenómenos naturales, así como sus posibles aplicaciones tecnológicas, utilizando las leyes y conceptos de las Ciencias de la Naturaleza.</li> <li>6. Aplicar los conocimientos adquiridos en las Ciencias de la Naturaleza para disfrutar del medio natural, valorándolo y participando en su conservación y mejora.</li> <li>7. Reconocer y valorar las aportaciones de la ciencia para la mejora de las condiciones de existencia de los seres humanos y apreciar la importancia de la formación científica.</li> </ol>	
Contenidos	
Primer curso	<p>I. La tierra en el universo.</p> <ol style="list-style-type: none"> <li>1. El Universo, la Vía Láctea y el Sistema Solar. La observación del Universo: planetas, estrellas y galaxias. Evolución histórica del conocimiento del Universo. La Vía Láctea y el Sistema Solar. Características físicas de la Tierra y de los otros componentes del Sistema Solar. Los movimientos de la Tierra: las estaciones, el día y la noche, los eclipses y las fases de la Luna. Las capas de la Tierra: Núcleo, Manto, Corteza, Hidrosfera, Atmósfera y Biosfera.</li> </ol> <p>II. Materiales terrestres.</p> <ol style="list-style-type: none"> <li>4. La hidrosfera terrestre. El origen del agua en la Tierra. El agua en otros planetas. La molécula de agua: abundancia, propiedades e importancia. El agua del mar como disolución. Sodio, potasio y cloro: abundancia y propiedades. El agua en los continentes. El vapor de agua en la atmósfera. El ciclo del agua. La contaminación del agua, su depuración. El agua y la salud.</li> </ol>
Segundo curso	<p>II. Tránsito de energía en la tierra.</p> <ol style="list-style-type: none"> <li>4. La energía externa del planeta. Origen de la energía solar. La atmósfera como filtro de la energía solar: su estructura. La energía reflejada: efecto invernadero; últimas directrices internacionales. La Hidrosfera como regulador térmico. Corrientes, mareas, olas. Distribución de la energía solar que llega a la superficie del planeta: origen de los agentes geológicos externos.</li> <li>5. Agentes geológicos externos. Agentes atmosféricos. La meteorización. Formación de suelos. El viento. Acción geológica. Energía eólica. Aguas salvajes y torrentes. Acción geológica. Los ríos. Acción geológica. Energía hidráulica. Los glaciares. Acción geológica. Las aguas subterráneas. Acción geológica. Aprovechamiento. El mar. Acción geológica. Energía mareomotriz. La formación de rocas sedimentarias. Carbón y petróleo.</li> <li>8. Conceptos de Biosfera, Ecosfera y Ecosistema. Productores, consumidores y descomponedores. Cadenas y redes tróficas. La biomasa como fuente de energía.</li> </ol>

f) Concebir el conocimiento científico como un saber integrado, que se estructura en distintas disciplinas, matemáticas y científicas, y conocer y aplicar los métodos para identificar los problemas en los diversos campos del conocimiento y de la experiencia, para su resolución y para la toma de decisiones. Estos objetivos se ven reflejados en los siguientes contenidos (Tabla 2, Tabla 3).

Por otro lado, hemos de tener en cuenta los Temas Transversales, siendo especialmente importantes en este caso la Educación Ambiental y la Educación para el Consumidor. La importancia de los Temas Transversales se deriva de su característica más singular, esto es, de su posición en la estructura del currículo educativo o *impregnación*, que implica que han de estar presentes en toda la práctica educativa y estar presentes en las diferentes áreas curriculares desde la Educación Infantil hasta la Educación Secundaria. El hecho de ser contemplados desde un punto de vista «transversal», no implica que solamente deban impregnar la vida del aula, sino que debe de producirse una implicación de toda la comunidad educativa, de forma que su tratamiento educativo llegue a toda la vida del centro y su mismo entorno social. Por lo tanto, estos contenidos educativos, aun teniendo como punto nuclear de desarrollo el ambiente escolar poseen un claro rasgo de extraescolaridad.

### **Estudio comparativo de los contenidos de de «Desertización, Basuras y Gestión del Agua» en el currículo educativo y este módulo en museos**

Como hemos visto en el apartado anterior, los contenidos sobre los que estamos trabajando,

están ampliamente recogidos en el currículo de la Educación Obligatoria, tanto desde las distintas áreas curriculares, como desde los Temas Transversales. Son precisamente estos últimos, al estar concebidos como *“aspectos de especial relevancia para el desarrollo de la sociedad en relación con el consumo, la igualdad, la paz, el medio ambiente, la salud, el ocio, etc.”* (D.C.B.) los que imprimen el carácter de extraescolar que permite insistir en ellos desde lugares externos a las aulas, como son Los Parques y Museos de Las Ciencias, como refuerzo a los contenidos escolares impartidos. De esta manera, ponemos en práctica una enseñanza globalizadora y contextualizada de lo que es la educación ambiental (desertización, basuras y gestión del agua, entre otros) para que los alumnos puedan percibir la realidad que les rodea y así aproximarse a su conocimiento. Visto esto, vamos a realizar un estudio de los contenidos encontrados en el módulo de «desertización, basuras y gestión del agua», de un museo de las ciencias y de su estructura y presentación, al objeto de analizar su identidad y adecuación didáctica. Observamos que el tratamiento que reciben estos temas en el parque se mantiene en la línea de la concepción de temas abiertos, introduciendo algunas novedades y temas de relación.

### **Descripción del módulo**

El módulo se presenta con un gran panel, en cuya zona central se destacan en letras grandes los tres temas que nos ocupan: • Gestión del agua • Desertización • Residuos sólidos A ambos lados, podemos ver grandes fotografías relacionadas con cada tema, y a la izquierda del panel, destacando sobre fondo blanco, una breve descripción del tema tratado, a saber:

La gestión ambiental debe considerar todos los aspectos ligados al impacto del desarrollo humano sobre el medio. Algunos de los problemas más importantes son:

- La desertización es un proceso que comienza con la erosión y desemboca en la pérdida de suelo fértil. Esto implica la imposibilidad de sustentar vida animal o vegetal. Es un problema grave en España, sobretudo en el sureste y en el sur. La única defensa es la conservación de los animales y la reforestación.
- En España producimos, en promedio, 1 kilo de basura por habitante y día. Multiplica esto por el número de habitantes de tu ciudad y por el número de días que tiene el año. ¡La basura amenaza ya con sepultarnos sino tomamos medidas! ...
- En nuestro país llueve mucho en el norte, pero bastante poco en el resto. Sin embargo, consumimos cada vez más agua, tanto en casa, como en la industria y la agricultura. Curiosamente, el agua en España es la más barata de Europa. ¡El país más seco tiene el agua más barata!

**Cuadro 1: Texto del panel del módulo de desertización, basuras y gestión del agua**

### Análisis del módulo

Se ha podido observar que la secuenciación de los tres temas fundamentales tratados en el módulo es coherente, siendo muy interesante la introducción de actividades interactivas que implican directamente la intervención del niño. Los sistemas que se emplean para provocar la actuación del niño son adecuados para alumnos de Educación Primaria pues el manejo del ordenador que están en exposición es sencillo y tanto el lenguaje utilizado como las actividades didácticas propuestas están en el nivel de comprensión propio de estas edades.

### Desertización

El módulo se inicia con una sencilla explicación del proceso en sí, de los problemas que ocasiona, así como de su importancia en España, para acabar con dos sencillas pautas que permitan atajarlo. El tratamiento de este tema nos parece acertado tanto por la sencillez como por la forma concisa en la que se expone, aunque creemos que debería hacerse mayor hincapié

en el papel que los hombres han desempeñado (y desempeñan) en este proceso. De hecho, el panel informativo habla del impacto del desarrollo humano sobre el medio; pero pensamos que debería haberse mencionado de forma más específica que, junto a las causas naturales, el ser humano, a través de su actividad económica (sobre todo agrícola) puede contribuir enormemente a acelerar el proceso. En la consola que acompaña al panel, se propone una actividad



**Fotografía 1: Imagen del panel de módulo de desertización, basuras y gestión del agua (Parque de las Ciencias de Granada)**

encaminada a conocer los diferentes desiertos existentes en la Tierra junto con sus características; Creemos que sería adecuado proponer, además, actividades que hicieran al niño plantearse una reflexión sobre la desertización, por ejemplo, relacionar fotografías en las que se observen las acciones atribuibles directamente a la acción humana con los efectos que provocan en relación con este tema; y, por otro lado, las que no son debidas a la acción de los hombres.

### Gestión del agua

Esta parte del módulo se inicia en el panel donde, concisamente, se indica que España es un país que posee zonas claramente diferenciadas en cuanto a la cantidad de agua de lluvia que reciben; destacándose el hecho de que un país pobre en recursos hídricos como el nuestro, posea niveles cada vez mayores de consumo de agua. En la consola que hay delante del panel, se plantea una actividad interactiva para los niños, consistente en cinco preguntas con tres respuestas posibles cada una de ellas, de las cuales sólo una es verdadera. La primera de estas preguntas, no implica directamente al visitante, pues sólo pone de manifiesto el conocimiento de un dato científico (el porcentaje de agua dulce del total terrestre). Sin embargo, al hacer reflexionar al niño sobre la pequeña cantidad que representa el agua dulce respecto al total del recurso en el planeta Tierra, consigue que éste tome conciencia de que el agua es en realidad un bien escaso. Las otras cuatro preguntas sí implican directamente al visitante, ya que hacen referencia al uso doméstico del agua.

Dos de ellas se refieren concretamente al despilfarro inútil ocasionado por un grifo que gotea o que se deja abierto mientras nos lavamos los dientes, afeitamos o fregamos

los platos. Ambas situaciones pertenecen a la vida cotidiana del niño y además es algo que en muchas ocasiones se hace sin pensar en la cantidad de agua que se gasta, por lo que la elección de estas cuestiones nos parece muy acertada, ya que permite al niño realizar una reflexión sobre el despilfarro de agua que él mismo realiza en su quehacer diario. Ciñéndonos a los alumnos de Educación Primaria, nos parece aún más acertada la tercera pregunta "¿Dónde se gasta más agua: en la cocina, en el inodoro o limpiando cristales?", ya que la respuesta correcta está asociada a la única actividad de entre las tres que con toda seguridad los alumnos realizan, que es utilizar el inodoro. Con ello, se asegura que el proceso de enseñanza-aprendizaje (interactividad didáctica) se realiza, ya que el alumno entiende inmediatamente que uno de los actos más cotidianos para él (ir al baño) constituye el de mayor gasto de agua en su casa, consiguiéndose así que recapacite sobre el grado de responsabilidad que tienen en sus actuaciones individuales. 3.2.3.- Basuras Al analizar esta sección del módulo vemos que los enunciados que se exponen no implican demasiado la intervención del niño aunque, quizás si la actividad se realiza con otros compañeros, provoque comentarios sobre la acción real que ellos tienen en su vida diaria en relación a este tema, en concreto en el tema de la separación de basuras. El objetivo de esta actividad no es tanto poner a prueba los conocimientos de los niños sobre separación o reciclado de materiales, como el de provocar comentarios entre ellos para saber si están actuando correctamente en su casa, en el colegio, en la calle, ... cuando están realizando el acto de "tirar un material a la basura". La interiorización de estos conceptos debe llegar a provocar un cambio de actitud del niño, que incluso puede llegar a cambiar los hábitos familiares. Pasamos a comentar cada

uno de los enunciados que se presentan en esta parte del módulo temático:

- La primera afirmación informa al visitante sobre la incineración, presentándola como una técnica de tratamiento de residuos contaminantes y, por lo tanto, poco aconsejable desde el punto de vista ambiental y sanitario.
- En la segunda, se incide en la existencia de una recogida selectiva, indicando que no es necesario separar las latas (no se especifica el material) porque, al ser ferromagnéticas, son separadas en las plantas de tratamiento mediante campos magnéticos. Aquí observamos una falta en el complemento de los contenidos, ya que no todas las latas presentan ferromagnetismo y por tanto no todas se pueden separar en el tipo de planta mencionada, aunque en la siguiente afirmación se indica que las latas de acero sí son ferromagnéticas y las de aluminio no. Ocurre con estas dos afirmaciones, que la primera no se cumple en su totalidad, luego no debería considerarse como una afirmación y la segunda debería de ir en primer lugar para no llevar a un niño a equívocos sobre el proceso de separación de este tipo de basuras. Probablemente se pretende una acción reflexiva en la que se llegue finalmente a la conclusión de que es importantísima la recogida de basura selectiva, pero eso no es comprobable (esa es una dimensión que no podemos alcanzar).
- Las siguientes tres afirmaciones se refieren específicamente al proceso de reciclaje del papel y el vidrio. o En lo referente al papel, se indica que el papel fotocopiado no es más difícil de reciclar que el normal. De aquí la única conclusión que se puede sacar es que este papel debe depositarse también en el contenedor correspondiente. La otra dice que las cáscaras de huevo no se reciclan jun-

to al papel, por lo que éstas deben tirarse al cubo de basura orgánica. En definitiva, estas dos afirmaciones sólo sirven para facilitar al visitante el juego posterior de la consola, que consistirá en depositar distintos residuos en sus correspondientes contenedores, y entre esos residuos aparecen periódicos y cáscaras de huevo. o La última frase persigue la misma finalidad que las dos anteriores, pues en el juego aparecerán botellas de colores que deberán ser depositadas en el contenedor de vidrio. Aquí se da una solución al problema de las basuras: el del reciclaje como alternativa a la acumulación de éstas. Creemos, que el verdadero problema no es tanto la recogida selectiva de basuras y su posterior reciclado, como la reducción de producción de basuras y la reutilización, por lo que este otro objetivo también debería plantearse.

### Contenidos LOGSE vs contenidos presentes en el museo

Los contenidos curriculares presentes en este módulo no se ciñen estrictamente a los explicados por la legislación vigente. No obstante, no vemos en ello un problema, ya que no es este el objetivo de los museos de ciencias, sino el de poner al alcance de la sociedad unos conocimientos que esta demanda. Nuestro análisis se basa en la idea de que ya que esta fuente de información existe, lo ideal sería que se adecuara lo más posible a las necesidades formativas de los niños en las edades indicadas. Pero para ello, es necesario el esfuerzo conjunto, no sólo de los museos, sino de los profesores que han de encargarse de preparar el material de apoyo necesario para que sus alumnos realicen con éxito esta experiencia educativa.

	CONTENIDOS LOGSE	CONTENIDOS MUSEOS
Primer ciclo	6. El agua. Composición, características e importancia para los seres vivos. El ciclo del agua: aguas superficiales y subterráneas. 9. La conservación del medio ambiente. Los riesgos de la contaminación del agua, de la tierra y del aire.	<ul style="list-style-type: none"> <li>• El agua. Importancia para los seres vivos.</li> <li>• La conservación del medio ambiente.</li> </ul>
Segundo ciclo	8. El clima y su repercusión en el paisaje. 9. La actividad humana y el paisaje.	<ul style="list-style-type: none"> <li>• El clima y su repercusión en el paisaje.</li> </ul>
Tercer ciclo	1. Funcionamiento y cuidado de nuestro cuerpo. Principales enfermedades que afectan a los aparatos y sistemas del organismo humano. Hábitos saludables y prevención de los trastornos alimentarios. Avances de la ciencia que mejoran la salud y la alimentación: medicamentos y antibióticos; potabilización del agua; la higiene; fertilizantes; aditivos, química del frío y salud animal. 3. Las relaciones entre los seres vivos. Cadenas alimenticias. Asociaciones intraespecíficas e interespecíficas. Poblaciones, comunidades y ecosistemas. 6. Las capas de la tierra. Atmósfera, hidrosfera, corteza, manto y núcleo. Minerales y rocas. Los componentes del suelo. Catástrofes naturales: volcanes, terremotos e inundaciones. 11. Concepto de energía. Fuentes de energía y materias primas. Energías renovables y no renovables. Desarrollo sostenible.	<ul style="list-style-type: none"> <li>• Potabilización del agua.</li> <li>• Desarrollo sostenible.</li> </ul>

### Conclusiones

Teniendo en cuenta la diversidad de edades de los visitantes a los Museos y Parques de la Ciencia, es comprensible que algunas de las actividades propuestas no se adecuen perfectamente a los niveles educativos deseados. No obstante, creemos que, en general, el Módulo de Desertización, Basuras y Gestión del Agua posee unos contenidos y unas actividades acordes con la edad de los niños a la que va destinada: Educación Primaria.

Ciñéndonos específicamente a la parte de desertización:

- Creemos que es bastante adecuada para los alumnos de Educación Primaria, ya que el proceso de desertización se explica con sencillez y con un vocabulario comprensible para los niños.
- Por otro lado, destacar que, a pesar de la importancia del papel del Hombre en el proceso de desertización, no se menciona la incidencia de éste sobre el medio.
- Indicar también, que no se proponen activi-

dades que hagan reflexionar a los niños sobre el tema de la desertización, aunque las que están presentes sí son adecuadas para niños de Educación Primaria.

En cuanto al apartado de gestión del agua:

- Hemos observado como todas las actividades planteadas, a excepción de una, implican o están relacionadas con la vida cotidiana del niño, lo que nos parece muy acertado porque de esta manera, conseguimos una implicación personal del niño que, al interiorizar los conceptos expuestos, permite el cambio de actitud de éste frente al consumo excesivo e irracional de agua.

