

# Getting Creative with Participatory Design

Andrew Warr, Eamonn O'Neill  
Human-Computer Interaction Group  
Department of Computer Science  
University of Bath, Bath, UK  
+44 1225 38 {3374/3216}  
{cspaw, eamonn}@cs.bath.ac.uk

## ABSTRACT

Most published work on Participatory Design (PD) has taken a practical approach, focusing on actively involving users in software development. There have been few attempts at developing theory to explain, and ultimately to improve, PD activities. Terms such as *creativity* and *innovation* are often used to describe aspects of the PD process. In this paper we describe our ongoing research applying theoretical conceptions of creativity in order to understand, explain and improve the creative process of PD.

## Keywords

PD, Creativity, Creative Process Models.

## 1. INTRODUCTION

PD initially grew out of Scandinavian concerns to bring democracy into the work place [12], by involving users in the design stage of the software development process. Since the 1970s the focus of PD has shifted from introducing democracy into the work place to a belief that 'active user involvement in the software development process leads to more useful and usable software products' [22]. It is universally accepted in the Human Computer Interaction community that we need to focus on the user in order to support their needs and expectations [10, 25]. However, Bødker and Iverson [5] stress the need to move beyond the fascination of user involvement in the design process and develop a professional PD practice. Complementing Bødker and Iverson's approach, we argue for advancing our theoretical accounts and understanding of PD, both to further the relevant scientific discipline and to inform systems development practice.

With very few exceptions [22], PD has not been the subject of theoretical investigation and explanation and has taken a largely practical approach [1, 5, 7, 16, 18, 19]. Despite advances in other aspects of systems development, the generation of design requirements and envisioned system designs remains something of a 'black art', within both PD and other systems development approaches. In the PD literature this 'black art' is frequently referred to using terms such as *creativity* and *innovation* [1, 5, 7, 18, 22, 27].

However, within the field of PD the meaning of terms such as *creativity* and *innovation* has received little attention. To deepen our understanding of PD as a creative design process, our research

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has first investigated the fundamental concept of creativity.

Creativity has been studied within the field of psychology [2, 4, 15] for nearly a century now, yet a question which has failed to receive a unified answer is:

- What is creativity?

Creativity has been defined over the years in terms of the creative process [4], the creative person [15], and the creative product [2]. In this short paper we propose a unified definition of creativity that is applicable for use in PD and describe our ongoing research on developing a creative process model for social creativity that could guide a professional practice for PD.

## 2. WHAT IS CREATIVITY?

Definitions of creativity have shifted from the process [4], to the person [15] to the product [2], yet these are all essentially important components of creativity.

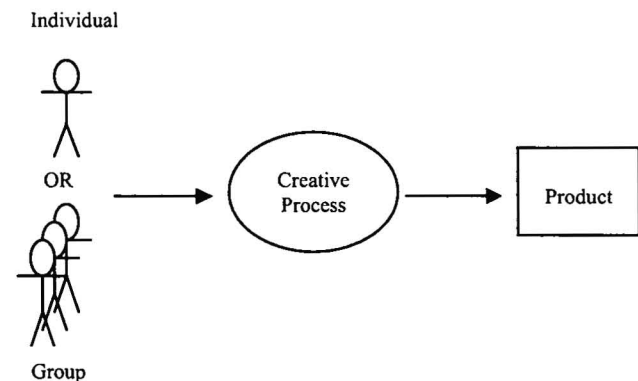


Figure 1 – The components of creativity

Each individual, or the individuals belonging to a group, has different personality traits, which affect their creative ability; they can explore and transform their conceptual spaces [4]; which will finally result in the development of a creative product [2].

When we consider the creative person in some environment, the personal traits of an individual and the social and environmental influences are internal and external factors respectively which influence creativity [2, 14].

It is useful to think of creativity as directly involving the creativity process (the exploration and transformation of conceptual spaces) to produce a creative product. Using a slightly modified definition of the creative process provided by Koestler [17] to allow for knowledge which exists outside our mind (i.e. in the environment) as argued by Clark [8], and the definition of the

creative product [2], we propose a hybrid definition of creativity as:

*'Creativity is the combination of two or more matrices of knowledge to produce a novel and appropriate product/response'.*

Studying this definition of creativity, some interesting questions arise which need to be answered in order for us to develop a more operationalized definition of creativity that allows us to apply this definition to PD:

- What is a product or response?
- What is novel?
- What is appropriate?

