

CD 145 / ED 182

Technological Tools for Learning

Spring, 2011

Thursdays 9-11:30 pm

Location:

Curriculum Lab at the Eliot-Pearson Department of Child Development

Prof. Marina Bers

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COURSE DESCRIPTION

This course explores the design and use of new technologies for learning. The underlying philosophy of this course is "constructionism", which states that people learn better when engaged in making and designing their own computational meaningful projects; therefore, we will become designers of technological tools to be used in educational and we will become researchers to assess the thinking and learning fostered by the different tools. We will also explore current research and debates regarding educational technologies.

Through the semester we will read and discuss materials from a wide variety of sources. We will also become familiar with new technologies ranging from collaborative on-line systems to robotic construction kits, to programming environments for children. The goal of the course is to build both technical expertise as well as theoretical knowledge to be able to choose adequate technology, integrate it into the learning environment and design research studies to evaluate its success or failure.

COURSE REQUIREMENTS

Readings and class participation (On-going--15% of grade): All students are expected to do the readings, and to participate in discussions of the readings in class. Most readings will be linked from the syllabus, except Prof. Bers' book "[*Blocks to Robots: learning with technology in the Early Childhood Classroom*](#)" (Teachers College Press, 2008). The book should be read by February 3rd, so students must start right away. For the rest of the readings, it is strongly suggested that students print them out and have them available in a folder to bring to class.

Class presentations (On-going--20% of grade): Class time will be organized as discussions, not lectures. To help get discussions started, each session a student will be asked to summarize the readings and suggest one question or provocative issue.

Documentation of robotic project (Due March 31--20% of grade): Students will work individually. Each student will create a documentation project for the curriculum lab to show his/her learning in class and experience visiting the classrooms working with robotics. There is a possibility of extra-credit for students who want to take on a bigger documentation project including video making. If interested, contact Prof. Bers.

Virtual community project presentation (April 21--10% of grade). Students will work in pairs. Each pair of students will develop a proposal for a virtual community to help teachers share resources to learn about robotics and to share curriculum modules and robotic example to teach math, science, literacy or social studies. They will present their proposals and receive feedback from the class

Final paper (April 28th—35% of grade). Each pair of students will write a proposal for the virtual community as well as prototype implementation. Prof. Bers will e-mail guidelines as time approaches.

January 20: Introduction and Course Overview

Readings for Class	<p>Koschmann, T. D. (1996). Paradigm shifts and instructional technology: An introduction. In T. D. Koschmann (Ed.), <i>CSCL: Theory and practice of an emerging paradigm</i> (pp. 1-24). NJ: Lawrence Erlbaum.</p> <p>Papert, S. (1999, March 29). Papert on Piaget. Time Magazine, special issue on "The Century's Greatest Minds," 105</p>
Design Studio	<p>Class activity with the four paradigms and Logo</p> <p>Papert's video</p>

January 27: Programming robots in Kindergarten (DevTech group)

Readings for Class	<p>Bers, M. & Horn, M. (2010). Tangible programming in early childhood: Revisiting developmental assumptions through new technologies. In I. R. Berson & M. J. Berson (Eds), <i>High-tech tots: Childhood in a digital world</i>. Greenwich, CT: Information Age Publishing.</p> <p>Bers, M (2011) The TangibleK Robotics Program: Applied Computational Thinking for Young Children Early Childhood Research & Practice (Volume 12, No. 2).</p>
Design Studio	<p>Students will explore tangible programming with CHERP</p>

February 3: Playful learning with robots

Readings for Class	<p>Bers, M (2008) Blocks to Robots: Learning with technology in the Early Childhood Classroom, Teachers College Press, NY</p>
Design Studio	<p>Garden activity with Lego WeDo robotics</p> <p>WeDo reference guide</p>

