hackJams – (re)-Designing the Future of Identity Management (and the Design Competition)

Dr. Sandra Wilson*, Lilia Gomez Flores**, Douglas Kinnear***

* University of Dundee, s.z.wilson@dundee.ac.uk ** University of Dundee, lgomezflores@dundee.ac.uk *** University of Dundee, d.z.kinnear@dundee.ac.uk

Abstract: In recent years the traditional design competition has been criticized for focusing too much on creating new 'things' and not addressing real world challenges. To address this issue we have invited international universities and colleges to organize *hackJams* to tackle the complex issue of (re)-shaping the future of identity management. In the process we have also redefined the nature of the design competition. Hacking is a cultural phenomenon that borrows, appropriates, re-evaluates and manipulates everyday objects, experiences and rules. Jams are about groups of people coming together to solve problems through creativity and innovation to address specific challenges. The *hackJams* are aimed at students in their 2nd year of specialism or their penultimate degree year and postgraduate students from disciplines as diverse as jewellery, interaction design, computing science and electronics and the physical sciences. This paper presents the experience of the inter-disciplinary hackJam and some of the preliminary findings arising from this process.

Key words: Design Competitions, Hackathon, Design Jams, Identity Management, hackJam, Collaborative Design, Research-Practice-Education

1. Introduction

John Thackara recently criticized the traditional design competition for focusing on the 'thing' rather than the individuals/ the team and for not addressing 'wicked' challenges and adopting a co-design approach (1). In attempting to address these criticisms and challenges IMprints research have adopted the hackJam format for an international design competition to re-design the future of identity management. Whilst this format has come to prominence in recent years little evaluation of it has taken place. The hackJams described here are still taking place, however this paper seeks to outline the format of the hackJam, its history of development and provide preliminary outcomes and analysis.

IMprints is an inter-disciplinary research project funded by the Engineering and Physical Sciences UK Research Council under the theme Global Uncertainties and its aim is to identify the taboos and desires that are informing the publics responses to future technologies of identification and authentication. We are now entering a phase of "persistent identity" [2] where our identity seems to be always 'on'. When we withdraw money from a machine outside the bank, or we log onto a computer to buy goods and services, our identity is now central to giving us access to a range of benefits. Identity management (IM) is an expression that has only been found in the academic literature since approximately 2004 and yet it is a concept that has slowly been infiltrating our lives and our daily lived-experience. Post 9/11 Governments and large corporations are placing a stronger emphasis on

security. This together with the fact that the majority of our interactions are now conducted remotely online via a computer or smart device various forms of identity management have developed.

2. Useful Definitions

2.1 Identity Management

Authentication is the process of positively verifying the identity of a user, device, or other entity in a computer system, often as a prerequisite to allowing access to resources in the system [3]. Authentication used to be a straightforward process based on direct contact and recognizing someone by visual appearance. Recently contact has become increasingly remote via a computer and so to identify a person is now more complicated; it involves the use of systems, devices and technologies to communicate who a person is and to validate their identity. Identity Management (IM) is defined as the enrolment and subsequent verification (i.e. the decision made as a result of authentication) that gives individuals a trusted means to prove who they are to others [4].

2.2 Forms of IM

There are three main forms of IM, knowledge/memory forms include passwords and pin codes that people have to remember and keep as a secret [5]. In 2011 The Telegraph reported that the average person in the UK "needs to remember 10 individual PINs or passwords a day" [6]. This is rapidly becoming a problem for most people who are starting to use the same ID and password for all their services making themselves easy targets for Identity Theft. In the future this form of IM is likely to fade away being replaced by others means.

A token is a physical portable artifact that performs or aids authentication [7] such as a passport, driving license, etc. This is an area that is expected to expand within the next few years as clothing and jewellery become augmented with embedded electronic and digital technology.

Body based forms or Biometrics are features measured from the human body that are distinguishing enough to be used for user authentication. Biometrics includes: fingerprints, eye, face, hand, voice, and signature, as well as other more obscure or futuristic metrics such as gait and smell [8]. It is also likely that in the future some of these forms will be used in conjunction with each other.

