Human Public engagement for good governance: the role of the Humanities

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Contents

Acronyms

ANC	African National Congress
CEO	Chief Executive Officer
CERILAC	Centre de Recherche Lettres Arts Cinéma (Université Paris Diderot)
CSIR	Council for Scientific and Industrial Research
DST	Department of Science and Technology
EFF	Economic Freedom Front
FSC	Fondation Sciences Citoyennes
HSRC	Human Sciences Research Council
HSS	Humanities and Social Sciences
IDP	Integrated Development Plan
LSM	Living Standard Measure
MA	Master of Arts
MASIS	Monitoring Policy and Research Activities on Science in Society (European Union)
MISTRA	Mapungubwe Institute for Strategic Reflection
NEDLAC	National Economic Development and Labour Council
NISCAIR	National Institute of Science Communication and Information Resources
NRF	National Research Foundation
PAIA	Promotion of Access to Information Act (no. 2 of 2000)
PCST	Public Communication of Science and Technology
PE	Public Engagement
PUS	Public Understanding of Science
SAASTA	South African Agency for Science and Technology Advancement
SAMEA	South African Monitoring and Evaluation Association
SASAS	South African Social attitudes Survey
SC	Science Communication
SLP	Social and Labour Plans
SSH	Social Sciences and Humanities
STEM	Science, technology, Engineering and Mathematics
STI	Science and Technology Innovation
TV	Television
UK	United Kingdom
US	United States

Executive Summary

The Department of Science and Technology (DST) and the Human Sciences Research Council (HSRC) hosted a policy workshop entitled 'Public engagement for good governance: the role of the Humanities'. The event took place at the Conference Centre of the Council for Scientific and Industrial research (CSIR), Pretoria on the 11th March 2015 and was attended by 71 delegates from the public, academic and other research sectors.

Reflexivity in science and institutional creativity

Professor Joëlle Le Marec, Centre de Recherche Lettres Arts Cinéma (CERILAC), Université Paris Diderot

People in Europe contemporarily trust science, but mistrust the political abuse of science, or political management of national priorities. The various forms of involvement in science entail the construction of facts (by scientific laboratories and/or by fieldwork observation, counting, identification and cartography); the conception of research questions and methods; the political management of priorities and divergent lobby groups; and the creation of research institutions. There is a lengthy history of changing relationships between science and the public. The first social sciences institute in France was established in 1799 but it was closed by Napoleonic directive and a professionalised manifestation emerged in 1804. Until the 1970s, scientists did not seek much input from the public. Thereafter, a recognition of the knowledge of the layman became increasingly common, with the establishment in France, for example, of Ministries of the Environment and of Culture. Since the 1990s, however, in parallel with a crisis in representative democracy, public participation in science has challenged the technicist authoritarianism of scientists with the burgeoning use of social networks. More recently, a new chasm is emerging between the fieldwork-orientated work of disciplines such as biology, geography and ethnography, and the high-tech methodologies utilised in the 'big science' pursuits of genetics and biodiversity. Although there is no common contemporary understanding of 'citizen science' and 'public participation', it is critical that cognisance be taken of minority views and 'responsible science'.

Science, Public Engagement, Citizenship in the 21st Century

Professor Bernard Schiele, University of Quebec, Montreal

Public engagement refers to two-way engagement, as opposed to one-way science communication. Public engagement entails a diversity of interests reaching consensus, directly or indirectly. World history between 1945 and 1980 indicates that the dropping of atom bombs in Japan in 1945 was an undisputable watershed moment for scientists, heralding the advent of their undisputed absolute authority. This paradigm weakened between 1972 and 1995 as the role of society in science was recognised. Input from lay people became more acceptable and scientific reports became more readable by the general public. Global mobilisations occurred in respect of environmental issues, nanotechnology, biotechnology and genetically modified organisms (GMOs). The co-production of knowledge by scientist and society emerged strongly as the deficit model was replaced. In recent decades, there has been a movement away from the perception of widespread scientific illiteracy to a greater exercising of democratic rights to challenge vested interests and 'expert' knowledge. It is becoming impossible for anyone to remain indifferent to issues of the environment, or to labour. Pervasive communication technologies have a continuing impact on knowledge and attitudes, with a constant flux of contradictory information. Although this promotes new forms of participation, a challenge is that is increasingly difficult to differentiate knowledge from opinion. In a complex society with reciprocal interdependency, no one or no grouping can claim to be at the centre of development. The consequences are an equality of interlocutors, and greater transparency, which enhance participation and engagement, comparable to islands in an expanding archipelago. The new heterogeneous frame of reference is that 'the public' has become a multiplicity of 'publics' and 'science' has become 'sciences', developing in a context of complexity, competence and reciprocal equality.

Asymmetries in science engagement are becoming symmetrical, compulsion is being replaced with collaboration, dependence with autonomy, submission with reciprocity, and transfer with mutualisation, and conventional modes of engagement with others that enhance inclusiveness.

Promotion of Public Engagement in the South: a Transdisciplinary Approach

Professor Gauhar Raza, National Institute of Science Communication and Information Resources, India

The world is watching South Africa, a great experiment in new democracy. The birth pangs and the learning process should be complemented by international experience in science communication. Engagement with scientific temper is critical to democratic development. It is not appropriate to assume the deficit model of a

strict dichotomy between professional scientist and uninformed, ignorant public. Different cultures and prevailing thought-processing methods, have resulted in different responses to science, as evidenced by the examples of India and China. The hallmark of science is inward-looking and self-referential, to repeat the questions and to engage with the changing answers, as has been done historically with the transitions from 'flat earth' to globe; from centre of the universe to edge; DDT from solution to problem; aspirin from positive to questionable. Although such transitions are engaged in a uniform way by scientific communities, they can be very unsettling for the ordinary citizen. It is incumbent upon scientists to convey innovation with the greatest possible, in spite of their training in scepticism. It is wrong to expect to teach all science to all members of the public. A major question is 'what science should be communicated to the public'? Nobody on earth can be properly designated as scientifically illiterate. This is the flaw of the deficit model. Common citizens use both scientific as well as extra-scientific cognitive processes in their daily lives. The proportionate distribution of their behaviour depends on access to scientific knowledge. Scientists have a duty to increase the proportion which is purely rational. Post-enlightenment science is now highly compartmentalised into super disciplines, disciplines and sub-disciplines. For example, a scientist in superconductivity is seen as a layman by a nanotechnologist. Resistance to new technological ideas and science is related to ideologies, as evidenced by the murder of a science communicator by fundamentalist Hindus in India, after the introduction of a government bill to counter superstitious practices. TV series such as 'Big Bang Theory' serve to enhance the popularity and accessibility of science. India is experimenting with new ways of science communication. These include programmes which publicly engage with scientists at a personal level – their challenges, achievements. What excites scientists may not excite the public e.g. Einstein's 'beautiful' equations, the cosmos. What must be communicated the use of the scientific method, to ask questions, to validate, and to triangulate, rather than to expect everyone to become a scientist. Science communication is not a scientific process, it must be achieved in terms of the rules of culture and politics. Science communication cannot be done using scientific method.

Science Measurement and the Public Understanding of Science

Mr Saahier Parker, Human Sciences Research Council, Cape Town

Access to information has increased exponentially, such that the effect of a message going 'viral' on the social media can become destructive. Nevertheless, science myths prevail and a recent edition of Time magazine (7th March 2014) highlighted ten such myths that "won't go away". These included the contentions that the seasons result from changing distances from the sun; primitive humans crossed paths with dinosaurs; the moon has a 'dark' side; and that (you can kill a virus; lightning does not strike twice in the same place. A good system of science communication is a national asset. The launch of the USSR sputnik into space in 1957 and President Kennedy's 1963 speech predicting a mission to the moon served to spark international cold war paranoia. Subsequent decades have seen growing scientific literacy, public participation, and mediation of scientific innovation in aspects ranging from nuclear bombs to mad cow disease to genetically-modified organisms. A skilled communication system is a national asset. An important dimension of the shift is encapsulated in Kantian versus Marxist analysis, the extension of knowledge from an exclusive elite to an increasingly educated populace. Martin Bauer (2008) observed that "…none of the new discourses made the previous ones obsolete, as research continues to enhance and expand the agenda". SASAS has identified the existence of several South African 'publics' in terms of the differences in attitudes towards, knowledge of and sources of information about science. Responses to one of the SASAS questions revealed a 17% increase in agreement with the contention that 'we depend too much on science and not enough on faith' between 1999 and 2010. Potentially relevant variables appear to be age, culture, access to information, race, employment status, income, religion, class, educational level and political affiliation. Further work on this during 2015 is expected to generate a Science Culture Index (SCI) for the country. Developed by Bauer and Shukla (2009), the SCI incorporates knowledge, attitude toward science, interest in science, level of informed-ness and involvement in science engagement activities. Science communication needs to expand its objectives from mere knowledge transfer to promotion of interest; increasing the perception of science as fun; and facilitating wider public appropriation of new practical skills and capacities in engaging new technologies.

Political challenges for public communication

Dr Hester du Plessis, Mapungubwe Institute for Strategic Reflection, Johannesburg

South Africa's Science Engagement Framework (2013) "embraces a broad understanding of 'science' or 'the sciences' and encompasses systematic knowledge" of the natural, engineering, medical, agricultural, social, and indigenous sciences, as well as technology, the innovation chain and indigenous technologies. The Framework recognises that public engagement requires awareness and discussion of scientific and technical as

well as social and attitudinal aspects of science-related issues. Deserving of further research is the role of the individual 'rock star' scientist or intellectual versus the collective intellect. The prevalence of Ebola in West Africa illustrates this point. The experience and public pronouncements of low profile medical professionals are elements in the domain of science communication, that are critically needed to counteract public antagonism towards health workers perceived to be contaminating neighbourhoods in affected regions. A legacy of the French Revolution are the three principles that social change is desirable; the state should manage social change; and that the state is legitimised by the people. Chaos theory (Nowotny, 2001) is of utility in elucidating uncontested middle ground. European Commission's Monitoring Policy and Research Activities on Science in Society in Europe (MASIS) 2012 report 2012 in Europe asserted that society must be fully engaged and that the precise dynamics of engagement need further research. Mobilised resistance and public disobedience (Derrida, 1998; Foucault, 2001) to bureaucratic ineptitude and misunderstanding of technological innovation could be lessened by improved performance on the part of organisations such as NEDLAC, in promoting public dialogue. International resistance movements such as evidenced by the Arab Spring and Occupy Wall Street, have been easily mobilised by social media networks. Collectives are proving more effective than individual 'rockstars'. Evidence exists that community organisations lack the capacity or boldness to engage with authorities on issues that affect them and that experts pay inadequate attention to public responses. Nevertheless, it should be remembered that whereas science is tasked to create knowledge, the socio-political economy is tasked to solve problems. Rationality should be combined with emotional maturity in all decisions emanating from scientific advances. The relationship between science and philosophy has always been close and the tools of history should be applied in science communication. Hegel elaborated on the need for administration to be politically neutral in order to be most effective, while Marx and Engels cautioned against the state being used as a ruling party conspiracy. Rawls advocated the use of the technology of the intellect. A balance should be found between a state run by people trained in the humanities such as the United States, and by scientists as in China.

Reflections and Recommendations

Professor Narnia Bohler-Muller, Human Sciences Research Council, Pretoria

It is incumbent upon the Humanities to promote public engagement with science by applying trans-disciplinarity which supersedes any specific disciplinary methodology. Care should be exercised in communicating complex concepts and terminologies to the general public in order to minimise misunderstanding or misinterpretation. A larger pool of informed individuals and institutions should be given opportunities to make public comments on science and technology issues. Stakeholder engagement should involve people at the coalface, such as activists, and private sector industry. The reasons for public resistance to science, engineering and technological innovation in South Africa should be interrogated.

Introduction

The Department of Science and Technology (DST) and the Human Sciences Research Council (HSRC) hosted a policy workshop entitled 'Public engagement for good governance: the role of the Humanities'**.** The event took place at the Conference Centre of the Council for Scientific and Industrial research (CSIR), Pretoria on the 11th March 2015 and was attended by 71 delegates from the public, academic and other research sectors.

Background and Rationale

The seminar presented an overview of the current practice of public engagement that aims to promote fair and transparent democratic governance in South Africa using case studies from some international countries. This included reporting on public participation as a consultative requirement in the integrated planning processes of local government.

Central to the discussion were the policy development, operational challenges and institutional arrangements that feature in the DST *Science Engagement Framework* (version 2, September 2013). Based on the understanding that public engagement embraces two distinct branches of research - Public Understanding of Science (PUS) and Science Communication (SC), it follows that the field is complex and diverse.

Science communication researchers study the impact of the media and other channels of communication on policy in order to ensure good governance. The topics of interest to science communicators are embedded within the multi-media communication process characterised through displays in science museums, science reporting in the media, TV, radio and knowledge exchange on the internet.

The field of research known as Public Understanding of Science (PUS) provides data to governments (for policy development) through global and national surveys - with the added functionality of developing comparative analysis models. To facilitate these models a theoretical framework is emerging that is in line with a transdisciplinary approach to research that facilitates growing interaction between the sciences and the social sciences and humanities (SSH). Researchers in both fields engage with the public and report on activities that include the popularisation of scientific research through reconstruction of scientific projects, reporting on new discoveries to the public and celebrate achievements and the initiation of new theories from a science-focused point of view.

The role of the humanities is central to endorsing the basic principles of science engagements with society: this includes ensuring the right to access to information; respect for traditional knowledge systems, commitment to the core principles of ethics and social responsibility and fostering critical citizens through the establishment of a scientific temper. Public engagement serves a dual function of transferring, interpreting and sharing new knowledge through mixed fora such as consensus conferences, citizen juries, expert panel discussions, scenario workshops and impact assessment modules. The complexity of engaging with the public takes place within a broad framework of ; 'citizen involvement', 'stakeholder engagement', 'participatory technology assessment', 'indigenous people's rights', 'local community consultation', 'NGO intervention', 'multi-stakeholder dialogue', 'access to information' and 'access to justice'.

The process of public engagement gave rise to the current 'science and society' paradigm. We find that the European Commission's Monitoring Policy and Research Activities on Science in Society in Europe (MASIS) 2012 report (www.masis.eu) considers the 'science in society' paradigm in Europe to be dominated by issues related to its role in sustainable development as well as its role to appropriate governance. In this regard the MASIS report states: 'Discussions and processes relating to the appropriateness of science in society should be inclusive and based on broad public and stakeholder engagement'. As driver for the Horizon 2020 research flagship, the MASIS 2012 report states that: '… the Europe 2020 societal challenges can only be tackled if

society is fully engaged in science, technology and innovation and it should be stressed that the dynamics of public and stakeholder engagement remains an important object for further research and experimentation'". With South Africa becoming a part of the broad international community of science communicators this report serves as guide.

It is within this frame of reference that the seminar reviewed current public engagement policies, operational practices and institutional arrangements. The seminar aimed to identify the gaps which could address the development of good 'public engagement' practice and relevant policy through an engagement with international experts.

The Workshop

A transcript of the workshop follows. In order to preserve confidentiality, the names of participants other than the main speakers are replaced with pseudonyms such as Mr X4 or Ms X2.

Opening

The workshop was opened by Professor Narnia Bohler-Muller.

PROF BOHLER-MULLER: Some colleagues will be late because of traffic as usual up here in Gauteng. So I think that we should start otherwise we're going to run out of time and our speakers are going to be cut short and the discussions will be cut short. So I believe that it would be best for us to begin and our colleagues will be coming in during the first part of the session. First of all, let me introduce myself. I will be the Chair of the proceedings today. My name is Professor Narnia Bohler-Muller. I am from the research programme called Democracy Governance and Service Delivery at the Human Sciences Research Council. My background is law and I am very, very interested in public engagement within the context of human rights. That's just to give you where I am coming from and if I ask any questions, that is the context in which I will ask them. I would like to very much welcome you all to this really exciting endeavour called Public Engagement for Good Governance: The Role of Humanities. It is co-hosted by the DST, Mapungubwe Institute for Strategic Thinking, or more easily pronounced MISTRA as well as the Human Sciences Research Council. I would like to begin by asking Dr Temba Masilela, the Deputy CEO of the Human Sciences Research Council to say a few words of welcome.

DR MASILELA: Thank you, Narnia. I'll keep it very brief and I hope colleagues don't mind if I speak from here. Just to really first of all acknowledge the support that the Department of Science and Technology has been providing for these series of seminars. Secondly, to really congratulate and thank my colleague, Dr Hester du Plessis, who conceptualised this particular research seminar and prepared the concept notes. I'd also like to thank our international participants and Professor Potgieter, the Deputy Vice-Chancellor from University of KwaZulu-Natal. I'd also like to acknowledge all of you who have made the time to come and participate in this seminar. I'm really looking forward to some robust engagements, engagement dealing with all of the controversial aspects of South African society and some recommendations that we can take forward. On that note, thank you very much, Narnia.

PROF BOHLER-MULLER: Thank you very much. We have some international guests here who are going to be sharing their experiences with us, which I think is very exciting and Dr Hester du Plessis has been very instrumental in bringing our guests from various parts of the world, so thank you very much for that. This is part of a seminar series. It's called the Human and Social Dynamics Research Seminar Series of the Department of Science and Technology, and as I've indicated co-hosted with HSRC and MISTRA. There is a purpose for the DST research seminars and perhaps we just need to think about that before we start. First of all its to disseminate research findings and transmit a body of knowledge, and so we are here to share and to gain something from one another, to provide an avenue for researchers to interact with one another, including from research councils, from universities as well as actors within the NSI, present and discuss ongoing research, identify gaps and I think Temba also mentioned trying to find a way forward, making some recommendations. So what we want to do, when we finish today at 3 o'clock is to have a couple of points that we can take forward in this regard. It's to reinforce the visibility of humanities and social sciences, and I think this is a wonderful opportunity for us to look at the humanities in particular. So the focus today is really public engagement with the humanities lens.

I do know that yesterday there was another similar event dealing with science communication and I will ask Professor Bernard Schiele and Hester to say a few words about that just now. To enhance public understanding of humanities and social sciences, and to strategically promote development coordinates into disciplinary research and also trans-disciplinary research, which is very cutting edge and very exciting. So the purpose and objectives of this particular seminar that

we need to keep in mind as we go on with our discussions, it is an overview of the current practice of public engagement that aims to promote fair and transparent democratic governance in South Africa and we're going to be learning from some best practices or good practices from other countries, but we're also going to be speaking about our own context and our own situation, and as Dr Masilela mentioned, some of the difficulties we have in South Africa around public engagements in order to strengthen democracy as well as governance.

So I don't want to read everything, because you've received the background to this particular programme which was kindly circulated by Arlene Grossberg, who is always the backbone of organising these kinds of events. The role of the humanities is central to endorsing the basic principles of scientific and science engagement with society. So there is an intersection that we want to look at today, focusing on humanities. The complexity of engaging with the public takes place within a very broad framework and there are so many terms, and sometimes we do not always think about the definitions of these terms, and it depends on the discipline you come from so that's why I like the idea of an interdisciplinary or a trans-disciplinary focus. We call it citizen involvement, stakeholder engagement, participatory technology assessment, indigenous people's rights, local community consultation, NGO intervention, multi-stakeholder dialogue, access to information, access to justice, public participation in the general sense of the word, and citizen participation which is what our Constitution focuses on. So, also the context that we are looking at this in is the fact that public engagements is actually entrenched within the Constitution itself. So the 1996 Constitution makes sure that we take into account in terms of building our democracy and establishing good governance within South Africa that we undergo processes such as participation and engagement. And there are, as we've indicated, best practices and good practices from all over the world including from the European Union. But we have people that have travelled far to join us today to make their presentations, and the first part of today will be listening to these experiences. The sessions will be broken up as follows: first of all there will be the presentation which will last 20 minutes, and I'll have to be a bit strict with that, so please for the speakers, I do apologise. It's not that we don't find your work interesting, but we want everybody to have an opportunity to speak. And then we will have ten minutes question and answer period from you, the people who are here to listen and to learn. So I'd like to introduce our first speaker, who is Professor Joëlle Le Marec – please excuse my pronunciation – from the University Paris Diderot and she will be speaking about reflexivity in science and institutional creativity, the ordinary turn, and her bio is in the programme so I'm not going to read that out, but I would like to welcome you and we are looking forward to hearing your insights.

Reflexivity in science and institutional creativity: the ordinary turn

Professor Joëlle Le Marec. Professor of Information and Communication Sciences at the Centre de Recherche Lettres Arts Cinéma (CERILAC) at the Université Paris Diderot

PROF LE MAREC: Thank you. Thank you very much. I'm very, very pleased to come here. It's a great, great pleasure for me to share with you and thank you, thank you, for the MISTRA, for being here. I thought when I can, sorry for my English because I'm, surely you will think a bit while speaking. So thank you also for telling me. So I'm dealing with an engagement, I said enlistment, I don't know if it, or responsibility and trust and about the condition of public today. My, who am I? Just in a few words, because I'm responsible for [unclear 0:10:48] for a master of scientific journalism in Paris. I think a lot about the future of the journalism. Thank you. My investigation in few words is essentially sociology and ethnography but also scientific or discourse about scientific matters, like cultural presence of science in the media, in the museum, etc., and practice and place of the public's trust of public's in institution, in media, etc. Ordinary communication and research context because as scientists we use very ordinary sociability and very ordinary knowledge and most of the time that is the most important part of the work. We trust in ordinary way of being in relation, etc. And I put common decency, well, I was very interested but I can, a generation of philosophy, young philosophy returning to … experience when he was in Spanish War, the best experience he had of Spanish War was not as he said, was

not heroism, was not a very heavy involvement, but was the ordinary daily life with like brothers and sisters and he said the major political lessons of what he lived in Spanish War in 1936 with common decency of ordinary laymen, and so, the treasure, the political treasure of ordinary sociability. And also practices of investigation and citizenship and my reference is Dewey, as you know for democracy is the capability of investigation for every citizen. So investigation is not only a technical and professional task for scientists, but every citizen could be saying what is happening here, I can begin an investigation. It's the condition of democracy for. And my engagement I don't put all, but I just chose that because of … collaboration for integral research cooperation between cultural institution, association and university. I don't have best practices but I'm trying to change a little bit our institution. Too much professional, too much technical rules, I think, opening those with association institution and trying to conceive programme, research programme tolerant to time, tolerant to debate, tolerant to errors, etc. Now first of all, three things. Political and cultural context of what I'm saying. There is a strong trust in science in European countries. There are some surveys and every year we can see that eighty or ninety percent of the European population trust science, but mistrust, I'm sorry, mistrust, political choice about science, and for example, there is some confusion between scientific research for the public as related to democratic values and search for common reality, freedom, etc., and confusion with scientific production of innovation for economical interest against what we call in French "bien commun", the common will or common interest. Since the '70s this term techno-science, it's not the same as science, but techno-science. I think it's related to production of innovation, technical devices, etc.

