Lorentz center

NIAS

Creativity
Meaning, Mechanisms, Models

Workshop: 12 – 16 September 2011, Leiden, the Netherlands

Scientific Organizers
- Johan Hoorn, NIAS & VU Amsterdam
- Arjan Postma, FreedomLab
- Frank Kresin, Waag Society

Keynote Speaker
- Robbert Dijkgraaf
  KNAW Amsterdam

Invited Speakers
- Gary Carter, FremantleMedia London*
- Paul Collard, Creativity, Culture & Education London
- David Hanson, Hanson Robotics Dallas
- Paul Hekkert, TU Delft
- Johan Hoorn, VU Amsterdam
- Mike Lee, Mayor of Appsterdam
- Arthur Miller, University College London
- Arthur Molella, Smithsonian I Washington D.C.
- Mark Runco, U Georgia Athens
- Bart van Rosmalen, Royal Conservatory The Hague*
- Richard Taylor, U Oregon Eugene

* To Be Confirmed

The Lorentz Center is an international center in the sciences. Its aim is to organize workshops for scientists in an atmosphere that fosters collaborative work, discussions and interactions. For registration see www.lorentzcenter.nl

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SCIENTIFIC OUTLINE

1.   Creativity in Theory

The concept of creativity is surrounded by a great number of theories and ideas, which all seem to have a point, sometimes seem to conflict with each other and at other times seem to be complementary. There is the idea of creativity as an evolutionary process, socially driven (e.g., Surowiecki, 2004, 2005), building upon prior ideas (e.g., Tapscott. & Williams, 2006, 2008), allowing co-creation (e.g., Anderson, 2006), and advocating a more-or-less deterministic world view (cf. the Marxist view on technological innovation). New technology always has its predecessors, science merely 'discovers' what is already there, independent of the individual. There is also the idea of the disruption of a grand tradition, the paradigm shift, forced by the individual psychology of the genius who at a flash of insight sees what others do not see (e.g., Simonton, 2009; Miller, 2000). And then there is the role of chance, probability, 'serendipity' (e.g., Baines et al., 2010) or systematically adding noise to a pattern (cf. fractals), the results of which may be interpreted as an artistic 'objet trouvé.'

Science, technology, arts, and business thrive on creativity. Yet, are we talking about discovering novelties or are we constructing them? And what is the creative process actually about? Association, integration, and evaluation are often-mentioned ingredients of the creative process (e.g., Csíkszentmihályi, 1996) but can easily be extended by incubation, abstraction, adaptation, etc. How do these concepts relate to one another?

This Lorentz workshop is meant not as a mere inventory of perspectives on creativity but as a serious attempt to evaluate the *meaning* of the different concepts, to define the different *mechanisms*, and try to come to the layout of a theory that integrates the different views. The discussions should be guided by the objectives that in the long run, such a theory is implemented as a computer *model* to validate its logical consistency and is confronted with real people to verify its empirical value.

2.   Creativity in Application

Such an attempt performed by the finest minds in the world is timely. The post-industrial "creative class" (Florida, 2002) is growing and expanding into areas that traditionally are not seen as creative (e.g., governance, business, education), blending in with creative core domains such as arts, design, science, and technology. Increasingly, policy makers and classical industry seek the help of creative professionals to broaden their scope, find new possibilities, and new ways of solving their problems. Attempts are being made to introduce "design thinking" (Brown, 2008; Martin, 2009) into business and governance. So-called "Living Labs" are initiated as open platforms to learn, co-create, and investigate creativity and innovation in solving pressing societal issues (e.g., Chesbrough, 2003). In addition, the creative community seeks to corroborate artistic ideas and design decisions with scientific evidence, for example, to understand the impact and effectiveness of innovations and to make creations that are more valuable socially and economically (cf. IIPCreate,[1] FES-CRISP,[2] NWO-RISCC,[3] THNK[4]).