Developments in the area of IM to date have been driven largely by technological advancements for example biometrics and by the security concerns of Governments and large commercial corporations. Consequently many of these IM examples are lacking any opportunities for personal expression and emotional engagement. The hackathon format has been identified as a useful approach for tackling intractable problems and for creating experiential learning and collaboration (9) that potentially would enable us to bring together students from diverse disciplines to create innovative ideas for re-shaping identity management.

2.3 Hackathon

Derived from marathon, 'athon' refers to any prolonged activity where endurance –either of mind or body- is necessary. Bikeathon, skiathon, jogathon, and danceathon are some good examples, as is the well-known telethon. Most recently is the development of hackathons. A hackathon is an event that gathers computer programmers, software engineers, web designers, and the like as a way to work with programming systems, develop new tools or applications, or to solve a particular problem. While telethons, etc. are meant to serve as a fundraising event,

hackathons are meant to encourage innovation and problem solving among a group with a specific skill set [10]. A hackathon usually happens when multiple programmers get together to complete one particular goal, such as hacking into the CIA's main computers and disseminating top-secret information on the Internet. A hackathon is like a binge-drinking party for geeks –only without the drinking. It can still get you arrested though [11].

Hackhaton as a word was first coined in 2005 by JotSpot CEO Joe Kraus, who adapted a concept created by Mike Cannon-Brookes in Australia, who agreed with his software company staff about running 'wild' creating a prototype in eight hours, and demonstrating it to the rest of the company. Since then the hackathon has been successfully used as a concept within the software, coding and computing areas, its success has been transferred to other areas "It's unbelievable what you can get done in a day with a focused, motivated, and creative team... I honestly believe that every company could benefit from [hackathons]." [12]

2.4 Design Jams

Design jams are our version of developer hackathons. In this context the word 'jam' is derived from terms most commonly associated with musicians e.g. jam session and jamming where musicians come together and play informally without any planning or practice and develop pieces as they play. At design jams the participants are encouraged to adopt the musicians approach and collaborate with each other to develop solutions to real world problems. Often design jams will be organized around themes or challenges and usually concentrate on user experience issues, however, like the musical jam scenario there is a limited formal structure to the proceedings in order to facilitate free thought and creativity.

The term design jam became popular in the design community in 2010. It came to prominence when used by a group that went on to create the Design Jam organization. Their first Design Jam took place in London in 2010 [13]. One of the Design Jam founders, Desigan Chinniah, has connections with the Mozilla organization who were one of the sponsors of the London event.

2.5 HackJam

A HackJam then is an event that brings together the developer and design communities. The HackJam still works in the same way as hackathons and design jams except that multiple disciplines such as developers and designers come together in interdisciplinary teams to work on the issues the event has selected to tackle. The term HackJam again comes to prominence through its use by Mozilla who had created an environment where ideas were developed into 'minimum viable prototypes' [14] when in the past after a design jam participants might have had to seek out developers to enable the production of a working prototype. Now, at hackjams everyone concerned was present and able to work on projects to produce a minimum viable prototype.

3. Hack Jams: a collaborative and innovative process of co-creation

The paradigm of the design discipline has recently shifted from a focus on processes belonging just to creative elites to collaboration, openness and democratization [15] [16] [17]. The new model for designing seems to be based on the involvement of different actors from diverse backgrounds that are becoming co-creators. The emphasis is now on the design process and moving from a 'design-in the-studio' strategy, based on a funnel model, to a 'design-in-use' strategy, where some participatory tactics such as prototyping can be used. Through the use of

hack Jams Imprints explores research through design process "where the action is calculated to generate and validate new knowledge or understanding" [18].

