4-1-2009

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Creative Design Environments: A Small-Scale Case Study

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Abstract

This paper describes how students in the University of Arts in London were involved in a creative design environment to further develop their creative thinking and design problem-solving skills. After providing a brief literary overview of the field of creativity and a definition of creative knowledge environments, the paper presents an exemplar of a creative knowledge environment and presents the critical features of such tools to foster social creativity.

Introduction

Problems in the Information Age have been mentioned throughout literature by various researchers. One of the main issues is the lack of creativity and innovation. As Drucker (1994) stated, creativity can be considered an essential capability for working smarter in knowledgeable societies. Another problem frequently stated is that technologies have been used as add-ons to existing practices rather than as a catalyst for fundamentally rethinking what education should be about in the next century (Fischer, 1998b). The current mindset about learning is dominated by a view of teaching as informing learners about something they presumably know nothing or little about. This is a misleading conception (Bruner, 1996). Yet, learning is more than being taught (Illich, 1973b). In order to deal with the complexities of 21st century learning, creativity skills, especially within the context of online collaboration, should be conveyed to learners.

Some Definitions
CREATIVITY

The word “creativity” derives from the same Latin root as does “creation,” used solely in the context of divine creation and the beginning of the world (Leach, 2001). As this view was integral to the medieval religious belief system, the concept of human creativity did not emerge until the beginning of the Renaissance (Leach, 2001). Until the twentieth century, creativity was considered to be an attribute found only in rare and unusual people.

Creativity can be regarded as not only a quality found in exceptional individuals, but also as an essential life skill through which people can develop the potential to use their imagination to express themselves and make original and valued choices in their lives (Csikszentmihalyi, 1990a, 1990b, 1996). The National Advisory Committee on Creative and Cultural Education (NACCCE) defines creativity as an imaginative activity fashioned so as to produce outcomes that are both original and of value. So, the main characteristics of creativity are (NACCCE, 1999):

- Using imagination: The process of generating original ideas and providing alternatives to the conventional
- A fashioning process: The active focus of attention and skills to shape an idea
- Pursuing purpose: The application of imagination to produce tangible outcomes from purposeful goals
- Being original: The originality of an outcome can be at different levels such as: individual originality in relation to one’s prior work, relative originality in relation to peer work and historic originality in relation to works that are completely unique
- Judging value: The evaluative mode of thought that is reciprocal to the generative mode of imaginative activity and provides critical, reflective review from peers

From the beginning of history, the concept of creativity has garnered much attention. In Plato’s Ion, the dialogues between Ion and Socrates emphasize the importance of inspiration from an external source and a state in which the creator is out of his senses. Although the term ‘madness’ is used, it does not seem to be describing the psychotic condition as currently defined.

Ion: Then what can be the reason, Socrates, for my behavior? When anyone discusses any other poet, I pay no attention and can offer no remark of any value. I frankly doze. But whenever anyone mentions Homer, immediately I am awake, attentive, and full of things to say.

Socrates: The riddle is not hard to solve, my friend. No, it is plain to everyone that not from art and knowledge comes your power to speak concerning Homer. If it were art that gave you power, then you could speak about all the other poets as well. There is an art of poetry as a whole? Am I not right? [...] Since their making is not by art, but is by lot divine...In all the rest, each one of them is poor, for not by art do they utter these, but by power divine, since if it were by art that they knew how to treat one subject finely, they would know how to deal with all the others too. Herein lies the reason why the deity has bereft them of their senses,
and uses them as ministers, along with soothsayers and godly seers; it is in order that we listeners may know that it is not they who utter these precious revelations while their mind is not within them, but that it is god himself who speaks and through them becomes articulate to us.

When it comes to individual creativity, individuals may have the following concerns related to their voices being heard:

- Being interested enough and willing to make the additional effort and time so one’s voice is heard: This relates to what motivates people to participate (Fischer, 1998a).
- Having something relevant to say: Unique expertise and local voices are valuable in a global world.
- Being able to express what one wants to say: Owners of the problems must have a digital fluency and be independent of high-tech scribes (National-Research-Council, 1999).
- Being able and willing to express oneself in a way that others can understand: This is relevant in participatory design processes in which people should express themselves without the use of their own professional jargon (Fischer, 1998a, 1998b).