From a theoretical point-of-view, it is debatable what the right approach to creativity is. Does the creative genius take the lead and the others should be seen as 'apprentices' or do all ideas count equally, irrespective of the credibility of its source? Again, taking a theoretical position has its impact

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[1] http://iipcreate.com/
[2] http://www.senternovem.nl/mmfiles/FES%200913%20CIRP%20DEF_tcm24-334072.pdf
[3] http://www.nwo.nl/nwohome.nsf/pages/NWOA_74QEZD
[4] http://www.thnk.org

on practicalities such as legal issues (e.g., copyrights, intellectual property) and hence, on the choice of a business model once a solution is about to be implemented. Social co-creation may favor creative commons, whereas individual genius may call for a more neo-liberal approach.

3   Conclusions

If governance, business, science, technology, and the arts are to work together, there should be a common ground in language and concepts regarding creativity. An integrative view on the various positions should provide signals of recognition that open up the discussion on usually subtle causes for misunderstanding. Such discussions will facilitate interpersonal relationships, which are crucial to cut across disciplinary boundaries.

An approach in which the various fundamental perspectives are represented, that is verified and validated, can count as the blueprint for a creative workflow that all stakeholders can relate to. It also makes clear what the differences are when one takes the 'individual genius' position, the 'social evolution and co-creation' stance, or the 'lucky coincidence' approach.

In sum, by bringing interdisciplinary minds together on this topic, the present Lorentz workshop on creativity wants to explore

- the meaning of the different concepts of creativity
- the different mechanisms of creativity (social, psychological, mathematical)
- conditions of creativity (e.g., internal versus external motivation)

so to work towards

- the layout of a theory that takes into account the different views, is fit for computer modeling, and empirically testable

The planned deliverables of the workshop are (also see PROGRAM):

- a set of agreed-upon principles and analytical statements regarding creativity
- the first implementation of a computer model on a robot platform
- a concise edited volume on creativity, its meaning, mechanisms, and models

In co-creation sessions, we will try to write a number of small chapters that are edited after the workshop period. This edited volume is then distributed among the participants as a work-in-progress and a research agenda for the community of creativity researchers.

4   Indicators of Success

This workshop will be considered a success if the scientific top of creativity research meets a number of icons from the Creative Industries and a set of principles and analytical statements is formulated for understanding, explaining, and making predictions about creativity: the meaning of concepts, the mechanisms involved, and the first formalizations based upon integrated principles.

5   Co-organizers

- Arjan Postma, Futurelab. Expertise and network in the Creative Industries and academia
- Frank Kresin, Waag Society. Expertise and network in the Creative Industries as well as in academia

6   Benefits to the Dutch Research Community

The Dutch research community that addresses creativity is scattered and hardly into contact with one another. Strong point is its diversity, as it covers areas such as industrial design, multimedia, literature, arts, business, and technological innovation. However, little exchange takes place within and between the top of research and the top of the creative industries, let alone that they can refer to a common language or a common set of principles and ideas. Bassett-Jones (2005) pointed out that diversity may lead to a competitive advantage but can also be a cause of misunderstanding, suspicion, and conflict. This workshop facilitates the communication process and hopes to initiate commitment and team-based trust, which should be continued throughout the Lorentz fellowship, at NIAS, PICNIC, the Innovation Platform, etc. Part of the workshop takes place at NIAS so that the receding fellows (national and international) can take part in the discussions. Another part takes place at the PICNIC festival for the public at large to participate.

PROGRAM

GENERAL OVERVIEW

We aim for about 50 participants. The workshop mixes formal with informal sessions and includes overviews by a renowned speaker as well as pressure-cooker and networking approaches, driving at short but extremely productive exchanges. To keep everybody fresh and motivated, the workshop will draw on a number of formats and participants can choose to come for the first three, four or all five days. As a kind of conversation pieces, we want to get demonstrators, artistic designs, games, working prototypes, and FabLab machines on site during the whole workshop period. The program contains the following:

Keynote address: Robbert Dijkgraaf, president of the Royal Academy of Arts and Sciences

The concept of creativity (*Day 1*)
- Arts and science (Arthur I. Miller, History and Philosophy of Science, University College London, confirmed)
- Technology (David Hanson, Founder and CEO of Hanson Robotics, confirmed)
- Design (Paul Hekkert, Industrial Design, Technical University Delft, confirmed)

The conditions of creativity (*Day 2*)
- Governance: conditions of talent development (Paul Collard, CEO, Creativity, Culture, & Education, confirmed)
- Business: motivation and management (Gary Carter, CEO, FremantleMedia, pending)
- Cultural environment: work conditions and urban setting (Mike Lee, world's toughest programmer, Apple, confirmed)

