Open Peer Commentaries

on Maria Daskolia et al.'s "Learning about Urban Sustainability"

Studying Complexity: Creativity, Collaboration and Learning

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> Upshot · Creativity, collaboration and learning are fascinatingly messy and interconnected processes. Does knowledge develop by engaging in a collaborative creative process, or does existing knowledge allow us to create more creative artefacts? Does one build upon the other in a bricolage process, familiar to constructionist learning experiences? If so, how can we best facilitate this type of learning? This OPC raises a number of questions that it does not attempt to answer but raises them to draw attention to the complexity of the phenomena under investigation.

« 1 » Maria Daskolia, Chronis Kynigos and Katerina Makri's target article presents an example of constructivist principles employed to provide the theoretical foundation for a learning experience designed to provide learners with an opportunity to develop their knowledge and understanding of the conceptually complex area of "sustainability." Rather than employing a simulated environment or microworld for learners to explore and develop their own explanations of the outcomes they observe, the creation of digital stories asks the learners to consider in a personally meaningful way the micro impact of macro systems they have previously been introduced to, whilst simultaneously developing their understanding of the complexity and interconnected nature of these systems.

« 2 » Three complex and interconnected areas are encountered in this article: creativity, collaboration and learning. Daskolia, Kynigos and Makri suggest that "a constructionist design entails a genuine pedagogical potential for enhancing collaborative creativity in students' learning" (§3), taking a mini-c and middle-c approach to creativity, asking the question:

> "How is collaborative creativity manifested in terms of new ideas and understandings generated out of the groups' collaborative processes, and embodied in the digital stories produced?" (**§29**)

« 3 » The key component of this question and initial statement of potentiality is "*collaborative creativity*." Collaboration is often confused with co-operation, when learners act together to achieve personal goals. While in collaborative activities, learners work together on a single-shared goal, creativity is an often intangible concept: it can be as difficult to identify a creative act or artefact as it is to identify the process through which it occurred.

« 4 » Creativity has long been associated with learning (Guilford 1950), but how to identify creativity is often contested as there is no single definition of creativity that is agreed upon across and even within disciplines (Kleiman 2008). Commonly, there are three clear aspects of creativity discussed in the literature: the person, the process and the product. Particularly relevant to this article is the fact that design is often a collaborative and social process involving groups of designers (Warr & O'Neill 2005). These ideas and concepts are shared (with or without the support of physical artefacts) and both the creative process and creative product become socially mediated, which is reflected in the findings of this article. However it also raises important questions about Group 3, who are characterised in the article as co-operating rather than collaborating. What are the implications for creativity and in turn the co-construction of knowledge? Does learning occur at the individual level or at the level of the group?

« 5 » Focusing on the design, it is interesting that each digital story in this article presented a problem scenario to be resolved (which was not a requirement in the initial brief). To begin with, a problem is a common aspect of models of creativity that not only prompts the generation of ideas but allows learners to evaluate their ideas. Andy Warr and Eamonn O'Neill describe the idea-generation phase, which follows the analysis of the problem, as "the more specifically creative phase of the creative process model" (Warr & O'Neill 2005: 121). From a constructionist perspective, it is likely that it is at this point in the creation of the digital stories that learners take ownership of the project and it becomes personally meaningful: a powerful constructionist idea. Therefore if learning is associated with creativity, it is perhaps the initial development of the problem and generation of ideas that need to be examined in depth.

« 6 » The creation of knowledge artefacts is a key feature of constructionist learning activities. They need not be final, as they are created to explore, test and extend understanding. It can be anticipated that these artefacts may be developed or even destroyed and created anew to encompass new / developing knowledge and understanding. For example, it appears that Group

http://www.univie.ac.at/constructivism/journal/10/3/388.daskolia

1 created their second digital story for just this reason, stating that their first digital story only addressed one aspect of sustainability whilst the second covered all three. However, it is unclear whether this is development of knowledge through collective engagement with a creative act, or whether this was knowledge they already held that they used to develop a more creative artefact.