A *product/response* is something which is generated by the creative process. It is considered to vary in different domains and cultures. For example, in the domain of art a product may be a painting or a sculpture, whereas in the domain of PD a product/response will be a design solution to the software development problem being tackled.

Boden [4] views *novelty* as belonging to one of two categories: Psychological Novelty (P-Novel) and Historical Novelty (H-Novel). P-Novel is an idea that is new to the mind in which it arose, though it may previously have been thought of by others. H-Novel is an idea that is P-Novel and has never been thought of by anyone else before. To assess if an idea is P-Novel one could simply ask the individual who thought of the idea, but assessing an idea to be truly H-Novel is impossible as one would have to cross cultures and time to see if the idea had occurred before.

In a group environment, such as in the collaborative activity of PD, we classify novelty by Individual Novelty (I-Novel) and Group Novelty (G-Novel). I-Novel is the same as a P-Novel idea, but a G-Novel idea is an idea that is new to the mind in which it arose and has not been previously thought of by another member of the group. Why then do we wish to categorize these novel ideas in such a way? As we have seen from our definition of creativity, if an idea is novel and appropriate it is considered creative. Boden [4], says that 'any H-Creative idea is "more creative" than any merely P-Creative idea'. On a smaller scale, we can say that G-Creativity is "more creative" than I-Creativity, allowing a crude measure of the degree of creative ideas within the group.

According to our definition, *appropriateness* is what differentiates novelty from creativity. So, how do we know when a novel idea is appropriate? Many creative process models [2, 6, 23, 26, 28], that attempt to describe the process of being creative, have a stage of problem definition and preparation. Applying this to PD and the software development process, characteristics for our final product are determined through requirements analysis in which users' needs are identified. Hence, in PD a design decision may be considered appropriate if it conforms to these requirements.

Applying our answers to the questions raised by our hybrid definition of creativity, we have a more operationalized definition of what creativity is:

*'Creativity is the generation of ideas, which are a combination of two or more matrices of knowledge, which are considered unusual or new to the mind in which the ideas arose and conform to the characteristics defined during problem definition and preparation'.*

We can make this definition of creativity more specific to PD by forming an instance of this definition. To do this we specify what our product/response is and specify what makes our novel product or response appropriate and therefore creative:

*'Creativity in PD is the generation of design decisions, which are a combination of two or more matrices of knowledge, which are considered unusual or new to the mind in which the ideas arose and conform to the requirements defined during the software development process'.*

So, we have developed a hybrid definition of creativity that helps us (i) to understand what it is to be creative and (ii) to perform some objective measurements to determine when creative ideas are produced. We have defined what it is to be creative, but how do we go about the process of being creative? To help us to answer this question, we examine three different perspectives of how one goes about being creative.

### 3. THREE PERSPECTIVES OF CREATIVITY

Shneiderman [26] offers three different perspectives on creativity: inspirationalist, structuralist and situationalist. *Inspirationalists* focus on the individual coming up with ideas, in a fashion such as the 'eureka' moment – a sudden change in perception giving rise to an idea from the subconscious [21]. Proponents of this perspective of creativity argue that when an individual has been presented with a problem, after she has studied the problem she regresses into a stage of incubation in which little conscious effort is made to solve the problem, though the subconscious may still be working on the problem, giving rise to a sudden stage of illumination when a potential solution has been generated. A creative process model which fits this view is provided by Wallas [28], including the stages of incubation and illumination.

*Structuralists* apply more systematic and methodological approaches to exploring and transforming conceptual spaces, as described by creative process models provided by Amabile [2] and Osborn [23] where new ideas are generated through the combination of two or more old, existing ideas. This view of creativity is considered more as a deliberate act, as described by Koestler [17]. Perkins [24] argues that the subconscious mental processes are behind all forms of thinking, and are therefore not specifically related to creativity. This perspective of creativity has moved away from creativity being viewed as a subconscious activity, to one that involves the individual having to make a conscious effort in order to be creative.

The *Situationalist* view of creativity moves away from the individual perspective of creativity and views creativity as more of a social process. This view of creativity is relatively new compared to the views of the inspirationalists and structuralists, and places more importance on interaction and collaboration with other individuals and the environment around us [9].