Y, por último, en cuanto a la parte de basuras:

- Nos parece bastante posible que el cambio en la estructura de las actividades (de individual a grupal), pueda provocar un desconcierto inicial a los niños, pero esto podría solventarse con unas indicaciones adecuadas por parte del monitor-profesor. De manera que si las actividades se realizan con grupos y no de forma individual, si que se podría conseguir el objetivo propuesto, que no es otro que un cambio de actitud en su comportamiento diario cuando va a depositar distintos tipos de basuras.
- Por otro lado, hemos observado que el tema de la reducción de producción de basuras y su reutilización no se trata, ni en forma de contenidos ni de actividades.
- Obviando esto, creemos que las propuestas son acertadas ya que se ataca de lleno el tema del consumo excesivo y la reutilización de productos, que son aspectos fácilmente comprensibles por niños de esta edad.

## Referencias Bibliográficas

- ALLEN, S. (1997). Using Scientific Inquiry Activities in Exhibit Explanations. *Science Education*. Phoenix. Vol. 81, nº 6. pp.: 715-733.
- BENAYAS, J. y MARCÉN, C. (1995). La Educación Ambiental como desencadenante del cambio de actitudes ambientales. I Jornadas sobre actitudes y educación ambiental. Edit. Perales, F. J.; Gutiérrez, J. y Álvarez, P. Univ. de Granada. pp.: 132-156.
- BROUARD, M. A. y POL MÉNDEZ, E. (1998). La comprensión de los contenidos del museo. *Didáctica de las Ciencias Sociales, Geografía e Historia*. Nº 15. pp.: 15-30.
- CONSEJERÍA DE EDUCACIÓN Y CIENCIA DE LA JUNTA DE ANDALUCÍA. (1992). «Decreto 105/1992, de 9 de junio, por el que se establecen las Enseñanzas correspondientes a la Educación Primaria en Andalucía». (BOJA nº 56 de 20 de junio de 1992).
- DEL VAL, A. (1997). El libro del reciclaje: manual para la recuperación y aprovechamiento de las basuras. Ed. Integral.
- DELEAGE, JEAN PAUL y SOUCHON, CHRISTIAN. (1996) Modulo educativo sobre la desertización. CYAN. Proyectos y producciones editoriales, S.L.
- EMBIID IRUJO, ANTONIO. (1997) Gestión del agua y medio ambiente. Ediciones, S.L. EL-VIRA, C. y
- FERNÁNDEZ DOMÍNGUEZ, M. A. (1992). Basura en la nave espacial Tierra. Cuadernos de Pedagogía. Barcelona. Vol. 208. pp.: 60-63.
- FERNÁNDEZ I CERVANTES, M. (1998). Didáctica de las Ciencias Sociales, Geografía e Historia. Nº 15. pp.: 51-56.
- FISHER, M. S. (1997). The effect of humor on learning in a Planetarium. *Science Education*. Phoenix. Vol. 81, nº 6. pp.: 703-713.

- FOPP, M. A. (1997). Los museos del aire y del espacio alcanzan la mayoría de edad. *Museum Internacional*. París. UNESCO. Nº 195, vol. 49, nº. 3. pp.: 4-7. 15
- GARCIA, ERNEST. (2004). Medio ambiente y sociedad: la civilización industrial y los límites del planeta de ALIANZA EDITORIAL, S.A.
- GRUPO GAIA. (1990). Consumo y residuos sólidos urbanos. Cuadernos de Pedagogía. Barcelona. Vol. 186. pp.: 58-62.
- LACIAR, MIRTA ELIZABETH. (2003). Medio ambiente y desarrollo sustentable. Ciudad Argentina.
- MYERS, N. (1992). El futuro de la Tierra. Soluciones a la crisis medioambiental en una era de cambio. Celeste Ediciones.
- PÉREZ, C.; DÍAZ, Mº. P.; ECHEVARRÍA, I.; MORENTIN, M. y CUESTA, M. (1998). Centros de Ciencia. Espacios interactivos para el aprendizaje. País Vasco. Servicio de la editorial de la Universidad del P. Vasco.
- SOTELO, JOSE ANTONIO. (2003). Desarrollo y medio ambiente en España Fundación INFODAL
- TERRY, C. J. (1997). Los museos de tecnología del Canadá se ponen en línea. *Museum Internacional*. París. UNESCO. Nº 195, vol. 49, nº. 3. pp.: 26-27.
- VVAA. (2003). La directiva marco del agua: realidades y futuros (III congreso ibérico sobre gestión y planificación del agua)
- VVAA. (2001). Problemática de la gestión del agua en regiones semiáridas. INSTITUTO DE ESTUDIOS ALMERIENSES
- VVAA. (1997). La basura a la basura de EDICIONES GAVIOTA, S.L.
- VVAA (1996). Envases y sus residuos. (Monográfico). Ecosistemas. Nov. pp 7-53.
- <http://www.esi.unav.es/asignaturas/ecologia/Hipertexto/00General/IndiceGr al.html>

PARTICIPATORY TOOLS

# Community Based Sustainability Planning and Rural Development in the South-Borsod Region, Hungary

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*In this paper, we present a complex participatory rural development project in a socioeconomically disadvantaged floodplain area of Hungary derived from a framework and common ground of ecological economics. We discuss the difficulties encountered during the fieldwork and reflections of the research team on the research processes. This still ongoing research project directed towards the issues of bottom-up sustainability planning can be conceptualised as a mutual learning between local and scientific perspectives with a strong commitment to a participatory approach. Its community-based appreciative research framework anchored in a hermeneutic and constructivist epistemology puts special emphasis on the systematic testing of ecological economics' theoretical bases in live-action contexts and development of deliberative institutional arrangements in order to offer valuable methodological tools and insights for ecological economics.*

## Introduction

In this article we first explore the theoretical underpinnings of our complex participatory rural development project in a socio-economically disadvantaged floodplain area of Hungary and its direct implications for the research design and implementation. We then proceed to the detailed presentation of our fieldwork, an action research process, that aimed at putting theories into practice and the concrete participatory methodologies used for different problems. All these were allowing for real problem-orientation and effective participation, enabling people in the research area to identify and express their important issues and needs, to stimulate discussion and analysis, and to take actions. Finally, we summarise our initial findings concerning both our theoretical questions and methodology.

## Theoretical background

Ecological economics as a heterodox, non-coherent school of economics (Gowdy, 2005) started only recently to consciously seek the alternatives of neoclassical economics. Its disciplinary self-definitions centred around the boundaries, limits and common grounds of this field of study (Røpke, 2005; Gowdy–Erickson, 2005; Müller, 2003; Ramos-Martin, 2003; Costanza, 2001; Costanza, 1989; Norgaard, 1989; Proops, 1989) following the notion that methodological pluralism proposed by Norgaard (1989) should not mean that “anything goes” (Söderbaum, 2000). However, there seems to be an agreement on certain tenets of ecological economics (Gowdy, 2005; Røpke, 2005; Söderbaum, 2000; Norgaard, 1989; Proops, 1989), which forms a theoretical basis of our empirical research as well.

Ecological economists as problem- and policy-oriented researchers aim to influence decision-makers in public policy debates on human-nature issues to the achievement of sustainability (Chiu, 2003; Söderbaum, 2000; Tacconi, 1998; Proops, 1989). As a science of sustainability, ecological economics is to deal with problems and topics of interest to lay audiences, where economy is considered to be embedded in natural and socio-cultural systems, and its growth and scale has biophysical as well as social limits. Ecological economics as a transdisciplinary field of study (Söderbaum, 1999; Norgaard, 1989) attracts scholars even beyond the disciplines of economics and ecology to join together in their theoretical and empirical enquiries so as to better identify, understand and solve interrelated economic, social and ecological problems. Again, recent discussions claim that transdisciplinarity should not justify anything identified as ecological economics (Røpke, 2005).

Ecological economics as a co-evolutionary framework of thought focuses upon the historically situated, long term interactions between complex ecological and human systems, the interrelations between economic activity and ecosystems (Norgaard, 1994; Proops, 1989). This study field also implies an awareness of historical specifications, context-dependency (space and time scale as well) and temporalities involved in conducting research.

Ecological economics as a post-normal science is not striving to deliver truth or objective reality anymore (Funtowicz–Ravetz, 1993), much rather to seriously reflect upon the social and ethical consequences as well as values and ideologies of its works (Söderbaum, 1999). Democratization of knowledge, openness, self-reflectivity, awareness of one's assumptions, values and explicit statements, plurality of perspectives, continuous process of reflection, the presence of an extended peer-community who take part in the quality assessment of information (Funtow-

icz–Ravetz, 1994) in the research process and in the production of scientific knowledge as well, are considered to be the most important elements of post-normal science (Müller, 2003; Tacconi, 1998; Funtowicz–Ravetz, 1994).

Ecological economics in its ideal for a sustainable society is committed to the political model of deliberative democracy (Prugh et al., 2000; Söderbaum, 2000; Costanza et al., 1997; Gowdy, 1994). Many authors offered new epistemological standpoint for ecological economics (Tacconi, 1998; Norgaard, 1994; Funtowicz–Ravetz, 1993). O' Hara (1996) has introduced the idea of discourses and discursive ethics to the field of ecological economics and environmental evaluation, while Meppem similarly, has brought communicative approaches to ecological economics (Meppem–Bourke, 1999; Meppem–Gill, 1998). Aldred and Jacobs (2000) have offered Citizens' Jury, another constructive methodological proposal for ecological economics. In contrast to neoclassical environmental evaluation processes (particularly contingent valuation method), citizens' juries are derived from the ideals of deliberative democracy. Although ecological economics favours empirical enquiries based upon extended peer community, including people affected by a particular issue, it certainly has paid much less attention to power relations, reproduction of social inequalities, participation and social interaction (Radcliffe, 2004; DeFilippis, 2002; Kapoor, 2002; Söderbaum, 1999).

From the perspective of the common ground of ecological economics presented above, one has to face the rather disturbing state of affairs that only a few empirical studies reflect clearly these theoretical underpinnings, "core beliefs" of ecological economics (Røpke, 2005, p.6.) and state explicitly values and ideology (Söderbaum, 2000), motives, assumptions, in their problem definition, in their scientific, pragmatic and political goals and ways of conducting empirical research.

### Constructive participatory methodology

The task of understanding how complex ecosystems and socio-economic activities interrelate required a transdisciplinary research approach. The research combined the existing disciplinary tools and concepts through forming of interdisciplinary cooperation between ecologists, economists, sociologists, anthropologists, aiming to build a platform of shared theoretical and methodological knowledge.

The research team used a hermeneutic-constructive approach which aims to facilitate better understanding of the social, economic and ecological phenomena within the researched community (Tacconi, 1998). This paradigm also implies that local perceptions, reality constructs, belief systems, mental models not only created through people's mind, but through reflective actions of their communities (Braun, 2002; Reason, 1994). It offers a Participatory Action Research (PAR) methodology with several traditions of participatory research approaches, theories and practice that empowers local people and facilitates social learning. In the case of PAR, theory emerges inductively from practice and reflects on what works and what not (Chambers, 1994). Its twofold objective is to produce useful knowledge and action through research, adult education and socio-political action, on the one hand; and to empower people through the process of constructing and using their own knowledge, on the other hand (Reason, 1994).

Throughout the appreciative research process, rather than directing or controlling the research process, the role of researchers is that of facilitators, offering participants an opportunity to think about the future of their communities (Balázs et al., 2005). The Appreciative Enquiry approach entering community-development from the business and management research (Ludema et al., 2001) is directed towards identifying what works

in a community and how to do more of what works. Instead of problem-oriented methods that are searching for external help and entrenching a sense of dependency in that community, achievements, existing strengths and local capabilities were assessed in an attempt to "create our sense of reality" by the power of language and discourse (Braun, 2002).

The emergent research design with a continuously evolving and developing conceptual framework through the fieldwork was used to be able to become "receptive to local idiosyncrasies" (Miles–Huberman, 1994). Qualitative research methods – including in-depth interviewing, appreciative enquiry, direct observation and participatory transact walk – were applied in order to explore, understand and be engaged with the subject matter of the research. Data analysis proceeded in an inductive fashion, avoiding forcing a priori theories to fit in this specific context. Finally, the application of participatory methods enabled the research team to negotiate the outcomes of the research with local people whom the data were derived (Tacconi, 1998).

### The promise of deliberative democracy

The road to global sustainability is leading through the political activity of local communities. A sustainable society requires strong democracy, wherein the different social, governmental aims and the necessary processes for reaching these aims are generated in community-based discussions involving the largest possible amount of people with an equal standing with experts (Prugh et al., 2000).

Deliberative democracy promises that the democratization of procedures, planning and development will lead to the common good, as in the deliberation process participants are more likely to go beyond their individual interests (Wilson–Howarth, 2002) or perhaps change their attitude and values

through collective actions. Building strongly on the fairness of processes, communicative rationality, the open discourse of equal parties, deliberative democracy enhances understanding between various parties on various issues and the articulation of different values, interests and perceptions. The procedural norm of discursive ethics accepts and creates space for free and open debates, with well-informed mutually recognized, and accepted participants (O'Hara, 1995).<sup>1</sup>

The community forum in Mez\_csát aimed to create a ground for a "deliberative arena" (Renn et al., 1995; Barber, 1984) being structured and assisted by the researchers as facilitators. Based on the principles of discursive ethics (O'Hara, 1996), representatives of key stakeholder groups could start to discuss and share their ideas about the possible visions of their micro-region.

### Social learning

The application of PAR methods implies that the research is conceptualised as a process of mutual learning. This co-construction means the recognition of self-referentiality, that is the critical awareness of being part of the researched system (Norgaard, 1994) and a commitment to local knowledge instead of scientific/expert knowledge. The ideals of endogenous development and giving voice to traditional communities (O'Hara, 1995) as well as traditional ecological knowledge, therefore, were taken seriously throughout the research.

Effective actions for change are the products of knowledge, experience and practice (Chiu, 2003). Participatory approaches emphasise the importance of experiential knowing. The aim of PAR methodologies is that, beyond an increase in understanding, a learning-approach of different knowledge types is generated at a social level leading to concrete and constructive action. In this sense, the research component of action research

is a tool for action, too, not an end in itself. For knowledge generation, participatory processes are required to involve and evolve stakeholders perceptions and values through learning.

Learning here is understood as the "accumulation of insights into system cause and effect by all those interests in a decision or an issue," wherein learning is a never-ending process. (Meppem-Gill, 1998). In the learning process, guaranteeing the quality of the process of decision-making, the real participatory nature of the process is what counts more than the concrete outcome of the process (Ramos-Martin, 2003; Meppem-Gill, 1998; O'Hara, 1995). Learning as active listening to each other is about how we learn, by whom and for whom. Learning should be taking place putting people's priorities first (Chambers, 2000), inclusive of all stakeholder interests, values and perceptions with particular attention to those who are in a marginal position, in our case roma ethnicity, poor villagers and women. Still, this wide range of stakeholders should be allowed for "being affected by not privileging some knowledge" (Meppem, 2000). Social learning must be amplified with empowerment of communities; communities should be made responsible for making decisions about their life (Shrivastava, 1995) especially in an area, where "upward-looking", seeking external help is an integral part of everyday survival.

In the light of the pluralism and multiple paradigms behind Ecological Economics we do not claim that an Ecological Economics empirical analysis could only follow one research methodology, nor we want to prove that we have got our participatory research process fully right. In the following, we turn to practical examples of research methodologies, structures, approaches, processes derived from the framework of Ecological Economics that might support and ensure effective community participation and problem-orientation.

### South-Borsod Floodlands – the study area

The current rural policy in Hungary is a centralised, sectoral and top-down approach leading to the exclusion of local resources, initiatives and local participation from development processes in general. As a consequence of the EU rhetoric on sustainability and participation, domestic policies will hopefully give more attention and support for a participatory rural development approach.

Since the fall of 2003, a participatory rural development project have been being implemented in the South-Borsod Floodplain by researchers from 6 Hungarian universities.<sup>2</sup> The key element has been to engage local communities in the development and implementation of a shared vision and strategy in a manner that reflects the needs, concerns and aspirations of the community.<sup>3</sup> The study site is situated in the Borsodi Mez\_ség Environmentally Sensitive Area, which is an ideal landscape for studying human-social-ecological systems interactions. This natural setting of the research helped to understand local realities and interactions among nature, economy and society in their own context. The historical relationship between nature, society and economy has gone through considerable changes in this particular landscape for the past couple of decades. From the interviews and a focus group discussion on the relationship of local people with water, it has become clear that these formerly interdependent three systems have got separated from each other, and seemed to have needed reconnections, re-linking. Disconnectedness of local nature, society and economy was identified as a general problem of ruralities and the main focus of our research. However, the specific problem perceptions, possible solutions and visions were to be identified by the local people using or tailor-making various participatory methodologies depending on the characteristics of the problems (Balázs et al., 2005).

According to the official classification of regions, the Borsodi Mez\_ség region is located on the areas of the Borsod floodlands small region and the Borsod flatlands (Borsod richlands) small region. Our research focuses on the southeastern part of the region, along the river on the area of Borsod-Ártér (Borsod-floodlands) in the following villages: Négyes, Tiszavalk, Tiszabábolna, Tiszadorogma, Árokt

The villages are located in the floodplain of the Tisza River where the main characteristics of the landscape have been formed by water. Over centuries, local people settled along the river have developed tools and practices adapted to take advantage of the pulsing patterns of flood and drought. Along the river, people could harness the energy of floods by developing a special economy and culture in the floodplain. However, the logic of modern, industrial agriculture has conquered traditional polyculture and converted the diverse agriculture of a floodplain economy to the monocultures of wheat fields. A dike defence system was constructed as well as all natural water flow resources have been drained from the area. By eliminating the most important natural landscape forming force, all the ecological services which formed the basis of the economic activities of local people were also eliminated.

