

The background of the cover is a complex, abstract composition. It features a dense pattern of white, black, and grey splatters and lines against a base of blue and orange. Several large, thick black circles are scattered across the page, some overlapping the splatters. The overall effect is one of dynamic, chaotic energy.

ISSN 1782-348X ■ Volume 10 Number 3 ■ July 2015

CONSTRUCTIVIST FOUNDATIONS

An interdisciplinary journal ■ www.univie.ac.at/constructivism/journal

Special Issue
**Constructionism
and Creativity**

Edited by
**Chronis Kynigos and
Gerald Futschek**

I 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.

Carina Girvan is a lecturer in the School of Social Sciences at Cardiff University. Her research focuses on the innovative use of existing and new technologies in education, as well as teacher professional development and emerging ethical issues in the use of new technologies in education.

RECEIVED: 8 JUNE 2015
ACCEPTED: 18 JUNE 2015

Tool Selection and Its Impact on Collaborative Learning

Kylie Peppler
Indiana University, USA
kpeppler/at/indiana.edu

> **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 con-

structionist 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, multi-modal 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,

including the use of computer-based modeling (Collela, Klopfer & Resnick 2001; Wilensky 1999), dynamic simulations (Collela 2000; Danish et al. 2011), and connections to social and biological sciences (Jacobson & Wilensky 2006; Hmelo-Silver & Pfeffer 2004), to name a few. However, the vast majority of these efforts involve students exploring models of existing systems rather than designing their own. This article echoes the work of Linda Booth Sweeney and others, who have argued that stories can offer an important avenue into systems thinking for young people (Booth Sweeney 2001). Booth Sweeney's work, in particular, calls our attention to the potential impact that stories have on our understanding of systems and traces a potential cause of our misconceptions of systems thinking to our children's literature. She notes that many Western children's stories exhibit linear causal thinking while there is a minority of notable stories that exhibit systemic ideas (e.g., Dr. Seuss's *The Lorax*) that can be leveraged to help young people develop systemic outlooks important to sustainability. Daskolia, Kynigos and Makri harness the power of storytelling as a means to support systems thinking, conveyed through the constructionist activity of digital storytelling.

« 4 » One of the challenges that the authors cited in their study was the translation of the groups' conceptual and narrative ideas into the technical dimension, the "digitalization" of their stories. The first group referenced in the article went so far as to change their project concept entirely because of their lack of familiarity with Windows Movie Maker, and members of the third group shot down an initial proposal from a team member to shoot and edit a short film because it would be too ambitious to do so. In constructionist learning, much attention is paid to the tools in use (in this case, the computer and the media applications utilized) and how the tool shapes our thinking (Papert 1980). In this respect, we see the impact that the range of media tools currently available for digital media production has on the idea construction and constraints of the learning space. Our choice of tools is important not only for their ease of use but also for their ability to support the design goals, in this case digital storytelling. In addition, many issues around sustainabil-

ity and systems thinking are particularly apt to nonlinear and interactive forms of digital storytelling, which are particularly efficacious for digital stories concerning systems concepts.

« 5 » As part of an effort to promote systems thinking through engaging in design with digital media, we created a curriculum centered on digital storytelling using the Scratch programming environment (Pepler et al. 2014). Scratch is a media-rich visual programming environment designed to be an accessible space for young people to engage in the creation of interactive stories, video games, and simulations through the use of command blocks and drawn or imported media "sprites" (Resnick et al. 2009). Enabling interactivity in a digital story not only engages young people in major systems thinking concepts – including interconnection, system components, feedback loops, and leverage points – but allows the viewer similarly to have an impact on the storyline through their choices. Scratch's particular affordances – remixing existing media, creating interactivity, non-linearity, and multimodality – made it an amenable environment for the creation of digital stories about systems. Moving forward, future research and development efforts should examine the impact of the tool on constraining and enabling the learning space. As evidenced by the three group projects in this article, the groups' choice of digital storytelling tool shaped the projects in consequential ways, having a profound impact on the genre, narrative, and aesthetic of the story being told, as well as each group's ability to collaborate in the design process.