### 4. THE PD PROCESS AND THE CREATIVE PROCESS

Despite explicit attempts to focus participatory software development work on related activities such as analysis and evaluation [3, 22, 29], that are essentially more analytical than creative, PD remains primarily focused on the *design* activities of the software development process, as reflected in the term PD

itself and exemplified by the majority of published accounts of PD projects [1, 5, 7, 16, 18, 19]. Gennari [13] describes this design process as 'human activity, involving communication and creative thought among a group of participants'. There is a good fit between PD and the situationalist perspective on creativity, as collaborative PD activity is a social process involving users and designers, working with and through artefacts in the design environment.

Much of the research on creativity has focused on the individual, yet in an activity such as PD the situationalist perspective is more appropriate, viewing creativity as occurring in a social setting, where it is affected by the environment and the people located in it. Social creativity has recently gained interest [9, 11, 20, 26], yet relatively little work has been done to date, leaving us with questions such as: what are the processes involved in social creativity?

Creative process models are commonly used as the underlying model for software-based creativity support tools. With the introduction of a social creative process model we raise the interesting question of how current and envisioned technologies may support the social creative process, and therefore assist users and designers in the process of PD.

When considering social creativity, where we have more than one person interacting and collaborating with each other and the world around them, there are many factors that can affect creativity – social and environmental influences. Amabile [2] has considered social-psychological methods for enhancing creativity, but has also identified factors that undermine the creative process. These social and environmental factors should influence creative process models for social creativity in the way they 'guide' the creative process. As a result, such factors need to be considered in order to produce creative process models that enhance creativity in a social setting rather than undermining it.

As noted above, the situationalist perspective on creativity is relatively new and little research has been performed in the area of social creativity. As a result, there are few creative process models that could serve as candidates to guide the creative process. However, Shneiderman [26] has developed one such model to bring a social aspect to the creative process. Shneiderman uses four stages to describe the social creative process: Collect; Relate; Create; and Donate. *Collect* is the initial stage of collecting information about the problem from information resources such as digital libraries and the Web. The *Relate* stage in the model is where you consult with peers and mentors and should be performed throughout the process as an iterative cycle. *Create* is the stage where you explore, compose and evaluate possible solutions. *Donate* is the dissemination of the results to information resources. Such a stage could cause new needs to be identified or cause new ideas to be generated by the community who view the solutions, resulting in returning to previous stages of the model.

A disadvantage of this social creative process model is that it fails to identify and to take into account social and environmental influences which can enhance creativity or have detrimental effects on the creative process as shown by Amabile [2]. A social creative process model that takes into account the detrimental influences on creativity, and tries to enhance the creativity of a social group could inform professional practice for PD. Our ongoing work is focused on developing the underlying theory for

such a social creative process model and on applying and testing it in PD settings.

## 5. CONCLUSIONS AND FUTURE WORK

Our research has brought together the topics of PD and creativity. PD involves users and designers coming together to produce 'creative thought' [13] in order to design useful and usable systems. While many techniques to produce these designs have been applied and discussed, many of the reported applications and discussions have been very pragmatic, have involved very little theoretical advancement and, therefore, have contributed little to the scientific disciplines relevant to PD.

Our particular focus in this short paper is the development of a theoretical understanding of social creativity and its application to PD practice. We have developed a definition of creativity that includes people, process and product and that may be operationalized and instantiated to the creative process of PD.

Our ongoing research is working towards the development of a social creative process model that takes into account social and environmental influences on group creativity. We hope that such a model may be used to inform the practice of PD. Further, the identification of technologies that can support this social creative process will inform the development of specially designed creativity support tools and environments for PD, akin to the 'Design Collaboratorium' developed by Buur [7]. Bringing PD and creativity together should lead to a better practice of PD leading to the development of more useful and usable software products.

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## 7. REFERENCES

- [1] Alborzi, H., Druin, A., Montemayor, J., Platner, M., Porteous, J., Sherman, L., Boltman, A., Taxén, G., Best, J., Hammer, J., Kruskal, A., Lal, A., Schwenn, T. P., Sumida, L., Wagner, R., & Hendler, J. Designing StoryRooms: Interactive Storytelling Spaces for Children. DIS, (Brooklyn, New York, 2000), 95-104.
- [2] Amabile, T. M. The Social Psychology of Creativity. New York, Springer-Verlag, 1983.
- [3] Beyer, H., Holtzblatt, K. Contextual Design. San Francisco, California, Morgan-Kaufmann, 1998.
- [4] Boden, M. The Dimensions of Creativity. London, MIT Press Cambridge, 1994.
- [5] Bødker, S., & Iverson, O. S. Staging a Professional Participatory Design Practice - Moving PD beyond the Initial Fascination of User Involvement. NordiCHI, (Aarhus, Denmark, 2002), 11-18.
- [6] Brannigan, A. The Social Basis of Scientific Discoveries. Cambridge, Cambridge University Press, 1981.
- [7] Buur, J. B., S. From Usability Lab to "Design Collaboratorium": Reframing Usability Practice. DIS, (Brooklyn, New York, 2000), 297-307.