The course of creativity (*Day 3*)
- Social-historic (Arthur Molella, Director Lemelson Center, Smithsonian Institution, confirmed)

- Psychological (Mark Runco, Torrance Center for Creativity and Talent Development, confirmed)
- Stochastic (Richard Taylor, Department of Physics, University of Oregon, confirmed)

Conclusions (*Day 4*)
- based on day 1-3, agreed-upon principles and analytical statements regarding creativity
- how to integrate views, make things empirically testable, and fit for computer modeling

Report (*Day 5*)
- a concise edited volume on creativity, its meaning, mechanisms, and models
- ending on a research agenda

SPECIFIC SYNOPSIS

Why the set-up differs from familiar formats

During my studies at NIAS, the literature provided overwhelming evidence that creativity happens when formats are as open as possible, mixing a large diversity of people and types of information, which should be freely accessible. Rules, regulations, pre-set goals, instructions, evaluative yardsticks, fixed formats, and selection processes provoke stereotypical behaviors and tunnel vision. The evidence ranges from cultural, technological, and economic history (e.g., Chua, 2007, p. xxi; Davids, 2008, p. 464; Mokyr, 2004), to music (Zander & Zander, 2002, p. 36), management and organization (e.g., Williams & Yang, 1999), design (e.g., Ward, Smith, and Finke, 1999), scientific peer review (e.g., Chubin & Hackett, 1990), and brain studies (e.g., Heilman, Nadeau, & Beversdorf, 2003; Schweizer, 2006; Schweizer et al., 2006). Therefore, I deliberately do not want to adhere to the traditional scientific formats and keep the number of formal presentations as low as possible. I do not want to give specific assignments to speakers. What we do want is a free exchange of information, leniently guided by a number of topics we want to touch upon. That may not be academic tradition but it certainly will lead to scientific innovation.

Before Day 1

Before the workshop starts, all participants receive a pocket-size 'dance card' with the names of the participants, their e-mail addresses, and a one-liner about their interest in creativity. In addition, the traditional list of participants includes all contact info as well as a recognizable picture.

Moderators provided by FreedomLab and Waag Society will host most of the sessions.

Day 1: The Concept of Creativity

Meet and Greet

Participants are welcomed and distributed over a number of stand tables where they find sticky notes and pencils. Preferably, there are five or six people at one table and they should not be acquainted. The moderator explains that each person has two minutes for introduction and another five minutes to talk about their affiliation with creativity in general. When finished, everybody should write down a name on a sticky note of someone in the room who they think will be of interest to one of the people at their table. In the second round, everybody changes tables and looks for the person that was recommended to them (they can use the 'dance book'). Then the cycle of introduction,

affiliation with creativity, and recommendation of someone in the room starts again. A third round is optional as from here, people usually start networking spontaneously.

Coffee break

Creativity Lectures (1)

This session consists of three presentations by international speakers on the concepts of creativity in arts and science (lecture 1 – Arthur Miller), in technology (lecture 2 – David Hanson), and in design (lecture 3 – Paul Hekkert). Speakers are asked for an overview of key concepts in their domain (e.g., artistic originality, scientific discovery, and aesthetics) and make an attempt to define what that domain regards as 'creative.'

Lunch

World Café[5]

The set-up of a *World Café* stimulates a lively discussion about the concepts of creativity in the various domains. Groups of people are positioned at a table, which are covered with paper tablecloths to write on. The *World Café* begins with an inspiring story by the moderator to install the guests with the right mindset, that is, they should reflect on the concepts presented in the lectures while looking for compatibility and complementarities.

In the first round of the *World Café*, each table chooses a 'host' (someone who leads the discussion) and who draws a collective mind map on the tablecloth about the definition of creativity. After 30 minutes, participants change tables but the host stays to explain the mind map to the newcomers and to lead the discussion further. The mind map is adapted and after 30 min. the tables change again until each group visited each table and discussed all definitions.

Tea break

During tea, the mind maps are digitized so that after tea, the hosts can present the mind maps to the group at large. The general discussion is recorded to be worked out by a secretary that evening. The conclusions of this day should serve as input to Day 4, where we want to arrive at a set of agreed-upon principles and analytical statements regarding creativity.