There's a crisis of technical turn in politics too. More and more research in science studies, philosophy, science philosophy, history of science, science of communication, etc., are interested about citizen science, a science made by laymen, amateur, against two, I think, against the technical turn in politics ruled by an expert in management, etc. And there is also a crisis, a good crisis I think in epistemology, a return to fieldwork. Not everybody be just to, we are also lost with our computers, but we don't do fieldwork reflexivity of what we do and above all I said, political value of ordinary choice, I think that is big thing humanities can support. Involvement in science, we are not speaking about popularisation or diffusion of science of media, etc., but in those four topics, I think, construction of facts for programme led by scientific laboratories, for example, lot of blood watcher or amateur in astronomy, they come, they look, they observe and they give freely. It's a gift, a gift to the community their results there, because they want to work for a common interest and they also have a love of that kind of activity. Second, the conception of question and method, there is recent history, gender … studies, citizen studies, showing some questions, for example, meet and question, with ... So that's, I think it's also a part of the ordinary term. The recognition of, for example, memories of forbidden things in France, the war with Algeria. Algerian community wants historian to take more interest in what happened to them, etc. The third political form of involvement is priorities. There's some association, for example, the asbestos – I don't know if you know, but in France there is a big scandal of the construction with asbestos with the council, etc., who ideas their association. They begin to push big lobbies to enter the political choice, for institutional question. For example, what we call boutique … is some institutions, very few of them, asking research university to do for them to respond to some questions. It's very linked to territory issues, for example, in the territory of Lyon in the south of France, there is one. There is a form of institution, people they make their own programme, they submit it to university, university submit it to politics and perhaps it will be taken in account. Just then I very quickly, there is a think a gap between professional and amateur and not between ignorant and servant, I don't know, but in just after the revolution the society of [unclear 0:20:49] was the first institution of social science in France and completely open to network way of working, etc., and their first case was the wild child who they found in France and make, there's a movie about the wild child. The wild child was the first case for that society and it was a big exit, it was very, very nice way of working for, also instruction for maritime expedition using ethnographic, geographical, botanical, astronomical, etc., knowledge. But Emperor Napoleon decided no. We want some more serious scientific institutions and decided to professionalisation of all science studies with wages, hierarchy, etc., where everything working exactly like in the other field of society when people work. So instrumental political and financial support and management workforce … of

science has non-professional activity. I saw but just astronomy, social and historical enquiries, weaknesses also, the case of ethnography with construction of knowledge with people and progressive recognition of their part, for example, Clifford, James Clifford, he wrote about that. Very quickly in the '70s in France there is a push … I think of, with the Ministry of Environment more cautious of the fieldwork with people, recognition, again recognition of the layman knowledge linked to territories and to … an institution, very interdisciplinary. The question of first science and society laboratories and in … where I stay, when he [unclear 0:23:26] made very strong critics of [unclear 0:23:32]'s vision of culture, he also open the door for conception of mediation, mediation in the construction of knowledge, etc. There is now, I think, something very ambiguous. There is a political crisis of representative democracy. People don't trust our politics because they all come from the same school, they have technical routines for managing the society, and there is an epistemological crisis in science studies. There is critic of internalist epistemology, I think, and a call for plurality and heterogeneity and ordinary decency. But at the same time, there is a strong market for expertise in social communication. So the other side, and market of so-called social networks and technical, sorry, participatory device. So I think there is quite a dual perspective in what we live today with participation. The … of too technical way of managing, etc., but there is a strong market for all advice, expertise and all the buzzwords you said about citizenry, etc., managed by [unclear 0:25:21] of professional agencies. They are linked to the government and they are linked to market also. So we have like a new [unclear 0:25:32] for progress of the public, but if possible worldwide market of technological devices for that. So I think movement for democracy and citizenship, but also we spoke of it with Gauhar, it also opens certain doors for hate for democracy, and we must be conscious of that. When we critique, are very critic with our democracy we also make a place for the hate of democracy. I do not know after, it's a question of trust, how we think, we think turn. Can we completely trust in our own will for democracy and science? Can we go very, very far in the critique? I don't know. I think we are in a difficult period. With whom do scientists and social scientists engage? And I put two names, Sandra Lugier and Albert … two French philosophers. They just wrote something about are you strong enough to open the democracy, to open to everybody, to lovers of democracy and to haters of democracy and they themselves they say if social scientists are absolutely, if their [unclear 0:27:26] they get more trust, more positive to the possibility of live the democratic values, difference democracy and the science and democracy, living democracy, taking the risk of being like witnesses, and experiment values of democracy in their own sociability, their own ways of making knowledge. It's real trust we have, but perhaps also there is some risk. I don't know, so I think, I don't know if, I cannot speak of good practice but I think we in France, what I would say that it's in sociability that we can rely on strongly, in constructed sociability in the field also, in the action, in the creation, etc., and we can afford the risk with that sociability and that is related to the thought of all well, about common decency. Thank you.

PROF BOHLER-MULLER: Thank you so much. I think that was really a good way to start the day, Professor, and I just, we will have, I think, 20 minutes for questions. If you'd like to sit down, you're welcome. There was so much in what you said and I love French philosophy, so the issues around democracy and potential for hate of democracy are very interesting. Your comments about becoming less technical and more tolerant, that we require some form of citizen science, but are we strong enough to deal with that and to deal with new stories and ordinary choices? And perhaps, if I could kick off with a question and then I'm going to go to the audience, allow three questions and then I will hand over to you. The first one is, I think it was Jacques Rancière, I don't know how to pronounce it properly, who said that democracy carries the seeds of its own destruction. And if you could maybe explain a little bit more around the hate or the fear of democracy that comes with very strong democracies. So that's the first question. Can I hand over to people in the audience? Anyone wish to ask questions related to this fascinating topic. Yes sir?

MR X1: My question is, you've referred to the fact that the elite in France, for example, are from the same mould, technocratic managerial, they are removed from the citizenship. Now in France it has led to a backlash in terms of support for the right wing in that country. So now we come to this thing of democracy, as soon as the right wing get a certain level of support, then people are questioning the fact of if they are really in favour of democracy. So you sit with this problem

that if you're in favour of democracy people can gain a majority of support by they're not necessarily democratic in nature. So that conflict and, just from your experience in France, where do you think that is heading in terms of the crisis of democracy in that country?

MR X2: Thank you very much. Joëlle, thank you very, very much for that. It was very, very interesting. I love the idea around public engagement and common decency. I was just wondering, in your opinion as well, in terms of the whole sort of dialogue in policy aspects around science, the impact for instance of something as dramatic as climate change, all of a sudden is affecting everybody and has huge policy implications, but also has implications for every single person, and so, and there's so much value that you can get from participatory processes because everybody's experiencing changes, so they basically are almost monitoring the climate as we speak, and that perhaps one of the major things that is happening as well in terms of distrust is people actually experiencing these changes around them, and yet they see the people that are making decisions for them internationally seeming to drag their feet and not doing anything and just wondering how that, the levels of frustration that would come through from a process like that.

MR X3: Hi. Just a question about, clearly France is one of the centres of science studies with, Baudet, Michelle Sales, Bruno Latour. It's a very lively area for science studies, and a lot of what you are saying shows that liveliness. I'm just wondering how do the scientists, the professional technocratic scientists, respond to that? Are they in or out of that? Because a lot of what we're talking about here is how we can communicate for science as humanists. My question in a way is, what are scientists doing to understand what's happening in the humanities around these questions.

PROF LE MAREC: … the last one of them. The last one, I think it links to the international, I think that we were used to put a gap between natural sciences and humanities and I think there is a new gap between fieldwork, however it can be, and big science, very big science. We had that experience. I made research some years ago and it was a big research, international with a lot of people, etc., human scientists, biologists, and the debate was between field people, biologists, field biologists, field geographers, field ethnographers, etc., and geneticists, very strong related to machines, very expensive machines. They could not afford to be late, they could not afford to move, so I think there is a kind of scientists for big science. They cannot follow humanities, they absolutely cannot know because too expensive, they know they are ruled by big agendas for their machines, … but I think there is doors for an opening in fieldwork, above all about a programme for biodiversity expedition, etc. And that links, I think, for what you said, because in the … I think was a strong way. It was the base of the crisis, of the crisis of mistrust, because I think people are far more wide about nature, relation, man nature than politics imagine, because we first saw that way for relation between nature and man during the year eighteen when politics felt it was just a new trend, from the trend people trying to have a nice consciousness and that it was a strong. So what you said, it's true that, what one problem is for example all the works, when we say the international agenda will rule problem of environment and that is exactly what is not [unclear 0:37:38] what is not wanted for part of population. They want to rule the things in the territories. For example, in France by now there are some big projects and people are moved by those big projects, project of nuclear waste, project of energy and they gather exactly like that, they gather to occupy parts and say we don't want to be ruled by international agendas. We want to rule now, and that's a choice for humanities because if scientists say as politics it's just a reaction of property, of fear, etc., people don't want to connect to resolve problems at an international level, it's unfair. It's unfair, because people gathering like that they won't not only gather for just a pond or just their garden. They want to rule, they want to make choice, etc. So I agree with you I think it's not, the problem is not that there is a local level and then international level linked, I think there is a gap between a technical way of managing international agendas and ways of ruling daily matters in environment and democracy. And what you say, it's a problem, I think it's, I think there is a big risk in France but also a big chance, because elective democracy doesn't function anymore. That's true what you said, it's true that we know that we don't have choice now. We don't have choice. When we go and when we vote we have choice for right and ultra-right, it's not a choice.

It's not a choice. So, that I think accelerate a desire for one part of the population to be in direct democracy and let the national deal for everything. Don't matter. But that also open those for hate of democracy, and yes, I don't know, that's a mystery. For me it's, we don't have the response, I don't know, perhaps that could be distrust here. I think it's a question of reason and trust, but it's also a risk.

PROF BOHLER-MULLER: Thank you so much. We have time for another three questions, if you don't mind, from the floor.

MS X2: My question is linked with …. democracy, and I'm wondering besides the hate, is there another element of not able to handle it? I mean, because we are doing a study and people are overwhelmed when there's so much diversity. They just don't know how to do it. Because we did a study and we went to the people and they say sometimes there are so many people and people lost inside, actually who one should focus? I mean, do you listen to the 5%? You need to include everyone. And then who do you listen to and when there are so many voices of putting all different directions, they just don't know what to do. And then interestingly, what we heard is that sometimes when people face those kind of situations they just withdraw because they just don't know how to do, and then, it kind of create a cycle. Then if you withdraw and then people want to kind of engage and they don't feel that they involved and then it just gets into that cycle. How do you deal with that? How do you deal with diversity?

MS X3: I'm trained as an economist, and I think it makes it very interesting to try and relate to a world which is more complex when economics would have you on the stand. I think my question is in some sense a comment and a follow up from what's been said just before me, in that there's a practice relating to bottom-up democracy and representation and participation where what's relevant for comparison is perhaps not France. But that does not mean that it's not important in this context of South Africa, and that we articulate clearly within closed circles is something that I want to put out there and that there are few individuals or even organisations that can bridge across society to elicit an agenda much less unpack very complex questions. And this isn't the same as to say that there isn't knowledge that resides within sectors of society that's important to understand in order to shape some shade future. But I think that we're very far from that, and that if you look at the Brazilian example where participative democracy has actually occurred heterogeneously, so you have comparison cases. You see that participative democracy works well to unpack specific types of policy, implementation, agenda information, but that it's not the be all and end all. Yes.

MR X4: My question is on the citizen science. I think you mentioned one of the developments in the area is citizen science and we've seen the literature that is actually a concept that is gaining a lot of popularity, but my problem is that going through the literature and even going through some of the case studies in citizen science, it seems there is no common understanding on what exactly this entails and also whether it is really an approach for public engagement or something else. So I'd like to hear your comment on those two issues. Whether there is a common understanding on what citizen science entails and whether it is really one of the projects for public engagement or for something else? Thank you.

Ms X4: I was very interested in your idea of a kind of democratic management of public engagement. I wanted to ask your opinion about the responsible research and innovation approach in the last research framework programme of the European Union because we don't know much about it in Argentina, but to me it looks like an appropriation of the rhetoric of public engagement and governance of science and technology, but it's empty of its original contents.

PROF LE MAREC: Oh, sorry. They wanted to product, the European Commission wanted social scientists and humanists to produce a lot of devices to manage and rule participation, that last four programmes, and now it's finished. They decided that it will be okay, we have sufficient devices for managing participatory sessions, etc., and that clearly that indicates that they don't take seriously caution of participation. They had four programmes in European to build devices,

forms of management of public empowerment, etc. But like buzzwords, it's true, it's true, because the last programme it's finished. If it was really politic and not technic it would expand, it would change with his own dynamic, I think. But now it's okay, we have enough agencies, we have enough to [unclear 0:47:53]. Perhaps I [unclear 0:47:54], it's true that I don't, usually I don't speak so in such a characteral manner but we have few time and some people in front of us are very characteral, so we can afford to be a little bit in that to understand each other. But what you say, you are absolutely right. Each time there are alternative way of making science, there are also a lot of debates and the strongest hostility is within those, we're for the same thing but with different manners. But just one case, it's Fondation, I will make the, Fondation Sciences Citoyennes (FSC), now it's one of the most important group of citizen sciences associations. It's not fully recognised by, but it's the one which have an activity of proposing law, legislation. They propose now legislation for good panel of laypeople. I don't know if I, it's true that there are buzzwords, but can they participate when there is a legislation session for science and society programme or something? So there are very concrete proposal from that foundation to the state, and I think that would be one of the powerful foundation. But it's true, you are absolutely true saying that there is no common understanding of what is behind, and I thought also about international level. I think transcultural debate is also far more interesting for us that international definitions or international levels or international way of considering things, I think looking, meeting like we do now, like meeting to see what is similar and what the differences are, but also what is the sociability we can construct in cross-cultural networks. It's international way of dealing with those matters, I think. That's what you need. And about the diversity and the voices, I think humanities and social science they can also say something about that because sometimes scientists, there say they are so much voices we cannot deal with everybody. We cannot. As if there were the state and everybody and as if the construction of society was by the vote, one voice, the majority, etc. But one of the reasons of social science, very big reason, is the construction of society very strongly constructed with association, institution, network, very complex but not, this is not only additions of voices. It's really a strong network and I think we could compare our network, social network that would be also a response for that critique. We cannot do with every voice, we cannot do with diversity. Yes, it's true it's a problem, but we also have a lot of intermediate, I don't know, a lot of structure, we can describe them and we can also produce a representation of our society, structured by association, by sociability, by institution and by creation every day of new institution, etc. Thank you.

Science, Public Engagement, Citizenship in the 21st Century

Professor Bernard Schiele, Science communication specialist, University of Quebec in Montreal

PROF BOHLER-MULLER: Okay, that's the end of the first session. So thank you very much Professor. An excellent way to start the day. We are going on to the second session dealing with international best practice. And this is Professor Bernard Schiele from science, well, he is a science communication specialist from the University of Quebec in Montreal, and Professor, I will give you some leeway in terms of time, if you could perhaps just deal with some of the issues that came up yesterday in terms of science communication, and hopefully that will also relate to your paper, if you don't mind.

PROF SCHIELE: I'd like to share. So there are three different pieces of information. One is related to interaction, participation and engagement. So there are three different sectors in the information [silence 0:56:57-0:57:50]. Thank you – refers to a two-way communication between experts, decision-maker, scientist and laypersons. Contrary to the one-way science communication which has characterised and dominated so far the relations between the scientific community are its representatives or spokespersons and the general public. On the one hand from a practical point of view public engagement is all about making decisions on matters that concern a community such as managing environment, health or risk. By bringing together a diversity of interacting competencies and interest in order to reach a consensus through public meetings, expert citizen panels, public hearings, deliberative forums. Sometimes

the engagement is indirect as public consultations, internet discussion groups. So to begin with, let's have a short, let's put it, let's bring the historical background to the front. So, to put it simply, one-way communication or information and scientific knowledge from expert to layperson characterised the 19th century and the greater part of the 20th century. It must be said the impact on society of science and techniques within [unclear 0:59:31] of technology back then was minimal. It is gradually that their old open society grow firmer and their power became manifest. The development of the atomic bomb during World War II was the watershed moment that revealed to all the transformative power of the scientist's knowledge, especially of the physicist. From then on all other forms of knowledge being depreciative, scientific or technical solutions were favoured above all else. The scientist's authority was absolute.

The creation by the US Congress of the Office of Technology Assessment marks a shift from 1972 to 1995 it add formation to analyse policy issues, having significant and technological component. At the beginning of the '70s it became evident that technologies have both positive and negative significant impact upon the environment and society, while the means to evaluate them were inadequate. However, its mandate went beyond the mere evaluation of scientific and technological policies. To fulfil its missions, it not only relied upon scientific and technological experts, but also on panels constituted by members of community that might be affected by them. In the same spirit evaluation reports were written in such a way that technical complexities might be understood by laypersons. Thus, the author contributed to a triple democratisation process, first, by including laypersons in its proceedings it signalled that its definition of the impact of science and technology went beyond purely scientific and technological criteria. Second, by making its reports easily understandable to laypersons it contributed to the scientific education of the public. Third, by making its reports easily accessible it contributed to the awareness-raising and the mobilisation of the public. For these reasons the author can be considered the first of the many public engagement initiatives that will characterise the '80s. Furthermore, the first consensus conferences which starts in the late '70s were conceived and their process invented in order to ensure that biomedical research contributes to the improvement of care practices. From then on they will spread fast especially in Europe.

From 1980 to today, in parallel, during the '80s the growing importance of environmental issues will contribute to the consideration of the public engagement movement. From the '80s, in response to growing global environment degradation they become a global concern. This new awareness led to a global mobilisation that is still very dynamic. On the one hand, our technology assessment agencies will spread. There were only three in the early '80s to eighteen today. On the other hand, they encourage public participation, yet, without systematising it, some of the methods developed in the '80s and the '90s are now used in the context of nanotech, biotech, GMOs and so on.

Today upstream engagement serves to anticipate innovation rather than to merely react to them. Thus, participatory process imply wider governance issues. However, the public engagement movement is globally larger and multi-form. It ranges from publicly speaking in a town hall meeting to coproducing new knowledge in participatory research, thus it covers distinct mode of participation in the pursuit of specific goals. Although we can refer to a two-way communication between expert and layperson, no definition exists that can adequately encompass all possible participatory practices. Thus, we must recognise that this movement is in fact a scope of distinct and distinctive practices. For this reason we must recognise that when a situation so requires that social actors as members of this community pursuing their own collective interests, mobilise or are mobilised around issues in order to debate or reach a consensus with all interested parties.
This raises two questions. What is public engagement, also called public participation, and who is the public when we refer to this concept? So, for a very long time we've talked about the deficit model and I would like to say a few words about it to make sure that we can compare what was the dominant paradigm and what is the emerging paradigm today.

So let's start by the old paradigm, the deficit model paradigm. I need some water. So at the age of the hegemony of scientific discourse the deficit model was the hegemonic paradigm of the relationship between the lay public and sciences and on the role that scientists are to play. Now, in view of its impact upon science communication practices that developed in the wake of World War II we can understand it as an ideology in practice. To put it simply, the deficit model relied on two assumptions. First, the general public was scientifically illiterate and two, thus they did not share the views of the scientists. So the public, it was believed, could not appreciate the value of science and therefore discussed the issues it poses. Thus, prior to forming any opinion on science topics – ten minutes left only? My God (used as an expletive) – the public should know more about science. Therefore, promoting science and public understanding of science became the late motive. Moreover, it was also believed that increasing the scientific knowledge bases of the population would naturally lead to a positive attitude towards science. In short, more science meant more valuation of science. In practice, the deficit model reproduced the dominant school model at the time, the scientists as teachers and supposedly ignorant public as pupils. However, this model cannot fill the knowledge gap between the public and the scientists, while the ever-increasing rate of new knowledge production makes it even more unlikely regardless of the effort invested. More problematic, the media usually presents scientific news out of context. Thus, devoid of any meaningful signification it lacks interest and relevance for the intended public. Finally, the deficit model strengthens a technocratic approach that limits the tackling of science and technology issues to experts. So we have to move beyond the deficit model, and this issue, move from the mastery of scientific knowledge to the exercise of democratic rights, and this is how we move from one paradigm to the other. In other words, we move from science to the democracy and that makes a major change in the way we relate to science and the way we deal with science content and science decisions. If I have enough time left, I'll try to develop that point. I'll put it very, very simply because you're familiar with those questions, so I'll keep it to what it seems. Today we are dealing with a global impact of science and technology upon society, environment, labour structure and daily life. Such is that, that no-one can remain indifferent. You all know about that. In parallel you might not be aware of that. This has a strong impact on what we might call authority, and we observe some sort of legitimacy crisis of authority figures, including science. And I think that my colleague referred to that when she discussed about the different movements that we're challenging, how we perceive democracy today and what are the different models we are trying to experiment to invent something new. But far beyond that is some sort of crisis of legitimacy and I think it's an overwhelming transformation of how we relate to science because science has been considered up to now as the ultimate and absolute authority.
Three, the third element to consider is the pervasiveness of communication technologies. The impact is much deeper than we think, because we are constantly, I would say soaked, so to speak, in a constant flux of contradictory information. And I think this is what you were referring to when you asked your question before. So, after it's well-established we can't avoid pinpointing to the explosion of communication technology and of information and knowledge production centre. The pervasiveness of this technology results in a constant flux of information that notably subvert traditional form of communication and dramatically increase the number of often contradictory information sources. It also results in the creation and development of new form of participatory collaboration. Thus, it becomes increasingly difficult to differentiate information and knowledge from opinion and judgement. And this is some sort of difficulty we have to face every time we consult the internet.

So these three changes, impact of science and technology crisis, of legitimacy and pervasiveness of communication are some of the factors that are playing, I would say, I would think, a very important role in the transformation we are going through now. So I'd like to say a few words now about the origin of participation and engagement. What was characteristic of the old deficit model was the fact that the relation was almost asymmetrical, and now people are looking forward to have some sort of symmetrical relationship, and this is a big change in the way, not only the way we relate to science but how we relate to each other in society, because we cannot think about relating to science without really thinking about how we relate to each other. And this is a big change. Much more important in my mind than the fact to master or not to master this particular type of knowledge. It's how we relate to each other that makes the difference.