An artist by training, **Kylie Pepler** engages in research at the intersection of arts, new technologies, and interest-driven learning. In addition to serving as the Director of the Creativity Labs at Indiana University, Pepler is also the lead of the MacArthur Foundation's Make-to-Learn initiative, an advisor to the Connected Learning Research Network, and a member of the 2015 National Educational Technology Plan Committee. She highlights findings from her NSF-funded research on the arts and new technologies in her recent book, *New Creativity Paradigms: Arts Learning in the Digital Age* (2014) commissioned by the Wallace Foundation.

RECEIVED: 25 MAY 2015

ACCEPTED: 22 JUNE 2015

Narrative Learning for Meaning-Making, Collaboration and Creativity

Giuliana Dettori

ITD-CNR, Genoa, Italy

dettori/at/itd.cnr.it

> **Upshot** • The target article by Daskolia, Kynigos and Makri shows the great potential of narrative learning to foster general learning skills, such as meaning-making, collaboration and creativity, while facilitating the construction of disciplinary content knowledge. This learning approach has much to recommend it, especially from a constructivist perspective, because it supports the implementation of collaborative and creative learning processes apt to promote reflective dialogue as a basis for knowledge construction, capitalizing on students' previous knowledge and experience.

« 1 » The target article by Maria Daskolia, Chronis Kynigos and Katerina Makri provides an interesting example of narrative learning, and shows how this approach lends itself to fostering general learning skills while facilitating the construction of content knowledge. This is, indeed, the educational aim of these authors, who specify they have "a focus on activating the students' creative potential for developing new understanding." Let us see why the use of stories appears to be the right tool to achieve such a learning aim.

« 2 » Narrative learning consists in letting students make use of narratives of any kind (from invented stories to narrations of personal experiences), meaningfully related to assigned learning tasks. This approach to learning has been increasingly raising the interest of educational research because scholars of diverse orientations have recognized its learning potential, which derives from its characterizing features (Dettori & Paiva 2009; Dettori et al. 2006). Narrative is a natural expressive form: from early childhood and throughout life, human beings appear to be endowed with "narrative intelligence" that leads them to naturally formulate and understand the meaning of stories (Bruner 1990; Mateas & Sengers 2002). Moreover,

CONSTRUCTIVIST FOUNDATIONS

An interdisciplinary journal ▪ www.univie.ac.at/constructivism/journal

Special Issue

Constructionism and Creativity

Editors: Chronis Kynigos and Gerald Futschek

- 281 Chronis Kynigos & Gerald Futschek
Re-Situating Constructionism
- 285 Richard Noss & James Clayson
Reconstructing Constructionism
.....
- 289 Karen Brennan
Beyond Technocentrism: Supporting Constructionism in the Classroom
OPEN PEER COMMENTARIES
- 297 Hugh Gash & Thomas McCloughlin
Embedding Technology in Pedagogy
- 298 Carina Girvan **Changing Teacher Beliefs: Moving towards Constructionism**
- 299 Giorgos Psycharis **Embedding Inquiry and Workplace in a Constructionist Approach to Mathematics and Science Teachers' Education**
AUTHOR'S RESPONSE
- 301 Karen Brennan **The Critical Context of Teacher Attitudes and Beliefs**
.....
- 305 Chronis Kynigos
Designing Constructionist E-Books: New Mediations for Creative Mathematical Thinking?
OPEN PEER COMMENTARIES
- 313 Karen Brennan **Objects To Think With**
- 315 Michelle Hoda Wilkerson-Jerde **Locating the Learner in Collaborative Constructionist Design**
- 316 Dolores Corcoran **Thoughts on Developing Theory in Designing C-Books**
AUTHOR'S RESPONSE
- 317 Chronis Kynigos **Designing for New Mediations: A Constructionist Approach**
.....
- 321 Eirini Geraniou & Manolis Mavrikis
Building Bridges to Algebra through a Constructionist Learning Environment
OPEN PEER COMMENTARIES
- 331 Nicole Panorkou **Proposing a Framework for Exploring "Bridging"**
- 332 Ian Jones **Building Bridges that are Functional and Structural**