With technology advancing so fast in the last few years, thinkers and practitioners within the design and innovation fields have adopted the idea that innovation arises from networks [19] where diverse actors are involved in processes of co-creation [20]. In the technology sector, there has been a shift from closed to open innovation processes, recognizing that sources of innovation can be found outside the company [21]. In particular, the role of end users has been challenged: they are no longer seen as passive consumers but as key resources for innovation [22].

The discourse about collaborative [23], open [24] and democratic [25] design and innovation is spreading, emphasizing the importance of networks and co-creation processes for the emergence of novelty [26]. As Seravalli explains, co-creation and collaboration is a central idea in design and social innovation, which can present shifting roles between the public, private and non-profit sectors with the creation of partnerships between nonprofit organizations, companies and public bodies [27]. This can lead to the creation of bonds between previously separate individuals and groups, which in turn can create a fertile ground for the emergence of new ideas [28]. 3D printing technologies are also further democratizing the creative sector where cheap and accessible prototypes can be printed in real time during events such as Hack Jams, further enhancing the refining of models and prototypes. Increasingly 3D designs are also openly available online and can be downloaded, adapted and printed.

Collaboration between diverse actors characterizes social innovation, but it is also a condition for its development: for identifying unmet needs and generating and implementing ideas [29]. The idea of Hack Jams reinforces this ideology where big corporations such as Yahoo and Mozilla organize events that bring people from different disciplines together to work around one same topic seeing it under different lenses. This recent phenomenon of Hack Jams however has yet to be systematically reviewed and evaluated.

4. Imprints hackJam

The Imprints International Design Competition hackJam concept was developed from the Mozilla Hack Jam model, however, the Imprints team made a few changes/additions to the event format to align outputs to the research project. Imprints firstly decided to adapt the term into hackJam. The reasons for this were that the use of Camel Case, a form of typography used in programming where the first letter of an identifier is in lower case with the first letter of each subsequent word in the identifier is in upper case [30], allowed Imprints to make a further link to developers, it also created a separate unique identifier for the Imprints competition.

4.1 hackJam Process

The hackJams were aimed at undergraduate students in their penultimate year of study along with postgraduate students. Universities registered their willingness to participate in the competition on the website [30] The site also contains a FAQ list and a link to a Flickr page where photos taken at previous events are displayed [31]. A project twitter feed and competition hashtag also exist, see [32] [33]. The prizes associated with the competition include £1000 in cash for the winning student team entry and a table-top 3D printer for the winning University. In order to make it as easy and straightforward for Universities to take part, they could choose on the website from one of two available toolkits [34]. Alternatively Universities could ask for a cash incentive of £50 to contribute towards material costs. The toolkit was developed and offered as we appreciated that existing universities and design programmes are organized on clear disciplinary lines e.g. Product design and computing students don't normally share classes or projects.

The events were also designed so that they could be either one or two days, decided by the organizing University. In both cases the first day would be a research day. If the event had a planned second day, then prototyping, with the aim of producing a viable minimum prototype by the end of the day would begin. If the event was a one day event participants would be advised to work on their prototypes at a later date.

Each day started with an hour-long lecture on the theme of IM outlining key definitions, examples of different forms of IM and what the challenges that need to be addressed are. It was anticipated that some undergraduate students may not have the experience or confidence to easily immerse themselves in the hackJam experience so Imprints devised a series of 'ice-breaker' exercises to help the participants learn about the subject in an enjoyable way while building the team and their confidence levels. Each ice-breaker exercise consisted of a hackJam 'mission' to collect information regarding a form of IM. The tasks were sealed inside blank envelopes and none of the participants had prior knowledge of the contents with teams picking an envelope at random. An example from the ten possible ice-breaker exercises Imprints devised is:

• To obtain a supermarket loyalty card and consider what personal information they have to give to obtain the card and what information its use may allow the store to collect. They are asked to try and obtain that information from store employees and to gather any available literature, record the event and reflect on whether it was a positive or negative experience and why.