So, second point ….. this evolution leads to a remodelling of the science communication apparatus, of the content of the changes and of the interaction of its actors. With the new keyword of participation and engagement in reaction to the old model of unequal and unilateral communication of knowledge between the literate speaker and the illiterate listener, symmetrical relationships between actors are now encouraged. However, symmetry does not imply that actors can claim to abilities and knowledge they have not yet acquired. Physicists, chemists, biologists will remain scientists and accountants, accountants, and so on, because role and abilities are not permissible. This is not the issue. We must now reflect upon the distribution of knowledge within society. On the one hand science allow us to form a world view and to understand the place we have within it. The progress of knowledge is therefore indispensable. However, this is not what is expected of scientists today. Scholars of the 19th and early 20th century may have assumed this role, yet the evolution of scientific practice transforms scholars into researchers. Research has now become a profession. It's radically different. They are doing a job. That's all. Now, every researcher has his own area of expertise and the research he or she conducts is far removed from daily life. In short the gap between new discoveries and common knowledge can only grow. Furthermore, as a result of this process the knowledge gap between scientists themselves can only grow also. An astronomer is not an astrophysicist. Our areas of research are constantly fragmenting into new ones, each one comparable to an island within extremely large and expanding archipelago. Our society is then characterised by an enormous hiatus between those who possess knowledge and those who don't, but rather by a multitude of fissures separating the specialists within the specialities and laypeople. Each one alone on their own island. In short, both the knowledge of laypersons and experts are mainly local and situated knowledge, only distinguishable by an area where they are mobilised and the context within they are applied. It's a completely different understanding of what science was, the ideal science we have in mind and the science that is really done in our modern society. Another aspect must be reflected upon, the society we live in is often called complex, and I think that my colleague referred to that complexity. In reference to a growing reciprocal interdependency of which individual, of which no-one and no regrouping can successfully claim to be its centres. I think this is what characterise our modern society. An increasing interdependency and multiple centres of decision constantly interacting with each other. Therefore, this constant sense of, I would say, contradictory discourse always circulating in society. So I think that we have to understand what are the changes taking place in our own modernity to begin to understand what public engagement might signify. So the turn we are taking is from the representative democracy to practice to daily [unclear 1:18:31] democracy. I think this is one of the major turns. We are trying to, yes, we are trying to try, if I may say so, in order to overcome the problem we are facing, and I don't know if we will find the proper solution. I don't know if it will lead to a better democracy or to the worst of what we might expect from democracy. But there is certainly a turn and people do not feel comfortable with the type of representative democracy we are living with now at the moment and are trying to invent a new form of participation, and they are trying to organise themselves to be heard and to be listened to, which is a little bit different. But just to complete my talk .. I'd like to stress what seems to be the major point that are taking place. We do not think in terms of the public, but publics. So what we thought was homogeneity is now understood as a deep and profound heterogeneity in society. And then we can distinguish between scientific knowledge and local knowledge because we recognise that each individual has, so to speak, his or her own expertise. So the problem is not to say which is the expertise of the [unclear 1:20:17], the question is how in a complex society which face us with the challenge of reaching a consensus can we work together? That's the problem and how can, from your perspective, from your expertise and from my expertise, can we find together, working together, a solution? So now heterogeneity is something that we have to keep in mind. Two, science is not something that is unified. It has never been, it was start so, but it has never, never been unified. It's an archipelago, and scientists now are professional and they are as ignorant as the layperson might be. This is complex, and now we understand that, and I have a friend who are building models for airplanes and she told me very, very frankly, I don't know how a model works because there are so many different people working together to make that happen that no-one can claim to be the only one who understands what's really working in a model. It's fascinating when you listen at this, it's frightening also, by the way, when you fly a plane. But anyway, complexity is another

characteristic of our modern society, and complexity in my very simple understanding means increasing interdependence, and increasing interdependence of course means increasing interaction and increasing the need to find ways to interact and reach together consensus. Competence then. People now are experts in their own field, and scientists are some sort of expert in their own field, but when scientists and laypeople are facing the effects of climate change they are totally equal, because they are both affected, either in their daily life or in the lab, whatever. This also made change. Finally, a point I didn't have time because of the precedent to address, in the deficit model we talked of the learner as some sort of passing learner. We expect media to bring knowledge to people and so and so. It never really happened that way. We learn in a context when we are faced with a problem we have to solve, when we have difficulty, when we need knowledge. Not when knowledge is simply thrown from somewhere, some place to anyone who might grasp it when they hear it or read it and so on. So we really engage ourselves into knowledge when we are sick, we look on the internet, what am I? What I'm feeling? And then we move to knowledge. So learning takes place within a context. And finally, finally, learning is facilitated in my mind by reciprocal relations. When you trust somebody and when this person trusts you, it seems to me it's much easier to share information and to learn from each other. And these are the, I would say we, if we want to think participation and engagement we have to change the vocabulary we use otherwise we won't be able to develop effective, simple effective model to really work together. So I think it's the start. I think that heterogeneity, archipelago of science, complexity, competence, situation, equality are some words we might have to keep in mind. And finally, before, before, before, I think that if I want to be a little bit more abstract I think we can distinguish between the deficit paradigm and the engagement paradigm. So if we look at the nature of relationships that will develop or are being developed between the people, I think we can [unclear 1:25:05]. So at the interrelation level we moved from an asymmetric relation to a symmetric, we are moving, in the process of moving to a symmetric relation. In the deficit paradigm the scientist, the teacher was the one who compel the one who didn't know to learn something. Now we are moving to collaboration. We're also moving at the level of interaction from authority, you must know that, to equality. Right, what can I learn from you but what can you learn from my own experience, and how can both of us can reach and find a solution or something like that? And at the [unclear 1:25:54] level we move from submission – I don't know, what can I do to learn more – to reciprocity – I might not be a biologist but I know a lot about that. How can each other could help each other? And we move also from an understanding of some sort of own differentiated personality – the public – to a differentiated personality. Each one has its own personality, its own knowledge, its own expertise and that's what makes [him or her] completely different and that's what give he or she the value she can contribute to the society. And finally we move to transfer to the mutualisation of knowledge. I didn't use the word sharing, but I prefer to use the word mutualise because sharing is simply exchanging. Mutualise means putting together, which is different. And finally, finally, finally, now you can use the pieces of paper I circulated. In those three sets of paper I tried to sensitise as best as I could the different mode of participation, engagement that are now, I would say, well-known, and I tried to see, I didn't do that myself, I relied a lot on people I read and so on and so on and so on, of course, to see what are the difference, for instance, between town hall discussions, science festivals, or a science café. What type of interaction are taking place? And what type of participation it is. And what I tried to do, I'm trying to distinguish between different form of participation because we tend to, I would say to merge and to put together different practices and each of these practices are very specific, are aiming at different goals, have different constraints, and trying to solve different problems. If you have any questions, I would be glad to answer to any questions. And just to conclude the conclusion, I would like to say that I think that, what I've been saying, okay, it's interesting, but I think that if people really want to be heard I think they have to organise themselves otherwise they can be in the street, they can make a lot of noise in the street, they can complain about anything in the world, if they don't get organised they won't be heard and they will never be listened to. So being revolted is one thing, being organised to make sure that changes are happening is something else. And for me, to put it simply, democracy is when you're organised and to make sure that your point of view is heard. It might be discussed, it might be contradicted, it might, and so on and so on. But, it's heard and listened to. That was about it. Thank you.

PROF BOHLER-MULLER: Would you like to take a seat? I think Professor Schiele has just proven Einstein's theory of relativity true, that time moves differently for the speaker and the listener. Thank you very much, Professor. We'll have to cut down a little bit on the question time, so I'm going to allow one round of three questions, and I think that the interesting part for me was really your comments about moving from a representative to a deliberative democracy. And now in South Africa we have a hybrid, we have both representative and participatory democracy and I think that causes quite a few problems and confusions, so perhaps you could comment on that. Any questions from the floor? Please remember to introduce yourselves.

MS X4: I guess the contrast between this presentation and the last roundtable that we hosted on the role of intellectuals in the formation of society is such a massive contrast in that being somebody who is younger and shall we say active, what you've proposed today is not revolutionary, but for the revolutionaries who characterised the transformation within South Africa who are still trying to exert influence and structure society, this might come as news to them. And I guess my question is how you facilitate a transition to a more inclusive dialogue that is informed, that does empower and capacitate all members of society to participate in decision-making processes, when the guardians of the existing decision-making process are invested in what is a conservative status quo?

MR X5: Professor Schiele, that was a very enlightening presentation, if I may say so. I'm interested in the whole notion of trans-disciplinarity and its implementation and impact. One question I always have that my wife is fond of probing me on is that, Jeffrey, when you talk about trans-disciplinarity, are you trying to say that, or the public engagement, are you trying to say that everyone can be an expert? What happens to the role of the institutions that we have established to create experts, to create specialists so that there's a separation in power perhaps between the experts and the non-experts. I guess, directly, I'm trying to ask you this question, when children are born they have the potential of being a Leonardo da Vinci, but the socialisation institutions that they eventually go through, the family, the schools, directs them in a particular direction. When you talk about public engagement and public participation, in the 21st century that is interlinked, that is complex, what is the potential of us going back to that potential that children have to produce renaissance men and women? Thank you.

PROF SCHIELE: I have no answer to that. What I'm trying to understand as best as I can are the changes we are going through, because my feeling is that we can be very active, and we can do a whole lot of things, but in order to make change happen it seems to me that we have to understand the process we are moving with, if I may say so. Instead of being, I would say, carried by the process to make sure that we understand and orient the process, otherwise we would always be involved in something without any possibility of really mastering or having a grasp on what's really going on. So if we switch from that perspective to the opposition between deliberative and the representative democracy, I don't know if it's the best way to state the problem. I don't know, I've no idea if it's really the best way to state the problem. Is there really an opposition between representative and between deliberative democracy? I'm not sure. I'm not sure. One thing is sure, I think that real deliberative democracy took place in Athens when there were a very few people able to discuss and allowed to do so, because there were those who really have a hold on the power of the time. So yes, at that time we could really think about deliberative democracy. That's not the case. That can't be the case in China when there is one billion and a half people living together. You simply can't think that. It's totally [unclear 1:35:58], Ethiopian. You can't do that even in Europe, that's not possible. That's not possible. So I think that some sort of representative democracy is here to stay for a very long time. But this by no means, means that there will be no deliberative process to involve as many as possible people to contribute to the decision, but it will never be in my mind, it will never be either this or that. That's not possible anymore. Societies are much too complex, much too integrated and the role of the institutions you referred to are so important and so, I would say, they play such a role in society today that they will, I think, in the next future they will certainly, they might change but they won't disappear soon, for sure. So we have to devise ways to cope with what I might say, those lure of interest because institutions are where interest are taking place and

project of society taking place and so on and so on, and people trying as much as they can to implant those projects and so on and so on. So, what we have to, ways to, we have to devise our ways and means to articulate all those interest in conflict and society and this seems to me much more realistic than some Utopian society. You have to get rid of this and that. I think it's never, it's not the way it works. So I think that big institutions are here to stay, but people also are here to stay and we will have some sort of constant necessity to better organise the interaction between those roles of interests at play in society. I think this seems to me much more realistic. As to how could we be more inclusive, I think that the different way, to refer to your question, I think that the different mode of participation that are emerging and that are taking shape are inclusive, are inclusive. They are inclusive in the way that they are taking into account the mind of the public to be heard and they are trying to develop different ways to make sure that each time a community is involved or affected or impacted by something, people of that community will have a say in what's going on, and they will change, they might change things, of course.

And what I am also very convinced that this deliberation process, if it is to sort of institutionalise itself, will work at the local level and not at the national or the state level, because the nature of the problem are completely different. You don't deal, for instance, just to take some sort of very, very big example, you don't deal with climate change at the local level. That's simply not possible. Not possible. You might deal on different practices, different ways and means that can be adapted by different communities. This can be I would say, this could percolate to the local or the community level, but there are different levels that comment, so to speak, different sort of participation, different sort of problem-solving approach and so on and so on and so on. And usually when we think about public participation, we have so broad a view that we are not able to distinguish the different levels of actors that are playing, we tend to confuse the different impact and level of impact of decision and so on and so on and so on. So I think that one of the difficulties is to, I would say, to find a proper level of intervention and the best mode of participation to that level, otherwise its very, very difficult to – so my basic understanding is that our society will, as the society is more and more integrated, it's more and more integrated, and I mean at the world level, not at the nation level, at the world level, I think the interaction, the levels of interaction will complexify themselves. And we will find for a lot of mode of intermediary level, so to speak, level of negotiation to adjust and to adapt to that complexity. This is how I try to understand, but I have no solution. I'm just thinking to try it, but some sort of, I won't say practical, that's not the way, but how can we really do something and not just be outraged by something and so on. Do you understand what I'm trying to say?

PROF BOHLER-MULLER: Thank you very much, Professor, for your input. As Jeffrey said, that was very enlightened and interesting conversation about public participation and issues around citizenship, which I think is something that perhaps we can explore in more detail later. But we're one session behind now so I'm going to introduce to you the third speaker, looking at a review of international best practice, that is Professor Gauhar Raza from Science Communication through Multimedia at the CSIR in India, and Professor Raza will be speaking about the promotion of public engagement in the south, a transdisciplinary approach. We are looking forward to your thoughts, Professor.

Promotion of public engagement in the South; a transdisciplinary approach.

Prof Gauhar Raza, Science Communication through Multi-media. NISCAIR, CSIR, India

PROF RAZA: Thank you Chair. I don't have power. I'm extremely thankful to the Department of Science and Technology, HSRC and MISTRA for inviting me here. It's been snapshot memories for the past fourteen years that I have of South Africa. I've seen it changing over a period of time and I think the entire world is looking at South Africa, because it happens to be the youngest democracy. This experiment that humanity is conducting in this part of the world is being looked at with great interest all over the world. And therefore, my experience is very important when I go back and discuss South Africa with friends in India, but whenever I come here I bring some

experiences of one of the largest democracies of the world, to South Africa. I'm sure that you will go through twists and turns of maybe pains of birth of democracy and will learn from various parts of the world. But this learning process has to be insulated and isolated from the mistakes that have been encountered elsewhere. You don't have to start ab initio, you don't have to start from scratch. And that is what is important for the humanity itself that we keep on discussing issues which have either strengthened the democracy or weakened the democracy elsewhere, and I've been arguing right from the beginning of my engagement with South African friends that the discourse, the engagement with scientific temple, what we call scientific temple in India, is extremely important for stability of the democracy. It becomes bedrock of democratic structures that are created over a period of time to establish democracy. Establishing democracy itself is a continuous process. It's not stagnant water, that you establish democracy and it's there forever. Therefore, this engagement is extremely important. Yesterday's discourse was in the tradition of deficit model that Schiele talked about. Let me also say that both the brilliant presentations have made my life difficult and easy at the same time. Difficult because I don't have much to say, and easy because everything has been said, I just have to say, I vote for this and that and that issue.

Anyway, a lot of research has gone into what is known as science communication. We have as researchers of public understanding of science for the past twenty years, looked at the public or the publics, and we have also looked at the channels which were discussed yesterday in great detail. What we haven't looked at from the perspective of communicators of science, learners of science, is science itself. At the two-end of the discourse, or the public engagement of science is science and the public or publics. If you go back to the era of enlightenment then modern science as an idea or a set of ideas established itself where there is structure of the democracy and these ideas started spreading across the world. When these ideas encounter different types of cultures, then these cultures responded to scientific ideas in different ways, because these were different cultures. The Chinese response to modern science was very different from how it was responded by the Indian culture. Or if you look today at … which was at one point of time at the zenith of scientific engagement, responded to this modern science in a very different way. Having said that, I'm just trying to establish that various people's culture and structure of talk respond to science in very different ways and we should be very sensitive towards that. I would like to say that if we look at the science then there are massive problems as far as communication of science is concerned, by virtue of the human activity, the nature of the human activity that we call science. The hallmark of science for us is that science is inward-looking endeavour. It keeps on looking at its own conclusions repeatedly. The same questions are asked time and again and maybe there is a paradigm shift which leads scientists to a very different conclusion. What I'm saying is repeatedly scientists ask certain questions and have come up with different answers. For example, the earth was flat, then it became – the same questions were asked, how are we placed in this cosmos? The earth was flat, it became round and then it became centre of universe. Again and again the same question was asked, what is this life [unclear 1:49:59]? So the hallmark of science is that it keeps on asking questions, and maybe it comes to very different conclusions. How does that happen in science? It happens because the unexplained part of scientific knowledge leads scientists to develop probably new technologies, new methods, new conceptual frameworks and these new frameworks expand the horizon of scientific knowledge. Now these characteristics of science, when it comes to public, creates cognitive dissonance. For example, if you take era of '70s, scientists were saying that DDT is solution to every problem, and today the scientists say no, DDT should be banned, it should not be used. For example, aspirin was recommended that if you take one tablet of aspirin every day then you'll have probably better heart functioning, etc., but today they say no, aspirin should not be taken, it creates more problems than it provides solution.

This nature of science and scientific discoveries which expand the horizon of knowledge and come to a different conclusion at any given point of time is very, very unsettling for a common person. The other problem that science being done in India, Africa, Europe or China, generates same culture and is done in same culture. So scientists working in a laboratory in South Africa probably is culturally much closer to a scientist working in United States of America, compared to his own culture. So the cultural distance between the public and the scientific community is

large if the engagement of scientific, the science, engagement with science among public is at lower level. Am I making myself clear?

I think the universality of scientific culture itself is a problem that is to be faced by every science communicator in the world. If you narrow the cultural distance, perfect. I'll be in time. Sure. When you do programmes on television, then it's 30 seconds. They show a board to you. So, there is this inherent problem of culture in which science is done. There is also a problem of language which was referred to yesterday. Scientists use language which is understood by their own community and outside the community of scientists, it could be a small community, it could be a large community, which is not properly understood. It's difficult to understand. For example, if you take the difference between velocity and speed, for a scientist speed or force, forces, but a common person would be using reactionary forces in the society, or forces of nature, which is not the definition of force in science. So it becomes extremely difficult problem to cut for a common person to understand that force when it is referred to or energy whenever it is referred to, is a scale of quantity and forces of active quantity, etc. This also means that a scientist in order to explain a phenomena to a common person has to spend more time and more energy in order to communicate properly. He has to explain every word, and it's not the dictionary meaning which would canvass science. It may canvass some feeling to another person, a layperson.

The fourth problem is that science after enlightenment is not a discipline. We keep using science to refer to a bouquet of flowers. Science in today's world expresses itself through disciplines which are highly compartmentalised and sub-disciplines and super-disciplines. And these disciplines do not correspond with each other, so it becomes more difficult for them to talk to a layperson. Bernard (Schiele) referred to expert and non-expert problem. If you try to define the word expert, in my opinion a scientist who is working in super-conductivity becomes a layperson for nanotechnology. He may not know anything, he may not know even the language of nanotechnology, because he has been working in super-conductivity for a very long time. Having tried to analyse the difficulty of communicating science I would move over to the public, but you're your sentence about science, but because they do not talk to each other, they gave up to public very easily, but the culture itself, the scientific culture itself, trains them not to talk to the lay public because scientific community is trained to be sceptical and not arrive at a conclusion and disseminate the conclusion suddenly to the public. And therefore for media, for science communicators it becomes difficult to talk to them.

And last thing, that all science cannot be taught to anybody. The mistake that we commit as planners and as communicators of sciences that we think that public should be taught all science and all sciences, and yesterday's data was proof of that attitude, that we tend to think that every common citizen on this planet Earth can become a scientist. No, it will not happen. So what science should be communicated to the public is a major question which should be dealt with by the planners and the communicators of science. Now looking at the other end of the scale where public resides and they're all concerned about this public or publics, one, that they do have their own culture and they do have their own structure of thinking, which Bernard (Schiele) also referred to, they are expert in their own areas of, and they spend their life, and they spend their life intelligently, so there's nobody on planet Earth who can be designated as scientifically illiterate. That is a major problem of the deficit model, that it designates people or a set of people in our society who can be called scientifically ilk. …. Now if we look at the research that has been conducted in the area of public understanding of science, we could with confidence say that a common citizen has two major compartments in a cognitive map. The vision that he has of cosmos, the vision that he has of society and the vision that he has of how things operate and how he's going to spend his life can be divided into two major categories or compartments of his cognitive map where science and scientific attitude resides. This is an area of cognitive map where he's rational, he uses scientific matter to the extent that he can use. And the other is completely irrational, completely unscientific and one could call it extra-scientific structure of thought.

Now which compartment this common man is going to invoke would depend or would be determined by the social cultural situation in which he or she is placed. If I take an example, then if a common citizen has access to modern medicine system, then, I'll finish, then he or she is going to go to the doctor, take medicine and get rid of his headache. But if he doesn't have access to it then probably he'll go to a sangoma or an ouchar[?] in India, and therefore it is extremely important for science communicators and planners of science to look at the society and see which part of his cognitive structure is behaving in which fashion or manner. And it's our duty to enlarge the scientific part of it, so that the society moves toward a scientifically tempered society. And the last thing is extremely important for democracy. We have discussed this engagement and have talked about science, have talked about channels of communication, have talked about publics, but we have not talked about the ideologies that we are pitted against. There is obvious a resistance to receive the ideas that are transmitted from scientific culture to the people's culture. It takes shapes and forms which are extremely complex, and I'm not dealing with technology. I'm dealing with science. In India a year back one science communicator, Dr Narendra Dabholkar, was killed by the reactionary elements, Hindu fundamentalists because he had introduced a bill against myths and superstition in one of the provincial governments. He received continuously threats and then eventually he was killed. Last week one of the science communicators in Bangladesh, Abhijit Roy was killed for communicating science. So communication of science and engagement with science is a political, economic, social and cultural project and it should be looked at as that. If we have an attitude that it's good to communicate science and we should communicate science and forget about these dimensions, then the science communication will not happen properly. It will not be able to save the democracy. Science cannot be communicated in ideological vacuum. Thank you.

PROF BOHLER-MULLER: Thank you so much. I'm sorry to hear about the aspirin, but I'm sure we can recover from that. Prof Raza, you've said to us that science communication cannot occur in a vacuum because of issues around language and culture, and that science is not homogenous, that there are many different kinds of expertise and many different ways of communicating science, and I think that that's an extremely important message. What I would like to ask you in terms of science communication is, sometimes it's important as to how we communicate, and what I've seen from, you know, the soft power of the United States of America that they have sort of super heroes who are spokespersons for science and a TV series like the Big Bang Theory where Sheldon and his friends kind of make science look cool, and how can we entrench that in perhaps the South African culture? Do you have anything similar in India where we can at least translate some of these issues into language and a cultural context that at least one part of the public would understand? I'm going to ask for three more questions from the floor. Yes?

MR X5: You know, I've actually been waiting for one of the presenters to actually discuss this very problematic concept of good governance, especially from the perspective of the humanities, because its sitting there, public engagement for good governance, but no-one's actually sort of disaggregated this concept. I mean, in the humanities the serious questions about the methodological shortcomings of this concept as well as the fact that good governance often tends to be used to mask the political content of seemingly objective policy interventions.
The other question that I also wanted to ask is why does democracy need the humanities? Because that's also supposed to be a feature of this seminar. Because in South Africa we're a very young democracy and the challenge is actually to train a new generation of citizens to participate in a democratic society, to deliberate on political issues, but also to learn to question political authority as well, and to also sort place ourselves as a nation and also place ourselves as part of a bigger global world order. And I would like to know whether the humanities, what does the humanities have to contribute to this?

MS X5: Professor, your lecture made me remember, an old paper of Steven Shapin of 1992. It says why the public ought to understand science-in-the-making. He also wanted to state what science should be communicated to the public, but the problem is that sometimes adopting a normative stance in science communication is seen as an old-fashioned way to see things, and that's why I'm so happy to hear what you said, because I think that we have to recover a normative stance in science communication. Why are we doing this and what image of science

we think has to do with promoting the scientific temper? So, my question is, the deficit model was meant to be closely related with an image of science whether based on the method and conjecture, some refutations as you said, as a narrow, and that's uncomfortable, not only for people but also for science communicators in their struggle with editors because conjectures are not well received for editors in newspapers. They want results. But also the way in which later perspectives such as the social status of science, the image they held of science is also uncomfortable because it has to do with tell people about interests, values, negotiations, alliances and so, in the end my question is, what would be an image of science, or what image of science we should transmit to the public to be more engaged with this enormous cultural and social and political enterprises?

MS X6: My comment is linked to the question that Mr X5 has posed. I'm not sure if he is posing the question in a provocative way to encourage discussion, but at some level I can probably comment and say, do you want the long answer to the question or do you want the short answer to the question which he poses? Why does a democracy need humanities? ….. If we're at that space where we're still posing that kind of question then I think we need another seminar where we engage that discourse, but I thought we're slightly beyond that. And I'm going to stop there, because I have some other questions and comments, but I will leave it over there for now. Thanks very much.