Similarly, a group or a community may have the following concerns related to their voices being heard:

- Encouraging the individuals to contribute to the good and progress of all: This is especially relevant in cultures that rely on social capital (Fischer, 2000, 2001).
- Supporting cultural and epistemological pluralism as an advantage to stimulate social creativity: The multiple ways of thinking, including the voices of under-represented groups, should be accepted.
- Avoiding that information be lost: Environments that support the right division between pull and push technologies should be created (Fischer, 2000).
- Avoiding illegitimate voices: This relates to the violation of privacy and spam mail (Fischer, 2001).
- Avoiding getting stuck in group thought: Controversy should be seen as an asset rather than as a limitation (Turkle & Papert, 1991).
- Eliminating sources of exclusion: This relates to making minorities reluctant to join in (Fischer, 2001).

CREATIVE DESIGN ENVIRONMENTS

Creative design environments (CDEs) are those environments, contexts, and surroundings, that are characterized by their exertion of a positive influence on human beings engaged in creative work, and their aim to produce new designs whether they work individually or in teams within a single organization or in collaboration with others.

CDEs can be considered at different scales. At the micro-level is the environment surrounding an individual or a small team where personal interactions may stimulate creativity. At the other
extreme is the macro-level at which a research institution operates and whose creative activities may be hindered or promoted by other institutions (Kasperson, 1978). So, CDEs can be considered as nested layers of environmental factors surrounding the unit in which creative activities are undertaken (Kasperson, 1978). The unit of analysis can be as small as one person or as large as a whole institution. In between are other levels of creative units such as a university department seeking creative ways of performing research. Characteristics at one level are influenced by properties and events at other levels such as the culture and goals of the institution.

The main components of CDEs are:

- Creativity: As articulated above, creativity can be defined as a novel and imaginative product which is useful and of good quality. The evaluation of a product as ‘creative’ is often a matter of social negotiation. Not every creative process will lead to a creative product as the context, knowledge, and ideas also influence creativity. Combining different frames of reference, the transfer of a methodological approach from one field to another, or the tension between divergent and convergent thinking may further foster creative thinking.

- Design environment: The design environment depends on a wide range of conditions and circumstances that overlap and intersect (Kasperson, 1978). Its components are:

  - Task characteristics: Tasks may vary in terms of their being simple/complex, routine/novel, short/long-term and modularized/integrated.
  - Individuals: Every one possesses different knowledge, skills, abilities, motivation, interests, values, beliefs and cognitive styles.
  - Group characteristics: Groups may vary in terms of their size, being integrated/loosely coupled, being inward/outward looking, the heterogeneity/homogeneity of members, and the underlying assumptions
  - General work situation for individuals: These entail the number of different work tasks, job ambiguity and features of time available for design (sparse/abundant, fragmented/concentrated).
  - Organization: This relates to the organizational structure, culture, leadership style and the degree of organizational tension/harmony.
  - Extra-organizational environment: This relates to information availability and cultural characteristics (Kasperson, 1978)

The different scales, at which CDEs can be analyzed, might be grouped into the following categories: macro (global, national, inter-organizational); meso (related institution) and micro (teams and individuals). In addition, each of these components has social and cognitive aspects. The social aspects are openness to new ideas or innovations and relations between individuals.
The cognitive aspects are cognitive work style and thinking style (adopting an experimental or ‘trial and error’ approach) (Kasperson, 1978). These two aspects are closely integrated and affect each other. While group characteristics and work situations are more socially tuned, task characteristics and field situations are more cognitively tuned.

An element of change should also be considered when thinking about CDEs because, over time, the relevant tasks might alter due to changes in their preconditions. It is also important to distinguish the main types of CDEs depending on whether they are related to academia, industry or government. Besides, different disciplines might have different cognitive and social styles (Kasperson, 1978).