Once students had completed the ice-breaker exercise they presented their findings to the group and were then shown the challenge posters and given time to consider them all before choosing one to work on. The challenge topics were identified and developed by the Imprints team and advisory committee ensuring compatibility with the overall aims of the project. The challenges are:

SMART WEARABLES: Can you connect the data of identity management with the emotional and expressive power of clothing and jewellery to enable wearers to feel empowered through designing a range of identity management tokens that can be personalized for each individual yet still contain universal identity information? In what situations would your smart clothing/jewellery work?

NO IDENTITY: How can you identify that you are who you say you are if you don't have any supporting evidence? Are there more body-based and or behavioral forms of identity management that could be used here? What forms of identity management can you suggest here to address these problems?

ID AFTERLIFE: What aspects of your identity would you want to leave as a legacy for future generations? And what might be a good way of presenting and accessing this?

CONTEXT SPECIFIC ID: A big challenge is to find a way of only providing context specific information when required. So for example if you are joining a new mailing list you don't need to provide your mothers maiden name and the name of your first pet etc. Scope out and design in what ways you could determine what information is appropriate for different identity management situations and the kinds of tools, techniques that you could use in these situations.

Once participants had chosen a challenge they would begin to brainstorm to identify the issues and possible solutions. Students are generally given an hour to do this and then they are asked to present their ideas to the rest

of the participants. On completion of the presentations participants are given the opportunity to change teams if they think they have a particular skill to offer a team, teams can also pitch for participants to join them if they need a particular skill to help them complete their prototype.

If a University had organized a day 2 events participants would begin to make prototypes according to their challenge solutions. At the end of the day the teams would present their final prototype solutions to the cohort.

4.1.1 hackJam Aims & Objectives

The hackJam events aim to encourage the next generation of designers to address the challenges of future identity management practices and technology, in particular learning how to collaborate with different disciplines. More specifically the events aim to identify the features and characteristics of desirable IM that would likely include a greater expressive, emotional and personal impact (Figure 1).



Figure.1 hackJam event. Source: Imprints hackJam Dundee

4.1.2 hackJam Events

To date team members have participated in five events, namely; Nottingham Trent University, Birmingham School of Jewellery, part of the University of Central England, Lancaster University and Duncan of Jordanstone College of Art & Design part of the University of Dundee. Nottingham Trent has since run another event with different students without Imprints team members present. There are currently 6 other events scheduled at Universities in Italy, Mexico and England along with 3 non-educational organizations expressing interest in running a hackJam. Imprints is continuing to promote the competition, which closes in December 2013.

4.3 Outcomes

There have been a range of competition entries submitted thus far and a selection of four here will help elucidate some preliminary outcomes. Team Illamasqua from Nottingham proposed 'Who am I?' (Figures 2) – A revolution in wearable skincare and electronics that allows wearers to transfer their ID information through a sensory exchange. They explored how new technologies such as electro conductive liquids and gels, haptic sensors and RFID tagging be integrated into cosmetics skincare for the mass market. They describe their entry as a revolution in wearable electronics; a cosmetics and skincare collection that allows users to transfer their ID impression through a sensory exchange. Agarose E-Gel allows an imprint of the wearer's identity to be transmitted by surface contact; a kiss, a handshake, a hug which will allow the transfer of data outside of conventional mediums such as the exchange of phone numbers or Facebook details. Young people rely on expensive smartphones to carry around sensitive data, but what if this was unnecessary, and the lipstick, hand cream or

perfume you wore could get you into a nightclub or pay for a drink. In twenty years time will we need to carry wallets and phones when we socialize with friends? To provide synergy between products and consumer the Illamasqua brand has endorsed this technology, being a brand that promotes "A confident statement of self-ownership". Their rich heritage and cultural background provides a platform to launch pioneering technologies in the beauty sector. Illamasqua also said "Expression encourages people for whom making-up is an intimate part of their identity" and 'Who am I?' provides people with a bridge between their identity and expression.