The region, along with inevitable decline of a collectivized industrial agriculture after the regime change in Hungary, has been spiraling downward into inescapable social and economic depression in the 1990ies. Unfavourable demographic conditions, ageing and shrinking population are due to the change in the availability of jobs. Death/birth ratio is the worst in this region, as compared to the same data for the whole county, Borsod-Abaúj-Zemplén. The villages of the South-Borsod Floodplain are officially designated as a most disadvantageous area of Hungary in economic and social terms with a significant Roma ethnicity in 3 villages. Furthermore, the minority-majority linkages

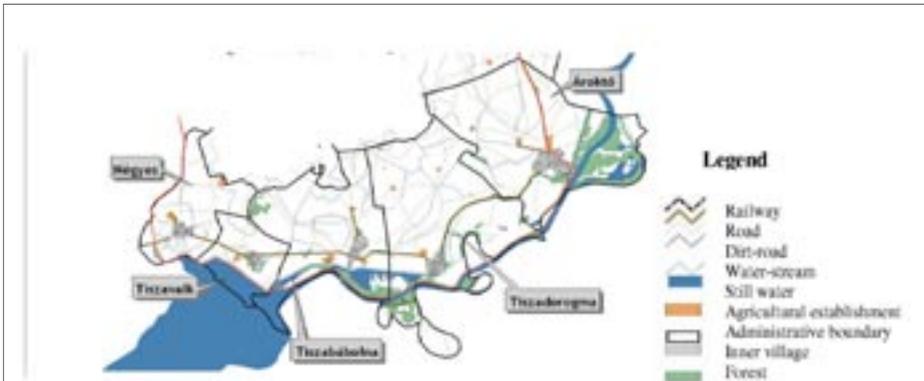


Figure 1 - Study Area (Source: GIS Studio at SIU-HELM)

are full of conflicts: in Árokt, a significant amount of people of majority blamed the Roma population for the village not being successful to becoming a rural tourist destination. The general stereotype of local people on the Roma people is that of too lazy to work and living on the benefits of the Hungarian social security system.

In 2002 the Environmentally Sensitive Areas (ESAs) scheme was introduced offering new contract-based incentives for the application of environment-friendly agricultural methods for a period of at least 5 years.

In 1998, 1999, and 2000 there were catastrophic floods on the Tisza River in Hungary. The last wave of floods threatened the entire Hungarian Great Plain with direct inundation. The recent serious flooding events experienced in previous years have demonstrated that new ways of water and wetland management is needed in order to move towards sustainability. Officially, two competing future scenarios exist for decreasing the risks of flooding. A technical water engineering one which would construct reservoirs along the Tisza River, or a wetland restoration one which prefers supporting an traditional extensive agriculture. According to the first scenario, reservoirs will prevent inundation from high water levels, in the event of a high peak flood wave. By contrast, with the wetlands restora-

tion scenario, flood waters will not be drained off quickly but will be spread over land and remain there as long as they are useful for ecosystems and for extensive agricultural practice. Railway Road Dirt-road Water-stream Still water Agricultural establishment Administrative boundary Inner village Forest

## The research process

PAR projects go through two main phases. One is the participatory appraisal and action planning phase, and the other is the participatory implementation of action, monitoring and evaluation phase. Action was considered an equally important phase of the project as the exploratory research component itself. However, we did not consider actions as a one-time event, but we have tried to design the action process as an ongoing process (Balázs et al., 2005). The following parts illustrate how a complex participatory rural development research project has been managed so far, and look ahead to the future activities. The "core beliefs" of ecological economics and participatory methodologies are illustrated with practical experience to provide feedback to theories and to identify what works and how in practice and what not.

### Appraisal and action planning

The initial step in the research process was a preparation for working in an interdisciplinary team of researchers through various self-organised workshops in order to help the diverse members of the research team to grasp each other disciplinary framework and build a platform of shared theoretical and methodological knowledge.

The second step was an extensive appreciative enquiry interviewing so as to create an empowering discursive situation between the researchers and members of local communities. A major objective of this stage of semi-structured interviewing was to uncover visions, the patterns and differences in local attitudes, problems, knowledge, perceptions, and values attributed to living in this particular landscape of Hungary. Positive stories and capabilities of the community were gathered from local people: local residents, including young people, old people, new inhabitants, women, men, etc., local farmers, teachers, micro-region managers, local government officials, local entrepreneurs. Key-informants were interviewed as well such as National Park or Water Management Authority officials, who had much access to information on most of the research issues based on their specific knowledge, experience, social status. Snowball technique was employed together with referrals and peer recommendations from local resource-users for identifying interviewees. The interviews – based on a flexible guideline – were conducted by pairs of researchers, whom were of different disciplinary background and generally of different gender to ensure diverse insights into the complex issues of the research area. The interview guideline focused on interviewees' individual perceptions exploring the natural environment, economic settings and societal relations of the particular community. The interview protocol ensured that the same information was gathered from all interviewees and

also provided flexibility to the interviewers to allow new topics to emerge.

Next, a more structured interviewing phase was designed so as to check whether and how actions can be carried out and support can be built for the proposed actions among local community members.

Altogether 126 interviews were conducted between December 2003 and February 2004 in the five villages. The length of the interviews was varying between half an hour to 3 hours, the average length of the interviews was around one and a half hour. Almost all of them were recorded to tape<sup>4</sup>, then a detailed interview summary was compiled for each.

Appreciative Enquiry (AE) type of questions had quite an added value to the research. AE questions encouraged interviewees to have positive reflections on their local traditions, such as basket weaving, matting, fishing, etc. and on their natural resources (Tisza river, local riparian forests, floodplain orchards, etc.). They could feel proud of their local values, such as clean streets, cultivated land, rare local plant and animals species, local celebrations. Local choirs, local NGOs, local books, folk dance groups, drama groups, local school and its teachers were valued highly. Interviewees could feel proud of their capabilities/skills – such as knowledge on traditional fishing practices, carpentry skills, or agricultural skills. AE questions encouraged local people to appreciate already existing local initiatives, such as the organising of a local trainband, or the cleaning up of a local lake; local heroes were named. In some cases, AE proved to be a powerful tool to make the interviewees think about their future, vision and dream. Important elements of these visions were the establishment and strengthening of local undertakings (“a new packaging factory”, “a free beach resort area”, “a new sewerage”, “thermal bath”, “new accommodation places for tourists”, “organising of transact walks for tourists

by local people", "more active participation in the agroenvironmental programs", and "establishment of local NGOs").

The answers to AE questions have shown that quite strong and diverse emotions are attached to the Tisza River. This river can still be considered as a place of high importance for local communities, with quite a significant place attachment. However, according to some of the interviewees, this place attachment seems to be somewhat lower now than some decades back and many people are only attached to their villages because of their family: they will more easily move away if there are no more relatives nearby. It seems that "outsiders" or weekenders tend to appreciate the value of nature much better than local people. The power of AE questions in initiating change and encouraging concrete actions was also visible in many interview situations: "If there were nature protection actions, and if I had the time, I would be glad to join you"; "It would be worthwhile to learn how to mat". In these interview situations, some elements of a new future could be constructed. In summary, many of these examples reveal that AE set the stage for finding stories that are empowering for local residents.

Though AE questions were not targeted to uncover problem areas, in many interview situations, local people raised unsolved, depressing issues. One important story of this type was the damage done by industrial agriculture (by breaking the co-evolutionary path of the landscape). The introduction of modern industrial agriculture (large-scale crop cultivation) required a dike defence system in order to divert all natural water flows from the area. Dam buildings in the 30ies and 70ies has resulted in aridity and secondary salinity in a major part of landscape. Through damming and flood protection embankments, the Tisza River lost its natural characteristics and huge areas of flood plains dried out. Therefore, traditional ecological

knowledge of local people was no longer valued since size of local wetland areas has radically shrank. Before the installation of the dike defence system, people could bath in the Tisza river; the banks of the river had been important community places, while afterwards, due to the high rise in the level of the water at many of the villages, this is not possible anymore. This way the villages have lost some community gathering places as well. The disappearance of water from the floodland areas resulted in the disappearance of ancient professions as they have lost their basic material inputs, such as swallow. Many local people were expecting the "uplifting" of the villages from the second dam construction project in the 70ies. However, these hopes were not fulfilled. Most of the interviewees considered the changes of the landscape, due to the second round of dam construction, as a big loss. The policy of the local water management authority gives place for some conflicts. The former areas of floodlands with fruit orchards now belonging to this authority are not taken care of and completely getting bewildered and destroyed ("not even wild boars are able to cross"). However, the need for the regeneration of floodplain orchards is still alive: some local people have the opinion that the cleaning up of floodplain orchards could be a good employment opportunity for many unemployed.

The relationship between the National Park and the local people is not without problems either. Most of the local people view the NP, on the one hand, as an authority which constraints their activity and the development of tourism and agriculture. On the other hand, many interviewees expressed their positive concerns about living in a nature protection area. Not surprisingly, the two most important reference points for "good old times" are the times before the installation of the dike defence system ("there had been so lovely maize and cabbage grown and

fish caught here”) and the “agricultural collectives“-times. The former is associated with the older people, whom were children in that time, the latter is by the middleage or older middleage people, whom learnt agriculture practices during the socialist era. The agricultural practices and knowledge of these two generations greatly differ: one is the agriculture of taking advantage of the pulsing patterns of flood and drought, and which is now only to be found in the memories and world views of elders (“...the wise peasant is missing, this group has become extinct”), while the other is more of an industrial agriculture. The first knowledge system developed over generations of experiences and observations with nature and naturally occurring resources within the very specific setting of the floodplain. Regeneration, discovery and acknowledgement of traditional ecological knowledge could be the basis of developing alternatives to recent natural resource management practices.

Many criticisms have been formulated by the interviewees concerning the everyday life of their villages (“even people’s morality is getting lower”), but still, passive and envy behaviour is reigning. Majority of local people accept their “destiny”, that their villages are not able to go one step ahead to stop spiralling downward to even bigger depression. The ability of local people to act is completely missing, blame is put on each other and on the local governments. Enthusiasm towards local celebrations is decreasing as well. Public participation in decision making is at a very low level.

The disconnectedness of nature, society and economy was especially visible in case of local children: although they live in a rural area, “they do not have a close relationship with local animals, plants at all.” Furthermore, due to the closure of some of the local schools, many children spend their school days outside of their

home villages, losing connections with them. This was one of the main reasons for organising “Nature Preservation Day” for local children together with local teachers and experts of the two nearby National Parks.

### Implementation phase

A group of researchers together with local teachers and experts of the two nearby national parks organised a “Day of Nature Preservation” for local children. Another group of researchers organised a community forum in order to bring local people together to share their visions and discuss possible actions within the micro-region.

In the following, the community forum will be presented in detail as the first concrete action of the project. By January 2004 the five villages in the research area with four other settlements have established the Mez\_csát Microregion.<sup>5</sup> Based on the decision of local mayors, the town of Mez\_csát was appointed as the leader of the micro-region, and the mayor of Mez\_csát was nominated as the head of the micro-region. During the interviews, it has become evident that there have been numerous reasons – such as the prospects of higher government regional development funding due to its disadvantageous economic and social situation – for this bottom-up initiative, but it has been clear as well that these settlements needed to prepare some kind of strategy for their common future. Therefore, our aim was to help to launch this process. Following the principles of discursive ethics (O’Hara, 1996), our proposal was that representatives of key stakeholder groups could start to discuss and share their ideas about the possible visions of their micro-region. Based on the idea of deliberative democracy, a community forum was planned to strengthen local decisions and empower local lay knowledge. The

community forum as a participatory method is able to create a ground for a “deliberative arena” (Bobbio, 2003; Renn et al., 1995; Barber, 1984) being structured and assisted by the researchers as facilitators. The presence of “outsider” facilitators and the participation rules laid down at the beginning of the forum were the tools used for governing participation and group interactions. Kapoor (2002) misses “systematic rules or legitimating force” governing participation in PAR processes. He questions for example that the facilitator could be enough for a “free and equal deliberation” (Kapoor, 2002, p.106.) as the facilitator is then granted a broad power and is considered as a “superior expertise”, which is against real deliberation. In this sense, facilitators can intervene in discussions and prefer certain participants to others. However, in our case the “non-decision-maker” participants did not feel intimidated by the formal authorities present.

The aim of the forum was that local people holding politically and socially significant positions – including mayors, local government representatives and the key personalities of certain micro-region initiatives – attend the forum and grasp the idea, as well as some technique of community-based, participatory development. It was also of primary importance to involve the representatives of those local or regional authorities, whose operations have a huge impact on the landscape and community viability, including particularly the two national parks.

The agenda of the forum followed the participatory model of “Vision to Action Forum” (VAF)<sup>6</sup> bringing together a broad range of members of the community to “assess their community’s strength and opportunities and to identify problem areas, to share ideas and hopes for their community’s future, and to shape and launch an action plan to achieve their specific goals”

(Clark, 2003, p.4.). VAF has three overarching goals: to strengthen community vitality, to build civic engagement and local leadership and to promote sustainable development. The most important outcomes of VAF are concrete “community projects” imagined by the community and published in a “Vision to Action Forum Report” distributed to all participants.

The original VAF approach had to be modified and tailor-made to fit the local conditions and needs. VAF is broadly inclusive and the most different groups of the community are present, while our idea was first to get key local decision makers and community leaders acquainted with the idea of participatory planning and community development and present in a half-day forum the most important methods and techniques of this approach to them. “Real” VAFs will be conducted in all villages of the micro-region only in a further step of the research.

During the VAF, four working groups were assigned to do one part of a SWOT analysis which presented a remarkably thorough analysis on their region in a relatively short time. Participants also identified visions which could be implemented with the fewest resources and voted on all visions. The preferred vision empowered local community to have local use of local lands, keeping most of the profit at local people. Many votes have been received by visions in connection with nature protection and the use of ecosystem functions in balance with nature, such as rural tourism, local food-manufacturing, regeneration of floodplain orchards, etc.

The 20-page summary report with the results of the forum was distributed to the participants and the local governments of the micro-region. In the local government offices’s, the report was made available to other local people as well, who did not attend forum. The report contains all background information on the forum, in-

cluding the programme and the outcome of the exercises of the forum, pictures, the address of the participants, etc.

The participants were very active all along the forum and despite of the high level of pessimism in the microregion, plenty of good examples and memories of a healthy community were expressed by them. For many of the participants, this was the first time to be publicly heard, and the first real opportunity to listen to the colleagues in the nearby villages. The forum helped to make the participants see themselves as a stronger community, which is able to make changes and helped them to realise their strengths and opportunities, which were thought to be hidden or non-existing. The forum was an ideal tool to mobilize socio-cultural and economic networks; networks of communication, co-operation and co-ordination. Such networks can represent enabling opportunities and help to have local control over local resources, initiate social learning, contributing to sustainable development of the region.

The research team is now in another phase of self-reflection not only to analyse data and experience gathered and gained so far, but to reflect upon the roles they have taken during the research. Further exploration is needed whether the transcript/report of the forum as a collective product turned out to be a useful tool in supporting further reflections about the future of the micro region and/or the villages or facilitating any further actions (Balázs et al., 2005).

As a next step, a capability assessment would help to identify all local resources and skills through which the common vision comes to reality and on which the concrete actions and projects can be built. Capability assessment is a tool to map the traditionally ignored "gifts", that is skills and non-economic abilities of residents, which may contribute to development. Some villages already requested very similar type of fora on a village level. One of

the research team's aim for the near future is to help these communities in organising these fora.

## Conclusions

The research project has already gained valuable experience in the way that is good for examining the interactions between ecological and human systems and for creating a vision for a sustainable future of the community. Our initial results suggests that participatory and democratic aspirations behind action research are much harder to achieve in practice than in theory. We have been able to make some interesting methodological observations concerning participation, which can help to prepare participatory action research plans in the future.

### Participation and direct democracy in practice Research design.

The main concern of participatory processes is who initiates the process, who would be responsible for the definition of the research question/research problem and for the design of the research. In our case, the research process was initiated by the interdisciplinary research team, implemented together with local people without giving them any role in determining research methods and research design. Still, the concrete actions truly reflected the problems identified by local people.

### Handling over the stick to locals.

Strong value commitments towards nature conservation and sustainable development made it especially hard for ecologists to stay back in the role of a "facilitator" (Chambers, 2000), not dominating neither the research process nor local people. Our task of being facilitators was to establish adequate conditions for a learning environment, where the future development and planning concerns are generated through a community level discourse process. The facilitators can neither determine nor

influence the outcomes of this process, even if the results of this process and decisions are not in line with their values, expectations, scientific background or strong commitment to sustainability, etc. Social learning must be amplified with empowerment of communities made responsible for making decisions about their life (Shrivastava, 1995). Experiencing the consequences, the institutionalised social learning process can provide opportunities to adjust development plans or planning concerns in case values or preferences changed through open debates. Therefore, the discursive process has to ensure and include reflexivity, the handling of unexpected consequences/impacts and anticipation of possible impacts on a community level. Still, the results of the interviews and the community forum suggest that the vision of a local community to have local use of local lands, keeping most of the profit at local people was popular.