PROF RAZA: See, the problem is that all of us are not in a position to answer the question, so it is mainly a discussion which we can engage in. We are not some experts who have come from outside and will give you an answer to all the questions. But anyway, my reaction to whatever colleagues have said here is that, yes, we are also experimenting in India with various ways of communicating science to people and very recently, a year back we started a programme where we started creating Indian heroes in science. This programme is pretty popular now. What we do in this programme is call a scientist, ask about his childhood, education, hardships, etc. In the second segment we go over to his contribution and in the third segment we go over to whatever achievements he has done. Has he experienced moments of eureka or not? This is one example where we are trying to communicate to the younger generation especially that science can be done by you, don't be scared of it. It is through a process, these human beings who appear to be hero today have gone through that, acculturation and you can also go through that. So, I think that science is a creative thing. It has its own aesthetics, it has its own culture, it has its own music, it has its own beauty. What excites scientists may not excite the common person. Einstein once said that if an equation is not beautiful it must be incorrect equation. So, there is asterisks of science in my opinion and that needs to be communicated to the people to an extent that they also get excited about cosmos, they also get excited about the beauty of nebulas or whatever they are interested in. But in order to communicate science we should not, I'm repeating myself, try to make them scientists. That is not the objective. It is the scientific method ultimately which needs to be communicated to the lay public. It is the method that can improve their life and the problem with science is that because its ever-changing, giving information, laws, frameworks may not mean anything tomorrow because that will change. The information will change, the conclusion may change.

So it is the scientific method, the filters that you have in science to validate knowledge, revalidate it, ask questions and seek for answers. That is what needs to be, and there is beauty in it. I can assure you that there is beauty in it and we can communicate that too. As far as the methodological question is concerned, I have no answer to it. What I would like to share is that if you ask a scientist, even the best of the scientists, how to define science, it will be very difficult for them. They practice science, but it is only people and experts in humanities who have been able to give some answer to such a question that 'how do we define science?' And therefore it's extremely important for us to have inputs from humanities to talk about how to engage people with science. There's another problem. If we do not engage them, then what we are saying is that communicating science or science society linkage is a scientific endeavour, which it is not. It is a cultural process. If you are not aware of this limitation of science communication, that it's not a scientific process, you cannot apply rules of science to communicate science, but rules of culture, rules of politics, rules of various other, history and

philosophy of science, it's only then effective engagement can happen and can take place. And I think that in order to make it more effective in any society, the terms, the frameworks from various disciplines of humanities that have to come to the rescue of science communication. Without that I think no science communication can happen. Yes, it's a major problem. It creates cognitive dissonance of very serious order. If you are talking about conjectures and not the distillate of science but the debate within science, which goes through various filters which are generally termed as scientific method, people for generations, human beings for generations in my opinion have been trying to absorb final verdicts rather than the processes, and therefore it's important to go to scientific method rather than only the distillates. Yes, the bedrock at any given point of time for science communication would be valid science of that time, but when you're communicating science you should be very conscious of the fact that this bedrock is dynamic and complex. It is not a solid monolith bedrock on which you can build a castle of science communication.

MR X6: ….. I just want to commend you on the way you expressed what kind of engagement and communication, in a way modalities we have to engage ourselves in when we go to communities. Yesterday I happened to be lucky and became part of yesterday's engagement, and I was a bit taken aback when two questions from two different participants from HSRC Cape Town fellows were raised, and those questions in a way for me they were flushed away. The question of one fellow asked about, have you consulted religious communities, and it was just, you were there, I remember. The second question was on indigenous languages, the whole question of how do we get to those people and that books are being written and that are translations, and the way you came up with now I shall think at least I know that I'm not lost because I was wondering, because I'm coming from two streams, the sciences and now as you can hear, I'm leading from the humanities point, meaning that I'm in a way trying to engulf the two and being one of those people to campaign for the two to come together. Thank you very much for that.

PROF BOHLER-MULLER: Thank you for that intervention. We are behind time, but I think it is very important for us to have a break so that we can discuss these issues with one another in a more informal way. So, we're going to have the tea break and I think that if we could possibly come back at 11:45 and then we can proceed with the rest of the speakers. Thank you.

Behind the numbers – science measurement and the public understanding of science in South Africa

Mr Saahier Parker, HSRC

PROF BOHLER-MULLER: Ladies and gentlemen I think we can begin, so please take your seats. Okay, we are starting the session around stakeholder perspectives and I am going to hand over to my co-Chair, Sumi Pango from the Department of Science and Technology.

MS PANGO: Thank you very much. Welcome back ladies and gentlemen. Already I think we are behind time so we will go right into the business of the day. It is my pleasure to welcome Mr Saahier Parker from HSRC, who is going to take us through the next presentation.

MR PARKER: Just about good afternoon, ladies and gentlemen. Thank you to MISTA, DST and HSRC for allowing me the opportunity to discuss some of the work that we have been doing in SAASTA and some of the work we've been doing at the HSRC. Just by means of introduction, I have a background in psychology, but due to a fortunate administrative error at the HSRC some seven years ago, I was interviewed for the wrong unit, fell in love with what they did and continued on to start a PhD about three years ago in science and technology studies with CREST with the University of Stellenbosch. So I speak to you today as a student, a very new student to the area of public understanding of science and science communication and quite fortunately I find myself in the programme between Professor Raza and Dr du Plessis, who have helped me considerably over the last few months. So it's a fun, so I was a little bit

nervous to be between the two of you but I hope I can present something of value to the community today.

So as the world has dramatically changed over the last 20 years, so has access to information and as people are able to freely access this information, discussions are ensuing over ever wider-reaching topics. Much of these discussions happen over social media as well as the World Wide Web, but also traditional media mediums to discuss and debate many social and scientific issues. While for the most part, this is a fantastic development, a look at some of these discussions highlights the falsehoods and some of the myths that are simultaneously being proliferated, as the current generation says, it's gone viral. The problem with viruses is that eventually they, you have more harm than good and this is the problem that we currently face when investigating areas of science communication and public understanding of science.

In 2014, Time Magazine with a global circulation of 5.1 million copies and an audience of 27 million readers published an article entitled ten science myths that just won't go away. Many of these myths continue to be circulated and many more are related not simply to science but to a number of other issues from a number of different areas related to the scientific enterprises. So if you look at the screen grab from the Time Magazine website, these are just three of the questions that have, according to the article are the ten, or one of the ten myths that just won't go away. The first one, you can kill a virus. Well, really you can't. You can deactivate it, destroy it but you can't kill a virus. Another very common one is lightning doesn't strike twice in the same place. Well, lightning doesn't actually care. It takes the path of least resistance and it will do that more than once if it so chooses. And the last one which has been common in the recent years is that one false move at the large [unclear 0:05:56] collide and kill us all. Well, the reality is the scope of the work is so small that that possibility is really, really not going to happen. Now the use if the internet to spread and share ideas is fantastic but this leads one to ask a very important question, is that do readers, do citizens, do scientists, do the people within our communities often consider the source, the agenda, the purpose of the information they are sharing? And most websites have that little line on top that makes sharing so simple. You can retweet, repost, share, like and we very rarely stop to consider why it is we are sharing the information and what it is that we are sharing, so it comes back to that issue of trust and the investment of trust that we as communicators, that we as researchers and we as members of the general public as well, invest in certain elements, in certain communication mediums. So in a global society, predominantly rooted in science and technology derived solutions, a public suitably skilled and competent in the acquisition, application and transmission of information in any field remains a valuable national asset. The study of how the public engages with science has been a constant companion now of the scientific enterprise since before the 16th century. However formal science measurement is more recent and gathered great momentum following the 1960s particularly in the United States and Europe. Though some of the concerns within the public understanding of science and scientific literacy have been around since before this date, the presentation will begin at that point and then guide us through the history of the movement.

So, 1957, ten years into the Cold War, the Russians stunned the world by launching Sputnik by the 4th of October 1957. Weighing just 83 kilograms the pinging metal sphere amplified Cold War paranoia across the world. And by the time Kennedy delivered his famous “we choose to go to the moon” speech launching the United States goal of landing a man on the moon, the Russians had already launched two satellites Sputnik 1 as well as Vostok 1 in 1961. Despite the generally positive public support for the United States science program, space program at least, increasing concern emerged within the United States public around the suitability of the education system to maintain pace with scientific advancement as well as the changing technology landscape being layered across American society at the time. And that again brings us back to the importance of the social context of science and how that impacts further developments within the fields. Now this concern within American society sparked a significant reform to science education to address the perceived low levels of scientific literacy within American society. Similarly in Europe and particularly in the United Kingdom, the late 1960s saw a period of increased public investment in science education as well as policy reforms in response to a number of the social issues that were being raised at the time. The study of the public understanding of science has traditionally been seen as a discourse in evolution with three distinct periods. We will just go through them very quickly because I am sure many people in the room are quite familiar with this. Generally accepted to have emerged around the 1960s, initial study focused on knowledge of science and had a

definite education focus. Measures were designed to measure scientific knowledge and these measures attributed scientific literacy through the application of various threshold measures, so one was either scientifically literate or not.

The second period emerged particularly in the United Kingdom and Europe following the release of the Royal Society report in 1985 entitled "The public understanding of science". This shift in the discourse moved attention away from purely knowledge measures to more, to take into account attitudes and public attitudes to science. The important impact of social attitudes and the influence this has on public support for science was noted and therefore since around 1985 this had become an important aspect. Now around the mid '80s and in the wake of the European mad cow disease crisis, and the public panic that ensued, the lack of effective public communication resulted in information being misinterpreted, similarly to the impact of early communication around genetically modified foods, stem cell research as well as nuclear research after the tragic events at Nagasaki and Hiroshima at the end of World War II. Following this period the science and society paradigm emerged realising the direct value and importance of the public science relationship. It did not simply see the public as anecdotal to the scientific enterprise, but as a valuable stakeholder that should take part and be part and parcel of scientific developments. Now these models present an arguments that is by default a deficiency regarding either scientific knowledge, scientific attitudes or scientific communication through one or a number of actors and therefore, we've heard it yesterday and we've heard it today, reference was made to the deficit models. And despite these many debates and the continuing debate across the global community, Martin Bower maintains that none of the new discourses made the previous ones obsolete. And as research continues we will enhance and expand the agenda.

Turning our focus to South Africa, we do have a few international guests, so just to give you some perspective, South Africa is a country which, like many others, has a number of social challenges. If we look at just some of the few of them which have been overlaid on society you've got political affiliations, religion, culture, gender, employment status, HIV status, social class. A number of demographic variables, a number of stratification variables which impact the various segments of society and does carry an inherent risk and impact for social measurement within South Africa. Looking at some of the empirical work conducted in South Africa since around 1999, sorry 1991, there have been approximately 21 empirical studies that are currently publicly available in South Africa. The earlier studies go back to 1991, 1993 by Dr Purus, as well as surveys by a dear friend, the late William Blankley and Company at the then Foundation for Research Development, the present day NRF, as well as the HSRC early in 1995 and in 1999. Many of these surveys were limited both in terms of size and scope. If we look at the work of Purus he had in the early work particularly there was a limitation in terms of who has accessed racial profiles, Louche in 1996 only looked at students. And similar surveys looked at specific areas related to biotechnology or nanotechnology which only relates to a very small segment of the population. Looking at some more recent work and those that attended yesterday had the pleasure of listening to Reddy and Michael Gastrow talk about their recent work. Adopting the standards of the United States NSF and the Eurobarometer modules, the SASAS survey looked at 3 183 participants using the module in the South African social attitudes survey. The survey covered all nine provinces, race groups and genders age 16 years and older in multiple languages and it was 20 questions that looked at three sections, within three sections – attitudes to science, scientific knowledge and sources of scientific information.

Turning our attention to some of the results, I must excuse myself, for the people that were here yesterday you might have heard this before, but let's just go through them very quickly. The demographic variables differentiate a number of stratified publics in South Africa and this is very important. Professor Raza spoke about this earlier as well Bernard (Schiele), that there is no homogenous public. It's a number of publics. Looking at the data comparisons were able to be drawn from the 1999 e-pop survey which was the precursor to SASAS survey series, and they represent a dynamic range of attitudes both positive and negative relating specifically to science, as well as some interesting results related to the index of promise and reservation. So just looking at some of the results from the 2010 wave, this was published in 2013 in the South African Journal of Science. It's not my work it's the work of Reddy and her group at DST. So the majority of respondents responded positively to items of scientific promise, however there does appear to be an increasing area of concern and risk awareness wherein reservation items recorded large increases between 1999 and 2010. Reddy and Company suggest that this is indicative of the coping mechanisms within science and technology and the change that has occurred over the last, over the

period between 1999 and 2010 and that change has become more difficult since 1999, furthering the need for effective social engagement strategies at various levels within the many South African publics. The results also speak to the social context of science with much of the change between 1999 and 2010 being a result of a large increase in the reservation score, plus 17%, which deals with issues of faith. We spoke about it earlier and someone else raised it this morning and someone else raised it yesterday as well. It's point number 3 on the slide over there.

Looking at information sources very quickly, as expected televisions, radios and newspapers remain the biggest or the most accessible sources of information for the South African public. The internet comes in a close fourth and should increase in terms of importance as access to broadband facilities, access to internet facilities, increases across the country. Michael Gastrow yesterday presented a very interesting segmentation by age, education and LSM that provides a fantastic opportunity to start looking at who are these publics? Where do they live? How are they made up and how can we use that information to further the research agenda? Back in 2006 or 2007 Michael Kahn, who was here yesterday, he was my former boss, introduced me to the most important question in science, which is so what? What does this mean? In South Africa we have many linked challenges, poverty, access to services, education, employment and if you consider all of these things, the benefits of an appropriately skilled public at varying levels becomes a *sine qua non* for the work that we are doing. Surveys provide the foundational empirical observations from which to develop further research and develop more comprehensive, coherent and integrated public understanding of science in South Africa. The empirical work completed beyond the work just of the HSRC and SASAS must be integrated towards arriving at a national consensus for research, study, implementation as well as an integrated plan towards addressing many of these concerns.

We now have a considerable amount of data that could allow us to meaningfully beginning to stratify the various publics and understand where the specifics areas of need are within this country in particular. We should endeavour to continue the work that Michael and his team are doing in terms of segmentation of the various publics and to inform targeted interventions towards greater efficiency with regards to our engagement activities. Efficiency and effective harmonisation remains a long term goal for all of us present here today. Beyond the academic community, greater collaborative efforts must be developed within government, higher education, the private sector as well as the general public. It's important to remember that this is not just an academic problem. As ambitious as we are we cannot solve these problems alone – the networks must be developed within and outside of South Africa towards addressing many of these issues. Alignment of policies, mandates across the system must happen towards meeting the set goals within an integrated approach. In South Africa future research directions must be developed with greater empirical evidence from which to start these discussions, not the end, but to start these discussions. As this areas is in constant flux repeated measures is essential towards creating effective outcomes and impacts in South Africa. This would necessitate the aforementioned collaborative networks, dedicated funding streams to continually drive advancement in this area, as well as the realisation that what we are currently working with are imperfect measures. However, in the absence of greater precision we must use what is available and some information with an acceptable and known level of shortcoming is better than no information at all. And in the end the more work we do, the greater we will advance as a country, the greater we will advance as a research community towards deriving the measures that we so much seek.

As part of my PhD I am looking to integrate a module in the 2015 wave of the SASAS survey. Key dimensions of measurement will include knowledge areas, attitudes towards science, interest in science, level of informed-ness and involvement in science engagement activities. Coming up we will hope to produce a detailed demographic analysis towards the development of an appropriate segmentation of the many South African publics. This will assist to identify the publics and the mediums most suited towards communication and engagement that would prove to be more effective in terms of the limited resources that we as a community, particularly in South Africa, have towards our disposal. Further to that the work will also be used to develop the first version of the science culture index, which some of you may know as the work of Shukla and Bower, which has tried, and there are many debates around this, but has tried to integrate the more objective indicators of science and technology such as R&D investment, PhD outputs, papers, research infrastructure, with the more subjective indicators of science, such as the public understanding of science and levels of scientific literacy. And then finally, I suppose,

the hardest part of all the above outputs will be an attempt to develop indicators for the measurement of public understanding of science in South Africa. This is a particular challenge and talking to my colleagues over the last few days it seems that we are not alone. It's a global challenge and it's a challenge which I think many heads will solve within time. The work will commence, the fieldwork will commence in September 2015 and hopefully we will have results available in quarter 2 of 2016 and with two minutes to spare, I thank you ladies and gentleman.

MS PANGO: Thank you very much, Mr Parker. I think it would be important for me to let you know that I am chairing this session of the presentations by default. I am actually sitting in for Mr Suchanandan who could not make it today. So you will bear with me if maybe I am taking you back to issues that you have already dealt with in trying to facilitate discussions. But I have picked up a number of points in the presentation, one of them being the suitability of education to keep up with science, the social context of science, policy reforms just to give a context to the debates and to the questions that may probably come out from the floor. And lastly, I think we will have to throw the question back to you, so what? I will now give people the opportunity to ask questions, make comments.

PROF SCHIELE: Can I, just one small comment and just one question. ….my comments [are] very simple, I have two. If we go back to the what we might call the Sputnik affair, of course the Sputnik affair launched a fabulous movement in favour of science in the United States, no doubt about that. But this fabulous movement can't be understood if we do not take into account the Cold War that was taking place at the time. So we have to ask ourselves was it really science at stake, or was it the Cold War effect? I would be inclined to think that it's extremely difficult to distinguish between the two, but focusing on science only would be misleading with regards to the context in which this movement for science was launched, so that's my comment. My question is the following one, in this kind of studies you are beginning to, you are about to begin pursuing attitude, knowledge and so on and so on, which have been taking place for at least 30, 35 years and have developed a strong set of instruments, it always strike me, it always strike me that these studies include people like Martin Bower and Shukla and other people that are involved in that. They are always reporting about the effect of the media but they are never correlating the results they obtain with the media content. So those measurements tell us a lot about what really people know, think or the attitude they share about science. Or if the people reflect what they hear, listen to, watch on the TV and so on and so on in the media. So I think that for further research, it would be extremely important to try to match what we are measuring to what the media are spreading. Otherwise it could be misleading and a common complimentary question would be that prior to any study of that sort, it would be interesting to compare the past result relating to the content of the media at the time. So that would give us a lot of information about the change of mood about science of the people. Otherwise those results appear to be floating in the middle of nowhere because they are out of any context and the interpretation we have of those results is simply self-referential. So I think that it's certainly something to take into account in the future studies. Thank you.

MR X6: …. a very similar question but I think it's worth putting again. In your presentation and in quite a number of the presentations, a lot emphasis has been placed on access to information in the media, television, radio books, etc. But there is a complication here which a literary scholar is particularly tuned into perhaps, which is that there are two kinds of access to information. One, where the information is available to you, but the other is that there is a difference between information and knowledge. You know, what really counts is not the access to information, but the access to the information. And I'm wondering whether these studies if they are not really touching on the question of the access to the access of information, if they are really very helpful? And I just want to throw in a general comment – while we are focusing on science here and communication questions, things are apparent particularly in the different national data we are getting, that actually another way of looking what we are talking are about is the efficacy of the higher education system as a whole. And therefore I think one thing that a humanist would say is we really need to broaden, as some of the papers have done actually, the scope of our discussions, both historically and conceptually, and to point out, to go back to something we've discussed a lot, but not quite discussed, the question of democracy. You know, so much depends on the shift, I mean just to throw anything, the shift that happens between Kant and Marx on the question of what public knowledge is or access to it through [unclear 0:28:18] where for Kant knowledge and enlightenment is only for scholars. It's only for the scholarly public, but for Marx disagreeing with Kant, it's a question of forming a public that isn't there yet. Now that question of forming a public that isn't

there, I think it's particularly crucial for understanding what we've been talking to in terms of the variation, the stratification, the differentiation of South Africa because quite simply speaking as an intellectual historian, we throw around a word like democracy far too easily. It's a word with an extremely complex history, it's reactivation in South Africa is extremely problematic, as we can see. You know, we can't just do this measuring thing. We have to think really seriously which means historically, conceptually about the key terms we are using. Otherwise we are letting those terms use us without really ever being having a chance of getting to the questions we are trying to answer.

MR X7: …Actually the presentation on the study itself was exciting and it's really good to see that type of work is being done. If I understood you correctly, I think one of your provision or recommendation is that there should be more effort towards collaboration, which is trying to provide an answer to what was said on earlier presentation to say that much of research work these days is inward-looking but when you do present, I mean collaboration, you start looking out and actually you enrich whatever you are doing. But my question was how much of that have you done so far in terms of collaboration in that work and particular I am asking that question because I know of an agency of government, the South African Agency for, what is it called? Its SAASTA, South African Agency for Science and Technology Advancement which has a full unit that actually looks at these type of things, carries these types of studies, sometimes it commissions this type of studies. but essentially looking at even at your earlier list of publications that you have consulted, there is two or three of the Purus who used to head the SAASTA, that organisation, but after that I haven't seen anything really, so I am wondering why actually, whether you are in talks or whether there is something happening between your unit and SAASTA in the interest of trying to make sure that you are looking outwards rather than looking inwards.

MR X8: I was just reading the report on science in society that was prepared for the UK government and when it was presented to the House of Lords there was a lot of critic around the old very gauche incarnations of public understanding of science where you had science is fun and essentially you treated the public as idiots, just essentially disseminating expert views. But one of the questions that came through is, how can we actually bring the public into the policy decision-making space? Because if you want to really enhance democracy, that really is the critical sort of platform that one would use. And although the House of Lords mentioned that the best people to make scientific decisions are scientists themselves, but the public does bring particular value in terms of the social context and the moral environment in which these scientific decisions are to be made. And it seems to me that the public understanding of science debate is kind of moving in that direction. I'd just like to get your views on that.

MR PARKER: Thank you, thank you very much. I will try and address the questions individually but I think [two delegates] shared some areas in terms of their questions. It's an important thing to remember that the public understanding of science is beyond just measurement. You know, you've got all aspects, yesterday we saw some of that with Vijay representing some of the empirical work and Michael talking about his work, particularly within media studies. I do agree with you that particularly around the points about what was really at stake and I think the question we've also then got to ask is, is science ever standing alone? There is always an additional element around it, there is an additional environment around it that we need to consider. And the effects that science has or rather that the media has in terms of the spread of science and the way they do that, I do agree with you it's a very important area to consider and it comes again back to this element of trust investment which is something that I find particularly interesting. I don't have the answer for you, for your specific question, unfortunately. It's an area that some of my colleagues are more involved with. But I definitely will pose the question to them and then maybe …. we can answer that for you.