Figure.2 Who am I? Source: Imprints hackJam Nottingham

The DEED (Data Exchange Ethics Device) from a Birmingham team operates with a database that ensures each time a person's data is used, that person is sent the equivalent data for the individual or organization making the data request. By creating this individual information exchange the human element is returned to each piece of data and would force much greater moral responsibility and social conscience is applied to all data use. They propose the DEED (Figure 3) would be a wireless data storage implant built utilizing a development of existing bone conductive hearing technology. The implant, fitted into the skull behind the ear, would feature voice reactive sensors to allow the user to authorize data use requests. The internal implanted component joins to an external, aesthetically pleasing component made of a smart material that would respond to body temperature and pulse to operate the device. The final component would be a hologram projection lens that visualizes data requests in front of the user's face. Each DEED would be created for a specific individual, molded to their facial shape, programmed to respond to their voice, pulse and temperature and installed with person-specific data. Upon the person's death, the device will transmit a programme to delete all data held on that person.



Figure.3 The DEED. Source: Imprints hackJam Nottingham

BeatPic also from Birmingham proposed a connection between the beating of the human heart and the taking of a series of pictures that builds into a coherent narrative of a person's identity. The human heart has gained significant anatomical and symbolic importance since the dawn of human civilization, hearts were once thought to be the center of a human, while surgical knowledge today had proven that incorrect, it remains a powerful symbol that frequents our everyday life. Having considered capturing moments throughout the day as the essential function of the design. The design is composed of 2 elements: Contact lenses camera/heartbeat tracker (achievable by employing micro-electromechanical technology) and a Heart brooch (functions as a data storage device). The components are connected via short-range wireless technology. The contact lenses keep track of the heartbeat of the wearer, and take pictures when one's heartbeat rises. With the advancement in the field of micro-technology, body parts that are more commonly exercised could easily manipulate the capturing of photographs; however, an involuntary movement can provide a more comprehensive narrative. The design of functional components of the brooch is kept minimalistic, but supplemented with detachable sections allowing the wearer to personalize the brooch. Though existing technology supports wireless access to the Internet and upload images automatically, it will retain the process of selecting and importing the photographs manually. The reason being while cybertechnology provides convenience, it also gives rise to hackers utilizing personal information for ill will. Since the photographs captured with BeatPic (Figure 4) documents one's personal life, they deserve the same respect that memory does. Therefore the decision of which images to import and share with others resides in the wearer.



Figure.4 BeatPic. Source: Imprints hackJam Nottingham

Living Book (Figure 5) is a design solution for ID afterlife from Dundee. They proposed the creation of a Living Book, with a collection of images, photos, letters etc. that have been collected and saved by the individual who wishes to leave this legacy of images to their family and friends. At an appropriate time during their life the individual can access the 'Live Love and Remember' website to upload the images of their choice. Their videos, cine film, DVDs etc. can be listed on the website as part of their legacy. These can then be used to create a living image in the Living Book using Augmented reality technology. This would be in the form of an App e.g. AR people. The family of the deceased can access the 'Live Love and Remember' website via a password to bring

together the images, letter, photos and film footage of their own choice. These will then be made into their personal book of memories by the Live Love and Remember team. Their Living Book can be personalized further by selecting a style, format, cover, etc. on the website. The book is a high quality product that offers a modern personal solution to how we can manage our personal legacy. The Live Love and Remember team feel the Living Book is something to treasure and keep the traditional book format alive. The website [35] itself is accessible, but not functional at the moment.



Figure.5 Living Book. Source: Imprints hackJam Dundee

4.4 Preliminary Findings and Analysis

It is too early in the process to give a complete analysis of the hackJam format and outcomes however some preliminary findings can be identified. First of all on the hackJam process itself, we invited participating students to complete short evaluation postcards that addressed whether this was their first experience of a hackJam, what they learned from the process and what were the most positive and negative features of the experience. The results analyzed from the Birmingham experience are that for 93% of students this was their first experience of a hackJam. For 72% of the students the experience was both educational and enjoyable. 100% felt that the experience had improved their awareness and understanding of identity management. The cash prize was seen as having relatively low importance, learning more about the subject was of value and a lack of time available was considered a negative experience.