**Design & Learning**

Current theories in educational theory make the following assumptions about learning:

- Learning is a process of knowledge construction rather than knowledge absorption. So environments in which learners can be contributors are required (Harel & Papert, 1991). Therefore, learners should create new artifacts through interaction with software tools (Repenning et al. 1998; Eisenber & Eisenberg, 1998; Nardi, 1993).
- Learning is highly tuned to the situation in which it takes place. So, environments which are domain-oriented and which support human problem-domain interaction are required (Fischer, 1999a). When working or playing, individuals act until they encounter a breakdown (Fischer, 1999a). By getting involved in ‘reflection-in-action’ (Schon, 1983) or an experimental mode (Norman, 1993) they can reflect about these breakdowns, which are key to situated learning.
- Learning is knowledge-dependent meaning that people employ their existing knowledge to construct new knowledge that supports user-tailored information (Ritter et al., 1998).
- Learning needs to account for distributed cognition by which the knowledge required to solve a problem is distributed among various participants (Norman, 1993). This distribution of knowledge is based on the asymmetry of knowledge between different stakeholders in problem-solving (Rittel, 1984). A reformulation of the deceptive conception that the teacher should explicitly inform the learners about something they presumably know nothing about is misleading (Bruner, 1996).

To bring the design mode into the academic curriculum, the “learning by design” approach can be adopted (Bereiter, 2002, Scardamalia, 2002). In this type of learning, the physical environment is the physical workbench where something is being built. Holbrook & Kolodner (2002) describe this type of learning as being achieved through a major design challenge where learners develop designs, build prototypes and use various resources to provide justification for refining their designs. So, this approach is explicitly focused on building concrete things (Holbrook & Kolodner, 2002). Ideas enter the process as they are relevant to producing an artifact (Holbrook & Kolodner, 2002).

Similarly, Bereiter et al. (1997) asserts that this constructivist approach entails the following
characteristics:

- A focus on idea improvement: Working together on improving ideas by using the available strategies and resources
- Problems versus questions: Although problems are often expressed as questions, pursuing solutions to problems rather than answers encourages knowledge building. In contrast to answers, problem solutions are continually improvable.
- Knowledge of value to the community: In knowledge building, artifacts, whether conceptual or physical, are used by other community members as tools for further knowledge advancements.
- Emergent goals and products: Products may emerge at any point in the iterative cycle of knowledge building and may serve various purposes such as highlighting a problem or disseminating results.
- Constructive use of authoritative sources: Apart from authoritative resources such as textbooks, all ideas are treated with respect and judged according to their contribution to the current problem-solving effort.

To create different mindsets, learning environments should be facilitated in such a way that knowledge is collaboratively created, externalized and shared (Arias et al., 2000). Impacting mindsets is a socio-technical design problem (Fischer, 1999b) (Figure 1.0) that requires making consumers become active contributors to the solutions of the problems (Schon, 1983; Fischer, 1998a; Arias et al, 2000). Allowing learners to engage in design activities by creating environments that support them in making artifacts that they can share with others is another function of this socio-technical design problem.

The Context of the Study

Sketchbook is a digital tool for art and design students that encourages them to showcase their work through portfolios, and collaborate on projects through posting images. (See a related website at: http://www.arts.ac.uk/clipcetl-sketchbook.htm) It has been developed by the University of the Arts in London which is one of the oldest art universities in the world. In addition to displaying their sample work, users can also employ a variety of creative thinking tools, do exercises for inspirational thinking as well as utilize online resources related to the areas of art, design, and research methodologies.

Sketchbook is an image-sharing site aimed specifically at artists, designers, or anyone who works in a visual medium. It allows the users to upload and show their work, offer descriptions of the process, and have friends and colleagues comment upon each other’s ideas. Students are also provided with the opportunity to create their online portfolios and to collaborate on projects through posting images or articles. Besides creative thinking tools, exercises and research methods are also presented. Sketchbook’s structured environment supports the students in their learning process (Figure 1.0).