- [8] Clark, A. Natural Born Cyborgs?  
[http://www.edge.org/3rd\\_culture/clark/clark\\_index.html](http://www.edge.org/3rd_culture/clark/clark_index.html),  
 2003.
- [9] Csikszentmihalyi, M. *Creativity: Flow and the Psychology of Discovery and Invention*. New York, HarperCollins Publishers, 1996.
- [10] Dix, A., Finlay, J., Abowd, G., & Beale, R. *Human-Computer Interaction*, Pearson: Prentice Hall, 2004.
- [11] Edmonds, E., Candy, L., Cox, G., Eisenstein, J., Fischer, G., Hughes, B. & Hewett, T. Panel: Individual and versus Social Creativity. *Creativity and Cognition*, (Loughborough, UK, 1999), 36-41.
- [12] Floyd, C., Mehl, W., Reisen, F., Schmidt, G. & Wolf, G. "Out of Scandinavia: alternative approaches to software design and system development." *Human-Computer Interaction 4* (1989), 253-350.
- [13] Gennari, J. H., Reddy, M. Participatory Design and an Eligibility Screen Tool. *Proceedings of the AMIA Annual Fall Symposium*, (Los Angeles, 2000), 290-294.
- [14] Gough, H. G. "A Creative Personality Scale for the Adjective Check List." *J. Personality and Social Psychology 37 8* (1979), 1398-1405.
- [15] Guildford, J. P. "Creativity." *American Psychologist*, 5 (1950), 444-454.
- [16] Klemmer, S., Newman, M., Farrell, R., Bilezikjian, M., & Landay, J. *The Designers' Outpost: A Tangible Interface for Collaborative Web Site Design*. UIST, (Orlando, 2001), 1-10.
- [17] Koestler, A. *The act of creation*. New York, Dell, 1964.
- [18] Kyng, M. *Scandinavian Design: Users in Product Development*. CHI, (Boston, Massachusetts, 1994), 3-9.
- [19] Mackay, W. E., Fayard, A., Frobert, L. and Medini, L. *Reinventing the Familiar: Exploring an Augmented Reality Design Space for Air Traffic Control*. CHI, (Los Angeles, 1998), 558-565.
- [20] Mamykina, L., Candy, L. & Edmonds, E. Collaborative Creativity. *Communications of the ACM 45* (2002), 96-99.
- [21] Nemiro, J. *Creativity in Virtual Teams: Key Components for Success*. Wiley & Sons, 2004.
- [22] O'Neill, E. *User-developer cooperation in software development: building common ground and usable systems*. London, Springer Verlag, 2000.
- [23] Osborn, A. F. *Applied Imagination: Principles and procedures of creative thinking*. New York, Scribners and Sons, 1963.
- [24] Perkins, D. N. *The Mind's Best Work*. Cambridge, MA, Harvard University Press, 1981.
- [25] Preece, J., Rogers, Y., Sharp, H. *Interaction Design*, Wiley, 2002.
- [26] Shneiderman, B. "Creating Creativity: User Interfaces for supporting innovation." *ACM Trans. on Computer-Human Interaction 7 1* (2000), 114-138.
- [27] Streitz, N., Geißler, J., Holmer, T., Konomi, S., Müller-Tomfolde, C., Reischl, W., Rexroth, P., Seitz, P., & Steinmetz, R. *I-LAND: An interactive Landscape for Creativity and Innovation*. CHI, (Pittsburgh PA, 1999), 120-127.
- [28] Wallas, G. *The Art of Thought*. New York, Harcourt, Brace & World, 1926.
- [29] Wright, P. C., Monk, A. F. (1991). "A cost-effective evaluation method for use by designers." *International Journal of Man-Machine Studies 35* (1991), 891-912.