For staff this was also their first experience of a hackJam, they considered it a valuable learning experience for students particularly because it enhanced their understanding of contemporary design processes, the icebreakers were greatly valued, two days were considered enough for the process and the timetable was well structured and 100% said they would use the hackJam process again as 'it was great!'

As the hackJam is future orientated a clear critical design focus is present, with several of the designs, for example 'Who am I?' based on more of a conceptual idea rather than something that actually functions. Consequently the design is intended to stimulate debate on issues and enable a wider public to decide what kind of future they would like. This also connects with Grusin's notion of premediation. According to Grusin [36] the logic of premediation insists that the future itself is already mediated, and that with the right technologies the future can be remediated before it happens. In this sense the hackJam process and the competition entries themselves become part of this media phenomenon of premediation.

Other important features that emerge are control – with users looking for the right to create their own privacy and sharing settings e.g. Living Book. It's clear too that the future will be smart i.e. smart materials: electroconductive liquid and gels and wearable technologies such as the Google ring. However what is the consequence of this, a recent article suggested that as our objects become smarter we become dumber! [37].

The initial entries to the competition suggest that student teams are achieving the aim of creating more expressive and meaningful forms of future identity management practices and technologies and in addition to this they are enthusiastic about the subject matter, and have enjoyed working with other disciplines and as part of a team.

5. Conclusions

The ultimate aim of the IMprints project is to create a grid of taboos and desires as perceived by the public, academia and commercial sectors, and the hackJam entries will contribute to this. It has been proven that commercial and private sectors of design and production are successfully following a more collaborative approach for tackling current challenges, the hackJam model used as a learning and teaching process helps design education make the same transition towards more critical design and inter-disciplinary partnerships, with a greater focus on research led teaching.

The IMprints hackJam format has therefore provided University students with a unique experiential and collaborative learning opportunity. Identity management is one of the most important cultural issues of our time that students have direct experience of. The hackJam format has facilitated design students working with engineers, computing and physical science students to adopt a more holistic approach to creating new solutions and generating innovation.

These preliminary findings therefore suggest that the hackJam format addresses several of the problems associated with the traditional linear individual focused design competition, through creating inter disciplinary collaboration, opportunities for co-creation that address intractable problems and issues. The hackJam competition has also ensured that institutions and their teams were provided with adequate resources and support, through providing 'tool kits' with all the materials needed for the events and lecture and further reading material support.

Further research and evaluation of this format is needed however these preliminary findings suggest that there is a strong indication that the hackJam is a more meaningful, educationally valuable and beneficial experience for both students and their institutions than the traditional design competition. Further than this it is hoped that this paper provides encouragement and guidance to others considering adopting a similar approach in the future.

6. References and Citations

- [1] Thackara John. (2011) Ten ways to re-design design competitions. <u>http://changeobserver.designobserver.com/feature/ten-ways-to-redesign-design-competitions/29088/</u> [accessed June 2013].
- [2] "moot" The 2010, Christopher Poole: case for anonymity online. June. <http://www.ted.com/talks/christopher_ _m00t_poole_the_case for_anonymity online.html> [accessed January, 2012].
- [3] O'Gorman, L. (2003) "Comparing passwords, tokens, and biometrics for user authentication. "Proceedings of the IEEE, vol.91, no.12, pp. 2021-2040.