#### **Rapport building.**

Interview situations were new to rural residents, therefore successful rapport building with the local people was crucial for a good interview and for the whole research process. Local people did not consider our presence as a "one time shot", and with their active participation in the forum they have expressed their trust towards the research team.

#### **Combining local and expert knowledge.**

The universities brought theoretical and technical knowledge and research expertise into the research process, which was then successfully combined with the knowledge and the other assets of the local people: local people started to get engaged in a social learning process through the community forum organized by the researchers, while researchers gained precious insights into local ecological knowledge. However, researchers were sometimes "given" or "charged with" the status of experts, as their knowledge was esteemed

higher by local people than the knowledge of local people. Researchers needed to be aware of this inequality and at the same time were trying to underplay their role as members of academia. Indigenous ecological knowledge of elder people is not anymore culturally embedded in the local knowledge systems; it is appearing less and less in a collective form of community-level (shared) knowledge. The transfer of indigenous knowledge to future generations is not assured, so possible future actions might be oriented towards this issue.

#### **Local capabilities.**

It has become clear that local people are very much able to analyse their own situation, to clearly reflect on their lives, to understand their own problems and opportunities. Those opposing or being skeptical about participatory processes in Hungary often claim that it is difficult to address and involve the different groups of local people in participatory processes, adding that Hungarian society and local communities are not yet ready and prepared enough for democratic processes, like the one presented in this article. The community learning environment of the forum empowered people to do much of their own analysis and community planning, and cooperate in an unexpected situation and in a new environment. Nevertheless, the discursive processes and direct democratic institutions or mechanisms of deliberative democracy, such as a community forum, can only be strengthened and learnt when continuously practised.

Diversity and working together. Diversity of values, perceptions, exceptions is a main principle of PAR. A lesson learnt during the community forum is that it is difficult to retain and recognise a sense of community diversity meanwhile there is a need for working together and producing a summary report for action. The exercise of seeking consensus risks simplifying diversity (Kapoor, 2002), "silencing"

or “excluding some community voices” (Kapoor, 2002, p.109.).

Expectations and responsibility. Local people are brought into a process in which expectations might be raised and then frustration might arise if there are no actions or follow up results. To avoid these, researchers needed to be transparent about their intentions and be aware of their social responsibility toward the community. Due to temporary lack of financial resources, the research had to be stopped for quite a long time, which was hindering further common action. The damages will be seen only when research continues.

**Time-intensity.**

Participatory approaches take a lot of time and efforts; the mutual learning process is time-consuming. Researchers have to spend great deal of time on listening to the local people and understanding their priorities, problems, visions. This can assure flexibility being always in response to local ideas and allowing local people to gradually become more and more involved in the social learning process. Even in a strong rural community many conflicts might arise: ethnic, social class, etc.

**Power relations.**

Each of the several social groups within a territorial community is likely to see its own situation from its own perspective, and power relations between them need to be explored. Lack of time might result in a failure to reveal power relations, the different perceptions of reality, local dynamics, and hierarchies. Issues of entrenched power and power structures, such as local government’s, water management authority/s, National Park’s, Roma population’s should not be dismissed, structural inequalities and power dynamics within the community must be managed in a careful manner. “Meaningful community change involves redistribution of power, authority and influence

in decision-making processes” (Schafft– Brown, 2003; DeFilippis, 2002). One of the difficulties of power issues lies “in the systematic checking of arbitrariness and power inequalities” (Kapoor, 2002, p.110.). The self-critical epistemological awareness (Chambers, 2000) embodied in doing participatory research should be extended to power relations both within the local communities in question and between researchers representing academic institutes and local lay people. The research group should find time for itself to reflect more not only on the working of PAR techniques, but as suggested by Kapoor (2002) also on discussing the theoretical assumptions behind them, and broader issues, such as localism and the role of power in PAR projects.

**Methodological conclusions**

**Design of the research process and research team.**

A lot depends on how the research process is organised in an interdisciplinary research team, and how the research team itself is organised; how it is able to work as a team with researchers of different disciplines. One of the biggest conflicts in the research team have arisen apparently between the natural and the social scientists. The former have not been familiar and been used to “emerging” research design and were expecting a much more tighter and pre-structured research process. This conflict forced both disciplines to face its roots. Disciplinary conflicts such as this need to be brought up to the surface as suggested by Söderbaum (1999) and handled constructively. Enough time and occasion should be left for getting insights into each other’s disciplines. However, a great deal of diverse information was generated this way and the different disciplines could sort them out, understand, and interpret them quite effectively. In this way, the disciplinary biases when each professional

might seek for information from his/her point of view could be better eliminated.

### Mixed methods PAR and AE.

The methods used need to be assessed in relation to the objectives of the project and the context in which they were applied (Røpke, 2005; Ramos- Martin, 2003). When the research focus is complex and broad just as in our case, qualitative research techniques can be used together in mixed-methods studies to provide more information than could be obtained by using either one alone. The adoption of PAR has proved to be a dynamic, non-standardised and flexible methodology, which helped the researchers to adopt to real-life situation as the research was unfolding. Admittedly, the use of AE has been difficult during the interviews: AE questions received a bunch of complaints as answers. However, AE questions certainly have helped a lot to bring up many positive feelings, ideas, visions to the surface. We can only hope that even by simply asking AE type of questions we have managed to achieve a little change. Certainly, AE worked much better during the community forum, where it has evolved to a more participatory and people centred approach than in personal interviews.

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### Footnotes

- 1 When used in ecosystem evaluation, the role of a discursive process is to help the community to learn about and articulate values and preferences for certain ecosystems goods and services (Wilson-Howarth, 2002)
- 2 The interdisciplinary undertaking comprised of the Institute of Environmental and Landscape Management, St. István University, Gödöllő together with the Faculty of Law, Pázmány Péter Catholic University; the Water Engineering College, Baja; Department of Plant Taxonomy and Ecology, ELTE University; College for Social Theory, Budapest University of Economic Sciences and Public Administration; Department of Anthropology, University of Miskolc. Part of the research team was already familiar with this area due to a research conducted there in summer of 2002 on the economic evaluation of natural capital of environmentally sensitive areas, on the relationship of local people and wetlands, and on the impacts of the Hungarian agro-environmental payment scheme.
- 3 The micro region in question is not totally unfamiliar with bottom-up initiatives since in the mid-90ies it has established a civil association for rural development and initiated a planning process involving local opinion leaders. However, failing to raise sufficient amount of financial resources, this initiative lost its credibility among people, and could not go beyond a kind of wishful thinking. The failure was partly due to insufficient mobilising of local resources and capabilities and too much waiting and hoping for external financing. Therefore, this time an emphasis was put on local capabilities and a community based, participatory planning process has been initiated.

- 4 Except for the cases where the interviewee did not feel comfortable with tape-recording. In these cases the interviews were recorded by taking extensive notes
- 5 Microregion is the smallest level of regional development policy and funding in Hungary, a „NUTS 4-level“ according to the terms of the European Union regional policy.
- 6 VAF is developed by the Vital Communities and Antioch New England Institute drawing on models developed by the Cooperative Extension Services of the Universities of Vermont and New Hampshire. The forum process has proved to be successful in many communities in the United States and Central Europe.

## References

- Aldred, J. and Jacobs, M., 2000. Citizens and wetlands: evaluating the Ely citizen's jury. *Ecol. Econ.*, 34:217-232.
- Balázs, B., Bela, Gy., Bodorkós, B., Milánkovics, K. and Pataki, Gy., 2005. Preserving Bio- and Socio-diversity through Participatory Action Research. *Living Knowledge: Int. J. of Community Based Research*, 5:11-13.
- Barber, B., 1984. *Strong Democracy. Participatory Politics for a New Age.* University of California Press, Berkeley.
- Bobbio, L., 2003. Building social capital through democratic deliberation: the rise of deliberative arenas. *Social Epistemology*, 17: 343-357.
- Braun, A., 2002. Beyond the problem-solving approach to sustainable rural development. Draft, Paideia Resources.
- Chambers, R., 1994. The origins and practice of participatory rural appraisal. *World Development*, 22:953-969.
- Chambers, R., 2000. Us and them: finding a new paradigm for professionals in sustainable development. In: D. Warburton (Editor), *Community and Sustainable Development, Participation in the Future.* Earthscan Publications, London, pp. 116–147.
- Chiu, L.F., 2003. Transformational potential of focus group practice in participatory action research. *Action Research*, 1:165–183.
- Clark, D., 2003. *Community Vision to Action Forums: An Organizer's Guide to Participatory Planning.*
- Costanza, R., 1989. What is ecological economics? *Ecol. Econ.*, 1:1-7. Costanza, R., 2001. Visions, values, valuation and the need for an ecological economics. *BioScience*, 51: 459-468.
- Costanza, R., Cumberland, J., Daly, H., Goodland, R. and Norgaard, R., 1997. *An Introduction to Ecological Economics.* St. Lucie Press, Boca Raton, Florida.
- DeFilippis, J., 2002. The myth of social capital in community development. *Housing Policy Debate*, 12:781-806.
- Funtowicz, S.O. and Ravetz, J., 1993. Science for a post-normal age. *Futures*, 25:739-755.
- Funtowicz, S.O. and Ravetz, J., 1994. The worth of a songbird: ecological economics as a post-normal science. *Ecol. Econ.*, 10: 197-207.
- Gowdy, J.M., 1994. *Coevolutionary Economics: The Economy, Society and the Environment.* Kluwer, Boston.
- Gowdy, J.M. and Erickson, J.D., 2005. The approach of ecological economics. *Cambridge J. of Econ.*, 29:207-222.
- Jenkins, T.N., 2000. Putting postmodernity into practice: endogenous development and the role of traditional cultures in the rural development of marginal regions. *Ecol. Econ.*, 34:301- 314.
- Kapoor, I., 2002. The devil's in the theory: a critical assessment of Robert Chamber's work on participatory development. *Third World Quarterly*, 23:101-117.
- Ludema, J., Cooperrider, D.L. and Barrett, F., 2001. Appreciative inquiry: the power of the unconditional positive question. In P. Reason and H. Bradbury (Editors), *Hand-*

- book of Action Research. Sage. London, pp. 189-199.
- Miles, M.B. and Huberman, A.M., 1994. *Qualitative Data Analysis: An Expanded Sourcebook*. Sage, London.
- Meppem, T., 2000. The discursive community: evolving institutional structures for planning sustainability. *Ecol. Econ.*, 34:47-61
- Meppem, T. and Bourke, S., 1999. Different ways of knowing: a communicative turn toward sustainability. *Ecol. Econ.*, 30:389-404.
- Meppem, T. and Gill, R., 1998. Planning for sustainability as a learning concept. *Ecol. Econ.*, 26:121-137.
- Müller, A., 2003. A flower in full blossom? Ecological economics at the crossroads between normal and post-normal science. *Ecol. Econ.*, 45:19-27.
- Norgaard, R.B., 1989. The case for methodological pluralism. *Ecol. Econ.*, 1:37-57.
- Norgaard, R.B., 1994. *Development Betrayed: The End of Progress and a Coevolutionary Revisioning of the Future*. Routledge, London.
- O' Hara, S.U., 1995. Valuing socio-diversity. *Int. J. of Social Econ.*, 22:31-49.
- O' Hara, S.U., 1996. Discursive ethics in ecosystems valuation and environmental policy. *Ecol. Econ.*, 16:95-107.
- Proops, J.L.R., 1989. Ecological economics: rationale and problem areas. *Ecol. Econ.*, 1: 59- 76.
- Prugh, T., Costanza, R. and Daly, H., 2000. *The Local Politics of Global Sustainability*. Island Press, Washington, D.C. and Covelo, California.
- Ramos-Martin, J., 2004. Empiricism in ecological economics: a perspective from complex systems theory. *Ecol. Econ.*, 46:387-398.
- Radcliffe, S., 2004. Geography of development: development, civil society and inequality – social capital is (almost) dead? *Progress in Human Geography*, 28:517-527.
- Reason, P. and Bradbury, H. (Editors), 2001. *Handbook of Action Research. Participatory Inquiry & Practice*. Sage, London. Reason, P., 1994.
- Three Approaches to Participative Enquiry. In: N.K. Denzin and Y.S. Lincoln (Editors), *Handbook of Qualitative Research*. Sage, London, pp. 324–339.
- Renn, O., Webler, T. and Wiedemann, P. (Editors), 1995. *Fairness and Competence in Citizen Participation. Evaluating Models for Environmental Discourse*. Kluwer, Dordrecht.
- Røpke, I., 2005. Trends in the development of ecological economics from the late 1980s to the early 2000s. *Ecol. Econ.*, (forthcoming)
- Schafft, K.A. and Brown, D.L., 2003. Social capital, social networks, and social power. *Social Epistemology*, 17:329-342.
- Shrivastava, P., 1995. Democratic control of technological risks in developing countries. *Ecol. Econ.*, 14:195-208.
- Söderbaum, P., 1999. Values, ideology and politics in ecological economics. *Ecol. Econ.*, 28:161-170.
- Söderbaum, P., 2000. *Ecological Economics*. Earthscan, London.
- Tacconi, L., 1998. Scientific methodology for ecological economics. *Ecol. Econ.*, 27:91-105.
- Wilson, M.A. and Howarth, R.B., 2002. Discourse-based valuation of ecosystem services: establishing fair outcomes through group deliberation. *Ecol. Econ.*, 41:431-443.

PARTICIPATORY TOOLS

# DIALOG : Quebec Network on Native Questions. A New and Innovative Alliance Between Universities and Aboriginal Communities

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**D**IIALOG - Le réseau québécois d'échange sur les questions autochtones brings together researchers, students, practitioners, community actors and analysts from the academic milieu, practice settings, governmental agencies and Aboriginal organizations. These diverse actors share the goal of deepening, diversifying, disseminating and renewing research on Aboriginal peoples. DIALOG currently has more than seventy members, including researchers affiliated with eighteen universities, eight of which are in Québec, five in Canada, three in South America and Mexico, and two in Europe. They encompass thirteen academic disciplines, and are active in the Americas, Europe, Asia and Oceania. Dialog, launched in 2001, was officially recognized in 2003 as a Strategic Cluster, when it received a 4-year grant from the Fonds Québécois de Recherche sur la Société et la Culture (FQRSC).

## Indigenous peoples studies as a field of scholarship

In Québec and in Canada, the study of Indigenous peoples now encompasses a wide range

of intellectual and analytical challenges. By the same token, it also offers researchers unique opportunities to increase the social relevance of their work and to participate in the transformation of knowledge and society:

- As a field of scholarly endeavour, Indigenous peoples studies now cuts across all the social sciences and humanities. For decades, anthropologists were almost exclusively responsible for the bulk of the scholarship on Indigenous peoples. Today, researchers in a variety of other disciplines including law, political science, history, geography, sociology, linguistics, education, environmental studies, management and literature also contribute to the field in significant ways.
- Indigenous peoples studies are an integral part of the history and transformation of humanity. In a time of accelerated change and multifaceted globalisation, Indigenous peoples studies provide an intellectual space within which issues such as the relationship between peoples and states, cultural diversity, identity politics, and the sociopolitical

coexistence of different forms of knowledge can be better formulated and understood.

- In the wake of the Royal Commission on Aboriginal Peoples in the 1990ies and recent developments in the quest of First Nations and the Inuit for self-government, Indigenous peoples studies have become a field of research both of increasing popularity, attracting widening cohorts of Indigenous and non-Indigenous students, and of intensifying diversity as research topics and themes keep expanding.

From a structural perspective, these different aspects are engendering four main challenges: to build bridges between various disciplines whose tradition of research in the field of Indigenous peoples studies is still fairly recent (except in the case of anthropology), and to work in so doing toward the elaboration of a truly transdisciplinary project; to bring together dispersed and isolated bodies of knowledge and data sets; to disseminate all the relevant scientific production on a larger scale and reach out to all who can make profitable use of existing information; and, to renew the intellectual foundations of the field of Indigenous peoples studies and consolidate its presence in university curricula.

In addition to these key challenges, there is another one, which, in some respects, is even more fundamental. As Indigenous peoples have come to take their rightful place in the production of knowledge over the past decade-as knowing subjects rather than as mere objects of knowledge-Indigenous communities and their representative organizations have been insisting on monitoring, or on being active participants in, many of the research projects that concern them. This situation represents in and of itself a significant challenge that requires a number of changes in the way research on Indigenous

peoples is carried out. These changes must include:

- A serious evaluation of ongoing practices of interaction between researchers and Indigenous peoples as well as an in-depth reflection on the conditions of participation of Indigenous peoples in the research process.
- A reformulation of existing conceptual frameworks, of current research practices and of the ways in which research results are applied.
- The creation of some form of interface that can link the social sciences and the natural sciences with a view to developing a broader and more accurate understanding of the realities experienced by Indigenous peoples.
- A greater recognition of the contribution of Indigenous peoples studies to the advancement of knowledge both in the social sciences and the natural sciences.

### **DIALOG as a scientific and social response**

Such a situation reinforces the need to develop new tools for research and dissemination targeted to Aboriginal organizations and communities, to expand links between the various actors involved in research, and to set up new spaces for discussion, exchange and collaboration, the scope of which must be at once national, intercontinental and international. In other words, we now need to collectively reflect on the theoretical, epistemological, methodological and ethical issues inherent in this field of study.