Wine and cheese party

Day 2: The Conditions of Creativity

Creativity Lectures (2)

Three lectures address the same issue from different angles. Someone with experience in governance (Paul Collard) provides his view on creativity and education and how to make it flourish under the limitations of law, political and cultural context, socio-economic constraints, etc. The second lecture (Gary Carter, pending availability) will do so from a business perspective. The third lecture (Mike Lee) will be from a perspective of occupational and urban culture. What are the conditions certain cities offer as compared to other places that makes them become a creative hub?

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[5] http://www.theworldcafe.nl/pagina/19/inspirerend_dialoogconcept

Coffee break

Acting out Scenarios

This session is a role playing game in which perspective taking stimulates discussion. Two groups work on a scenario between a creative professional and an administrator and two groups do so for the interaction between creative professional and a project manager. Yet, the scenario of the one group takes the perspective of the professional; the scenario of the other group takes the perspective of the governor/manager. The theme of all four scenarios is the tension between internal and external motivation, freedom and restriction.

Lunch

After lunch, the theater group Boom Chicago acts out the scenarios followed by a short discussion of what the proper balance is between motivation types and between freedom and limitation. The outcome of this discussion is recorded and worked out by a secretary that afternoon. The conclusions of this day serve as input to Day 4.

Tea break

In this session we start to implement our ideas on creativity and its conditionals on a robot platform. This work continues throughout the workshop.

Dinner at NIAS, Wassenaar

Connecting Conversations[6]

For the evening program at NIAS, we invite Bart van Rosmalen who is a musician and lecturer at the Royal Conservatory in The Hague. He specializes in musical recitals and uses his art as a metaphor to reflect on the way professionals in art, science, and business work and how to further strengthen their cooperation. He will address the issues how to accommodate diversity and polyphony in the Creative Industries? How to create conditions for deepening the quality of creativity and innovation? His music is used to stimulate partnerships, develop new methods, and establish a growing network among academia, industry, governance, and the arts.

Day 3: The Course of Creativity

Creativity Lectures (3)

This day will be spent at the PICNIC festival in Amsterdam. We start the morning with a keynote address (Robbert Dijkgraaf) on creativity, physics, and fine arts.

Coffee

Then follow three lectures on the processes and mechanisms of creativity as formulated by three different disciplines. These lecturers will put forth the socio-historic view (lecture 1 – Art Molella),

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[6] http://www.connectingconversations.nl/person/212/nl

the individual psychological view (lecture 2 – Mark Runco), and the statistical coincidence view (lecture 3 – Richard Taylor). Speakers are asked for an overview of key concepts in their domain (e.g., the evolution of innovation, genius and insight, and serendipity) and make an attempt to describe the mechanisms that underlie these phenomena.

Lunch

Make the Mechanism

This session facilitates the discussion by prototyping the processes that the speakers described during the lectures. The room is cleared of furniture and plenty of materials are present to handicraft mock-ups of the creativity process (colored cardboard, boxes, circles, scissors, tape, glue, Lego mindstorm, etc). Three groups are formed with one of the speakers at its center. In the first half an hour, each group creates a large lay-out of the creative process. For example, if the theory says that chaos is transitioned into order, the group could devise a mock-up machine that shows how that is done. Participants are invited to reflect on what chaos is, which parts apparently can be pasted together in what way, and how that leads to a result that we consider order. The speaker guides but does not restrict deviations from his or her initial proposal. The audience can participate.

Meanwhile, programmers keep working on the robot platform. The presentation by Mike Lee is repeated for the public by means of a robot performance.

Each group gives a plenary explanation of the visualization they have made after which the three groups reflect on the presented mechanisms while looking for compatibility and complementarities. The outcome of this discussion is an integration of the assumed processes, recorded and worked out by a secretary that evening. The conclusions of this day should serve as input to Day 4.

Boat ride and Lorentz dinner at Leiden

Day 4: Confluence

Overview lecture (4)
Based on the workshop results, Johan Hoorn provides an overview of confluence approaches to the study of creativity. Recent theories of creativity hypothesize that multiple components must converge ("confluence") for creativity to occur. Such understanding of creativity requires a multidisciplinary approach, taking into account a person's intellect, knowledge, thinking style, personality, motivation, and environment (social, cultural, economic, political). The overview of integrative approaches to creativity will help the next session in merging our conclusions of the previous days.