« 7 » I would argue that there may be evidence of both within the one group's work and it is essential to examine the discussions between students to help illuminate this process of moving from one to the other. It is also worth considering how much of the creativity was driven by the technology and how much by collaborative knowledge construction.

« 8 » To explore the complex interconnected nature of creativity, collaboration and learning, it is also essential to understand the wider learning context in more detail. Real-world (non-lab-based) learning environments are messy places for research. It is this complexity that the educational researcher must relish if we are to develop the initial insights gained from this study further. Case studies are particularly powerful for developing an understanding of phenomena under study as they provide a rich description that researchers and educators use to inform their understanding of the implications of the research in their own contexts.

« 9 » One aspect of this study that remains unclear is the content and timing of the taught component of the module. There can be no assumptions as to what concepts were covered, what examples were given or even the mode of instruction. There can also be no assumptions made as to the level of student engagement in this more traditional section of the module, nor what they have learned from it. In developing this study, it would be valuable to consider whether the discussions that occurred as part of the workshops would have usually taken place in seminars (with no knowledge artefact created) and if so, would the same level of conceptual development have been achieved? This leaves us with some important questions: What is the role of existing knowledge in any apparently creative process or final artefact and does this mediate whether or not it is actually creative? Finally, considering the research question that is the focus of this study: Are "new" ideas and understandings generated and to what extent are they new at a group and individual level?

« 10 » The work of Daskolia, Kynigos and Makri demonstrates one way in which educators can support their students to develop these new understandings through constructionist learning activities, simultaneously providing researchers with several routes to explore the complex interconnected nature of creativity, collaboration and learning.

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Received: 8 June 2015
Accepted: 18 June 2015

Tool Selection and Its Impact on Collaborative Learning

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> Upshot • Daskolia, Kynigos and Makri's article offers us a view into potential applications of constructionist learning theory to help students conceive of and collaborate on solutions to today's complex problems. This work in many ways parallels the efforts of those investigating systems thinking and highlights the importance of digital production in that process. While many efforts rely on simulations and models, the authors place centrally the role of digital production in understanding complexity. This, in turn, calls our attention to the affordances and limitations of our current tools for facilitating learning and collaboration, and ultimately to the need for new tools.

« 1 » The expansive and often vague conception of urban sustainability is a particularly ripe area for exploration using constructionist means, given that constructionist learning is at its most efficacious when learners are brought together in a social context to create and share a personally meaningful text (cf. Papert 1980; Papert & Harel 1991) as well as illuminate "powerful ideas" such as sustainability and complex systems (Papert 1980). The approach explored in Maria Daskolia, Chronis Kynigos and Katerina Makri's target article sits well at this intersection and helps expand the constructionist literature beyond the typical domains of science, computer science, and mathematics. In particular, their study helps us envision how this lens on learning and engaging with the world can shape our understanding of large, complex societal issues from within the domain of digital storytelling.

« 2 » Urban sustainability is a particularly powerful idea to explore, as it necessitates the awareness of and synchronicity between countless moving parts. In this article, the authors reference the three pillars that support most urban sustainability initiatives – economic, ecological, and societal concerns – and appear to challenge the students in their study not only to consider the *interrelationships* between these factors when collaborating on a solution to urban challenges, but also the most elegant way to *represent* these solutions in a short, multimodal narrative. A running thread through the group projects in this article, which included narratives about pollution and the environment, urbanization and public spaces, and the tension between eco- or historical preservation and economic growth, concerned the use of microcosm to symbolize the intersections of large, vast systems. Each group seemed to struggle at first to devise a project that acted as personal story, "issues" piece, and call to action. And, yet it was very clear in the end that each of these digital stories demonstrated an understanding that the circumstances of the individuals in their communities are shaped and influenced by greater systems in motion.

« 3 » An understanding of how systems like those depicted in these group projects work offers students a powerful lens for seeing, engaging, and changing their world (Jacobson & Wilensky 2006). There are numerous well-articulated approaches to teaching systems thinking in the classroom,