Inherent in the very structure of a network is a creative, dynamic and essentially stimulating impetus towards the enhancement of knowledge, professional relations and interpersonal ties. A network is both a meeting place and a

platform. Its richness and strength in fact lie in its individual members and in the knowledge and capacities that each person brings to the network. In the field of Indigenous peoples studies, this approach to sharing, pooling and interrelating has proven especially effective in helping to bring societies and cultures closer. The network operates in a transversal fashion. Through its very structure, it encourages openness; it is outward facing. DIALOG calls upon personal capacities that are vastly strengthened by the fact that they are part of a collective undertaking. Consequently, DIALOG provides to its members and partners :

**A crossroads for interaction and capacity building**

Across Québec, Canada, the Americas, Europe and the Pacific, DIALOG provides a forum whose primary function is to encourage the gathering of everyone involved in research on, about and with Indigenous peoples, regardless of their approach. DIALOG is thus designed as a rallying point, both virtual and real, for all of its members whatever their background. It is intended to serve as a liaison between individuals and organizations, to stimulate the exchange of information and to help to coordinate activities. DIALOG is emerging as an innovative space for a new kind of professional and institutional engagement that focuses on strengthening collaborative initiatives and encourages the development of new forms of solidarity between academic and Indigenous communities.

**A stimulating environment for training and knowledge sharing**

Given the growing numbers of students and the multiplicity of research interests and disciplinary practices, we now need to look at training researchers in focusing on issues related to

Indigenous peoples in a different light. New, multidisciplinary teaching approaches, increased student participation in research and discussion activities, and training programs and interactive seminars held in Indigenous communities are but some of the avenues that are currently being explored and that are likely to stimulate learning, the exchange of information and the development of skills.

**A way to revive and refocus the public image of research**

Research is often disregarded or considered with suspicion within Indigenous communities. It is essential that new and original forms of research partnerships with Indigenous peoples be developed and implemented. As governments seem more prepared to address the concerns of Indigenous peoples and international organizations are more sensitive to their demands (as evidenced by the setting up of international conventions and global working groups), it is crucial that the growing and significant need for good, efficient, targeted and relevant research be satisfied.

**An opportunity to contribute to the renewal of research**

A number of challenges are presently facing Indigenous peoples: the quest for identity and self-government, the renewal of internal governance, the establishment of a new dialogue between the Indigenous peoples of the Americas, land claims, the erosion of ancestral knowledge, and the marginalization of Indigenous women and youth within the political, social and economic spheres of their communities. All these challenges raise a number of multifaceted and complex interrogations. Sharing the concerns underscoring these interrogations, exploring new research paths in response and forging

new ties between actors involved in the field provide fascinating opportunities to renew and further advance knowledge.

**A means of creating suitable conditions for maintaining a constructive and innovative dialogue**

Suitable conditions for a lasting dialogue will only emerge through concerted action and the impression shared by all that they are involved in the process as respected and equal participants. To last, innovative dialogue must also be nurtured through the unwavering will of concerned parties to engage constructively and enduringly with the other.

**A mode of access to new services**

The network facilitates access to new tools for researchers and Indigenous organizations. For example, by showcasing its members' work, DIALOG acts as an information gateway to ongoing, Québec-based research on issues related to Indigenous peoples. This information gateway, which includes the scientific production of Québec researchers as well as that of Canadian and foreign researchers on Indigenous realities in Québec, can be a very useful reference tool for all interested in scholarship on Indigenous peoples, whether they are active in universities, in government or within Indigenous communities.

**A showcase for the world**

The growing political salience of Indigenous peoples-state relations in Québec in recent years has mobilized an ever-increasing cohort of researchers who have developed a keen interest in broadening an understanding of issues related to Indigenous peoples. As a result, Québec researchers have developed a solid expertise and an original outlook on a variety of topics including Indigenous knowledge, history, transnational

collective action and intercontinental alliances, Indigenous governance and the social impact of modernity. They are remarkably well positioned to foster Indigenous peoples studies as a field of scholarship. However, their work still remains little known within the Canadian scientific community and outside Canada. By joining together within a network, they can better promote their work and forge ties with other researchers outside Québec, and enhance the exposure of their efforts at intellectual rapprochement with Indigenous peoples.

**INFRASTRUCTURES**

# Centre for Knowledge Transfer: A Digital Look at the Centre for Knowledge Transfer at Tilburg University

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## Introduction

In this workshop, we would like to show how the Tilburg Centre for Knowledge Transfer helps the Science Shop and the Small and Medium-sized Enterprises (SME) Office to perform their mediation tasks in a high-quality fashion. The Centre for Knowledge Transfer was established in 2002 with two departments: the Science Shop for social knowledge transfer to the not-for-profit sector and the SME Office for knowledge transfer from the university to small and medium-sized businesses. The main task of both the Science Shop and the SME Office is to mediate in research projects between society and small and medium-sized enterprises, respectively, and the university. Having matched a researcher and a client, the Science Shop focuses on supervising the research process and on publishing its results. The SME Office, besides matching researchers and clients, focuses on acquisition of research assignments and on matching demand in cooperation with the university's student societies.

In recent years, we have devoted a lot of energy to improving our services, partly by developing a large number of instruments such as guides, scenarios, manuals, procedures and software. For each aspect of mediation, ranging from social research questions to research ques-

tions deriving from small and medium-sized enterprises, including the preconditions for such mediation, we have developed instruments that aim to guarantee a constant and high-level service quality.

In this workshop, we will be presenting our vision of quality policy with reference to the work of the Science Shop and the SME Office. We will also outline the instruments we have developed to sustain such quality policy with regard to knowledge transfer in both social and commercial fields.

## Vision of quality policy

The quality policy of the Centre for Knowledge Transfer at Tilburg University centralizes four adjectives:

- 1 client-oriented;
- 2 transparent;
- 3 systematic;
- 4 proactive.

These four concepts are guiding principles in our work and a framework for designing our processes and choosing between alternatives. Below, we will highlight these four concepts.

### Client-oriented

It may seem like stating the obvious to say that a Centre for Knowledge Transfer should

be client-oriented, but even so the concept is in need of some clarification. Client-orientation, firstly, does not just refer to our clients who commission research assignments but to all people and organizations the Science Shop and the SME Office are dealing with: student researchers, supervisors, etc., may also be considered clients of the Science Shop and the SME Office. Secondly, being client-oriented goes way beyond the centre's readiness to mediate research projects for social organizations and small and medium-sized enterprises. In one's entire performance as a mediator and at every stage of research project mediation, you need to be aware of the necessity of client-oriented action. You should not only be receptive to signals coming from clients, student researchers, dissertation coordinators, etc., but you should also put yourself in the positions of these people and their needs at any point in the mediation process. Telling a client about the progress of a research project when they phone up is far less client-oriented than producing regular interim progress reports for clients at your own initiative.

### **Transparent**

Our clients often have a fuzzy idea of the university. They do not know exactly what is being done there nor how. Students and their supervisors, on the other hand, are often unaware of how the Science Shop and the SME Office operate or what it means to be carrying out a research assignment for a social organization or an entrepreneur. The Science Shop and the SME Office have to try and communicate as openly and clearly as possible with all parties involved. This can be done, first of all, by providing information on what is being done at Tilburg University and on the method of working of the Science Shop and the SME

Office. However, it is also important to be lucid about how you proceed and to show what the Science Shop and the SME Office do and stand for. This is the significance of transparency: clients and others know what to expect from the Science Shop and the SME Office and are not left guessing about such matters.

There are various ways of working transparently. On the one hand, it is an attitude you adopt as a mediator. On the other, the Centre for Knowledge Transfer undertakes to be transparent, for example, by producing clear brochures for clients, prospective clients, and student researchers, or by using well-considered and transparent mediation procedures.

### **Systematic**

It is not only important to us that our clients and others know what the Science Shop and the SME Office can offer to them, but also that they can rely on us. Like honouring agreements and punctuality, it matters to us that clients should know that the Science Shop and the SME Office are meticulous in their method of working. One way of accomplishing such meticulousness is to use fixed procedures in performing certain duties. To this purpose, the Science Shop and the SME Office have developed scenarios, procedures, and manuals. Using these in our mediation tasks does not mean we operate in robot-like fashion; rather, they help to support our work as mediators. Over and above that, we need sufficient creativity to be able to do our jobs as mediators. It is like preparing a tasty meal: the recipe helps you to prepare the meal, but the cook's qualities make or break its culinary success.

### **Proactive**

The fourth quality we value as mediators at the Science Shop and the SME Office is a proactive

attitude: in mediating a research project, we do not wait and see but anticipate the next steps. When a student researcher indicates he or she is in a particularly tough stage of the research project, we get in touch after a week to inquire how things are going, rather than be told after two months that he or she has not been making much progress for weeks on end. We expect our mediators to take initiatives where necessary and prefer them to do too much rather than too little.

**Instruments**

The survey below indicates which elements of the mediation process and which instruments we will be dealing with in the workshop.

PRECONDITIONS		
MEDIATION COURSE		
WEBSITE		
RESEARCH ROJECT		
Before	Targeted	acquisition, Mediation conditions
During	Mediation guide,	Mediation database, Commitment researchers
After	Research project evaluation,	Organizing symposiums, conferences, etc.
INK-AUDIT		
COMPLAINT HANDLING PROCEDURE		

Below, we will give a brief description of each component mentioned in the diagram and a discussion in terms of the key concepts articulated in our vision. Naturally, we will be discussing these matters in greater detail in the workshop.

**Mediation course**

In the three-day mediation course that was developed by us, new student mediators learn

about the history, aims, design, and method of working of the Science Shop. The course also provides hands-on training, for example, in intake interviews, group conversations, and handling our mediation database.

The mediation course primarily aims to introduce new student mediators into the method of working the Science Shop pursues. However, the course has been designed to meet our own requirements. The course book has been arranged so systematically that is can be used as a mediation manual. The course has also been evolving over the years, incorporating participants’ experiences’ wishes.

**Website**

Our website has developed into an important medium of communication, presenting lots of information besides general information on the Science Shop and the SME Office and their work. It contains summaries and full-text versions of all public reports of the Science Shop, Science Shop news, including news and pictures of conferences and symposiums we organized, SME Office network meetings, and all instruments mentioned in this workshop.

Our website is a prime medium for us to pursue transparency, which also means clients and other people can see how we train our mediators, how we perform our tasks as Science Shops and SME Office, and how we evaluate our mediation projects.

**Targeted acquisition**

In our targeted acquisition policy, the Science Shop and the SME Office acquire new research projects in a targeted way. At the departments, the Science Shop surveys what themes are interesting from a social point of view, what are possible research questions inherent in them,

and whether there are sufficient supervisors and students researchers available. These themes are then brought to the notice of social organizations that might be interested in such themes. By way of such targeted acquisition, moreover, we also anticipate social questions from potential clients.

The SME Office liaises with knowledge transfer networks, the Chamber of Commerce, SME societies, university student societies, and faculty student supervisors to make a match between supply and demand.

This represents an acquisition modus that is highly client-oriented because targeted acquisition starts from the potential demand from clients and the potential supply of researchers and supervisors .

### **Mediation conditions**

The mediation conditions do not just describe what clients can expect from the Science Shop and the SME Office but also what we, the Science Shop and the SME Office, expect from clients, student researchers, and supervisors.

The mediation conditions particularly aim to accomplish maximum transparency in mediation. Our experiences with these mediation conditions have also taught us that clients consider them as highly client-oriented and proactive because they tend to pre-empt many possible questions.

### **Mediation guide**

The mediation guide, which is also used in our mediation course, deals with all the ins and outs of mediation. It has a theoretical part on the history of mediation at the Science Shop and the SME Office and general starting-points in mediation, but also an elaborate and practical step-by-step plan detailing various stages that can be distinguished in mediation.

This guide has been designed to be very systematic and transparent. In addition, it has been designed not only with a view to promoting client-oriented thinking in our mediators, but also to help them anticipate the next steps that need to be taken in the mediation process and the expectations clients, student researchers, and supervisors will have.

### **Mediation database**

Our mediation database is a tailor-made Microsoft Access application closely dovetailing with our mediation practice. The database not only facilitates the registration of client, student researcher, and supervisor data, but also tracks research project progress in so-called logbooks. This database can also generate management information by literally just pressing a button. Moreover, the database is quick and easy to access for anyone at the Centre for Knowledge Transfer.

The database greatly improves the transparent and systematic method of working at the Centre for Knowledge Transfer. In a new version of the database that will shortly be brought into use, new functions like reminders and filing documents such as interview reports and appointment memos will also help to increase proactive use of the database and to improve the arrangements of mediation materials.

### **Ties with student researchers**

We publish a special newsletter for student researchers to improve their ties with the Science Shop. This newsletter deals with prospective, current, and new research projects and gives practical tips. In addition to ties with our students researchers, this newsletter also aims to present an image of the Science Shop that is in line with the key concepts. The SME Office also publishes a newsletter, which is distributed

at the university and means to inform students and supervisors about SME Office activities.

**Evaluation of research project mediation**

After each research project has been concluded, the client, student researcher, supervisor, and mediator are invited to review the project by way of a written evaluation form. This form has been designed to be easy to process and allow comparison across time.

In addition to practical matters, the questionnaire also includes questions on Science Shop and SME Office staff performance on the four key concepts from the vision.

**Organizing symposiums, conferences, etc.**

After completion of each research project, the Science Shop seeks to do something with its results beyond their publication in a research report. We stimulate clients, often in conjunction with us, to create an opportunity for centralizing the research results, such as a formal presentation to a mayor or minister, a symposium, or a workshop. This allows us to make clear what the results of the project are to people other than the client, but it also enables us to show what the Science Shop does and can do for prospective clients.

**INK audit**

Over the last few years, we have regularly performed an INK self-evaluation to review our services. Points for improvements are formulated on the basis of the results of these self-evaluations.

The INK model is dovetailed to the method of working we envisage. These self-evaluations not only give us an idea of the quality of our services but also shows us how we can continue to improve this quality.

**Complaint handling procedure**

If anything should not go according to plan in a research project, we have a procedure for clients, student researchers, supervisors and other to lodge a complaint about the Science Shop or the SME Office. The complaints committee at the Centre for Knowledge Transfer will formulate a response to the complaint and will attempt to deal settle matters to the complainant's satisfaction. Should the complainant feel that this settlement falls short of their expectation, the complaint can be submitted to the Science Shop management, who will take a decision that is binding for the Science Shop, the SME Office, and the client.

Our complaints handling procedure is in line with the key values of the Centre for Knowledge Transfer.

## SCIENCE COMMUNICATION

# The Science Communication Escalator

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*Science communication is like happiness : no-one is against it, but everyone has a different notion of it. The concept of science communication certainly needs to be refined. At present, there is no perfect blueprint for the communication between scientists and society. Maybe the search for such a model equals the search for the holy grail, but at the same time it gives us some food for thought about the possibilities.*

## The risk management escalator

For instance: Is the organisation of science communication related to the nature of the scientific knowledge? This question was inspired by the presentation of the 'Risk Management Escalator' by Ortwin Renn, on the ESOF 2004 at Stockholm (Ortwin Renn).

*"Risk management is confronted with three major challenges: complexity, uncertainty, and ambiguity (Renn and Klinke 2001; Klinke and Renn, 2002)."*

Starting point for Ortwin Renn is that there are four types of knowledge / science : simple, complex, uncertain and ambiguous knowledge.

Straightforward or simple knowledge are facts that don't involve any discussion or uncertainty, or simple relationships between variables. It is usually what we mean by 'basic science' and what is being taught at schools. This knowledge is the result of scientific investigation that reflects a positivist view on truth. This form of knowledge tends to be generally accepted and there are no conflicts about it.

- e.g. water boils at 100° C. under atmospheric pressure of ...
- e.g. gravity
- e.g. the sun evolves around the earth

*"Complexity refers to the difficulty of identifying and quantifying causal links between a multitude of potential candidates and specific adverse effects."*

In a situation where scientific knowledge is context dependent, it is called complex knowledge. This can be the case when for instance external environmental factors influence the results. These results can therefore vary according to the factors. The conflicts that arise are solely of a cognitive nature.

- e.g. lab results can produce entirely unexpected effects in field experiments
- e.g. Western agricultural knowledge cannot always be implemented in the Third World
- e.g. scientific knowledge is not interpreted or used in the same way by everyone

*“Uncertainty is different from complexity. It comprises different and distinct components such as statistical variation, measurement errors, ignorance, and indeterminacy (WBGU 2000, pp. 52ff.), which all have one feature in common. Uncertainty reduces the strength of confidence in the estimated cause-and-effect chain”*

In the case of uncertain knowledge, emphasis is on ignorance, determinability, deviations in measurements, statistical variations. Conflicts arise both on a cognitive level as on the level of valuation / reflection. Science provides for the knowledge, but it is insufficient. More research does not necessarily result in more knowledge, certainly not in the long run. Trust is an important parameter of this kind of knowledge.

e.g. nutritional applications of biotechnology

*“ambiguity or ambivalence. This term denotes the variability of (legitimate) interpretations based on identical observations or data assessments”*

If different interpretations of one set of data, methods or instruments of measurement are possible, and if there can be discussion about what these mean for mankind and the environment, then this knowledge is ambiguous. The conflicts that arise also concern values and are therefore strongly prescriptive.

e.g. greenhouse gasses : is the earth warming up or are we on the verge of an ice-age ?