Coffee break

Blue-skying at the White Board

This session requires a large number of large whiteboards, good-working markers in as many colors as possible, clean wipers, and sticky notes. There will be a number of moderators, a typist, and a camera person to capture all ideas and to make an online report. Based on the discussions of the

previous three days, a theoretical integration and conceptual synthesis commences - in this stage without regard to any specific application of its result. The aim is to arrive at an integral view on creativity to *understand, explain, and predict about the effects it may exert, the meanings it establishes, its mechanisms, and how to make it flourish in application.* The output of this session should be a set of analytical statements that could count as a provisional 'theory.' In addition, first ideas should be formed about the empirical testing of this theory and how to formalize its premises and hypotheses from a mathematical or statistical viewpoint.

Lunch

Workshop, Desktop, Sweatshop

The 'minutes' worked out by the secretary on the earlier days are input for the afternoon session. Groups are formed that work out various aspects of the creativity issues. Behind the desktop, the workshop becomes a sweatshop. Dependent on the outcomes of the morning, this could lead to several short chapters on the integrated or still not integrated view(s) on creativity. These groups will be the authors of the chapters that are collected in an edited volume that will be offered for publication. The editing is done after the workshop period. The day could end with short plenary presentations on the outline of each chapter.

Proposed chapters (about ten pages each):

Meaning of creativity
-    concepts of the new theory
-    the contents that creativity produces
Mechanisms of creativity
-    social and psychological processes
Modeling creativity
-    possible ways of formalizing the new theory
Empirical validation
-    possible research designs and measurements
Constraints of Application
-    practical guidelines for management and governance
Research Agenda
        (added after the results of Day 5)

Day 5 (optional)

Appreciative Inquiry[7]

Appreciative Inquiry is a way of appreciative exploration and discovery and it can be used as an instrument of change. We will use *Appreciative Inquiry* in a positive and constructive manner to envision the future application of and predictive power of the new-born theory of creativity. *Appreciative Inquiry* differs from more traditional methods, which focus on problems, deficits, and weaknesses of an idea. Instead of asking the question 'what is the problem with this new theory and why is that?,' we start with the question 'what were the moments of success during the creation of our theory and how can we expand this success into the future?'

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[7] http://www.managementissues.com/ontwikkelingstools/ontwikkelingstools/appreciative_inquiry_in_de_prak tijk._20070420434.html

In this way, the change is aimed at what the people in the room really want to achieve in the future (their creative research agendas), rather than on what we do not want. The central idea is that the past already has answers that will help to shape the future. These answers need to be found in a constructive manner. The starting point for anyone involved in the change process is to participate in shaping the change.

During lunch, the different agendas are digitized by a secretary so that after lunch, these can be presented to the group at large.

Reporting Back

The afternoon is meant to present the deliverables of the entire workshop to the larger creativity community and for the participants to rework and finalize the chapters. In addition, a group of volunteers works out the research agenda, which will be the final chapter of our edited volume.

Farewell drinks

PARTICIPANTS

We wish to invite around 50 participants from science, creative industries, arts, captains of industry, and governance, half of which will be key participants. The key people should consist of scholars in the arts (i.e. contents of creation), social scientists and psychologists (i.e. the effects of creation), and computer or natural scientists (design of a creation). We will encourage these people to bring along one or two of their brightest (PhD) students or postdocs to attend the sessions.

Scholars of arts and humanities should broaden our insight into the *meaning* of creative expressions, individually and culturally. They should tell us what they regard as creative contents and why. Historians and philosophers could provide the necessary background to systematize the various lines of thought about creativity.

Social and communication scientists as well as psychologists and neuroscientists can help us understand the *mechanisms* of perception and experience. What are the effects of creative artifacts on the human mind and brain? When do we regard an act or artifact as creative? What is a creative personality?

Computer scientists, AI experts, and mathematicians could give us insight into the parameters of creativity in exact thinking. They can clarify the design of logic systems. Moreover, they can help us formalize our thoughts, remove inconsistencies from the theory, and translate theory into a computational *model*.

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