- 334 John Mason **Bringing Reflection to the Fore Using Narrative Construction**
AUTHORS' RESPONSE
- 335 Eirini Geraniou & Manolis Mavrikis
Let's Cross that Bridge... but Don't Forget to Look Back at Our Old Neighborhood
.....
- 338 Nicole Panorkou & Alan Maloney
Elementary Students' Construction of Geometric Transformation Reasoning in a Dynamic Animation Environment
OPEN PEER COMMENTARIES
- 348 Janet Bowers **Documenting the Learning Process from a Constructionist Perspective**
- 350 Karen F. Hollebrands **Reasoning in a Dynamic Animation Environment**
- 351 Arthur Hjorth **Body Syntonicity in Multi-Point Rotation?**
AUTHORS' RESPONSE
- 352 Nicole Panorkou & Alan Maloney
Planting Seeds of Mathematical Abstraction
.....
- 355 Pavel Boytchev
Constructionism and Deconstructionism
OPEN PEER COMMENTARIES
- 364 Gerald Futschek **Deconstruction in Software Construction**
- 365 Brian Harvey **Construction and Deconstruction**
- 366 Wayne Holmes **"Deconstructionism"—A Neglected Stage in the Constructivist Learning Process?**
AUTHOR'S RESPONSE
- 367 Pavel Boytchev **Does Understanding Deconstruction Require Its Deconstruction?**
.....
- 370 Chrystalla Papademetri-Kachrimani
Learning about Learning with Teachers and (from) Young Children
OPEN PEER COMMENTARIES
- 382 Ana Isabel Sacristán **Backwards-and-Forwards from the Unexpected: Teachers as Constructionist Learners**
- 383 Nikoleta Yiannoutsou **Elements of Surprise in Teaching and Learning**

- AUTHOR'S RESPONSE
- 385 Chrystalla Papademetri-Kachrimani
School Reform: Is it indeed impossible?
.....
- 388 Maria Daskolia, Chronis Kynigos & Katerina Makri
Learning about Urban Sustainability with Digital Stories: Promoting Collaborative Creativity from a Constructionist Perspective
OPEN PEER COMMENTARIES
- 397 Carina Girvan **Studying Complexity: Creativity, Collaboration and Learning**
- 398 Kylie Pepler **Tool Selection and Its Impact on Collaborative Learning**
- 399 Giuliana Dettori **Narrative Learning for Meaning-Making, Collaboration and Creativity**
AUTHORS' RESPONSE
- 401 Katerina Makri, Maria Daskolia & Chronis Kynigos **Seeking "Power" in Powerful Ideas, Systems Thinking and Affective Aspects of Learning**
.....
- 405 Edith K. Ackermann
Amusement, Delight, and Whimsy: Humor Has Its Reasons that Reason Cannot Ignore
OPEN PEER COMMENTARIES
- 412 Vincent Kenny **All Alone, Together?**
- 414 Theo Hug **Towards a Delightful Critique of Pure Reason**
- 416 Anna Chronaki & Chronis Kynigos
Humor as a Humble Way to Access the Complexity of Knowledge Construction
AUTHOR'S RESPONSE
- 418 Edith K. Ackermann **Impenetrable Minds, Delusion of Shared Experience: Let's Pretend ("dicciamo che io ero la mamma")**

REGULAR SECTION – BOOK REVIEWS

- 422 Patrick Hoburg
Specifying Revolutionary Sense-Making
- 426 Sven Delarivière & Joachim Frans
Computational Explanation in Cognitive Sciences: The Mechanist Turn
- 430 **Acknowledgment to Reviewers of Volume 10**