For each type of knowledge needed for the calculation of risks, a different type of risk communication is involved.

Orwin Renn’s model of risk communications is based on the hypothesis that each kind of knowledge about risk, requires its own kind of risk communication. Characteristically, the diversity of the group of communicators involved, increases with the uncertainty and ambivalence of the risk knowledge.

Is this hypothesis also feasible for science communication ? In other words : do we need to implement another kind of communication for each different type of scientific knowledge ? In the following pages, we will construct a model resulting in the presentation of a science communication escalator.

### The science communication escalator

In the science communication escalator, four dimensions of science communication are being presented. Each dimension comes with its specific characteristics and is related to the kind of knowledge that it communicates. Vice versa, we can say that each type of knowledge needs its specific way of communicating.



Originally, science communication is the dissemination of scientific results to a generally passive and monolithic public, usually through the formal education system, or through the mass media. In this diffusion model the communication process goes in one direction, from a sender to a passive receiver. (Logan Robert A., 2001) The aim of communication is the 'understanding of science' by citizens, in the hope that there will be a greater support for science, and especially for the great amount of money that goes to science. (Lewenstein B.V., 1992) A lot of effort aim to increase the scientific literacy of the public. This results in the creation of several 'public understanding of science' programmes (PUS), based on the concept of this 'deficit model'. See for example: (Paisley William J., 1998; Laugsch Rudiger C., 2000; Wynne Brian, 1991) Simple or straightforward knowledge is communicated most efficiently through Public Understanding of Science.

Where complex knowledge is concerned, the sender is still the agent trying to pass on knowledge to the receiver, but precisely because the knowledge is complex, the sender has to pay special attention to the target group, and whether this group has received the knowledge, has interpreted it correctly and whether the group is receptive to the knowledge. The greater attention for the public also involves a greater creativity in the 'packaging' of the message. A variety of events arise with the audience in mind. The 'public awareness of science' (PAS) is the main aim, not only the public understanding of science. See for example: (Stockmayer Susan, Gore Michael, & Bryant Chris, 2001; Wynne Brian, 1991; Laugsch Rudiger C., 2000; Clark Fiona & Illman Deborah L., 2001) As the public understanding of science is supply driven, the public awareness of science is more demand-driven.

As mentioned before in this paper, knowledge can also be uncertain. More research does not necessarily result in more knowledge. When communication in this area has to be initiated, and especially if decision making on a management level is involved, science provides the source of data and knowledge used to give substance to standpoints. Moreover, representatives of the general public take part in the communication process. For instance, this is the case in citizen juries or panels. These activities can be ranged as Public Engagement of Science, PES. The aim is to consult the public for decision-making. It is still supply driven and a two-sided communication process between experts and non-experts.

At last, we need to mention ambiguous knowledge. It is characterised by a large complexity, a lot of uncertainties, different interpretations of data and disputes about the right choice of methodologies and instruments of measurement. When communication about this kind of knowledge is concerned, a dialogue involving all interested parties, becomes necessary. Where scientific knowledge does not have all the answers, complementary types of knowledge from other fields of intellect and other sources such as experience and practical knowledge can be available. This form of communication (PPS) is not common practice in Flanders, but certain experiments are being implemented. In the past few years for example, we have seen stakeholder dialogues, citizens' discussion groups and focus groups – meeting and sharing vision, values and interpretations. The communication that arises is not only of a cognitive (as with PUS and PAS), but also of a reflective and prescriptive kind. Thus, communication becomes hard and time-consuming, since this process requires more time, energy and openness from all participants.

Taking the science communication escalator as a model, it is paramount to adjust the methods of communication according to the nature of the knowledge, which can be straightforward, complex, uncertain or ambiguous.

**Tendencies in science communication**

These dimensions and the science communication escalator show us that the tendencies noticeable in communication in view of an increasing complexity and uncertainty of the scientific knowledge are :

			PPS Public participation of Science
		PES Public engagement of Science	
	PAS Public Awareness of Science		Actors : scientific experts + specific target groups
PUS Public Understanding of Science	Actors : scientific experts + specific target groups	Actors : scientific experts + specific target groups +representatives of the public	Actors : scientific experts + specific target groups +representatives of the public +external experts
Actors : scientific experts			
Sender-predominance	Receiver-oriented	Expert / layman	Partners
<ul style="list-style-type: none"> <li>inform</li> <li>one-way</li> <li>monologue</li> <li>top-down</li> <li>mass-media</li> </ul>	<ul style="list-style-type: none"> <li>context</li> <li>target group</li> <li>needs, wishes</li> <li>feedback loops</li> </ul>	<ul style="list-style-type: none"> <li>consulting</li> <li>both ways</li> <li>closed participation</li> </ul>	<ul style="list-style-type: none"> <li>dialogue</li> <li>open participation</li> <li>mutual</li> <li>bottom-up</li> <li>local knowledge</li> </ul>
No conflicts	Conflicts : cognitive (incomplete or incorrect comprehension)	Conflicts: cognitive + evaluative/reflective	Conflicts : cognitive and reflective /evaluative + prescriptive (different norms and values)
Simple	Complex	Uncertain	Ambiguous

Scheme: the science communication escalator

- from large, anonymous groups to small conversation groups
- from little interaction to intensive interaction
- from mass-media communication to interactive communication
- from knowledge-driven to problem solving – driven
- from applicability to serviceability
- from supply-driven to demand-driven
- from transmission to transaction
- from closed to open
- from product to process communication
- from objective knowledge to socially constructed knowledge (positivist to constructionist)
- from ignorant public to competent public
- from short-term to long-term interaction

A lot of head work is still necessary, and I would like to appeal to anyone who can come up with new insights or ideas.

## Reference List

- BARBAGALLO FIONA (2002). Should we continue to pursue dialogue? In South-Africa: Conference Public communication of science and technology 7.
- BUCCHI MASSIMIANO (1998). Science and the media , alternative routes in scientific communication. Routledge London and New York.
- CLARK FIONA AND ILLMAN DEBORAH L. (2001). Dimensions of civic science. Science Communication, 23, 5-27.
- GIBBONS MICHAEL (1996). The new production of science and research in contemporary societies. London Sage.
- GIBSON IAN (2000). Scientists are citizens too. Fabian Review, 112, 11.
- KING SUZANNE (2002). Understanding your audience. In South-Africa: Conference Public communication of science and technology 7.
- LAUGKSCH RUDIGER C. (2000). Scientific literacy: a conceptual overview. Science Education, 84, 71-94.
- LEWENSTEIN BV (1992). The meaning of „public understanding of science“ in the United States after World War II. Public Understanding of science, 1, 46-68.
- LOGAN ROBERT A. (2001). Science mass communication, its conceptual history. Science Communication, 23 nr 2, 136-163.
- PAISLEY WILLIAM J. (1998). Scientific literacy and the competition for public attention and understanding. Science Communication, 20 nr 1, 70-80.
- STOCKLMAYER SUSAN, GORE MICHAEL, & BRYANT CHRIS (2001). Science communication in theory and practice. Kluwer Academic Publishers.
- THE WELLCOME TRUST (2001). Science and the public: a review of science communication and public attitudes toward science in Britain. Public Understanding of science, 10, 315-330.
- WYNNE BRIAN (1991). Knowledges in context. Science, Technology and Human Values, 16, 111-121.

## SCIENCE COMMUNICATION

# Law Education through Mass Media: Learning and Teaching from the Reality

MELISA GUEVARA PAREDES

Legal Diffusion Area, Proyección Social de Derecho, Pontificia Universidad Católica del Perú

It is a pleasure for me to have the opportunity to explain the methodology developed in Pontificia Universidad Católica del Perú Law's Faculty on the course named Proyección Social de Derecho, PROSODE, (Social Outreach of Law), an optional course of studies that has more than 14 years on Law's programme and involves activities on three areas: Legal Advisory, Legal Education and Legal Diffusion. The last one of them going to be the theme of this article.

The Law education at University Level constitutes a challenge and an enormous responsibility. Training futures lawyers involves an education that goes beyond the theoretical knowledge and dissimilar concepts respect the society, its reality and potential on positive and negative aspects. For 14 years, the course named PROSODE, have been offering an integral education to the futures lawyers through the carried out learning by means of the transmission of legal knowledge through mass media (radio). On the Area of Legal's Diffusion, the students identify the most critical areas and obstacles for make true the citizen's rights and then they prepare legal theme's radial programmes. On this way, the students obtain new knowledge's, new abilities and understand their real's role as future lawyers.

One of the main deficiencies detected on the lawyer's developed are difficulties for work as a team. That problem motivates a change of mind on the different areas that include communication in general, relations with the staff,

writing, negotiation, time handling and other ones. The education's model practised on the Diffusion Area of PROSODE, as well as the rest of the areas, is a methodology based on the development of legal's skill. The market's labour for lawyers today requires not only academic professionals, also requires professionals who have the capacity of work with people formed on other areas. By the nature of legal's work, the lawyer needs the development of abilities like experience's learning, catching information quicklier than the generation before them, analysing the cases from different points of view, developing communicative capacities and to develop personal qualities like self administration, handling of time, ability to work with no need of supervision, initiative, work in equipment, solution of problems, risk/cost/benefice analysis, among others abilities that PROSODE teach through the reality.

## Methodology applied in the Legal Diffusion Area

The traditional Peruvian education for Law's students present difficulties because doesn't mix the theory with the practice, necessary for an optimal performance. The methodology that we used is centred on the student and looking for the development potentialities on the following areas: legal reasoning by means of the oral analysis of cases, felt of professional ethics, sen-

sitivity, common sense and good judgement, skill to work with other schemes of collaboration, interpersonal abilities like knowing how to listen and, finally, ability to work on team.

In order to develop these abilities, the handling of the class turns on something fundamental. The classes are developed on theoretical-practice's sessions. The theoretical class needs three hours weekly, and the practice class around 4 hours for preparation the radial programs on extra curricular schedules (by group before the emission). On the first hour a theoretical class is developed and the Professor's Assistant initiates the debate treating the main points about the subject of the day for reflection, the selected themes to debate during the cycle around the social Peruvian's problems like a public administration, access to the justice and the familiar relationship; the students will be able to propose subjects of additional reflection and approach the debate with texts that they read previously. This debate contributes to form the logical and creative student's analysis and improve their talents of oral expression.



Working with the student's team.

On the second hour of practical sessions, the students are grouped and the work is focused on the development of their legal abilities through the solution of real cases, in order to solve the problem on integral way. Questions done by the listeners in past radial programs are given

to the students with the purpose of show them the colloquial language and how to analyse the legal aspects. From those cases the students must develop their ability to include/understand the sense of the question, to clarify it and to give an answer to the listener in a short time during the radio program. For example thus, the case of a listener's question called:

*„Doctor, my husband left the house and he doesn't send anything for my children, what can I do?“.*

Evidently this simple question will deserve an analysis of its legal contents through the identification of the central problem of the question. The students identify the main problem that in this case is not the absence of the husband; the real problem is the economic situation respect to the children. Once identified the way of the question, the students must learn to cross-information the listener to obtain the data necessary to acquit its on three questions by maximum, for example:

- Mistress, are you civil married?
- How long your husband left the house?
- Are their children recognised legally? How old are they?

This practical exercise develops in the students the ability to thinks in order and at the same time of consultation and choose the most suitable alternative for the client previous cost/benefice analyse; thus, the students will have to indicate to the listener the best one alternative for solving their problem and/or indicating the institutions that can help them.

On this way the talent of the student is developed on three areas:

1. Problem's identification.
2. Problem's diagnostic.
3. Choose the best solution alternative.

The cross-information them allow the student to obtain the data to give one's answer to the problem. The students on an average of three (3) minutes acquit the consultation being following the right way and what kind of institution can help them. It is part of the formation that we offered our students who acquire empathy with the real situation of the listeners, reason by whom the answers initially are oriented to a human approach of the conflict, always looking for the consensual exit and explaining clearly the audience that a judicial process is always the last alternative by the high emotional and material costs (in terms of time and money).

The cases that need more analysis or inevitably require the beginning of a judicial process are sending to the system of decentralised legal lawyer's offices that PROSODE has in our city; thus „to the air“ our students recommend to the audience and the public in general to put themselves in contact with the members of the Legal Advisory Area.

### The radial program

The Legal Diffusion Area emits 2 radial programs weekly, a program produced and lead by the students in R-700 Radio, named „El Derecho a tu Alcance“ (The Law near to you), which is listened by an average of 10,000 people on the principal Peruvian cities and, another one called „Tiempos de Conversar y de Actuar“ (Speaking and acting times), which is transmitted through a Canto Grande Radio, located on a poorest area from Lima City. Additionally, the University are developing a pilot project from signal emission of the university radio named Zona PUCP, that realise its transmissions from the College's campus and whose radial programs are transmitted on Real Player by Internet.

The first step for the students must be respect the schedule that establishes a minimum term of two (2) weeks of anticipation to the emission of the radial program for the delivery of pre report that contains: the subject chosen for the program, the justification of its selection, that includes the social importance and the distribution of the work between the members of the equipment.

The minimum number of members on each student's team is 3: two of them will be alternated with the locution and the other one will be on charge of the coordination with the cabin operator and filter the calls (attention to the listeners). Delivery anticipated of pre Report permits to detect on time initial problems in development of subject, like for example approach that can to give to subjects controversial as abort or corruption, always we remember that the program hasn't only like purpose offering legal advisory also make them reflections on different subjects from legal contents.

In the second week, the group's members must present/display a report that contemplates: subject, motivation, objective of the radial program, scheme, distribution of the students and the legal investigation.

A script is recommendable for guide the students and permits them to adapt their vocabulary to the audience, nevertheless, at the time of leaving „to the air“ is not allowed to take this script to them, only a summary in a page to avoid lost the way of conversation for follow a script. The emission of a radial program must be natural and spontaneous and the speakers must be in continuous visual contact to be able to complement themselves in their explanation.

Usually, in the first time „on the air“ the students are nervous, most to them never have had an approach in radio programs, reason for which is fundamental the development of a

climate of confidence between the members of the group and the Professor's Assistant that collaborates with them in the elaboration of the program but is not the one on charge of its development, the program is produced and lead by the students and the Professor's Assistant acts as support during the radial's emission and its intervention will be auxiliary in cases of difficult cases or when detected mistakes in the development of the program.

During this stage the students and the Professor's Assistant adapt the technical language to colloquial one than permits the fast apprehension by the audience; the use of examples and resources is very useful for these effects. We called „resources“ to all those elements that collaborate in the emission of the program, such as interviews, vox populis, publicities, stadistics, testimonies, etc.



The author of the article working with her students.

Outside of the cabin, the remaining members of the group monitored the development of the program and, of being necessary, they make telephone calls to the radio in order to indicate how the program is understood.

### Scheme of the radial program

The Scheme of Radial Program are made by professors of the Sciences and Arts of the Communication's Faculty that has allowed to

develop a designed scheme us for maintain during one hour the attention of a no expert public (and sometimes little interested) in legal themes.

I PART 11:00 Beginning (introduction music)

Greetings between speakers Greetings to audience

11:03 Introduction to theme - commentaries with practical cases

TIP I: Theme of the day Presentation of the speakers - personal references of each one Greetings of the speakers Commentaries about the week news

11:07 WHAT ARE WE GOING TO LEARN?

TIP II: Knowing about theme Knowing how to detect a legal problem Knowing what to do and where going to go for solving legal problemsI INVITATION TO CALLING (to give the telephone numbers of the Radio)

11:10 RESOURCE I (máx. 4') (Statistics, recordings, vox populi)

11:14 Commentaries to the resource linking to theme

Common and legal definitions How the theme appears in the daily life - how to recognise it Modalities/Causes - Examples Attention of calls Governmental institution that can help the audience PUBLICITY

II PART 11:33 Remembering the principal points of the first part

TIP III: INVITATION TO CALL

11:35 Procedural subjects of the practical cases. Advisory to audience's questions

11:54 Conclusions

11:57 Goodbye - Speaking about the next Radio program. Closing

That scheme of a radial program has given us good results and it allows us to have a suitable spending times. All radio programs require

at least 3 of the named „tips“ of hearing that mean moments of increase the attention of the audience.

The first part of the radial program introduces the listeners to the subject, is recommendable that after the presentation of the speakers these make a commentary on the news or some event before the development of the day's theme and cause an interest of the audience on its opinions. It begun to develop the subject through an description of the objectives at which we want to arrive on authentic „why you must listen us?“ and „what are we going to learn today?“, thus for example, if we developed as subject of the day about Divorce will begin the conversation commenting a reality that indicates that the marriages can't get to consolidate on the time and that often in order to avoid sequels in the couple and children a consensual solution is preferable, for this reason is important to recognise when a marriage has problems, which are the possibilities that the couple have for solve its, the possibilities and interest of the law to preserve the family and finally, how to initiate a process divorce that allows the couple to reach a consensual solution.

For example, during the first part of the program, we will speak about the legal concept of Divorce, their causes and consequences to the couple and children. The second part of the program is centred in procedural aspects. After publicity, the students have to reintroduce to the listener on the theme and analyse procedural questions like terms, costs and others. On this second stage, listener's calls to the radio and explain their problems motivated through real cases narrated by the speakers respect to which describes solution alternatives. Here the security on the answers that the students transmit is important and the work of the Professor's Assistant, who monitored behind the program, is

fundamental because that indicates how to develop the theme one and polishing its exhibition through the precision of legal terms, explanation through cases, etc.