Mr X6, you spoke about the focus on measurement or rather this overt focus on measurement. I think, and as I said earlier, it's wider than that. There is a number of areas of influence and there is a bigger area of involvement that needs to be pulled in to this movement and it touches on what our colleague from the Council for Higher Education and Training spoke about in terms of collaboration and looking outward. One of our colleagues yesterday spoke about the South African, the way we operate in silos and we've got to build bridges rather than break silos, we will leave that to Eskom, for the most part, but just getting back to building bridges, I think it becomes very important to start adopting a multidisciplinary approach to try and cover all the bases, simply because we've been debating for so long that what has actually come out in the last 30 years is generally more questions than answers, and some of our colleagues that

have been involved for a longer period of time will tell you this. So I think the issues of collaboration and why the collaboration, beyond the people in this room, to include elements of the public, Mr X8, to invite them here because that's the missing link. That's the people that are not here. Michael spoke yesterday about the business and the private sector not being here, but where are the members of the public? I am of the view that the public has a tremendous contribution to make, to ground the work that we are doing, specifically in the issues that are experienced in terms of daily life. Because if we're not answering those questions then what are we actually doing? It just becomes an exercise in self-enrichment. So if we are not engaging the public effectively we are then losing half of the discussions that we are having over the last two days. Just in terms of the question from the gentleman on this side about collaborations, a lot of the work that Vijay and her team has done has been in collaboration with SAASTA. A lot of the work has been, we're currently engaging with the Centres of Excellence based in Stellenbosch University. Within SAASTA we also have a wide network of international scholars that we regularly collaborate with. So we have been trying to do this, but it's very difficult and coming to events like this and meeting people, making connections, creating the networks for yourself, I think, is where we are going, and where I hope to go. So we have to continually keep that outward focus and I do recognise the importance of that. Thank you.

PROF RAZA: You see, some of us have been working for a long time and there are issues related to both conceptual framework and also of indicators, some of them Bernard (Schiele) has just now referred. I think that the deficit model is a model which is rooted in a conceptual framework where scholars wanted to compare the two countries or several countries, as far as scientific literacy is concerned. And with this conceptual framework, they developed the indicators. **….**Please will you send my hello to your friend as well? See, the conceptual framework in which deficit model is rooted, aims at comparing countries across the world. The aim of that model was not to improve science communication, and therefore as Bernard (Schiele) said, they looked at those people who are giving right answers to a scientific question, right? And therefore you declare that the nation it stands at this level, so many people are going to pass the exam. If you want to communicate science, or from the perspective of a science communicator or a science activist as we call in India, then those who have not answered correctly are more important because then you can formulate the strategies to effectively communicate to this section of science, that is question one.
The other issue which is extremely important is that if nation has not set certain goals for communicating science, what do you measure the scientific literacy against? Is it happening naturally? The nation estate has not taken a vow to communicate maybe laws of motion. Then if everybody knows laws of motion, so what? If you come to the conclusion that in China people don't know laws of motion but in South Africa everybody knows laws of motion, so what? So there are problems related to conceptual models that have been applied, and there are also problems related to the indicators that have been used for measuring scientific literacy or engagement. Zen Chow in passing makes a very, very important comment in his paper, and he says that these different models that have been developed are rooted in different realities and different national objectives or personal objectives. I would like to know from you, you're doing research and you are aiming to have PhD, so that is one objective very clear, we understand. How do you look at the national objective of this whole endeavour? What do you want to measure? Not maybe for PhD but along that basis.

MS X7: In some sense I am going to be far less eloquent than the people who have preceded me but I guess out of this ….. data interface with the world, where I clearly meet people who have read bad science, internalised it and don't buy vitamins. Or people who have done biology and remember that you pee the Bs and Cs out and then don't spend money on buying vitamin B and C, right? But these are all observations and it is measurements and I think that what you are embarking on fundamentally, if it's going to be meaningful, is a philosophical enterprise in terms of not only what people think, which you can measure, but how those thoughts are formed and how the manner of thinking within public discourse is derived in a South African context. And it's not going be a neat hypothesis and you may not even come to answers that are conclusive. But to create relevance in terms of your research, a conception of what leads people to think, and I mean that's been out there for a long time, and modify how they think not just update knowledge, I think is central to the understanding of science, life, all sorts of things. But it's possibly going to need to be pitched at a level where you ask people why they buy and Bs and Cs and pee them out.

MR X6: Also as a student, Mr Parker, I am just like you now from the other side. The other question has been answered, I mean asked by Professor Raza about the real contribution in reference to the other works you have quoted, especially Reddy and a list of the people who have already done some work in that. Maybe I am just struggling to see the limitation after you mention the indicators. Maybe the limitations of your study, but let us say also the limitations of your study maybe if I may ask, just that?

MS X8: I would like to ask, maybe very broadly, how do you actually define science when you speak about public awareness of science or public understanding of science? So how do you perceive the science, like what is science for you? Because if what public will tell you, will you acknowledge it as science that you also understand as science. And I particularly would like to focus on indigenous knowledge systems. Is this somehow included in your measurements or in your, you ask about ways in which public contributes, so is this a public contribution or not? Because I have a feeling that we look, we perceive science as a novelty, something that we want reach the stars, right? Whereas we forget that science is also what is behind us and we barely understand, for example, indigenous knowledge systems, but we already want to understand something that we don't even know yet what. Thank you.

MR PARKER: When I heard Professor Raza was going to be here I was quite terrified of the questions that he might pose, because reading his work it is clear that he would not agree with many of the things, and we've had informal discussions over the last two days and we've been very friendly. I agree with you that the importance is not particularly on those that have answered the questions correctly but more on those that have not. And the goal therefore towards developing a segmentation of the public would be to identify where those gaps are, as a first step and would be a goal for me within this work and to add to the work that's already been done in this country. Because I think unless you identify where the gaps are and how we can effectively address them through our partners at higher education and our partners within government on that side, we cannot hope to resolve any of these issues, we cannot hope to begin to answer the questions and begin to make the change, because that is essentially what this is about. It's about effecting social change, effecting a change that will be to the benefit of the entire South African population and that would reduce the burden, the tremendous burden that a lot of our population carry in terms of inequality, access to information, access to resources and gainful employment.
So I think as a beginning to identify where the gaps are, not only who the strongest performers are, but identify where the gaps are and how to effectively address them in the context of the South African public, would be an initial goal of this research. And because it's such a broad area you cannot answer every question through a single instrument or through a single research instance. So that would probably be for me the biggest outcome that could come out of this research.

The lady behind you spoke about the vitamins. I agree with you, it's more about how people think, it's about attitude formation, it revolves around how knowledge is internalised and how knowledge is received and who transmits it and how the person that's receiving it has been conditioned to receive certain points of information. I think the important thing would not only be, I think your question was related to about knowledge transfer and how people engage with knowledge. It's not particularly about understanding the outputs or the knowledge generation, but particularly the process, because it comes back to what Professor Raza spoke about this morning, the continuous evolution, the continuous change in the way we understand the world and the way we understand science, and that investment of trust, because if today we are saying that high protein low carb and tomorrow we switch it around as it happened recently in South Africa, the trust that the public invest in those people and that information is severely challenged.
So if we take attention away from the knowledge dimension but particularly to the process of doing science and what science is, I think we can begin to address some of those issues as to how people engage with science at that level.

Yes, but I'm talking about the way people think about science and the way people perceive the scientific enterprise. Olga asked a question about how I define science. It's particularly difficult. I think some of our speakers this morning spoke about that as well. For me I think it's a collection, it's broader than just physics and chemistry, it's all the fields of study that we engage with and that to me would be an ideal way or an ideal type of measurement, but it becomes really difficult to do and to include everything. Professor Raza spoke earlier about no one can be an expert on everything and the public and not know everything, and there is always going to be a gap between what practitioners of science in any field know

and the general public knows and I'm comfortable with that. I think we should try all efforts to reduce that gap and to minimise that gap but we will never ever close that gap, simply by the notion of we've had the benefit of being able to enhance ourselves through education and we've also carried the responsibility to feed that back into society. So I would define science, for me personally, as an amalgamation of all the fields of study that we have engaged in and to construct studies of this nature I think you have to start limiting that to certain areas, and certain key national priorities I suppose would come into effect there.

PROF RAZA: One of the definitions of what is science is, I am sorry to butt in….is what scientists do, that is the smallest definition of science.

MR PARKER: But then what is a scientist? Am I a scientist? I mean, you know, that, so that's – you spoke about indigenous knowledge systems as well, when we construct the items, the specific items, we will obviously look at, and Michael has looked particularly at media analysis and looked at what the particular issues are and what the relevant issues are in the South African media, and we also consult, we spoke to Vijay yesterday about looking at how we can appropriately localise the knowledge item particularly in looking at measurement techniques. So that will be taken into account, whether it will have a specific focus on indigenous knowledge systems, I fear my answer would probably have to be no because that's a very broad area of interest, but it will be taken into account within the final instrument design. Did I answer everyone's question?
I think the limitations. Can we pick that up outside? Okay.

MS PANGO: Okay that brings us to the end of this session. Ladies and gentlemen, I have been advised that according to the programme we are supposed to move to the second session 5, but the proposal is that we break off now for lunch and then when we come back we will deal session 5 of the programme. But what will happen is that we will make our lunch a little bit shorter so that we are able to finish on time. I hope that is acceptable in the name of democracy? Thank you.

[break]

Political challenges for public communication

Dr Hester du Plessis, Faculty Head: Humanity, Mapungubwe Institute for Strategic Reflection (MISTRA)

MS PANGO: Welcome back. Welcome back, ladies and gentlemen. Let us proceed with the second-last session of the day. We'll request Dr Hester du Plessis, Faculty Head, Humanities at MISTRA to give us her presentation.

DR DU PLESSIS: Thank you very much and welcome back after the lunch and I am very happy to see that so many of you stayed behind for the last two sessions. Mine will be a formal presentation and the very last one will be an interactive opportunity to discuss some of the issues and maybe come to some kind of conclusion about the way forward and how can we take up this conversation in future. But before I start with my formal presentation, I would really like to just mention a few things. First of all I must mention that this debate around democracy and science communication and public engagement is not new amongst the group of international speakers who joined us for this event. And I can refer back to the PCST which is the Public Communication of Science and Technology conference that happened in Florence in Italy in the year 2012, where we had a panel discussion under the leadership of Professor Schiele, with the specific title of on the meaning of participation and democracy in different cultural and social contexts. And I looked at my paper presentation from that period and realised that in the few years after that now, I've made such a big conceptual shift in how I think about the topic. But I do acknowledge that if we didn't start the process of thinking about it during that panel discussion, I probably wouldn't have moved ahead in the way that I have. So that is just one of the acknowledgements. We are planning another session now for "Science in You" which is a conference that is going to happen in France in June

where we will also take up the topic of the political engagement by science communicators or then the public engagement intervention between democracy, state and the public.

So those are debates that's been ongoing and it's been circulating and every time we speak, something new is added and I think that is very typical of how knowledge is growing. So what I also want to mention, and it's something that we at MISTRA are talking about quite frequently these days, is the role of the collective intellectual, not the specific what we call rock star intellectual, that people tend to admire. Because we do consider ourselves to be a collective intellectual. Or collectively intellectually. I don't know how to describe it, but we all contribute equally to some debates and I think if we need to identify rock star within MISTRA, it would be a difficult task. It is a collective. And everybody is contributing to this conversation that we have in public most of the time in a collective manner, but also with consultation internally. Then thirdly I want to mention that this whole issue of democracy, I think we have been neglecting a little bit in our presentations, but I hope that we can take the conversation further and we're planning to do a series of seminars with the University of Pretoria Centre for Advancement of Scholarship. Professor Robin Crew is the leader, the director there and we plan four seminars to take place, two this year and two early next year. The one will be speaking about democracy, the different forms of democracy, what we have as a constitutional democracy and all the other configurations and discuss what suits us and how do we understand this topic. The second one will be on integrity and I think here we can start to say that humanities is becoming much more of a force in the conversation because talking about integrity, you will bring together all scholars to talk about one topic. The third one will be power, in other words power and democracy and the fourth one will be responsibility. And we hope to publish a book after that based on the presentations that's going to happen during these four fairly major international seminars where we will invite maybe a few rock stars to come and talk to the local collective intellectuals about certain topics. We have high ambitions of for instance, getting Slawosz Dizek here to come and shake up South African society a little bit. We hope we get there. Then I also just quickly want to mention that we very often forget to identify specific occasions that happen in Africa. When it happens and we do it too late, or we neglect to do it. I am not going to include this in my speech, but I think it's worth mentioning that we are all aware of the Ebola outbreak in Africa at the moment. We are all reading as much as we can about the scientific facts. We are all aware of preventative measures to take to not get Ebola. We are all aware of all the medical tests and trials that is going on. All of that is in the domain that we all share as science communicators. Then suddenly something pops up and it's very unexpected and I think, wow this is where public understanding of science should jump up and down and say this is the opportunity and I don't see it happen. And that is where we start to read more and more now about the local health workers in the Ebola-stricken areas, either being killed or being chased out of that area. And here suddenly we see the surfacing of belief systems, local belief systems that come in. Misunderstanding of the situation itself, and how do we deal with that? How do we deal with people fearing the health workers now, because maybe rightly so or maybe wrongly so, they fear that contamination coming from the health workers is actually spreading the virus. The common kind of common knowledge observation that needs further investigation to counteract. Okay, so that's more or less what I wanted to add on top of this. I am going to try and stick to my presentation as much as I can and I must say, then I am going to put in into this conversation a few of the humanities topics that is normally neglected when we speak about science communication or public engagement or the sciences. As a starting point I took what is in the science engagement framework version 2 that came out in September 2013 and it also answers the question that came up in the previous conversation. What is the sciences or what is science? And here they very clearly state that it is a broad understanding of science or the sciences, encompassing systemic knowledge, systematic knowledge which includes the natural sciences, engineering sciences, medical sciences, agricultural sciences, social sciences and humanities. Indigenous sciences technology, all aspects of the innovation chain and indigenous technologies. Big mouthful. So in fact it's all of it. All of it together, and that means that the role of the Humanities is not an unexpected, unwelcome kind of intervention. It is actually part of the parcel of this engagement framework.

And then public engagement requires not only awareness and discussion of scientific or technical aspects of issues, but also of the societal and attitudinal aspects as well, bringing us back more or less to a kind of a regulated framework like we have seen yesterday, with the presentations that were there, where we control the situation, and we have a situation that is probably considered subconsciously or consciously as ideal and we live in this wonderful society where we are able to do things. Now I am going to talk

about what we are not able to do. So in the framework, one very short little line to develop a critical public which actively engages and participates in the national discourse on science and technology, thereby supporting the spirit of our participative democracy. And that really brings the responsibility home that science communication, or talking about the sciences here in our regard, needs to look at democracy. I am making two points here. The first is that you cannot talk about democracy without talking about the persuasion of ideology in the conceptualisation of democracy and then then its impact on the public sphere. Those things go hand-in-hand. I'll go back into details a bit later. And then secondly the post-colonial government system in South Africa where we illustrate the difficulties in our democratic struggle for ideological freedom, not just to be able to open up the sciences for everybody and to bring in the publics. So as a framework, as a kind of a philosophical framework we all refer back constantly to the persuasion of ideology in regard with the legacy left by the French Revolution, and there three principles guide whatever we do in what we call a modern society.

The first one is that social change is not something intrinsically objectionable, but normal and desirable. I very often, listening to people working in, sort of looking at data, looking at indicators, then I wonder how much they take into account that society is not stable, and that society should change, and it's for the good of society to change. We often want to have a static model and say here is the ideal world, this is where we stay. Secondly the proper institution to manage the course of social change is the state. So it places the main responsibility on the shoulders of the state. And then states receive their legitimacy from an entity that can be referred to as the people. And here we have the full cycle because in the end the people are those that bring about the change and those of you in humanities who know about revolutions, who know that the revolution and the revolutionary is most often the new leader of the next generation of leaders. So we have a cycle and we have a continuous change of debate. So there are two issues that I want to bring out here. The one is the knowledge production that has shifted its epistemological boundaries through an evolution of complexity. And there exists a remarkable coincidence between the development of a more open system of knowledge production and the growth of complexity in society. Here I refer to the chaos theory. Helga Nowotny is known for introducing the whole issue of transdisciplinary approach to research. In our own experience, we found that the transdisciplinary approach is actually the one that brings about change that gives you the opportunity to identify those gaps in between issues, but most importantly it provides you with a theoretical framework that looks at three different levels. The one is a level of levels of reality and on the other hand you have complexity and in the middle you have this uncontested middle ground area where you need to meet with certain issues in between role players, etc. The second issue is the European commission's monitoring policy and research activities on science and society in Europe. The Masters report that very clearly states that discussions and processes relating to the appropriateness of science in society should be inclusive and based on broad public and stakeholder engagement since societal changes can only be tackled if society is fully engaged in science, technology and innovation and it should be stressed that the dynamics of public and stakeholder engagement remains an important object for further research and experimentation. In other words a clear awareness that the dynamics of public and stakeholder engagement is not known. It is not a finished topic. We need to engage, we need to talk about this much more.

So public engagement, I am not going to go, it is in our concept note as well, the different kinds of descriptions in it that actually indicates the shift of the epistemological boundaries through this process of complexity, so we are not now just speaking to the publics, we are speaking in them in the relation of a multitude of actions. And each one of them contribute to the bigger picture. And we are not always aware of or we are not able to capture those different perspectives and engagements with the publics to make sure that they all also speak to each other to help us build a fuller picture. But most importantly the three priority conditions that underpins public participation is something to keep in mind. First of all, access to information, and I am not talking here about archival information, that's already a fairly contested terrain to work in, but also information in between state and the public, and how do you actually rely on that kind of process. We have recently, and I am sure Catherine will assist me in criticising NEDLAC for instance in its failure to actually facilitate us in this process of engagement. Then there is participation in decision-making and thirdly traditional redress where necessary. Big role players in this whole thing. So for public engagement for good governance, we have to follow a few kind of actions and they fall under the range of regions indicated and they are the norms. Provide a platform and meeting place for discussion, facilitate mutual learning, identify public needs and concerns and merge citizens'

values and opinions with the expertise of scientists. These are very idealistic, but also very practical kind of requirements that we need to look at. But then bringing in the humanity perspective is probably quite important at this stage, because we have not been speaking about issues that are related to the publics and how they interact and I am now going to take up the position from the other side. I am going to, what they say, cross over or whatever and say I am the publics and what are the things that's important? And what I love are these two quotations. The one from Jacques Derrida where he says the word resistance resonates in my desire and my imagination as the most beautiful word in the politics and history of this country. And he goes on with that. In the same kind of way Michael Vockel says, look if there was no resistance there would be no relations of power, because everything would simply be a question of obedience. And that's quite evocative. Do we want to have with our indicators and our science surveys, how do we want to measure the level of obedience that we desire? And shouldn't we actually be desiring resistance rather than obedience? Okay, so in defiance and resistance what we find in the domain of the publics now, and I may be jumping a bit fast here, is that we don't have a, we don't have a kind of normative publics domain. We have a very unstable public domain that we work in. Most of us most of the time. But at the moment it's becoming much more of a volatile and an unpredictable space. And I am specifically talking about the rise and the social uprisings that we witness. I'm sure all of you, like I am, following lots of publications in this regard where people talk about the Occupy Wall Street. What has happened? What has happened with the Arab spring, etc.? They are numerous and they are just not contemporary. They date back to in the history of China, etc. And we follow with interest what has happening, but we actually don't always recognise the fact that we are living in those times at the moment as well.

So our publics or us as the public, is part of that whole unstableness that happens and there has been mention in previous presentations, the networking, in some sense the kind of superficiality that comes out with through our social networks, but also the ability through social networks to mobilise people, to make them stand up for some kind of cause, get together and then talk to them. To the state about what they experience, and I think Occupy Wall Street is one case study that, it will do you good to go and just look at the systemic way that they actually manage this Occupy Wall Street. And you come across the fact that these are highly informed intelligent intellectuals that are coming together in pockets all around one theme and one topic and you start to then ask the question, who are the rock stars there and you need to answer the fact that there are no rock stars anymore. These are also functioning as a collective intellectual to inform the state about things that they find unacceptable. So I think I have missed, so let me just conclude by talking about South Africa. And I must mention that a week ago we had at a round table at MISTRA around the role of the intellectuals in a democracy and it was very interesting to come across opinions that came from the fact that South African history is embedded in this whole thing of resistance and defiance. That is our psyche, is that we are busy resisting and defying whatever is the norm. The ANC's internal operations was in defiance, in resistance. We are here today because of the fact that we have been applying those kinds of issues in how we are, and now what we find ourselves in, we are now the revolutionary, the cycle has been completed. The previous revolutionaries are now the leaders and now we are suddenly called the protest capital of the world. We have never been the protest capital of the world. We are famous for being protesting about everything. Statistics now show with 122 violent protests, marches over the past three months, it's sometimes easy to forget that violent resistance has been part of the African National Congress' strategy of rendering the apartheid regime ungovernable. I think it's important to keep on remembering how the publics, we as publics in South Africa, how do we interact with the state? We are not doing something that has never been done before. It is a kind of a normative state that we are in. And the challenge is, how do we manage this in a way moving forward in our democracy? And then the grievances, I am not going to go into those statistics. But I want to say that these protests are the political manifestation of some 27 million people in South Africa living off R799 or less per month. That is the stark reality. Once you stand to look at those statistics, say this is nearly half the population that is now living below the minimum wage. Something is wrong. And then you relate it back to the social movements that are slowly gathering momentum, like the Occupy Wall Street kind of concept, and you realise that the public is not a stable environment. It never probably will be. But there are issues that we need to look at when we look at the public that is maybe falling out of this deficit model of the public is this passive recipient. And then to understand the passion of the ideology, it's very interesting to look at what has happened in Africa over the past, well from the 1960s which is the sort of period of liberation for most of the African countries and there we find numerous ideological perspectives that were introduced by the different governments over that period ranging

from a more or less pure Marxism/Leninism to populist ideas rather similar to the Russian narodiks, or Ghandi in India as well as a nationalist ideology. And that national ideology is also something that we grapple with. How do we manage to become nationalised? How do we manage to be a national identity? I couldn't resist using my colleague's slide, because I want to ask the question in a very appropriate visual way. Where to now and how are we going to manage this public engagement debate in South Africa in this atmosphere of anger and discontent?

Because the science museum, science journalism, science reporting through conferences, workshops and science communication engagements with the public is probably ineffectual and futile. Across the globe millions are homeless and hungry and science seems to be unable to solve many of the basic problems. Given a choice, will these millions of people wait for science to assist them, or will they rely on common sense, like going into violent uprisings? So scientist engagements with the public is turning into the public engagement with the scientists. And I want to conclude by saying the more that we understand the publics, we know about what makes them tick, or it tick, I don't know how you refer to the publics, and the more that we actually see ourselves as being part of that problem, and the more we understand our own history and where we come from, we might get closer to a kind of situation where we will be able to communicate efficiently with government about democracy. Thank you. That's it.

MS PANGO: Thank you very much Dr Hester. As you were going through the presentation a lot of questions came into my mind. And I am not sure if this is the platform to be talking about those. But I think it is worth sharing with you my thoughts just for us to start pondering around these issues. I think the question that was asked before lunch as to what is science is very critical. Because at least it gives context to the debates that are happening in this room and outside this room. And the definition that was given there, it gives a broader sense of what science is. And now the question that comes to mind is how do policies address public needs and concerns? And if we have that definition of science, you ask the question who rules the world? Is it science? Which science? And how does it relate to people's needs and concerns? I will now get to rounds of questions from the floor at a rate of four questions per round. I will start this side. Thank you.