- [4] The Scottish Government, "Identity Management and Privacy Principles Privacy and Public Confidence in Scottish Public Services" <<u>www.scotland.gov.uk/Resource/Doc/16999/0110002.pdf</u> > [accessed June, 2012].
- [5] Ponda, R., Podda, J., Bunnella, J. & Hendersonb, R. *Word association computer passwords: The effect of formulation techniques on recall and guessing rates,* Computing Security, vol. 19, no. 7, (November, 2000) pp. 645–656.
- [6] The Telegraph, "Average person 'uses 10 online passwords a day'," June, 2011, <<u>http://www.telegraph.co.uk/technology/news/8602346/Average-person-uses-10-online-passwords-a-day.html</u>> (accessed June, 2011).
- [7] Weiss, K.P. Method and apparatus for positively identifying an individual, eds. Bruce Christianson, Bruno Crispo, James A. Malcolm, Security Protocols: 14th International Workshop, Cambridge, UK, March, 2006.
- [8] Boelle, R. et al. (2003) *Guide to Biometrics: Selection and System Design*, Springer-Verlag, New York.
- [9] Topalian, Claire (2013) Hackathon events do they really help anyone? <<u>http://www.forbes.com/sites/groupthink/2013/04/19/hackathon-events-do-they-really-help-anyone/</u>> [accessed June 2013]
- [10] Cammorata, N. (2013). Words you should know 2013: The 201 words from science, politics, technology and pop culture that will change your life this year. F + W Media, USA
- [11] Bergman, G. & Lambert, J. (2011). *Geektionary: From Anime to Zettabyte, An A to Z Guide to All Things Geek.* F + W Media, USA
- [12] Tate, R. (2012). *The 20% Doctrine*. Harper Business, USA.
- [13] Available at <<u>http://www.designjams.org/</u> > [accessed March 2013]
- [14] Available at <<u>https://webmaker.org/en-US/events/guides/hack-jam/#during</u> > [accessed March 2013]
- [15] Leabeater, C. (2008). *We-Think*. London: Profile books.
- [16] Chesbrough, H. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston: Harvard Business School Press.
- [17] Von Hippel, E. (2005). Democratizing Innovation. Cambridge: The MIT press.
- [18] Frayling, C.(1993). *Research in art and design*. Royal College of Art Research Papers, 1, 1-5.
- [19] Tuomi, I. (2002). *Networks of Innovation*. Oxford: Oxford University Press.
- [20] Prahalad, C.K., Ramaswamy, V. (2004). *Co-Creation Experiences: The Next Practice In Value Creation*. Journal Of Interactive Marketing, 18 (3), 5-14.
- [21] Chesbrough, H. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston: Harvard Business School Press.
- [22] Von Hippel, E. (2005). Democratizing Innovation. Cambridge: The MIT press.
- [23] Leabeater, C. (2008). *We-Think*. London: Profile books.
- [24] Chesbrough, H. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology. Boston:* Harvard Business School Press.

- [25] Von Hippel, E. (2005). Democratizing Innovation. Cambridge: The MIT press.
- [26] Seravalli, A. (2012) *Building Fabriken, Design for Socially Shaped Innovation.* Design Research Society Conference Bangkok
- [27] Phills, J.A., Deiglmeier, Miller, D.T. (2008). *Rediscovering social innovation*. Stanford Social Innovation Review, Fall 2008, 34-43.
- [28] Mulgan, G., (2006). *Social Innovation: what is it, why it matters and how it can be accelerated.* London: The Young Foundation.
- [29] Den Ouden, E., Valkenburg, R. (2010). *Balancing value in networked social innovation*. In Participatory Innovation Conference 2010 (pp. 307-313). SPIRE center, Sönderborg, Denmark
- [30] Available at <<u>http://www.imprintsfutures.org/id-hackjam-competition</u>/>[accessed March 2013]
- [31] Available at <<u>http://www.flickr.com/groups/idhackjam/</u>>[accessed March 2013]
- [32] Project Twitter Handle: @imprintsfutures
- [33] Competition Hashtag: #IDhackJam
- [34] Available at <<u>http://www.imprintsfutures.org/id-hackjam-competition/</u>> [accessed March 2013]
- [35] Available at <<u>http://alisonbest.wix.com/liveloveremember#</u> > [accessed March 20130]
- [36] Richard Grusin, *Premediation: Affect and Mediality After 9/11* (UK: Palgrave McMillan, 2010), 240.
- [37] William Agosto, 2011 http://agostographics.com/technology.html [accessed March 2013]