Those cases that cannot be acquitted by their complexity „to the air“ are derived, as we commented, to the Advisory Area, offering to audience an integral support in the solution of their problems. We had experiences in which the listeners comment out heated on subjects of national policy, have narrated complicated situations of its personal life as adultery and some of them tell us crying their experiences, situations that require a very delicate treatment and which motivate that students thanks to the audience for the entrust to them. The handling of these situations already constitutes part of the previous work in class before the emission of the radial programs and contribute to change the Law' perception that sometimes the classrooms forget, that after a conflict, exist a human face.

Finally, 10 minutes before the ending of the program, the students concluding to answer the first question „what learned today?“, emphasizing that exist people and organizations specialised in helping them like the system created by PROSODE.

The experience to participate on PROSODE changed my perspective about professional Law work and, like me; lots of students finished the course fascinated with the experience to help with our knowledge to people who need aid. First, was I student, after Professor's Assistant and now my professional development I had oriented to the development of cooperation, and is wonderful for me to see my ex students became Professor's Assistants too. But independently of the vocational discovery, exists some „before“ and „after“ on the life experience in PROSODE.

SCIENCE COMMUNICATION

# Science meets Society

KARIN REE

Karin Ree, Chemistry Shop; Maria Hermsen, Science Shop of Medicine, Groningen, The Netherlands

Together with the local newspaper the Science Shops in Groningen organized five lunch meetings where researchers and managers of different Faculties discussed with a delegation of people from society. The discussions were about the relevance of the Faculty research for society. Fellow organizer was the local newspaper. Aim of the meetings was to get clear what is the social roll off science from the University of Groningen.

Are researchers promoting their research enough outside the research world?

Is the social output of researchers well measured?

Are rich founders too powerful?

Are researchers obliged to a public promotion of their research results?

Have the Dutch taxpayers the right to know the research output?

Participants discussed these and other questions during the lunches. Each lunch had the same structure, but with different people who discussed different research fields. The local newspaper had an important roll in the discussion and in bringing out the discussion outcomes. Besides that, the Science Shops published a one-time magazine about the results of these lunches and with lessons for the future.

In an oral presentation, I will tell the audience more of the goals; the whereabouts and the results from these lunches and some other activities from the Science Shops in Groningen.

**SCIENCE MEETS SOCIETY**

Karin Ree  
Chemistry Shop

Maria Hermsen  
Sc. Shop of Medicine

Groningen  
The Netherlands

**Science Shops  
University of Groningen**

- Since 1979
- Decentralized organization
- Informal cooperation

For instance in the Science meets Society Project

- Biology
- Chemistry
- Econ. Management
- Education
- History
- Languages
- Medicine
- Pharmacy
- Physics

**SCIENCE MEETS SOCIETY  
The idea**

Quality assessment of University & Social Services

Main tasks	Assessment	Consequences
Research	Formal assessment	Budget status
Education	Formal assessment	Budget status
Social Services	No assessment	No policy, No credits

**SCIENCE MEETS SOCIETY  
The aspects**

- Communication of research results / PR
- Accessibility of research potential (profit and non-profit)
- Structural deliberation on research development
- Science & society education
- Research policy on (broad) social issues

So Science Shop is broad based!

## SCIENCE MEETS SOCIETY

### The organization

Six lunch visits of social delegations

Politics (1: Mayor)  
Industries  
NGO (large)  
NGO (small, local)



Faculty of  
  
Medicine  
Economics/Management  
Education  
Biology  
History and Art  
  
University Board

## SCIENCE MEETS SOCIETY

### The partners

- **Regional newspaper ('Dagblad van het Noorden'):**
  - Discussion leader
  - Public relations and interviews
  - Mediator of laymen's questions
- **Students:** -Assessments of dissertations
- **Researchers:** -Projects in the shop window
- **Deans of the faculties:** -Host



## SCIENCE MEETS SOCIETY

### Some results and aspects for further discussion

- **Communication/PR**
  - Information to media and stakeholders
  - Layman's speech at graduation ceremony
- **Structural deliberation**
  - Advisory boards (broad) for research schools
- **Research policy**
  - Special chairs to integrate social topics
- **Assessment /rewards for social services**

## SCIENCE COMMUNICATION

# The Living Knowledge Magazine: Experiences and future opportunities

NORBERT STEINHAUS

Bonn Science Shop - Wissenschaftsladen Bonn, Bonn, Germany

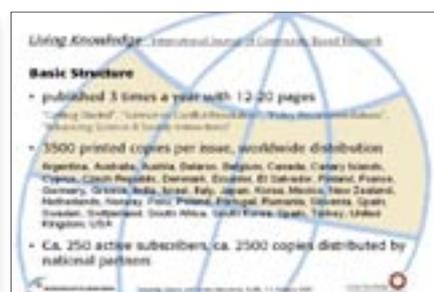
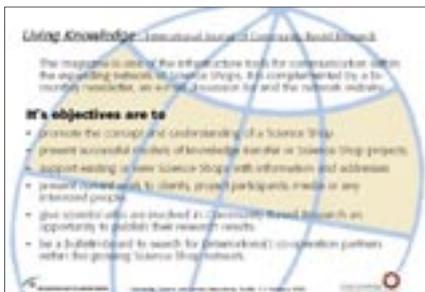
The dialogue between society and science needs to be a two-way street where everybody listens as much as he talks. The dialogue between the public on the one side and researchers and experts on the other side will be more promising and productive, when the public is able to discuss „science/society“ issues in full knowledge and understanding of scientific „facts“, of the results of the research, of scientific action and of the way in which research operates in practical terms. Sharing the expertise of Science Shops advances citizens' ability to participate in the dialogue between science and society.

The magazine „Living Knowledge - Journal of Community Based Research“ informs every four months about issues relating to the various facets of Science Shop work. It is one of the infrastructure tools for communication within the Living Knowledge network. It publishes a combination of news, reviews and discussion of Science Shop research methods, results and impacts. It is targeted to Science Shops and Science Shop staff, as well as similar working

organisations and scientists interested in community based research. In addition, LK supplies intermediaries and the media with general information about the international Science Shop network, and the process and results of community based research. This structural activity for the expanding network is complemented by a bi-monthly electronically newsletter.

The objective of this workshop was to give a short status report on the evolution and the experiences of editorial work for „Living Knowledge - Journal of Community Based Research“. But also future opportunities for this communication tool were presented and discussed:

- Options for electronically issues of the magazine were reflected.
- The need for Science Shop staffs' scientific publication in a peer reviewed research supplement to the magazine was verified.
- Future income strategies to guarantee publication and dissemination should have been discussed in the workshop.



*Living Knowledge* - International Journal of Community Based Research

**Feedback I**

- Active demand for magazines, increasing number of subscribers
- Positive feedback on content and form from subscribers, intermediaries and the media
- Survey from June 2004 by C. Kuijvenhoven:
  - 52 % see the magazine as important or very important network activity (with science shops and organisations on L.A. Discussion list)
  - 59 % would be willing to pay for a subscription, 40% would pay 10-20 € per year
  - 76 % stress visibility of the network, lobbying for Science Shops and PR activities as important or very important

www.science-shop.nl  
Publishing, Training and Public Relations, Suite 111, Utrecht, 3584

*Living Knowledge* - International Journal of Community Based Research

**Feedback II**

- During the SCIPAS project period (1999-2001) the need for a peer reviewed journal was expressed.
- Submission of articles to the magazine on one's own initiative is rare. Submission on demand is more common.
- Submitting in English seems to be a problem for non native speakers.
- A printed journal is seen as too expensive in relation to it's advantages.

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*Living Knowledge* - International Journal of Community Based Research

Objectives for communication tools in future network must be determined

**Future opportunities**

1. Same structure as before (magazine, newsletter, discussion list and website) with 2.200 – 3.000 € printing and shipping costs per issue. Less pages and/or less often. Peer reviewed part in supplement possible.
2. Webmagazine instead of printed. Active request for information by readers is necessary. Peer review is possible. Payment for download. Special printed editions.
3. Involving a well known publishing house. First research done, publishers expectations unclarified.

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# 2<sup>nd</sup> International Conference 'Living Knowledge' "ADVANCING SCIENCE & SOCIETY INTERACTIONS"

Seville, Spain, 3 - 5 February 2005

## Program Overview

<b>Planning of Sessions</b>				
Opening Session				
Welcome Remarks		Introductory Presentations		
Plenary Session: Experiences in science & society interactions.				
Parallel Sessions: Experiences in science & society interactions				
I.1. Administrations	I.2. NGO's	I.3. Universities	I.4 Science shops or CBRs	I.5. Videos on experi- ences
Plenary Session: Opportunities in science & society interactions				
Parallel Sessions: Opportunities in science & society interactions				
II.1. Environmental Sciences	II.2. Social Sciences	II.3. Tech.Developm.	II.4 Urban regeneration	II.5 Health Sciences
Plenary Session : Processes, tools & infrastructures for science & society interactions.				
Parallel Sessions: Processes, tools & infrastructures for science & society interactions				
III.1. Networks	III.2. Particip. Tools	III.3 Infrastructures	III.4. CBRs Management	III.5. Science Communi- cation
Plenary Session: Conclusions				
Poster Session & Visit exhibition				

**Opening Session**

**WELCOME REMARKS**

- Francisco Garrido. National Congressman Green Party (Socialist Party Group) (Spain)
- Francisco Solís Cabrera. Ministry of Innovation, Science and Enterprise. Andalusian Region.
- Doña Paula Garvin. Councillor on Citizens' Participation. Municipality of Seville
- Jose M<sup>o</sup> Bueno Lidón. Presidente de El Monte de Piedad y Caja de Ahorros de Huelva y Seville.
- Alejandro Hernández Toro. Asociación Europea Estudiantes Ingeniería (ESTIEM).
- Pedro Nuñez Abades. Vicerrector de Estudiantes / Vice-rector of Students. Universidad de Seville / University of Seville.

**INTRODUCTORY PRESENTATIONS**

- Henk Mulder, Science Shop de Química en Univ. Groningen Países Bajos / Science Shop of Chemistry Univ. Groningen. The Netherlands: Science shops as infrastructures for science & society mediation.
- Caspar de Bok, Coordinator of "Living Knowledge" Network and of ISSNET Project "Improving Science Shop Networking: Presentation of the Science Shop Network "Living knowledge" and the ISSNET Project, as well as the conference objectives and program

**Welcome remarks.**

- Federico Paris Carballo. Director of the School of Engineers of the University of Seville (Spain).

**Plenary Session:**

**INTERNATIONAL EXPERIENCES IN SCIENCE & SOCIETY INTERACTIONS**

- Chair: Michael Straehle. Science Shop Vienna, (Austria)

- Gerry McCormac. Pro Vice Chancellor for Community & Communications. Queen's University Belfast (UK). Meeting universities obligations to communities to share, listen and learn from their experiences
- Kirsten Kossen, Programmes Officer of the Northern Alliance for Sustainability ANPED. An NGO's experiences on linking science and society
- Alba González Jácome. Universidad Iberoamericana de México. (Mexico). Impact of the gubernamental support on the rural population in Mexico.
- Khan Rahi. Coordinator of the North American CRN / Lessons learned from the role of the Community Research Network (CRN) in US & Canada.

**Parallel Sessions:**

**INTERNATIONAL EXPERIENCES IN SCIENCE & SOCIETY INTERACTIONS**

Parallel Session I.1.: Cases Public Administrations.

- Chair: Arturo Garcia Arroyo. Fundación Nacional de Ciencia y Tecnología. National Science and Technology Foundation. (Spain)
- José Mora Galiana. Director General de Servicios Sociales e Inclusión. Junta de Andalucía. Promoción de la relación ciencia y sociedad desde la Administración Regional Andaluza.
- Oleksandr Svyetlov. The role of government and business in facilitation of Internet usage: science – citizen interface. Problems

of ICT advancement in Ukraine and CEE countries.

- Angel Casas. Dept. Economía. Instituto. Tecnológico de Monterrey (México). El capital social como base ciudadana del desarrollo socioeconómico en los procesos de integración latinoamericanos
- Kelly Hradsky. Saint Mary's College (USA) Exploring the relationship between special education law and the effect of its implementation in American Society.
- Amelia Lopez Izquierdo. Oficina de Plan Estratégico. Ayuntamiento de Seville. (Spain). Ciudadanía e innovación en el Plan Estratégico de Seville.
- Ana M. Gonzalez Ramos. Modelo Computacional del sistema de ciencia, tecnología e innovación de las Islas Canarias
- Francisco Rubiales. EUROMEDIA. La gestión comunicativa de foros sociales de debate para la innovación tecnológica en Seville.

Parallel session I.2. Cases NGOs

- Chair: Alejandro Hernández Toro. Asociación ESTIEM.

- Ricardo Martínez y Paula Martínez. Questao de Equilibrio. (Portugal). La Escola de la Foresta para la integración de niños difíciles en colaboración con la Universidades de Lisboa y la Esc. Sup. De Educación de Setúbal..
- Tom Thomas and Karuna Sridharan. Institute for participatory practices, New Delhi, (India). Participatory Assessment of Delivery of Public Services.
- Rosario Rodriguez Diaz. Dpto. Sociología. Universidad de Seville (Spain). El asociacionismo de los pequeños empresarios en Andalucía.
- Daniel Pérez. Ingenieros Sin Fronteras (Spain). Tecnologías para el desarrollo / Technologies for development.
- Joseph Caron. CINBIOSE. Univ. Quebec à Montréal. (Canada). Building on communitybased knowledge to bring together citizens and science.
- Francisco Vilches. Ecologistas en Acción (Spain). La experiencia de investigación sobre el riesgo medioambiental.
- Miguel Martínez-López. Facultade de Sociología. Universidade da Coruña.(Spain) El asociacionismo de investigación y trayectoria profesional. Una carrera de obstáculos.

Parallel Session I.3. Cases Universities & Research Centres

- Chair: Jose Antonio Borrero. Dir. OTRI. Vic. Investigación. Universidad de Seville. La experiencia de la Oficina de Transferencia de Tecnología de la Universidad de Seville.

- Manon Vaal. Utrecht University. (Netherlands). Developing practices at the Science Shop for biology
- Noemí Sanz Merino, Angel Camacho Alvarez, Juan Carlos Gonzalez Galbarte, Inés Gutierrez González, Mariano Martín Gordillo y Andres Sampedro Nuño. Observatorio de Cultura Científica (Universidad de Oviedo). (Spain). Un Proyecto de educación CTS en la difusión participativa de cultura científica
- Sang-Dong Lee. Daejeon Science Shop Initiative (Korea). CPPR, Centre for People Participatory Research.
- Sophie Van Den Bossche. Vrije Universiteit Brussel (Belgium). Centrally organised university Science Shop: the benefits.
- Rocio Quijano López, Miguel Perez.Ferra, Luis C.Vida Sagrista y M<sup>o</sup> Teresa Ocaña Moral. Universidad de Jaén (Spain). Aprovechamiento didáctico de algunos fenómenos físicos expuestos, como actividades en espacios sociales interactivos dedicados a la difusión científica.

Jeffry V. Mallow. Physics Dpt. Loyola Univ. Chicago (USA). Gender and Science Anxiety: research and action.

N.Invenizzi & A.Kuenzu. Univ. Paraná Cuitibar. (Brasil). Educación científico-tecnológica, trabajo y ciudadanía

David Hall, Irene Hall & Sharon Lockley. Interchange, Liverpool (UK). Civil renewal and social capital: aspects of Science Shops for social science

Parallel session I.4. Cases Science shops or CBR's.

Chair: Santiago Idalbuo. Coord. Secret. Conf. Consejos Sociales. Secretario Consejo Social de la Universidad de Navarra (Spain).

Jose Manuel de Cózar-Escalante y Juan Sánchez-García. Centro de Estudios Ecosociales. Universidad de la Laguna. Islas Canarias (Spain). Environmental protection and democracy: the Eco-social Studies Centre in University of La Laguna (Canary Islands).

Catalina Buliubasich. CEPIHA.Fac. Humanidades de Salta (Argentina). La educación intercultural bilingüe en Salta, Argentina: acciones desde la Universidad.

Frits Van den Berg. Science Shop for Physics. Univ. Groningen (Netherlands). Citizen's participation in Research and Technology.

Camelia Draghici. InterMediu University of Transilvania, Brasov (Romania). Social demand for technological and health approach.

Noelia Alvarez Garcia. Univ. Oviedo (Spain). Una reflexión sobre la función emancipadora de las Science Shops.

Inés Gutierrez, Jose Antonio López, Andrés Sampedro y Noemí Sanz. Universidad de Oviedo (Spain). Una experiencia de proyección social del conocimiento: el Observatorio de Cultura Científica de la Universidad de Oviedo.

Edith Donders, Sofie Van Den Bossche et Jean-Pierre De Greve. Vrije Universiteit Brussel (Belgium). Bottlenecks in Science Shop activities.

**Plenary Session:**

**OPPORTUNITIES IN SCIENCE & SOCIETY INTERACTIONS (PROJECTS, PROGRAMS, RESEARCH)**

Chair: Claudia Neubauer, Fondation Science Citoyenne (France)

Monica Menapace. Project Coordinator. Unit Education and Science, Dir. Science and Society, (European Commission). Science and Society in the 7<sup>th</sup> Framework Programme of the European Union.