MR X7: I'm from [a small town] in the Northern Cape. I want to start where she concluded in terms of our relationship with the public. So when I got the invitation on Monday and I saw public engagement for good governance, the first thing that I thought of was my own municipality. Because the auditor-general for the past two, three years, in his report indicated that the municipality did not comply with the IDP processes, did not consult communities. And the IDP document is important for me, for us as communities, because we are a mining area in a renewal energy area, so your SLP, social and labour plans of the mines will be informed by the IDP. And also your economic development obligations in our municipal area. Now if you don't have a credible IDP, because there was not enough public engagement, and there is good governance problems in terms of service delivery, and I thought that this seminar would assist me to answer those types of questions that we are having in the community. I can give you practical examples. When the mines go to the municipality, the municipality gives them a project, we have a poultry project where the mines spend about R10 million for chickens but there is not a single chicken at that mine. So I thought this thing was going to be very practical and was not going to be at such a high level that I don't understand, and was going to speak to those for all the issues that we sometimes do not understand. So I would recommend that in the future, maybe have some community practitioners on the programme, case studies from the community as well so that this thing can speak to what the ordinary people really are looking at local communities. So for me it is a little bit high level. It's like, before the mines, just another practical example, we didn't have prostitution. And then now we have prostitution and then the academics come in and then they want to come and discuss this thing, and then we say to them no, man, why don't you just go tonight to the robots and then you will find these prostitutes there. Now you want us to come and … us about prostitution when you can just go and practically see them and talk to them. Now this thing is always the same. And some relation the issue of good governance, and I didn't get that out of all the presentations. But it was a good workshop, it was very informative, it was just at a very high level. But the link of the community and the link of the ordinary people is very important. I think that is where you concluded.

MR X8: Oh, Hester, of course, I'm sure if I would go as to assert as you did that science cannot solve the many basic problems. It's not how I would say state the problem. I will give you just, for instance if you

say science cannot solve the problem of poverty, I agree with you. If you say science cannot solve the problem of inequality, I will agree with you. If you say science cannot solve the problem of the access to basic education, I would agree with you. But science has shown that poverty leads to problems, leads to disease, that inequality leads to submission, leads to violence. We know, humanities have shown that, so science has learnt us a lot, has told us a lot. Science has shown that access to, the lack of access to basic education somewhat curtail the possibility of someone to achieve something. So it's not only science that's at stake. It's how the result of science sometimes are put in place or not put into action. So this leads us to the role of who are interested in what? What is the role of the government in modern society? How does it arbitrate the different interests of society? So it's not what role of science, what does he expect the role of science to be. So this is how I would restate the question. Otherwise we would be inclined to think that the culprit is science. But science itself, I agree with you, cannot sort out the problem. But ask science what kind of problem it can solve and ask other what result science has brought up, are being put in place or not by different institutions. This is how I would restate your affirmation.

PROF LE MAREC: Thank you, Hester, for that presentation, I liked very much because especially at the end with whom are we [unclear 0:34:26] and what alliances can we make and where and that makes me think that we must absolutely take very seriously the project of those collective that we can create. Sometimes you spoke about occupy, I see the photo you chose, so I think every time we have an assembly we should try, as you say, to get more reflectivity to be more ethics, more modest, etc. The project, the intellectual project, empirical project of being more in what we say, being more with the one we are with, being more, I think it's very important and just to think it is that, when there are processes of technology assessment, historian of science, Dominique … he said that in fact people are ready to make a lot of change in the way they think, the way they, when they are with other people. That the expert, the scientist doesn't change so much because they don't pay enough attention sometimes so there is perhaps an epistemology of care, of paying attention to details, to the very kind, very tiny change and not being convinced that's on the level of relevance in the country. I think you showed us a lot of inspiration to densify our assemblies, our collective, our group.

MR X9: Thank you, Chair. In terms of these political challenges, I just wanted to get your impression, Hester, as well. One of the concerns I am having is how, you had one of your first bullets access to information as empowering people for participation and what have you. I mean, recent studies have showed that people are getting less access to government information, for example, in terms of sort of Promotion of Access to Information Act, PAIA requests, that they are being less fulfilled now than they were three years ago, but quite dramatically so. Government is tending to publish its documents for the minimum comment period of 30 days. And so it seems that government is actually allowing less access to information, is reducing its participatory process. But civil society is having access to far more informal sources of information. So surely this in itself must have an impact on social unrest? I mean if people are actually equipped with more and more information, but are given less and less platforms to share that or actually get involved in governance, surely the public protest like Wall Street, for example, Occupy Wall Street, is one of the only ways that you can actually, civil society can express that kind of frustration. This lack of involvement.

DR DU PLESSIS: I just want to stress the fact that I am talking here about the sciences as per definition that I showed in the first slide, so it's all the sciences. I don't blame science *per se*, I blame the sciences, which in other words I blame the humanities for not doing enough to make sure that these kinds of failures, like Mr X7 has mentioned, and I really appreciate that you come here and I am very sorry that we can't assist you in understanding, but I can assure you that if you look at this slide and all the different conversations that's taking place, it is again a case of joining the dots and certainly you are welcome to speak to my colleagues at MISTRA who are working in this area and facilitating a lot of these debates between mine workers, the public, the unions and government to try and get some kind of space where people can share information. And then Ms X9 is just going to quickly mention to us what we found in our study about NEDLAC, which is an official body that was instituted by government. ..over to you. Keep it short.

MS X9: I think I particularly like the famous, in the light of the last question, sorry, I don't know what your name is. I was quite cynical at the end of our interrogation of the ostensible construction of NEDLAC as a forum to facilitate public participation in a representative process to inform policy, because there is some

naivety that accompanies the genesis of the new South Africa. And I think that that naivety exposes itself in different ways, at different stages and I won't speak to specific instances outside of this one, but particularly when looking at the community element of representation. Who I found to be represented there was essentially arbitrary and if one takes the Women's League, for example, and contextualises that in a feminist debate in the contemporary era, the Women's League were never conceived of as a body to further the cause of women and there is a fascinating history there. They were there to support the male protagonists housed within the ANC. And it is astonishing if you look at how supposed capacitation maps to actual representation and capacitation within forums, where NEDLAC is just one such example, and there was in fact limited interest in the civil society segment when we presented our work at specific levels. So I think that if you have an emerging group of representatives they are far closer to communities and civil society. And there is a socialisation process that occurs, that's part of the government project or the civil society project or the [unclear 0:41:51] project or the labour project. And I was fortunate to gate crash NEDLAC a few times, somebody put me on a list, because they thought it would be interesting and interested to be there. And in some instances it was interesting because you had an overt contest between sectors of a very predictable format. Did you have any innovation, did you have any will to collaborate in the same sense that occurred when NEDLAC was first constituted? No. And do we have a clear sense how in a climate were our representation, deliberation, participation, is not important, how that organisation will evolve beyond serving as a window dressing exercise, to check a box of public participation. There were other, I just want to raise as a possible concern, [unclear 0:42:50], the EFF in particular, Gayton McKenzie is not a friend of mine either, but I think that they provide a very interesting entry into the kind of political situation and it's been an immensely disconcerting to see words out of sight of protests being matched by violent suppression. And that's just what I want to leave you with.

DR DU PLESSIS: Thank you. Can I pick up again in answering? Because that provides me with the opportunity to just inform you about the context in which we were looking at the role of NEDLAC and that was a project we worked on to look at, to identify pillars for a social contract in South Africa. And that stems from quite a big history that I am fairly sure most of you are aware of, where people like Cyril Ramaphosa, for instance, sort of first do the lack of trust in our society. We don't trust each other. Basically it's that. Even on individual level we don't trust each other. And that comes out very much in when we start to speak about the role of the intellectuals because there is confessions coming from the ranks of the intellectuals that they live in a culture of fear, they are scared to speak their minds, they might lose their jobs. As basic and simple as that. We also come from a very long history of a culture of silence where we don't talk about things because it doesn't suit the government of the day to speak about those issues. So these are debates that I argue should be placed in the domain of the humanities to understand and to then inform how we deal with each other. And then how do we identify those pillars that can actually guide us into a possible solution for the situation that we find ourselves in. And that answer is very much, and I hope Joëlle's comments, and thank you for that, because it also brings in the fact that we, and I like what you say, we need to intensify the collective. It's not useful and it's never going to happen that we will have rock stars in the humanities who is going to steer us out of this big situation that we are living in. We are going to need the collective to help and assist us in thinking through these issues. Yes, and I hope, Bernard (Schiele), I have answered you sufficiently. I take note, thank you very much for your comment, I maybe put it too blandly by saying the science, scientists, but there is a space there where I think our colleague from Postmasburg has identified the failure of communication. We do know how to purify water, we don't. We do know how to have alternative energy, we don't. So what is this issue that happens repeatedly and collectively and all over South Africa where we don't apply the sciences in our engagement and in our solving of local problems like you indicated. Thank you.

MR X10: I think science cannot solve and it is not meant to solve problems. Scientists ask questions and solve those questions and enlarge the horizon. It is the social, economic, and cultural structure in democracy or otherwise which is responsible for solving people's problems. It is the democratic leadership in a country like India or South Africa which would be within its rights to place a social problem, educational problem, or economic problem before the scientific community and the scientific community may be able to provide an answer. But scientific community can only provide answers, it can generate knowledge. It is the responsibility of the structure to implement that and solve a social problem. For example, one of the projects which is known as Manhattan Project gave birth to big science. So

scientific community solve the problem $e=mc^2$ which was just the knowledge generated and created. It was a scientific investigation which led to $e-mc^2$. But when you wanted to make a bomb, then that was a political decision. It was not a decision taken by the scientific community. In fact scientific community opposed it. Opposed it vehemently at the second phase of – so scientists are not expected to solve social problems, economic problems, management problems, scientists are expected to generate knowledge around a question whether it's natural sciences within the purview of natural sciences or social sciences. I think therefore it is extremely important to engage the scientific community also into saving the democracy. Or reinforcing the democracy. They cannot be working without sync between the two. The scientific community have to be responsible and similarly the politicians, the managers, the policy makers, have to understand science whether they can provide a solution to a problem or not.

MS X9: I just want to bring in another kind of aspect that I think hasn't been discussed so far into the discussion which is linked with a body of literature that have I been reading lately and I find it fascinating which is on decision-makings. And it talks about the emotional brain and the rational brains. And I think when we talk about science, the first impression when we talk about science, we are talking about rationality, we are talking about information, we are talking about facts and so on and so forth. But increasingly actually it has been found that for complex decisions, if we use emotional brains actually we would make better decisions, and especially linked with the issue of good governance, it is found that morality is actually associated with emotional brain a lot better, a lot more than the rational brain because people can, they can know, they can do the cost benefit analysis, that is what happened to the social past, they know all the consequences, but they don't have the emotional brains to know what is right and wrong. So it is not about information, it is not always about rationality, it is not always about information. And a lot of discussion we have so by talk about trust. That is about the emotions and people talk about action, you need to be able to sympathise with other people, but that is when emotions, when action takes place. So my question is what role can science play in terms of evoking those kinds of emotions, in terms of to push people to make decisions, to make people do good things? What is the role of science in all that? Does science have a role of that, or maybe science is only there to provide the information? What does it, where does it stand? That's my question.

MR X11: I'm wondering if you would agree with something like this? You know the conference began, oh, this was yesterday, actually, I think with Thomas Auf der Heyde claiming a very big transformative role for science. He said science is the driver of the economy, science is the driver of social cohesion and I am wondering if you would agree and it is coming I think from what you are saying, that that idea of science is a convenient fantasy. It's a convenient fantasy because it's comforting in that it allows you to think there are quite simple technicist solutions that can be found to do this that and the other, to solve real social problems. So it is a comfort. But at the same time as it's a comfort, it's also a distraction because the social problems need social and political analysis and are amenable to social and political thinking and solutions which are side-lined by too much of an emphasis on science. And once again, I was so interested to see, one of two people who've actually got a little bit further historically, which to come back to that powerful question earlier about [unclear 0:53:15] parties, what the role of the humanities is in these things is to pose questions, because without questions you can't get answers. And one of the things we are talking about, is to problematise by thinking historically and philosophically. Let's take one simple example, going back to your thing and the municipalities. In the history of political theory which are humanist-based study, the birth of the modern state is deeply tied to the extension of literacy. As Jack Goode called it, the prime technology of the intellect, if we want some scientific stuff. At the birth of the modern state, there are two completely opposed ideas of the administration. In Hagel's political thinking we have the argument that administration is the key to the success of the new post-French revolution modern state. You must have effective administration which is politically neutral, well trained and disinterested. So that is one powerful vision of what administration should be and certainly isn't in South Africa. The critique of that theory, the administration and its idealism in various senses of the word comes from Marx. He says famously along with angles in the manifesto, the state are administration in my sense, is simply a conspiracy and I will change the wording a little, of the ruling party. That's all it's doing. It's administering things for its own benefit and Marikana is an example that many people would say is an example of that process. Now why I am saying is twofold because you are asking what is happening. And I want this, in a sense I am replying to by saying Humanities does two things in this regard. It suggests that actually literacy and particularly quite advanced forms of literacy, are crucial to the functioning of societies. And this is something we really need to grasp, in a country with eleven

official languages or more, and how we attend to that, it is an absolutely crucial problem. Secondly, we need to think about our current day problems with the resources that the long experiment of human history as it is recorded in the Tax Week Humanist study, embodies. They provide some of the tools for anybody thinking today, if they come across those things. And my example here is, people often say humanities is so distant from the real, only science is close to the real. I want to just mention the, for me a crucial example in the campaign, the AIDS campaign, when one of the leaders of the campaign was really worried and said can we actually challenge government? You know we wanted a change of government, we wanted democracy, now we have it, can we actually challenge the government on these policies? And Zacky Achmed, MA in literature from the University of the Western Cape said why don't you read John Rawls' *Theory of Justice* where he says yes, you can challenge government, that's a part of democracy. You know the humanities are there, as I say, because they're a record of embodied thinking about complex social problems. It's something we can draw on at quite abstract levels, and I know you have talked about abstraction, but more fundamentally it points to the very simple fact that literacy, or literacies of various kinds are crucial to the existence and functioning of social collectivities. And that's the technology, the technology of the intellect that we study in the humanities. Sorry for rambling on for so long about these, I hope you will forgive me.

MR X12: Thank you, Chair. I am going to get into trouble with Mr xx in these issues. Dr du Plessis, the statistics that you projected on the screen is quite troubling. South Africa has a population of plus minus 53 million citizens and you say that 27 million of those subsist, survive on less than R800 per month. We have 18 million people dependent on the state for social welfare and only 6 million people who comprise a tax base. That is not a sustainable model. Professor Raza you answered my question and the question that was posed by some of the colleagues, can science and scientists solve problems? I would say yes and no. Scientists yes, are there to provide models, frameworks for solving problems but in the science when you compare what, currently the frameworks that are pursued in the world. In American since they won, you've had social scientists, lawyers and people from the humanities running the state. Go to the other hemisphere, in China in less than thirty years you have had engineers and scientists running the state. And what are the results? In one generation, less than 25 years the lives of over 600 million people have been bettered. So I guess the Chinese model for us poses serious questions. Who are better equipped to run and provide practical solutions for today's societies? I say this to disagree with Professor xx. If you look at the achievements or lack thereof, between the pure scientists, the pure sciences and what is called STEM and the humanities and social sciences, what is called HSS. In the last 2 000 years there is a big difference. The pure sciences have contributed significantly to the collective human civilisations. You know what I am talking about? The wheel and medicine, us being able to go into space, etc. What has the humanities and social sciences contributed in the last 2 000 years? Yes, they pose the questions, they problematise the questions, but they never arrive at a consensus. For the past 2 000 years the humanities and social sciences have been asking the same questions. What is truth, what is beauty, what is meaning? Where has that taken us? I am not too sure where it has taken us, whether it's practical and conducive. Thank you.

MR X13: Can I just add a footnote? Certainly the Chinese government is run by a trained scientist and trained engineer, I totally agree with that, they play a key role in the Chinese government. But that might be necessary, but not sufficient to understand what had, what has happened to China over the last 30 years. We have to go back in history and look at the failure of the Maoist system and return to economic development that was taken by Deng Xiaoping. So it's not science only, it's some sort of political turnaround that changed the course of history in China and brought in the economic development that made possible the change in the quality of the lives of millions of people. Science were of some help, of course, but the economic turn decided by Deng Xiaoping was certainly instrumental in the change in China.

DR DU PLESSIS: Yes. I just want to say that I was going to rely on the collective intellectual here to ask Jeffrey to answer some of the questions using the Chinese model, so of course he raised it and it's now already in the public domain, and I must say that a lot of these issues when I make my notes, I refer to check the Chinese model, because it is not per se that the Chinese model is the best model or it's a model that we should aspire to, but certainly in the project that we have just completed at MISTRA looking at the role of Confucianism in China, we looked at it in this very wide variety of what is, what the social values mean in a governance model like they have in China, and how does social values as a kind of a

philosophy underpinning society, how does it sustained itself within the fluxes of different kinds of leaders that come in, different kinds of ideologies that are promoted. It is a very good learning curve. I think we started off falling in love with China and we ended up very, being like a good parent, quite critical and say hey, pull up your socks. It's probably not the best solution on earth that we can follow, but nevertheless what I am trying to say is that it's more than just ideology, it's also the publics and what drives us. And in some of our previous conversations over the past few months at MISTRA, I keep on asking the same question every time when we have debates with the public, and different members of the public. What is the ideology that's driving South Africa at the moment? Where are we heading to and what do we want as a collective? I don't find a clear answer. I think we are still struggling in our democracy to answer ourselves in that. You give, with your question about the emotional brain, and you know in the arts world they also have they have this left side of the brain, the right hand side of the brain theories, and it gives you certain abilities, but I think the best expression or the best example to use here, is that we do have a way of using emotional, whatever you call it, the emotional brain if you call it that, with our violent protests that we have, you have the testing of the ground, you have a conversation, you press the barriers, you move further, nothing happens, you move further and it goes into violence. And now we have a situation that is very volatile and we need to really think about maybe going back to the roots of why are we so violent in this country? We are really way too violent to explain it in a kind of nominal, normal way, emotional and intellectual brains and stuff. We are just very, very violent and we need to reflect on that and look inwards on that one. That's just a political comment. I think even when Gauhar was speaking, I was recalling the Chinese project because he was working as a partner in the project itself, and it often comes to mind how can the world, because democracy function in the way it's functioning, and that's India and still survive. I am constantly amazed by the fact that India is still surviving, to be quite honest. I don't know how they survive. It's such a huge population, there is such huge poverty, there is very less violence than we have, but there's more kind of inequalities. You can carry on having these lists but there is a passion for sharing information and I think the most wonderful thing about India for me is that in their constitution Nero made sure of the fact that they have this obligation to the public to foster what they call a scientific temper and that means there is an awareness, there was an awareness. It's still there, it's still being maintained that people need to be scientifically tempered, in other words, go through the motions like he explained in his speech, of enquiring, making sure that you have a critical overview. I sometimes wonder if we do apply a scientific temper in our problems about the municipality's services and deliverance, lack of deliverance, what will happen? What will happen if we start to really talk about the logic of the process, of supplying water to a community from A to Z, plus all the responsibilities? It's those questions that I believe the humanities can assist in answering in general.

And, [Mr X12] I am not going to respond to you. You can respond to me again. But I think basically what we need to acknowledge is that we are in deep trouble and we need a way out quite fast. I think Mr X12 will, as the collective intellectual here, assist in saying that most of our engagements over the past months has stressed the point that we are in trouble and we need to think about this and whether we rely on science to assist or whether we just move into the pure political domain, is a questionable thing. And then very finally, [Mr X11], I keep on thinking that one should mention that the relationship between philosophy and sciences being the most intimate, probably most exciting relationship in the disciplines over many, many years and we tend to forget that there is something like the philosophy of science and that philosophy of science brings in history, philosophy, world views, all those kind of debates, so we sometimes forget about our own specialities. Thanks.

MS PANGO: Thanks, Hester. That concludes session five of today's programme. I am going to hand over to my co-Chair to continue with session six. Thank you.

Reflections and recommendations for best practices in public engagement in South Africa

Professor Narnia Bohler-Muller, HSRC

PROF BOHLER-MULLER: Right, we have, I think, twenty minutes remaining and the day is due to end at ten past three and I suppose people make arrangements and plans according to the programme. So we

have a little bit of time left, but what we need to do part of that time, used for some recommendations. And so we need to think collectively, I guess. I'm very much an individual, but around how we're going to wrap up the day. And how we are going to try and get as many ideas on the board as possible. Any recommendations, Hester?

DR DU PLESSIS: Sjoe, that's a tough one to start with because I think we have raised so many of these different issues, but I will definitely recommend much more of a responsibility to be taken up by the humanities to assist in what is happening in the science world. That relationship has been neglected. We tend to work in different domains and we shouldn't. And there is no more ideal platform to do that, than through public engagement. That's why I think it is such a very, very important topic. Promoting public engagement and taking up the role of the scientist, in other words having more speakers coming from the world of philosophy, history, social sciences, to speak in debates around science and technology is definitely, for me, one of the priority areas. And can I have a second one? The second one will be to start to really think about the application of trans-disciplinarity rather than relying almost too much on the specific methodologies related to the specific disciplines, because the methodologies are also there as a tendency to keep the disciplines separate from each other. And there is no easier bridge to follow than using that transdisciplinary approach too.

PROF BOHLER-MULLER: Okay, those are two, I think, very good recommendations. The relationship between science and the humanities and the need for these debates to take place. As a form of public engagement as well as the application of the transdisciplinary approach to research and to public engagement, are there any other concrete statements or suggestions? Or even questions? Yes, Mr X12?

MR X12: Thank you, Chair. I think it's the point that was made by the gentleman here at the back, that in terms of a stakeholder participation, the relationship should not only be seen as between the state and research communities. But it should also involve people at the coalface of society. Local government, one, but the two most important, well, not importantly, two, also people in industry, the private sector. Thank you.

MR X13: Yes, here. Okay, I think for me, the starting point is really to ask ourselves, say yes, we are doing this, why are we doing this? Because to me having sat here the whole of today, I don't think that has been answered. In particular why should the public be engaged in science given that we have also heard during the discussion here, that not everyone can be a scientist and if that science is not there to solve all sorts of things? So essentially with all these sort of conflicting ideas and things like that, I think we need to define what is it that we are doing and why should the public actually be engaged in science? And also following from that, I think we have had that science is broad. There are so many things that actually comprise science, but if we have answered why should we engage the public in science, is that everything that is falling under the word science or are there particular issues that we need to focus on, given that time is not on our side? We have all these other things to deal with, so exactly what is it that we need to prioritise in order for us to actually achieve what we are intending to do. At the moment everything is just all over the place and I think if we continue along that road, we will not be able, we will sit here maybe ten years down the line, and still be asking the same type of questions without actually having made any tangible progress.

PROF BOHLER-MULLER: Thank you very much. I think perhaps if I can tell a little story and then we can see how this can connect to your question to prioritise, and it has to do with municipalities. We have just finished a project where we have looked at issues around implementation of court judgements, this is an HSRC project and one of the issues was with regards to the Harry Gwala informal settlement, just outside of Johannesburg which is really bad-off in terms of living under R800 or less per month. And the Harry Gwala residents have been trying since before 2009, to have the township, sorry the informal settlement upgraded to a township. This can only be done when scientists come in and give them options as to how to do it, infrastructure wise. So what the municipality did, was they consulted their scientists and they went to the community with the plans and they said this is what we plan to do for your community. The community said no, we don't want this. We have a number of issues you haven't spoken to us about and therefore we will call in our own scientific experts to give you other options, because we don't want high-rise buildings. Culturally it's a problem. So there was this assumption on the part of the municipality, the City of Johannesburg, that the residents wouldn't understand the science. Or weren't interested in the

science. Whereas the residents were very much interested in the science and were willing to engage in the discussion around the science. So maybe that could be one of our priorities because it has got to do with service delivery, and service delivery frustrations lead to protests. Just an idea.