The content of Sketchbook is divided into the following seven areas that can be accessed
through the top frame of the page layout.

- Gallery
- Sketch
- My Portfolio
- Groups
- Inspiration
- Books
- Links

![A Screen Layout of Sketchbook](image)

**Figure 1.0 A Screen Layout of Sketchbook**

Based on the constructivist theory of learning, Sketchbook provides a rich context for learning that involves building a work of art. By establishing a strong connection between design and learning, Sketchbook facilitates a meaningful construction where the users are engaged in building sharable artifacts.

Sketchbook’s constructivist learning environment aims achieving the following pedagogical goals:

- Providing experience with knowledge construction process: Once the tutor facilitates the process, Sketchbook users take the responsibility for strategies or methods for solving problems in the “Inspire” section.
- Providing experience in multiple perspectives: Students are engaged in activities that enable them to evaluate alternative solutions to these activities so they can eventually enrich their understanding.
Embedding learning in realistic and relevant contexts: As most of the activities in Sketchbook are grounded within the complexity of real life, the ability of students to transfer what they learn to everyday life may be increased.

Encouraging ownership and voice in the learning process: As Sketchbook users play around with their illustrations they can identify their own directions and objectives. The tutors may act as a coach by helping the students frame their learning objectives rather than determining what they will learn.

Embedding learning in social experience: Sketchbook facilitates collaboration between both teachers and students, and students and other students. In this way it increases social interactions.

Encouraging the use of multiple modes of representation: Sketchbook facilitates learning with photographs and videos in addition to written communication.

Encouraging self-awareness of the knowledge construction process: Sketchbook users are provided with activities in the ‘Inspire’ section that allow them to develop awareness about their own knowledge construction process.

Moreover, Sketchbook provides the user with the opportunity to gather and organize artifacts regarding one’s professional development as well as their collaborative work. It is a reflective tool that demonstrates growth over time.

Sketchbook’s underlying learning theory stresses the active involvement of learners in building their own knowledge. As learners structure and organize their work of art they correct themselves. Their works are constantly being refined. Reflection on one’s own work also makes learners become informed about their own learning goals and strategies. As the learners further explore the drawing space, they are actively engaged in imposing meaning upon their works.

The teachers can also create meaningful experiences in their classrooms by using Sketchbook. They can use Sketchbook as a domain oriented design environment by showing exemplary work or by evaluating their students’ individual or collaborative work. Sketchbook users can also meet with others that share the same interests and competencies to further improve their skills through the exchange of ideas and collaborative work. So, Sketchbook fosters reflective practice and critical thinking by offering the opportunity for one’s work to be reviewed by their peers.

Another main feature of Sketchbook as a domain-oriented design environment is that it is a medium of expressing one’s authenticity. Due to the fact that Sketchbook users can showcase their work, a culture of digital documentation can also be fostered.

Below, a list of possible tasks (Table 2.0) for collaborating on Sketchbook has been provided:

<table>
<thead>
<tr>
<th>Strategy Rationale</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teacher may initiate a work of art to be further modified by the students</td>
<td>Because of the nature of the evolving drawing, students could be constantly engaged in the learning process.</td>
</tr>
</tbody>
</table>
Students may be expected to make a collaborative drawing and post their contributions at least twice a week. Participation points may be calculated based on these online contributions.

Students can be expected to take part in regular peer reviews by critically evaluating each other's works of art.

Students can be divided into 3-4 small groups to provide answers for the 'Exercises' in the 'Inspiration' section. They can even get into an exchange of ideas with students from other colleges.

Instructors may require high-quality online interactions with peers and discussions of readings suggested by Sketchbook making a portion of the grade dependent on it. (At least 25% is recommended).

Effective learning environments should provide frequent and meaningful interactions among learners. Good practice encourages cooperation among students.

Teachers can point out various mind-mapping tools in the “Inspire” section to continually promote good interaction.

Good practice encourages prompt feedback so that faculty-learner interaction may be improved.