Roger O'Sullivan: Director Rural Community Network (United Kingdom). From sitting on the veranda to valuing the enrichment of engagement. A view from the field.

Saeed Asefzadeh: Bridging Gaps: Empowerment of the Community in Health Questions

Rob Hagendijk. Dean ISHSS, University of Amsterdam (Netherlands). Science Shops and Civic Sciences after 'Lisbon'.

Michael S. Joergensen. Science Shop. Technical University Denmark (Denmark). Improving interaction between NGO's, Science Shops and Universities.

**Parallel sessions:**

**OPPORTUNITIES IN SCIENCE & SOCIETY INTERACTIONS**

Parallel session II.1. Opportunities in Environmental Sciences (ISSNET WP4 Workshop)

Chair: Carmen Teodosiu, InterMediu, Technical University Iasi, (Romania)

George Barjoveanu. InterMediu. Univ. Techn. Iasi. Romanian perspective on partnerships in sustainable water management and land use.

Christine Feurt. Wells National Estuarine Research Reserve. University. New England (USA). A model for collaborative community conservation

Krischan Ostenrath & Anke Valentin. Science Shop Bonn (Germany) From information to participation: Visualisation of land use change in the state of North Rhine-Westphalia.

Balint Balazs. Institute of Environmental and Landscape Management. St. Istvan Univ. Godollo. (Hungary). Pvaluing Crop biodiversity on farm in Hungary.

Parallel session II.2. Opportunities in Social Sciences

Chair: Juan Maestre. Catedrático de Sociología. Univ. Seville.

Sergio Tobón (Universidad Complutense de Madrid) (Spain) y Ariel-César Nuñez-Rojas (Universidad de Manizales). La formación de competencias investigativas en la Educación Superior de Colombia: un análisis hermenéutico de la política de calidad estatal.

Blanca Miedes y Dolores Redondo. Observatorio Local de Empleo. Fac. Ciencias Empresariales. Universidad de Huelva. (Spain) La ciencia social al servicio de la gobernanza en la sociedad del conocimiento.

Antonio-Luis. Hidalgo-Capitan et alter. Depto. Economía General y Estadística. Universidad de Huelva. Autorregulación de la economía mundial.

Andrés Sampedro, Jose Antonio López, Luis Blanco y Mencía Muro. Universidad de Oviedo (Spain). La difusión de cultura científica como actividad de transferencia universitaria.

Jose G. Birlanga Trigueros. Universidad SEK, UNED, Segovia (Spain) Saupere Aude: Pensamiento Científico, versus divulgación social.

Christine C. George, Chiara Sabina & Apama Sharma. Centre for Urban Research & Learning. Chicago Loyola University. (USA). South Asian Inmigrant Women and domestic violence in the USA. Findings from university community research.

Pierre Beaucage. University Montreal, Québec. (Canada). Afirmación identitaria y difusión de saberes indígenas.

Ramon Garcia Dils. Sociólogo. (Spain). La experiencia de las Escuelas Populares en el desarrollo de una educación horizontal en Cataluña.

Tiago de Sousa Brilhante Pedrosa. Social learning tools (SLoTs): the VGAS experience.

Parallel session II.3. Opportunities on urban regeneration (TEMPUS /FIPSE Workshop)

Chair: Phil Nyden. Centre for Urban Research & Learning. Loyola University. Chicago. USA.

Francisco Oñate (DG. Educación Medioambiental. Consejería Medio Ambiente, Junta Andalucía), Luis Hornillo (Plataforma del Pumarejo & Ateneo Verde) y Teresa Rojo (Univ. Seville) (Spain). La educación ambiental como instrumento de dinamización participativa del barrio urbano: la Plaza de Pumarejo de Seville. Barbara Hadenfeldt. Institute of Urban and Regional Development. University of California, Berkeley (USA). The University in the Community: managing collaboration.

Luis Andrés-Zambrana / Fco. José Torres Gutierrez (Universidad y Compromiso Social) & Juan José Jiménez Palacios (Polígono Sur). Enseñanzas colaborativas para la regeneración urbana en Seville

Jacques Pain. Univ. Paris, Nanterre. (France) & Ricardo Martinez. Univ. Setúbal (Portugal). Developing techniques for urban youth integration.

Jill Roberts. Saint Mary's College, Notre Dame, IN, USA. Collaborative research on juvenile delinquency in the US.

M<sup>a</sup> Angels Alió. Dpto. de Geografía. Universidad de Barcelona (Spain). Oportunidades de investigación colaborativa del territorio desde la Universidad de Barcelona.

Sam Marullo (Georgetown University, USA), Phil Nyden (Loyola Univ. Chicago), David Hall (Univ of Liverpool, UK), T. Rojo (Universidad de Sevilla), Sarah Jane Know, Organization of the NorthEast (Chicago, USA); and Nancy Aardema, Logan Square Neighbourhood Association, (Chicago, USA): Curricular Framework for Sustainable Equitable Community Reinvestment

Parallel session II.4. Opportunities in technical developments

Chair: Emilio Fontela. Decano de la Facultad de Económicas. Universidad de Nebrija (Spain).

Ana Vilas Boas et al. Federal Rural University, Rio de Janeiro. Brasil. Facing Digital Exclusion

Tali Tal. Technion Israel Institute of Technology (Israel). An Ecological Garden as a Learning Environment that Supports Environmental Awareness.

Eduardo Morales-Ramos. Instituto Tecnológico de Monterrey. (México). El papel de la ciencia y la tecnología en el sector agrícola mexicano.

Rick Worthington. Pomona College & Loka Institute (USA). Community participation in US nanotechnology R&D policy.

Manuel Lopez Peña. (Spain) Infraestructuras y procedimientos para la mediación ciencia y sociedad. Experiencia del centro de tecnologías del reciclaje.

M<sup>a</sup> José Asensio, Manuela de Paz, (Univ. Huelva), M.I.Franco-Ligenfert (Fundación Valdocco). El Plan Integral de Distrito V de Huelva.

Stefan Deegener. Institute of Municipal and Industrial Wastewater Management. Hamburg University of Technology (Germany). Ecological Sanitation.

Marta I. Gonzalez and Betty Estevez. Dpt. Ciencia, Tecnología y Sociedad. Instituto Filosofía CSIC (Spain). Comunicación, argumentación y negociación en conflictos ambientales: el caso de la energía eólica de Cádiz.

Parallel session II.5. Opportunities in Health Sciences Cooperation

Chair: Miguel García Guerrero. Director del Centro de Investigaciones Científicas Isla de la Cartuja. Sevilla (Spain)

Denae Friedheim. Saint Mary's College. Notre Dame. (USA). Diagnosing Distraction: society effects on prescribing methyphenidate.

Karen Hye-cheon Kim. Univ. North Carolina- Chapel Hill (USA). Lessons learnt in collaborating with African American Churches to improve health

Kovacs Burns. Univ. Alberta. Fac. Nursing. (Canada). A canadian partnership of patient and citizen groups engaged in national health initiatives and policy discussions

Jennifer Kauper-Brown & Sarena D.Séller. North Carolina & Washington Universities (USA). University Community-campus partnership for health.

Lynn Langille. Atlantic Health Promotion Research Centre (Canada). Partnerships for health research: strategies for collaboration.

Diana Cupsa, Ilie Telcean, Zoltan Ellenees. InterMediu. Univ. Of Oradea. Dpt. Biology. Fac. Sciences (Romania). Involving citizen participation in allergic pollinosis prevention.

Selen Yegenoglu, Aylin Acar, Hacettepe University School of Pharmacy (Turkey) Patients' rights in health care sector in Turkey.

Laura Rossi, Ramos Jesús, Ghiselli Andrea, Manzi Pamela, Mastrobuono Tiziana, Ciampietro Mario. National Institute for Research on Food and Nutrition (INRAN) Rome (Italy). Learning how to make better choices about our food, our life, our future. Interfacing scientific knowledge traditional wisdom, daily problems and cultural values.

**Plenary session:**

**PROCESSES, TOOLS & INFRASTRUCTURES IN SCIENCE & SOCIETY.**

Chair: Jose-Maria Flusa. Presidente de la Conferencia de Consejos Sociales de las Universidades Españolas (Spain)

Peter Nijkamp: Chair of Netherlands Organisation for Scientific Research (Netherlands). Advancing societies' influence on research agendas.

Shigeru Miyake. Research Institute of Science and Technology for Society (Japan). Promoting risk communication in Japanese Chemical Industry. (Japan)

Eurig Scandrett. Co-ordinator Friends of the Earth – Scotland (United Kingdom). Increasing NGO participation in research and the policy agenda.

Marina Lobo, Joana Soares, Joao Serpa, Antonio Cámara, Edmundo Nobre, Luis Cerqueira e Nuno Banza. Fac. Ciências e Tecnologia Univ. Nova de Lisboa, YDREAMS e Câmara Municipal do Barreiro (Portugal). Geo-virtual reality and participatory planning: new technologies for public participation (small audiences) in Barreiro

Jeffrey Will & C.H.E. Owens. University of North Florida. (USA). A decade of creating Community-University partnerships

**Parallel sessions:**

**PROCESSES, TOOLS & INFRASTRUCTURES IN SCIENCE & SOCIETY.**

Parallel session III.1. Networks.

Chair: Anabel Carrillo Lafuente. Presidenta del Consejo Social de la Universidad de Córdoba. (Spain).

Kirsten Von der Heiden. Communication Scientist & Land Use Researcher, Berlin (Germany) Improving social and environmental contributions towards sustainable agriculture: GRANO Research Program (BMBF) on Agricultural Extension".

Miguel Presencio & Alain Labatut. Consejería de Bienestar Social. Junta de Andalucía. Sevilla. (Spain) El proyecto REVOS: Red Europea del Voluntariado Social / The REVOS project: European Network for Voluntary Services.

Maureen Butter. Science Shop for Biology. Univ. Groningen. (Netherlands) & Margriet Samwel (Germany). Internationalization and international NGO networks: ANPED the Northern Alliance for Sustainability & WECF Women in Europe for a common future.

Herminio Irizarry, Inst. Tecn. Monterrey (Mexico) & Felix M.Cortes, Univ. Pontificia (Puerto Rico). A global perspective of business cluster and network developments

Eelke Wrieling. LINK Consult / Agricultural Economics Research Institute. Wageningen University and Research (Netherlands). Knowledge in living networks.

Michael S. Joergensen. Technical University of Denmark. (Denmark) European Union Research Networks.

Elise Kamphuis. Science shop of Economics, Management & Organization. University Groningen (Netherlands) What should ISSNET implement to improve its Science Shop networking?

#### Parallel session III.2. Participatory tools

Chair: Francisco Fernández. Política Mediterranea / Mediterranean Policy. (Comisión Europea). EASW, an European Methodology for technology policy options.

Lars Karlson. Dpt. Education. Lund University (Sweden). Participatory Worklife Research through Research Circles.

M<sup>a</sup> Teresa Ocaña-Moral, Rocío Quijano, Miguel Pérez-Ferra, Luis Carlos Vida-Sagrasta. Universidad de Jaén. (Spain). Tratamiento de los contenidos del módulo de desertización, basuras y gestión del agua y su adecuación didáctica en entornos cerrados.

Barbara Bodorkos, Balint Balazs, Gyorgyi Bela, Gyorgy Pataki. Institute of Environmental and Landscape Management. St. Istvan Univ. Godollo. (Hungary). Participatory community development in the south Borsod Region

Ricardo Mateus. Escola de Samba "Batucatu". La música como instrumento de relación e integración social en las sociedades del conocimiento.

Carole Levesque, University of Quebec (Canada). DIALOG network. On native questions. A new and innovative alliance between universities and aboriginal communities. (Canada)

Gregorio-Jesús Fernández-García. Prof. Formación Ocupacional, Sindicato Comisiones Obreras, Seville (Spain). Las técnicas participativas para la animación socio-cultural.

Cristina Gouveia, Alexandra Fonseca. Instituto Geografico Portugues, Lisboa, Portugal. Senses@watch. (Portugal)

#### Parallel session III.3. Infrastructures

Chair: Enrique Román Corzo. Presidente de Consejo Social de la Universidad de Jaén. (Spain).

Luis Carlos Vida-Sagrasta, Rocío Quijano, M. Pérez-Ferra, M<sup>a</sup> Teresa Ocaña-Moral. Universidad de Jaén. (Spain). La ruta del agua: los Museos de la ciencias como herramienta didáctica para jóvenes.

Shabtab Dover The Belmonte Science Laboratories Center Authority for the Community and Youth. The Hebrew University of Jerusalem, (Israel). The Wonder of Science.

Saskia Visser. Science Shop Language & Communication. Univ. Groningen, (Netherlands.) Research helpdesk for pupils.

Benedykt Puczkowski. Fac. Law and Administration. University of Warmia and Masuria. in Olsztyn (Poland). Intercultural communication and Building the global society

Marta Soler (Univ. Barcelona) y Lourdes Rue (CREA, PCB. (Spain) Abrir el parque científico al barrio. Opening the Science Park to the neighbourhood.

Iris Sliedrecht - Van Lavieren. Tilburg University (Netherlands). Centre for knowledge transfer: a digital view on a way of working with knowledge transfer

#### Parallel Session III.4. CBR's Management Workshop

Organiza /Organiser: Jennifer Kauper-Brown. (Community Campus Partnerships for Health), Diane Calleson (Univ. North Carolina-Chapel Hill) & Sarena D.Séller (Health Serv. Dpt. Univ. Washington). Building and maintaining effective community-institutional partnership. An interactive session.

#### Parallel session III.5. Science Communication

Chair: Jose Manuel Gomez y Méndez. Dpto. Periodismo. Facultad de Comunicación. Universidad de Seville.

Armando Menéndez-Viso. Universidad Nacional de Educación a Distancia. Madrid (Spain). Los artefactos como instrumentos de divulgación tecnocientífica.

Ann Van de Auweruert. Univ. Antwerp. (Belgium). Science communication escalator: How to manage science communication.

Jose Manuel Gomez y Méndez y Sandra Méndez Muro. Dpto. Periodismo Univ. Seville. (Spain). Periodismo útil y sociedad civil Antonio Cascales. Facultad de Comunicación. Univ. Seville. (Spain). La construcción mediática del fracaso en las Olimpiadas de Atenas.

Melisa Guevara Paredes. Facultad de Derecho de la Pontificia Universidad Católica del Perú (Peru). La enseñanza del derecho a través de medios de comunicación masiva

Karin Ree, Maria Hermsen & Annette Scheepstra. Science Shop Groningen (Netherlands). Science meets Society.

Jordi Mas Catalan Foundation for Research and Innovation. Science weeks as tool for public awareness of science. Spair Norbert Steinhaus. Science Shop Bonn (Germany). The Living Knowledge Magazine – Experiences and future opportunities.

#### **Plenary Session:**

#### **CONCLUSIONS**

Chair: Peter Levesque. Social Sciences and Humanities Research Council of Canada

Carmen Teodosiu, InterMediu, Technical University Iasi, (Romania) Phil Nyden. Centre for Urban Research & Learning. Loyola University. Chicago. USA.

Caspar de Bok, Coordinator of "Living Knowledge" Network and of ISSNET Project "Improving Science Shop Networking

Farewell: Juan Maestre. Catedrático de Sociología. Univ. Seville.

#### **POSTER SESSION**

Chair: Patricia Rojo. Pax Mediterranea. (Spain)

Poster 1: Diana Cupsa. University of Oradea (Romania). Some ways of preventing giardia and other parasitosis transmisión to the human host.

Poster 2: M<sup>a</sup> Jose Miranda. Dpto. Ciencia, Tecnología y Sociedad. Inst. Filosofía CSIC.(Spain) Las diversas clonaciones en los medios de comunicación españoles.

Poster 3: Kirsten Von der Heiden & Wolfgang Endler. 'Kubus' Science Shop. Technical University of Berlin (Germany). Preliminary study on expectations and cooperativeness of german experts on transnational networking in the field of water management. A preliminary ISSNET study.

Poster 4: M. Alexandra Abreu Lima. Estac. Agron. EAN INIAP. (Portugal). One Step further: from Portuguese Young student's perceptions about plant biotechnology and their ethical reasoning about S&T to adult visions about these issues.

Poster 5: Kirsten Von der Heiden & Wolfgang Endler. 'Kubus' Science Shop. Technical University of Berlin (Germany). Science Shops bridging the gap between research and society.

# Speakers List

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**A**t the beginning of February 2005 around 250 people from 30 countries all over the world participated in a three days international conference in Seville, Spain, which focused on ‚Advancing Science and Society Interactions‘. This 2<sup>nd</sup> ‚Living Knowledge‘ Conference, organised by the International Science Shop Network and financially supported by the European Commission, offered a unique opportunity to scientists, policy-makers and practitioners in community based research to share experiences and build networks for approaching citizens participation in science.

With over 100 presentations - not only from an European context but also from North-, Central- and South-America, Africa, Middle East and Far East - the 2<sup>nd</sup> ‚Living Knowledge‘ Conference offered of a the huge palette of different experiences and interesting examples of community-based research and science and society relations.

This publication shows the presentations of the plenary sessions and adds information to the presentations of the plenary sessions. All speakers' abstracts and their submitted additional material can be found on the enclosed CD.

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