MR X14: Thanks. Hester mentioned the issue of the humanist engagement with science, obviously humanities is a discipline within science itself, but the other aspect for me that perhaps hasn't been taken forward in this particular seminar, and it's something which probably Temba and myself might discuss after this, is how the humanities itself engages with society? Which is a very important aspect because there is this perception in society about the value of the humanities, well the humanist deal with, well supposedly or perceivedly deal with very abstract, abstruse sort of topics. We've been talking today about the turns in the academic literature. There's been a post-modern turn, there's been a literary turn, now we have heard the ordinary turn, you know you can go on and on and on. And you can imagine if you have this kind of conversation with a lay person, he will just be totally confused. The reason I mention this, is when I read the literature, it seems to be now moving in the direction like this around societal challenges. The big questions in society. And we need to now have a conversation between humanists, policy makers, civil society, and even the private sector itself, what are these big questions? What is the role for the humanities in interrogating these questions? When the humanities identify research questions or a hypothesis, for instance, is the public, the publics, are they involved in this kind of discussion and for me that seems to be a very creative space which we are probably missing in this particular seminar. And I must be very fair to you, when I saw the title of the seminar, and I was under the impression we were kind of moving in that direction, but it doesn't matter now because I think it was a very productive day today, but it's probably something that we need to pick up in a separate discussion. Because I think the humanities in particular, the traditional non vocational humanities, what we consider to be the history, philosophy and cultural theory and so forth, are disciplines that are actually at risk in South Africa, from a funding perspective, from the perspective of how they perceive their status and their role in the university itself, and if we don't start looking at how the public engages with these disciplines, my fear is that we are going too far down the road, before we try and tackle this very thorny issue.

DR DU PLESSIS: Can I just quickly respond to this? I think it's very important that that question that you raise is, but also to just mention that those debates are taking place but maybe not in such a structured way that one would like to. And I specifically would like to refer to the Charlotte episode that happened in Paris a while ago. It evoked an enormous amount of discussions about the main issues that I mentioned in my speech, that is underpinning a modern democracy. The freedom of speech. The right to opinion. All those very basic rights. It really promoted a lot of very intense debates that I really hope that we can continue in our discussions because in that debate underpinning that and maybe coming in from the side, but it's probably overridingly more important, is the issue at the moment, there's sort of tensions in our democracy between being a secular state and our slow shift into being a post-secular state. And what will that mean to us as a democracy and what are the dangers and implications of that? And that moves us straight back into the debate around fundamentalism and what the effect of fundamentalism will be on our society. We haven't even tackled that yet, because we are so inward-looking with our own problems.

MR X15: Sorry, can I just say something? Something that struck me. If you look at these, the news on television, or any of the talk shows and so forth, whenever you have issues that are of concern to society, whether it's a political issue, or economic issue, who are the people that they are actually inviting to speak on these issues? There is a very small circle of people and they often either, they are either economists or they are political scientists. You rarely hear from the humanities proper. And when I was reading a book called Turning on the Mind, French philosophers on TV, you find that since, Paul Sartre appeared on the 8 o'clock news in 1951. Over this period since, I think it was sort of 2001 or so, there have been 3 500 programmes which featured French philosophers on French TV. But yet in South Africa, we don't have that kind of space. It tells you something about the culture, what you call the scientific culture that we spoke about yesterday.

MS X10: I mean, I just think it's a level at which your analyses We don't work or live in a society where things are not engineered with an ostensible social programme. So to look at the media and go, oh there is an elite, it seem like it's a closed circle, without going further to think about why the closed circle exists and what degree of engineering is being put forward through official media, and what is necessary to

capacitate population broadly in order to distinguish between varieties of information, dialogue, sort of pervasive, but not necessarily structured in a way that the agenda is to do anything more than confuse or to talk down. All I am saying is that I can prioritise the world with which we are faced at multiple levels, but it doesn't help to shift the conversation in relation to the topic that we have here today. I wanted to return us to the notion of how is it that there are people in this room who have a completely different expectation about what should have been derived from today's session? What is it that public engagement means and do we have any agreement on that? What is good governance? Because we've been throwing around words like humanist approaches and that's not much of what I hear about in government circles when they go to government meetings, occasionally singing 'Kumbaya' and occasionally read papers that are policy papers where even the people in the department haven't read those papers. And the role of the Humanities in relation to what Mr xx was saying, I think it's one of the things that stuck out for me in terms of there is a dishonesty within South African society regarding our values about people being able to navigate the society for themselves. And one can frame it in the context of literacy, one can frame it in the context of numerous social policies regarding broader education, health, transport, housing, etc., or science. But there's a fundamental level at which we need to agree on the starting point within the South African context for good governance and to assume that the world is the way it is as a result of something entirely random, I find greatly problematic.

PROF LE MAREC: My own, I long for doing something perhaps not here, just here, but to tell what I would like from my community, for example. One thing, I want engagement, I'd like scientists engaging programmes in the field to do interdisciplinary programme, for example for biodiversity or things….. when they publish paper they have more courage to tell exactly what they learn from who and to make visible the exact state of the sociability they can witness. I don't know if I'm quite clear, but I think one engagement of the scientists, for example social scientists, would be to reduce the gap between what they produce in the public space, papers, etc., and what they really learn, by who they were inspired, etc. And if we could manage to do that I think it would be an experiment in small communities and that would perhaps reduce that habit to use, I don't know… some words or some reference, etc., which are not exactly what happened. So we would not be in the mode of provoking public engagement but to be witnesses to testify for what happened when we were involved in such things. I think that would change the vision of society we could produce. That would put perhaps more violence but also more gift, that would I think and that it is very difficult because we feel a censorship and like a strong censorship from universities, from the state, etc. But if we could manage that, I think we could hope big change, because we cannot say people must change and ourselves, we don't exactly tell what is happening when we are for example working as I have said about quality of science, about for example also naturalistic sciences, etc. I find it very difficult to do.

MR X16: Sorry, just a point of clarity. I wasn't actually speaking about any kind of conspiracy in the media. What I actually meant was the idea of when there is a big issue, a complex sort of problem that is being debated and it's playing out in the media, it would be useful to get multidisciplinary perspectives rather than from the usual science aspects. So I was a bit confused how that got 'jargled' in the conversation.

MR X17: Thank you. I think it's just in response to an earlier point as well round the title of the seminar. The reason I was here is because exactly it's the title, public engagement for governance and typically, for example, I am faced with a problem within, for instance, in the Nationalist Environmental Management Act in its principles, it has supposedly a framework for good environmental governance and part of that is public engagement. I mean there are specific principles around you need to engage with people, you need to get the collective wisdom. People who are affected by decisions must be involved in those decisions, and it's all very, very important. But they've never really been unpacked in terms of how you do this. They are just there as principles. And I was hoping to get some sort of sense of what the role of the humanities are in that situation, so to give some very practical examples, as I guess my colleague is as well, from his municipality, is that how do we do this stuff? How do we involve the humanities in a design of participatory process, for example? Those kinds of sort of situations I think is an important one. Because we really just haven't unpacked that thing. And I mean, importantly, I mean we have also had intrinsic knowledge that it's the publics that we're dealing with. And this whole sort of homogenous South African public and participation, of course from our side, we know that that's completely inaccurate and completely untrue. But how do we actually start designing processes?

There was a cry for help really early on saying how do we speak to 52 million people? We can't speak to 52 million people and the response was, ah, well you know, we have got complex social networks, we must engage with these things, but how engage, how do you identify them? How do you start finding a nexus where you engage to try and get some level of broad consensus that you can feel relatively comfortable, that you at least heard the majority of South African voices through a participatory process?

DR DU PLESSIS: Can I quickly respond to that? And I again rely on Jeffrey to maybe support this. One of the topics that we constantly go back to is the topic of violence, and if you look at the kind of forms of violence that you have, and you have this popular assumption that there is violence because there is poverty, which is a very, very hazy kind of assumption to make, because I think in a country like India there is vast poverty and much less violence. So it's not one equals the other in a logical way. To start to have more public debates, just about a very simple issue like violence, why are we so violent in this country? And then bring that back into understanding ourselves, understanding the role of the state, understanding the space that democracy allows us in this problem that we face with violence, maybe that is the kind of way to use rather a topic or a theme, rather than trying to find this, the problem itself, and then zoom in on the problem, because I like to refer to it as the meta narratives that are important and one of our meta narratives that we face is climate change. And in that metanarrative, there are many, many narratives that we need to flag. But it's always useful to tell society that this is contributing to the debate on climate change which immediately brings it into a global perspective, into a planetary perspective, into an atmosphere, and then you go on and on in the debate. So opening up these issues, but staying within topics is maybe a good way to resolve it. I like the way of talking about violence, defiance, resistance. Those are concepts that we should be, become very familiar with and understand what is the philosophy behind defiance, because this is our society. We are a defiant society and suddenly we don't like it when we are defiant and the frustration then turns to violence, so those kind of debates are probably as important as talking about energy solutions for the future.

PROF BOHLER-MULLER: Okay, ladies and gentlemen, no more questions. No more comments. Sorry, we've come to the end of the session and I'd just like to wrap up and just a couple of comments, threads that have come through, especially in the second part of the day, because we started to focus a little bit more on the humanities. One of the comments that came through strongly, was that we need to look more at the relationship between the sciences and the humanities. And there is even a theory that humanities falls within the sciences and that's an interesting perspective. But one of the ways that we can do this is by applying trans-disciplinarity in our research and determine how stakeholder participation can play a role in science and society debates. Why are we doing this? I'm not sure if we are able to answer that question today, but I think perhaps it's to enrich human engagement, human engagement within society and human engagement with science to understand how people can assist us in crafting scientific policies, for example, making wise decisions, taking into account gender, culture, language, history. We have a number of societal challenges and we can look at that through a humanistic lens and we have spoken about the importance of philosophy and how that can frame the way we look at issues of violence in South Africa, for example, we need to observe what is going on around us to be more reflective and focus more on public debates that will increase the understanding of the role of science in society and society in science. So, thank you very much to everyone for your participation, to the panellists who have travelled from far, to my Human Sciences Research Council colleagues who organised this wonderful event. To MISTRA, our partners and of course to the Department of Science and Technology who made this all possible. Thank you very much.

Appendix 1: Programme & Abstracts

Date: 11th March 2015

Venue: Council for Scientific and Industrial Research

Chair: Prof. Narnia Bohler-Muller, HSRC

Rapporteur: Dr Stephen Rule, Consultant

08:00 - 09:00	**Registration, Tea & Coffee**
09:00 - 09:10	**Introduction**
09:00 - 09:10	**Welcome and Opening Remarks** Dr Temba Masilela, HSRC
9:10 – 09:50	**Session 1: Review of international best practice**
09:10 – 09:30	*Reflexivity in science and institutional creativity: the ordinary turn* Prof. Joëlle Le Marec. Professor of Information and Communication Sciences at the Centre de Recherche Lettres Arts Cinéma (CERILAC) at the Université Paris Diderot
09:30 – 09:50	***Q & A***
09:50 – 10:40	**Session 2: Review of international best practice**
09:50 – 10:10	*Science, Public Engagement, Citizenship in the 21e Century* Professor Bernard Schiele, Science communication specialist, University of Quebec in Montreal
10:10 – 10:30	***Q & A***
10:30 – 11:10	**Session 3: Review of international best practice**
10:30 – 10:50	*Promotion of public engagement in the South; a transdisciplinary approach* Prof Gauhar Raza, Science Communication through Multi-media. NISCAIR, CSIR, India
10:50 – 11:10	***Q & A***
11:10 – 11:30	**Tea**
11:30 – 12:10	**Session 4: Stakeholder perspectives: Review of current public engagement practice in South Africa**
Moderator:	Tom Suchanandan, DST
11:30 – 11:50	*Behind the numbers – science measurement and the public understanding of science in SA* Mr Saahier Parker, HSRC
11:50 – 12:10	***Q & A***

12:10 – 13:00	**Session 5: mediator for public engagement**
12:10 – 12:30	*Political challenges for public communication* Dr Hester du Plessis, Faculty head: Humanity, Mapungubwe Institute for Strategic Reflection (MISTRA)
12:30 – 13:00	***Q & A***
13:00 – 14:00	**LUNCH**
14:00 – 15:00	**Session 6: Reflection and recommendations for best practices in public engagement in SA**
Moderator:	Prof. Narnia Bohler-Muller, HSRC
15:00 – 15:10	**Closure and the way ahead.**
	Departure

ABSTRACTS

1. Reflexivity in science and institutional creativity: the ordinary turn

Prof. Joëlle Le Marec, Professor of Information and Communication Sciences at the Centre de Recherche Lettres Arts Cinéma (CERILAC) at the Université Paris Diderot

Some recent trends in science studies are rooted in a question: is there a theoretical, cultural and political "treasure" in ordinary practices and living knowledge? Those questions rose from several disciplines, and several intellectual communities:

- ethnology of neighbourhood, urban sociology and daily uses of language
- studies of daily life in research and the sociology of interdisciplinary 'field works'
- ordinary practices of investigation, and the condition of public
- studies of the care and formal attention to engagement
- political views about common decency

Some of those trends will be discussed in detail and the presentation will then propose new forms of cultural and social creativity that are presently made in scientific institutions.

2. Science, Public Engagement, Citizenship in the 21e Century

Professor Bernard Schiele, Science communication specialist, University of Quebec in Montreal

Public engagement (PE) refers to a two-way communication between experts (decision makers, scientists) and lay-persons, contrary to the one-way science communication (SC) which has characterised and dominated so far the relations between the scientific community (or its representatives or spokespersons) and the general public. On the one hand, from a practical point of view, PE is all about making decisions on matters that concern a community (such as managing environment, health, risk) by bringing together a diversity of interacting competencies and interests in order to reach a consensus (through public meetings, expert-citizen panels, public hearings, deliberative forums). Sometimes the engagement is indirect (public consultations, Internet, discussion groups) On the other hand, the increase of a two-way mode of interactions to achieve a common goal signals a profound change in society. It is related to: 1) a transformation of the role of the institutions in our modern complex societies; 2) an evolution of the relationship to knowledge (expertise is being redefined while previously marginalized forms of knowledge – often local – are now recognized and integrated in the decision making process); 3) a redefinition of citizenship; 4) a transformation of the nation state; and 5) a globalizing world. In short : the development of PE has something to do with the redefinition of boundaries in a world where new synergies between expert and lay knowledge are growing and new ways and means of interaction between people are developing. This presentation will focus on these changes.

3. Promotion of public engagement in the South; a transdisciplinary approach.

Prof Gauhar Raza, Science Communication through Multi-media. NISCAIR, CSIR, India

The continuous, rejection, correction and replacement of previously arrived at scientific conclusions, doctrines, laws or conceptual models are the hallmark of modern science. It is through competing scientific ideas, tested on the anvil of scientific method, that science expands the horizon of knowledge and achieves relative exactitude. Within the scientific culture milieu, individuals are so acculturated that the process is well understood. However, the ever-changing nature of scientific knowledge creates cultural-cognitive-dissonance, when it encounters the public culture and subcultures. Consequently, scientific ideas face resistance before they become part of peoples' cultural structure of thought. More often than not, scientific explanations compete with culturally absorbed ideological positions, which include superstition and irrational beliefs, held by the public. The so-called scientific method, which is not a linearly laid out method but a rainbow of techniques and process, employed by scientist when investigating a scientific problem and arrive at conclusions, ensures the communality of a scientific culture across national, social, religious, ethnic, racial and cultural bounds. It follows that engagement with the public is a complex and convoluted process worthy of further attention by the scientific world.

4. Behind the numbers – science measurement and the public understanding of science in South Africa

Mr Saahier Parker, HSRC

The emergence of formal institutional science measurement in the early 20th century provided the foundation for the formation of an entire industry related to STI indicators (Science, Technology and Innovation). The study of the way(s) in which the public engages, contributes, values and supports science has been part of this evolution and embraces the notion of the changing and complimentary conversation around the study of

science engagement. This paper will explore the public facing empirical measures as a component of public engagement activities in South Africa. What is the purpose of public understanding of science (PUS) surveys in South Africa, what opportunities have been identified and how are the varied public(s) impacted by the contribution of STI to social and economic progress in South Africa? Drawing on the limited universe of empirical evidence from within South Africa, we will review the current state of public understanding of science research in South Africa and explore proposed research toward addressing some of the gaps that have been identified.

5. Political challenges for public communication

Dr Hester du Plessis, Faculty head: Humanity, Mapungubwe Institute for Strategic Reflection (MISTRA)

The current political landscape is characterised by a growing demand for socio-political change by Social Movements, Unions and civil society organisations. These movements and organisations are transforming the public platform as a space of regulated formal exchange of information to one of spontaneous, unregulated and informal information sharing. It will be posed that social mobilisation is changing the science communication political landscape. Social movements and organisations are demanding and enforcing the opportunity to negotiate democratic rights - often in innovative ways and sometimes aggressively. At the same time the newly 'occupied' public space provides opportunity for the sharing of information and new ideas by an informed and politically active public. As a result the role of the popular public political intellectual as science communicator could be progressively marginalised by the open approach of public opinion in its collective and informed demand for radical socio-political and economic transformation.

Appendix 2: Biographies

PROFESSOR NARNIA BOHLER-MULLER

Prof Narnia Bohler-Muller is Deputy Executive Director of the Democracy, Governance and Service Delivery research programme at the Human Sciences Research Council and an adjunct Professor of Law at the University of Fort Hare. She began her academic career as a law lecturer at Vista University (Port Elizabeth campus) in 1996. During that time she was a member of the executive committee of the Vista Council and legal advisor to the Acting Vice Chancellor. Dr Bohler-Muller was a Professor of law at Vista University and Nelson Mandela Metropolitan University (NMMU) before joining Africa Institute of South Africa as research director of social sciences in February 2011. She has been a member of the Councils of Vista University, NMMU and AISA. She is an admitted Advocate of the High Court of South Africa and was a presiding officer for the Private Security Regulatory Authority (PSIRA) in Port Elizabeth. Prof Bohler-Muller was a research consultant for DOJ&CD, where she assisted in developing a policy on HIV/AIDS and access to justice. She has also been a research consultant for the Institute for Child Witness Research and Training on a number of issues related to gender-based violence against women and girls. Prof Bohler-Muller was granted research fellowships at Griffith University (Brisbane, Australia); Birkbeck School of Law (London, UK) and BRICS Policy Centre (Rio de Janeiro, Brazil). She has over 40 peer reviewed journal publications and has co-edited two books on gender violence and human trafficking one book on BRICS. She has published a number of policy briefs and media commentaries. Prof Bohler-Muller is national representative of South Africa on the BRICS Think Tank Council and the Indian Ocean Rim Association. Her research interests include jurisprudence; international and constitutional law; human rights and democracy; and gender justice. Currently her research focus includes human rights and democracy in Africa, and the socio-political and legal implications of BRICS in Africa. She has won numerous awards, including the CEOs award for outstanding leadership in 2014.

DR HESTER DU PLESSIS

Dr Hester du Plessis holds a PhD in Philosophy (UNISA) and is the Head of Faculty: Humanity, Mapungubwe Institute for Strategic Reflection (MISTRA), Midrand, South Africa. She was a Senior Research Specialist (Science Communication Research) in the Research Use and Impact Assessment (RIA) unit at the Human Sciences Research Council (HSRC) of South Africa. She has academic and journalistic experience in the field of Art and Design and was Senior Researcher the Faculty of Art, Design and Architecture (FADA), and Associate Researcher at the Sustainable Energy Technology and Research (SeTAR) Centre, Department of Geography, Environmental Management and Energy Research, Faculty of Science, University of Johannesburg (UJ). She held a Research Chair in Design Education and Innovation at the National Institute of Design (NID), Ahmedabad, Gujarat, India in the Design Vision Centre (DVC). Her publications include a number of chapter contributions, journal articles and book publications such as: *The concept and application of transdisciplinarity in intellectual discourse and research.* Her most recent research is on *The philosophy of Chinese civilization: the rise, decline and rise of civilizations*. She serves as Steering Committee member on the project Journées Hubert Curien, University of Lorraine, Nancy, France.

PROFESSOR JOËLLE LE MAREC

Professor Joëlle Le Marec, Professor of Information and Communication Sciences at the Centre de Recherche Lettres Arts Cinéma (CERILAC) at the Université Paris Diderot, where she has directed the Master in Science Journalism programme since 2011. Previously, she was a professor at the Ecole Normale Supérieure of Lyon where in 2002 she created the "Communication, Culture et Société" research team with Igor Babou and led the regional research cluster "Enjeux et représentations des sciences, des techniques et de leurs usages" (Challenges and representations of science, technology and of their use) from 2007 to 2011. Her research focuses on museum visitors, the discourse on science in museums and the media, communication practices in research, particularly in surveys, and links between academic research, cultural action and militant involvement. She edits the Science Studies series at the Editions des Archives Contemporaines (EAC).She is the current president of the project Journees Hubert Curien at the University of Lorraine, Nancy, France.

MR SAAHIER PARKER

Mr Saahier Parker is a PhD Intern in the Population Health, Health Systems and Innovation unit of the HSRC. He holds an MA in research psychology and a BA (Hons) in clinical psychology, both from the University of the Western Cape, and a Bachelor of Social Sciences degree from the University of Cape Town, having majored in psychology, anthropology, and gender studies.

He has been working in the area of Knowledge Economy Indicators since 2006, most notably as part of the team that produces the annual National Research and Development Survey. He has also worked extensively in the property and telecommunications sector. He has gathered valuable experience in conducting large multinational opinion surveys and market research projects across a multitude of business sectors within South Africa, Africa and in the international arena. Mr Parker's special interests centre around the use of information technology to improve and create more efficient research environments. He holds a wide reaching expertise in database management, IT resource optimisation, research design, questionnaire development, strategic planning and project management. His areas of research interest include gaining a deeper understanding of global systems of innovation, alternative economic indicators and understanding adolescent risk-taking behaviour.

PROFESSOR GAUHAR RAZA

Scientist and Head, Science Communication through Multimedia (SCM) Division, at National Institute of Science Communication and Information Resources (NISCAIR, CSIR), New Delhi. Prof Raza has authored numerous books, chapters and journal articles on the topics of Science Communication and Public Understanding of Science. He is the anchor for an India TV show on science called Eureka, produced numerous science documentaries and is the Editor of the Journal for Scientific Temper (JST) at the CSIR, New Delhi, India.

PROFESSOR BERNARD SCHIELE

Bernard Schiele Ph.D., is Researcher at the Interuniversity Research Centre on Science and Technology, and Professor of Communications at the Faculty of Communication at the University of Quebec at Montreal, Canada. He frequently teaches and lectures in North America, Europe and Asia. He has been working for a number of years on the socio-dissemination of science and technology. He is a member of several national and international committees and is a regular consultant on scientific culture matters to governmental bodies and public organizations. He is also a founding member and current member of the scientific committee of the PCST network. He chaired the International Scientific Advisory Committee for the New China Science and Technology Museum (2006-2009), and chaired the Scientific Committee of the 2012 Hubert Curien Conference (Nancy [France]) (2011-2012). He was a member of the Expert Panel on the State of Canada's Science Culture (2013-2014) which published its report in 2014, Science Culture: Where Canada Stands (Council of Canadian Academies). As co-editor, among others books he has recently published: *At the Human Scale – International Practices in Science Communication* (Beijing University Press, 2006) ; *Communicating Science in Social Contexts – New models, new practices* (Springer, 2008) ; *Science Communication in the World: Practices, Theories and Trends* (Springer, 2012) ; *Science Communication Today – International perspectives, issues and strategies* (CNRS, 2013) ; and recently *Les Musées et leurs publics – Savoirs et enjeux (Museums and their Visitors – Knowledge and challenges)* (PUQ, 2014).