Table 1.0 A list of possible collaborative projects on domain oriented design environments

Methodology

Research Design

Taking into account the complexity of factors that simultaneously influence creative thinking skills, controlling factors utilized in experimental studies would limit the understanding of educational issues. Creativity is a construct—an aspect of consciousness—and is therefore difficult to measure. In addition, an individual’s creative and complex thinking skills may differ from those of others based on the specific educational situation the learner is experiencing. As some theorist have argued, analyses of “person-situation” interactions using rich situational descriptions may facilitate
more understanding about individual difference constructs. Also, as various theorists state, generalizations about learning cannot be validated without studying the personal differences along with the situational differences. For these theoretical and practical reasons, a hermeneutic phenomenological approach could provide insight into the construct of creativity in online learning situations. Understanding the phenomenon of the learner’s creative and complex thinking skills by observing, questioning, and gathering stories from students who attempt to learn online would be the focus of these phenomenological observations.

Participants

Participants were students of the University of Arts in London who were willing to reflect about the relationship between their use of Sketchbook and their creative and complex thinking skills. To this end, students currently enrolled in a program were e-mailed and asked whether they would be willing to participate in such a study. The justification of this sampling method is, instead of making generalizations concerning the relationship between the development of creative thinking skills and the use of Sketchbook, we investigated the value and function of Sketchbook as a mediating tool through this case study. Twenty-four art and design student participated in the small-scale study undertaken in the University of the Arts in London.

Data Collection

To look more closely at the process of portfolio development, a qualitative study investigating the experiences of these twenty-four students was conducted. Data was collected via student interviews and field observations. Students who were enrolled in the introductory course participated in a focus group interview after completing their initial draft of the portfolio. The focus group interview lasted forty-five minutes and centered on the decision-making process. At the conclusion of the class, the researcher conducted a second group interview where open-ended questions were asked concerning the choice of media and possible future revisions. These interviews focused on the process of developing the portfolio, reasons for developing the portfolio beyond the requirements, and changes they would like to make in their portfolio over time.

Semi-structured interviews with students and observation of the learners' online art and design products were used as data collection methods. The students were asked about their use of Sketchbook and their perception of the potential advantages pertaining to the development of creative thinking skills.

According to Patton (1982), the fundamental principle of qualitative interviewing is providing a framework within which respondents can express their own understandings in their own terms. Thus, open-ended, rather than closed, questions should be used as far as possible (Patton, M., 1982). Patton’s style of qualitative interviewing is referred to as the ‘standardized open-ended interview’ through which questions are asked in the same way and order, with a minimum of probing by the interviewer (Patton, M., 1982). The use of probes was preferred by the researcher in order to allow the informants to answer more on their own terms (Patton, M., 1982). This way
the interviewer, seeking, at the same time, both clarification and elaboration on given answers, was freer to probe beyond answers (Patton, M., 1982).

Results

Student responses covered a range of opinions, with the diversity illustrated by the qualitative feedback from the open-ended questions:

“In my opinion, we should not be expected to be creative with computers, that will be unfair in some instances.”

This response was typically found in students from the developing world with notably lower ICT literacy skills than the other students. Yet, with guidance and training, all students were able to readily produce e-portfolios in the weeks following the initial assessment.

Another challenge for these students was their different opinions with regard to whether they should only include the sketches relevant to their own field (fashion and design) or any other drawings not particularly related to fashion and design.

“It was quite fun to put together the e-portfolio. The assessment of this course also makes things less stressful on us.”

Once the requisite publishing skills had been mastered, students enjoyed the capacity to individualize their drawings, and in general, invested disproportionate time in their sketches, despite the fact that it was not rewarded in assessment. Moreover, those students having used digital media admitted that the digital media really made a difference for them since it resulted in robust learning experiences.

“I think it is an amazing way for preparing job applications in the future. Learning about my personal strengths and weaknesses via this online portfolio, I can work now on my weaknesses.”

Similarly, one student mentioned that, by being encouraged to identify their own strengths, they would take responsibility to develop them further and therefore became engaged in genuine life-long learning.

Moreover, one student stated that “the good thing about Sketchbook is that it is collaborative so that we can further develop the drawings of others.”