MR TOM SUCHANANDAN

Mr Tom Suchanandan is the Director of Advocacy and Policy Development at the Department of Science and Technology. He would like to highlight that his previous two positions were at a senior level both at Human Sciences Research Council and the Department of Science and Technology. He was also a member of the South African delegation to COP8 and COP10 (Nagoya Protocol). Together with the International Cooperation (DEA) drafted the South African position on Access and Benefit Sharing. Represented the country on behalf of the former Department of Environmental Affairs and Tourism in Montreal on Article 8j of Convention on Biodiversity as well as in Peru in November 2002 on Benefit Sharing in Mega-diverse countries. He was part of the team that drafted the Cusco Declaration. He deputy co-chaired the Working Group on Genetic Resources and associated Traditional Knowledge at the World Intellectual Property Rights Organisation in Geneva, Switzerland in 2011. In 2012 facilitated the drafting of the text which will lead to a Treaty on this issue. Tom was co facilitator with India and Australia in on texts at the intergovernmental committee at the World Intellectual Property Rights Organisation in Geneva. He chaired the drafting of Bali Text in Indonesia on the Protection of Genetic Resources and Traditional Knowledge in 2011.

DR TEMBA MASILELA

Temba Sipho B. Masilela is the Deputy CEO of Research at the Human Science Research Council (HSRC), South Africa. His wide-ranging research interests include social policy, public management reform, social innovation, research communication, the research-policy nexus, and stakeholder engagement. He was the founding

director of the Policy Analysis Unit at the HSRC and was previously the executive director of the Policy Analysis and Capacity Enhancement cross-cutting programme at the HSRC.

DR STEPHEN RULE

Stephen Rule is an independent research consultant and Director of Outsourced Insight and has extensive experience in the design and management of social surveys and data analysis throughout southern Africa. He has managed quantitative and qualitative research on, and monitoring and evaluation of educational and developmental projects, and religious and political issues. He was a Board member (2011-14) of the South African Monitoring and Evaluation Association (SAMEA). Previously he has been a Director of Surveys at the HSRC, a research director in the Department of Social Development, and chairman of the research committee of the National Development Agency (2003-07). From 1986-96 he lectured in urban and political geography at Vista University in Soweto (now part of the University of Johannesburg). He holds a PhD in Political Geography from the University of Witwatersrand.

Appendix 3: Attendance

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Appendix 4: Presentations

Professor Joëlle Le Marec

MISTRA 11 mars 2015

Engagement, « enlistment », responsability, trust : what is a *public*

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Some preliminary information…

- Teaching
  - responsible for master of scientific journalism in Université Paris Diderot
- Investigations : sociology, ethnography, semiotics (sciences of information and communication) :
  - -comparative studies of mediatic « discourse » about sciences in Museums, and medias (TV, press)
  - practices and « place » of the publics of museums and cultural institutions (libraries)
  - ordinary communications in research contexts (laboratories, field work, interdisciplinary and intercultural contexts, etc.)
  - common decency (Orwell), practices of investigation and citizenship (Dewey)
- « Engagements »
  - collaborations for intercultural research, cooperation between cultural institutions, associations, and university

The political and cultural context

- Trust in science, but doubts and mistrust in science policy choice : confusions between scientific research and scientific production of innovations for economical interests against « bien commun » (common interest?)
- Research related to technosciences or research connected to values of democracy?
- Crisis of the « technical » turn in politics - more and more research in sciences studies about citizen sciences and sciences « amateurs »
- Crisis in epistemology : field work, reflexivity, and above all, political value of ordinary choices, and relation between knowledge and "common decency" (Orwell)

Forms of involment in science we are talking about (not diffusion or popularisation)….

- - in construction of facts for programmes led by scientific laboratories : identification, counting, cartography (birdwatchers, astronomy)
- - in the conception of questions and methods : recent history, gender, subaltern studies, « citizen studies »
- - in the political management of priorities : lobbies (AIDS, Asbestos association, etc.)
- - in institutional creations : Boutiques des sciences, PICRI, fondation sciences citoyennes

To remember…
Science as a profession….

- 1799 : Society des « observateurs de l'homme » : first institution of social sciences, success with the wild child case and instructions for maritime expeditions
- 1804 : failure of the Society - « professionalisation of scientific institutions (Museum, School of medecine, Polytechnical School) : « professors », administrative responsibilities, wages, hierarchy (Cuvier, Lacépède, etc.)
- Instruments, political and financial support, and management work force (Bacon and the Royal Society), formation

But….
Permanence of science as a non-professional activity : scientific societies, volunteers, « amateurs »,

- Astronomy, naturalists (birdwatchers), botanists
- Social and historical inquiries, witnesses,
- Engagement and/or « enlistment » of volunteers for the « the good causes » war (from 1793!), health, culture (inquiry about languages) and for transmission to the next generation (strong value of science)
- The case of ethnography : construction of knowledge with people, progressive recognition of their actuality (Griaule, Clifford)

Seventies in France…Time for participatory processes and community intitiatives

- 1972, creation of ministry of environement, Ecological consciousness, creation of interdisciplinary in territories (ecomuseums)
- creation of first « science and society » laboratories, thesis, cursus (Levy-Leblond « pour une autocritique des sciences », Jurdant and GERSULP.
- 1966 Bourdieu, « l'amour de l'art » struggle against vision of universalist culture led by ministry of culture since Malraux, empowerment of regional communities for visions of culture as « men and their environment » transdisciplinary approach of culture and knowledge.

Années 90-2000 : ambiguous revival of « participation » (1)

- Political crisis of representative democracy : in search for legitimacy with « citizen participation » (conference of consensus, CNDP, OPCST, etc.)
- Epistemological crisis in science studies : critics of internalist epistemology / studies of epistemological plurality and heterogeneity, « ordinary decency » and the layman's knowledge

Années 90-2000 : ambiguous revival of « participation » (2)

- Market of expertise in social communication, in management of debates (applied sciences in SHS),
- Market of so-called « social networks » and technical « participatory » devices
- Economy of triviality (Jeanneret)
- New way of talking about « progress » : the public empowerment

Tensions

- Movements for direct democracy and citizenship (but also hatred of democracy)
- Enigmatic period : With whom do scientists and social scientists engage? S. Laugier, A. Ogien
- Creations and sociabilities in science and politics

Professor Bernard Schiele

Science, Public Engagement, Citizenship in the 21e Century

Bernard Schiele
CIRST/IRCST-UQAM
Pretoria, 11 March 2015

Public engagement for good governance:
the role of the Humanities
HSD Research Seminar Series

A SHORT HISTORICAL BACKGROUND
1945-1980 : undisputable science

1) The development of the atomic bomb during WW2 was the watershed moment that revealed to all the transformative power of the scientists' knowledge
2) 1972 (1995) Office of the Technology Assessment (OTA)
3) Mission: analyze public policy issues having significant and technological components

4)**The OTA contributed to a triple democratization process** :
- by including laypersons in its proceedings
- by making its reports easily understandable to laypersons
- by making its reports easily accessible

A SHORT HISTORICAL BACKGROUND
1980-today : environment and mobilization

1) The growing importance of environmental issues will contribute to the consolidation of the PE movement
2) Some of the methods developed in the 1980s and 1990s are now used in the context of nanotech, biotech, GMOs and so on

Two questions:
- What is public engagement, also called public participation ?
2) - Who is the public when we refer to this concept ?

PARADIGM CHANGE
Beyond the deficit model

1) From the 1990s on, attempts are made to go beyond the *deficit models,* putting a new emphasis on two-way communication between scientists and the public that goes

2) Beyond the mere transmission of scientific knowledge the issue moved from the mastery of scientific knowledge to the exercise of democratic rights

PARADIGM CHANGE
Understanding this paradigm change : some food for thought

1) The global impact of science and technology upon society, environment, labor structures, and daily life today is such that no one can remain indifferent.

2) In parallel – and probably as a result – we observe a legitimacy crisis of authority figures, including science

3) The pervasiveness of communication technologies results in a constant flux of information

THE ORIGINS OF PARTICIPATION AND ENGAGEMENT
Understanding this paradigm change : some food for thought

1) Now, every researcher has his own area of expertise and the research he or she conducts is far removed from daily life

2) The society we live in is often called complex, in reference to the growing reciprocal interdependency of individuals of which no one and no regrouping can successfully claim to be its center

3) It must be stressed that these transformations leads to the equality of interlocutors and to the reciprocity of their exchanges, but also to greater transparency, since it is the conjunction of these three factors that make the success of participation and engagement possible

CHANGING THE REFERENCE FRAME (Goffman)
From passive knowledge to active knowledge

- Heterogeneity : Publics not public
- Archipelago : Sciences not science
- Complexity : Increasing interdependence
- Competence : People are experts, scientists are some sort of experts
- Situation : Learning takes place within a context
- Equality : Learning is facilitated by reciprocal relations

RELATIONSHIP	DEFICIT PARADIGM One way communication	ENGAGEMENT PARADIGM Two way communication
Interrelation	Asymmetric	Symmetric
Interpersonal	Compel	Collaborate
Interaction	Authority	Equal rights
Condition	Dependence	Autonomy
Behavior	Submission	Reciprocity
Personality	Undifferentiated	Differentiated
Knowledge	Transfer	Mutualize

MODES OF PARTICIPATION AND ENGAGEMENT
Modes promoting dialogue

They range from «information transmission to information exchange or critical dialogue» (Einsiedel 2014)

E.g. : science cafés, town hall meetings, festivals, some exhibitions and online discussions

MODES OF PARTICIPATION AND ENGAGEMENT
Modes promoting engagement

They focus on deliberative processes between citizens in order to reach a decision. Some see in it a renewal of democracy in the form of deliberative democracy, against the shortcomings of representative democracies as practiced by most institutions worldwide. Thus, it is the adaptation of a political theory to science and technology communication.

E.g. : consensus conference, deliberative polling, scenario workshop, citizens jury and upstream engagement

MODES OF PARTICIPATION AND ENGAGEMENT
Modes of knowledge coproduction

They bring together amateur volunteers known as citizen scientists and professional scientists on research projects in order to produce new knowledge. This process takes part in the wider transformation of knowledge production which is increasingly object-oriented, and for this reason, transdisciplinary. This research is often conducted by teams of digitally interconnected members operating from different localities

E.g. : science shops and citizen production

Mr Saahier Parker

You can kill a virus

No you can't. You can deactivate it, destroy it, but you can't kill it

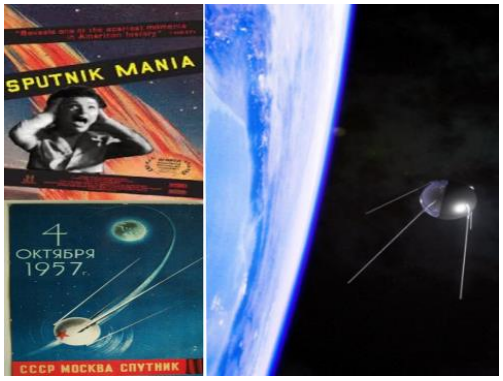
Lightning doesn't strike twice in the same place

Lightning actually doesn't care, it follows the path of least resistance, sometimes more than once

One false move at the LHC at CERN will kill us all

The scale of the work at CERN is too small

How then does the public engage, acquire, assimilate and use scientific knowledge?



Scientific literacy & the Public understanding of science

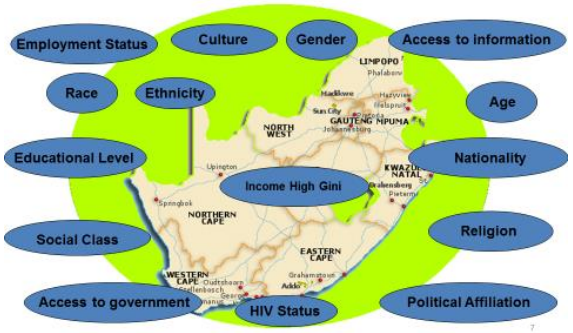
- **A public suitably skilled and competent in the acquisition, application and transmission of information (in all fields) -a valuable national asset.**
- **The Public-Science intersection has been noted since before the 17th century.**
- **Formal science measurement is more recent, and gathered increasing momentum following the 1960's, particularly in the USA and Europe.**

Evolution of the discourse…

Period and Research Paradigm	Attribution Deficit	Research Areas
Science Literacy 1960's onward	Public deficit of knowledge	Measures of literacy, Educational policy
Public Understanding of Science 1985	Public deficit of attitudes education	Knowledge and Attitudes Attitude formation and change
Science and Society 2000 onward	Trust deficit, Expert deficit, Public confidence	Public participation, Mediators of science, Evaluations of impact

Adapted from Bauer, M., Allum, N. & Miller, S. 2007 page 80

Public understanding in South Africa



Author	Title	Year
Pouris	Public understanding and appreciation of science among the public in South Africa	1991
Pouris	Public understanding and Appreciation of Science among South African Teenagers	1993
HSRC	Omnibus Survey	1995
IEA	Trends in International Mathematics and Science Study (TIMSS)	1995
FRD-HSRC	SA Science and Technology Indicators - Public Understanding of Science chapter	1995
Laugksch	Test for Scientific Literacy and its application in assessing scientific literacy of matriculants entering universities and technikons	1996
HSRC	EPOP	1999
IEA	Trends in International Mathematics and Science Study (TIMSS)	1999
Pouris	Interests, Public Attitudes and Sources of Scientific information in South Africa	2001
Blankley and Arnold (FRD)	Public Understand of Science in South Africa – aiming for better intervention strategies	2001
Goolam	The scientific and technological literacy of first year physics students: the effects of a traditional school curriculum	2001
HSRC	SASAS: Biotechnology survey	2004
IEA	Trends in International Mathematics and Science Study (TIMSS)	2003
Pouris	Assessing Public Support for biotechnology in South Africa	2004
Conradie	The role of key role players in science communication at South African higher education institutions: an exploratory study	2004
HSRC	SASAS: climate change	2007
Reddy et al	Public understanding of science in South Africa	2010
HSRC	The Public Understanding of Biotechnology in the Media	2010
HSRC	Trends in International Mathematics and Science Study (TIMSS)	2011
HSRC	SASAS module: Public attitudes toward nuclear technology and energy in South Africa	2011

Empirical studies of public understanding of science and scientific literacy in South Africa. Adapted from Reddy et al, 2009

Recent empirical work:

- Reddy *et al* 2013 published: **Public attitudes to science in South Africa** (S Afr J Sci. 2013)
- Surveyed 3 183 participants using a module in the 2010 wave of *South African Social Attitudes Survey*
- Survey covered all 9 provinces, race groups and genders, aged 16 years and older, in multiple languages
- The module consisted of 20 questions across 3 sections- *attitudes toward science*, *scientific knowledge*, *sources of scientific information*

Results: South Africa (2010)

Reddy *et al* 2013

- Demographic variables differentiate a number of stratified publics in South Africa.
- Where possible the 2010 data was compared with 1999 data from the HSRC-EPOP survey
- Results indicate a dynamic range of attitudes to science – both positive and negative attitudes
- Comparison with 1999 HSRC-EPOP results similarly indicate a change in overall promise and reservation indices in South Africa

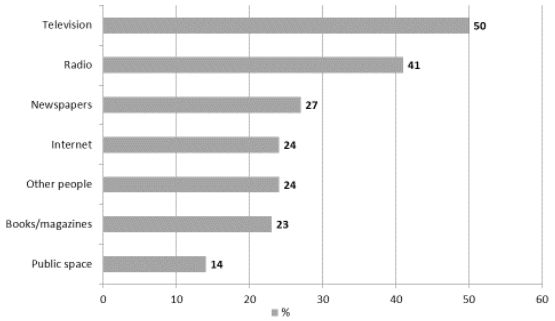
Results: South Africa (2010)

Reddy *et al* 2013

R, reservation item; P, promise item

Results: South Africa (2013)

Reddy *et al* 2014



So what?
What does this mean?

- What is the purpose of public understanding of science (PUS) surveys in South Africa?
- What opportunities have been identified and how are the varied public(s) impacted by the contribution of STI to social and economic progress in South Africa?
- Can the system be effectively integrated and harmonized toward greater efficiency ?
- Future directions for research?

Planned work

- Conduct empirical research to contribute to the growing series of data on the public understanding of science in South Africa
- Key dimensions of measurement include **knowledge**, **attitude toward science**, **interest in science**, **level of informdness** and involvement in **science engagement activities**

Planned work

- Demographic analysis will inform the development of a segmentation model for the South African PublicS
- A further output will be the development of the first South African *Science Culture Index* (Shukla and Bauer)
- The development of indicators for the measurement of the *public understanding of science* in South Africa
- Fieldwork will commence in September 2015 results will be available Q2 2016.

Thank You

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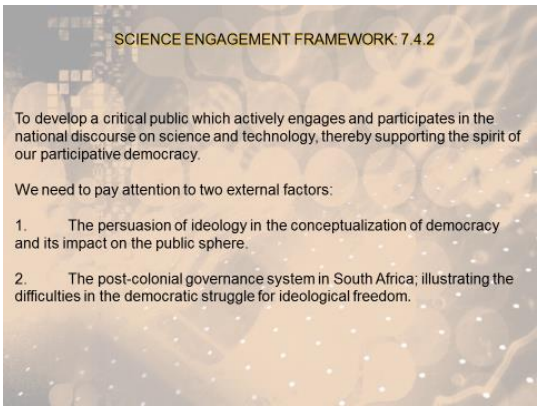

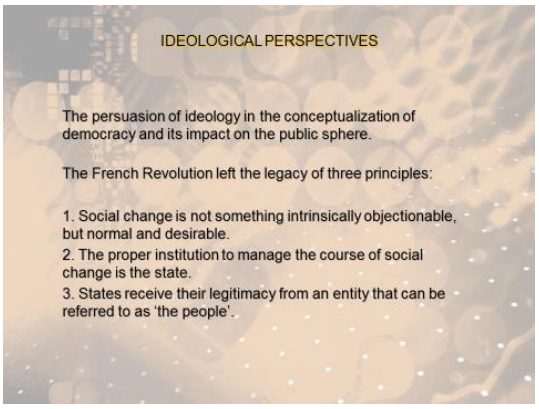

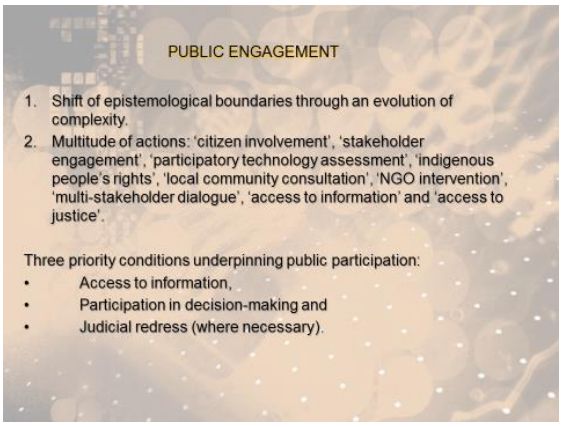

PUBLIC ENGAGEMENT FOR GOOD GOVERNANCE

Improved governance and the empowerment of citizens are often quoted as main reasons for public engagement and participation activities, but also for a range of other reasons:

- To provide a platform and meeting place for discussion and debate between the public and researchers.
- To facilitate mutual learning between public and researchers.
- To identify public needs and concerns.
- To merge citizens' values and opinions with the expertise of scientists, to create an increased acceptance and research agendas that are both scientifically interesting and socially robust.

THE BROKEN SOCIAL COMPACT AND THE PHILOSOPHY OF DEFIANCE: A HUMANITY PERSPECTIVE

"… the word resistance resonated in my desire and my imagination as the most beautiful word in the politics and history of this country, this word loaded with all the pathos of my nostalgia, as if, at any cost, I would like not to have missed blowing up trains, tanks and headquarters between 1940 and 1945 – why and how did it come to attract, like a magnet, so many other meanings, virtues, semantic or disseminal changes" Jacques Derrida (1998:2) .

" … look, if there was no resistance there would be no relations of power. Because everything would be simply a question of obedience. From the moment an individual is in the situation of not doing what they want, they must use relations of power. Resistance thus becomes first, it remains above all the forces of process, under its effect it obliges relations of power to change. I thus consider the term resistance to be the most important word, the key word of this dynamic" Michel Foucault (2001:1559-60) .

DEFIANCE AND RESISTANCE = SOCIAL UPRISINGS

In order for individuals to choose between different opinions and options three factors are required for citizen participation in politics:

- resources (time, funds and civil skills),
- a psychological engagement that requires and interest in politics including concern with public issues and membership in a group with shared political interests;
- and recruiting networks through which citizens are politically mobilised"(Brady et all 1995)

IMPROVED GOVERNANCE AND THE EMPOWERMENT OF CITIZENS

Improved governance and the empowerment of citizens are often quoted as main reasons for public engagement and participation activities, but also for a range of other reasons:

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- To merge citizens' values and opinions with the expertise of scientists, to create an increased acceptance and research agendas that are both scientifically interesting and socially robust (Jan Riise 2012:284).

WARNING: SOUTH AFRICA

- South Africa has been called the 'protest capital of the world'. With 122 violent protest marches over the past 3 months it is sometimes easy to forget that violent resistance has been part of the African National Congress's (ANC) strategy of rending the Apartheid regime ungovernable and remain embedded in the political culture of the ANC (David Bruce 14 February 2014 in the Mail and Guardian).
- Most grievances are around service delivery and in particular around land, housing and municipal services (water and electricity). Government corruption, lack of consultation by government, rampant crime, unemployment, policy brutality and low wages are listed as the lead causes of protests. Police statistics shows 8,000 to 11,000 'crowd control' actions per year between 2004 and 2012. These protests are the political manifestation of some 27 million people in South Africa living off R799 or less per month.

TWO STRATEGIC ISSUES FOR CONSIDERATION TO DEMOCRATISE THE ROLE OF SCIENCE COMMUNICATION:

1. Understanding the persuasion of ideology in the conceptualization of democracy and its impact on the public sphere.
2. Investigate the obstacles within the post-colonial democratic governance system in South Africa to assist is in illustrating the differences between a struggle for democracy and ideology.

We need to understand the kind of ideology we are talking about. In this regard ample examples exist within Africa of efforts to follow specific political ideologies in efforts to 'decolonise' Africa. For example, numerous efforts were made to institute an African socialism which manifested in many forms through the past decades. We find that the African ideological spectrum ranges from a "… more or less pure Marxism-Leninism to populist ideas rather similar to the Russian narodiks or Gandhi in India, as well as nationalist ideology (Fanon, Cabral)" (Hettne, 1995:85)

SO WHERE TO NOW?

In an atmosphere of anger and discontent, the science museums, science journalism, science reporting though conferences and workshops and science communication engagements with the public is most probably ineffectual and futile.

Across the globe millions are homeless and hungry and science seems to be unable to solve many of the basic problems. Given a choice, will these millions of people wait for science to assist or will they rely on common sense?

Scientists' engagement with the public is turning into: the public engagement with the scientists.

THANK YOU