One of the challenges was how to sketch online when using Sketchbook. One student stated that “It was difficult to translate your ideas about your thoughts into the right drawings on the web page, but once you get used to it you can put your real life examples which may be helpful for your other colleagues”. Yet, despite this challenge of selecting the right drawing, one student
stated that "once you start to reflect and record your drawings you think that you feel motivated to enter a new creative experience into your portfolio."

Furthermore, three of the e-portfolios included some mind-maps of the art students’ interaction with others and these students believed these figures to be the most important component of the idea generation.

Depending on how much the students got involved in preparing their e-portfolios, they pursued different paths. For example, those students who were just beginning the process often included simple drawings they were using throughout their lessons. One third grade student mentioned: "As I continued to work on my e-portfolio, I wanted to reflect my own style as a design student.” As participants continued to revise and refine their work, they felt more motivated by the desire to reflect their personal style with regard to art and design.

Although at the beginning of the online sketching process the students wanted to know exactly how their drawings should look as if the contents were set in stone, they eventually became accustomed to the unpredictable nature of this collaborative development process. After the initial evaluation of their drawings, participants were told that they should think about the use of the tool as an ongoing process as well as revise the content frequently utilizing the flexibility of the digital media.

**Conclusions**

As Fischer (1991) stated, in a “gift-wrapping” approach, technology is merely wrapped around old frameworks for education. To move from “gift-wrapping” into richer contextual frameworks and computational environments, effort has been made to ensure that Sketchbook fulfils the following conditions:

- Being simultaneously user-directed and supportive: The choice of tasks must be under the control of the learner whereas the support provided by the system must be contextualized to the user’s task.
- Being sufficiently open-ended and complex so that users will encounter breakdowns: The system must provide means for allowing users to understand and learn from breakdowns.
- Supporting a range of expertise: Systems must be able to accommodate users at different levels of expertise.
- Promoting collaboration: When users are supported to overcome the symmetry of ignorance, they can learn from each other.

In this way, a synergy for social creativity can be created. As the Renaissance scholar no longer exists due to the rapid increase of information, social creativity becomes more and more crucial (Fischer, 1998b). Applications such as Sketchbook can empower individuals in the following ways:

- letting them articulate a partial description of their tasks
- supporting the creation of an artifact with a construction component
- using a catalogue of previous designs supporting design-by-modification
- supporting the exploration of argumentation
- providing additional feedback

As computers can be utilized for such complex tasks, more social creativity can be unleashed.

**Acknowledgements**

The author contacted the University of the Arts because of her research interest and would like to thank Dr. Julia Gaimster of University of the Arts in London for the information and support she provided.

**References**


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6 THOUGHTS ON “CREATIVE DESIGN ENVIRONMENTS: A SMALL-SCALE CASE STUDY”

**best diet**
on January 29, 2014 at 6:59 PM said:

I quite like reading a post that will make people think.

Also, thank you for allowing me to comment!

**Doyle Sumerlin**
on January 30, 2014 at 6:17 PM said:

I’m very happy to read this. This is the kind of manual that needs to be given and not the random misinformation that’s at the other blogs. Appreciate your sharing this best doc.

**ecolitoral.com**
on February 1, 2014 at 12:51 PM said:

Wow, incredible blog layout! How long have you been blogging for? you make blogging look easy. The overall look of your website is fantastic, let alone the content!
face wrinkle cream  
on February 3, 2014 at 4:06 PM said:

Use the term rinse free bath cloths and you will come up with many choices of products and brands. The procedure is recommended for both dark-skinned and fair-skinned patients. This is because the body naturally repairs itself so regularly and perfectly.

eye creams  
on February 3, 2014 at 11:00 PM said:

Good post. I learn something totally new and challenging on websites I stumbleupon everyday. It’s always helpful to read through articles from other writers and use something from other sites.

cork board ideas  
on February 5, 2014 at 10:05 AM said:

Way cool! Some extremely valid points! I appreciate you penning this write-up plus the rest of the site is also very good.