February 10: Learning Programming with Scratch

Readings for Class	<p>Resnick, M., Maloney, J., Monroy-Hernandez, A., Rusk, N., Eastmond, E., Brennan, K., Millner, A., Rosenbaum, E., Silver, J., Silverman, B., & Kafai, Y. (2009). Scratch: Programming for All. <i>Communications of the ACM</i>, vol. 52, no. 11, pp. 60-67.</p> <p>Resnick, M. (2006). Computer as Paintbrush: Technology, Play, and the Creative Society. In Singer, D., Golikoff, R., and Hirsh-Pasek, K. (eds.), <i>Play = Learning: How play motivates and enhances children's cognitive and social-emotional growth</i>. Oxford University Press.</p>
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Design Studio	Scratch activity (cards)
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February 17: Teaching content through Robotics

Design studio	Integrated curriculum modules Scratch reference guide
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February 24: Substitute Monday's schedule on Thursday

March 3: Classroom visit I

Design Studio	Students will visit and work in the classroom
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March 10: Classroom visit II

Design Studio	Students will visit and work in the classroom
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March 17: Computational literacy and technological fluency

Readings for Class	<p>Technologically Speaking: What is Tech Lit? Report from the National Academy of Engineering</p> <p>Technological Fluency</p> <p>Jenkins, H. et al. (2006). Confronting the Challenges of Participatory Culture: Media Education for the 21st Century. MacArthur Foundation.</p> <p>Alliance for Childhood Tech Tonic: Towards a New Literacy of Technology</p> <p>Technological Literacy standards (ITEA International Technology Education Association)</p> <p>Massachusetts Curriculum Frameworks</p> <p>National Academy of Engineering and National Research Council, 2002:</p> <p>NETS (National Educational Technology Standards) Project, ISTE (International Society for Technology in Education): http://cnets.iste.org/</p>
Design Studio	Students will compare and contrast the ways in which the different documents define what it means to be computer literate. They will be able

	to access the following resources as well, in case they find them useful. http://www.miami.edu/bb/assessment/ http://www.tcet.unt.edu/pubs/studies/index.htm
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March 24: No class. Spring break

March 31: Current debates on Educational Technologies

Readings for Class	Cuban, L So much high-tech money invested, so little use: how come? Wartella, E. A., & Jennings, N. (2000). Children and Computers: New Technology-Old Concerns . The Future of Children: Children and Computer Technology, 10(2). Papert, S. (1987). Computer criticism vs. technocentric thinking . Educational Researcher, 16(1), 22-30.
Design studio	In-class debate
Assignment due	Documentation project

April 7: Virtual Communities for learning

Readings for Class	Rogoff, B (1994) Developing understanding of the idea of communities of learners . Mind, Culture & Activity, Vol 1 Num 4, Fall 1994 Barab, B (2003) An Introduction to the Special Issue: Designing for Virtual Communities in the Service of Learning The Information Society Barab, S, MacKinster, J; Schekler, R (2003) Designing System Dualities: Characterizing a Web-Supported Professional Development Community . The Information Society
Design studio	Students will explore different educational on-line communities (ScratchEd , Lego community , Lego engineering , Tapped In , The Inquiry Learning Forum , Quest Atlantis , the Math Forum and CurriKi) And different resources such as Sakai , Moodle

April 14: Design-Based Research

Readings for Class	Barab, S; Squire, K (2004) Design-Based Research: Putting a Stake in the Ground <i>Journal of the Learning Sciences</i> , Vol. 13, No. 1, Pages 1-14 ,
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	<p>NY: Lawrence Erlbaum</p> <p>The Design-based research collective (2003) Design-Based Research: An Emerging Paradigm for Educational Inquiry</p> <p>Bell, P (2004) On the Theoretical Breadth of Design-Based Research in Education <i>Educational Psychologist</i> Vol. 39, No. 4, Pages 243-253 NY: Lawrence Erlbaum</p>
Design Studio	Designing and studying a virtual community for learning robotics

April 21: Games for learning

Readings for Class	<p>Klopfer, E, Osterweil, S & Salen, K (2009) Moving Learning Games Forward . The Education Arcade, MIT</p> <p>Gee, James Paul. (2008) "Learning and Games." <i>The Ecology of Games: Connecting Youth, Games, and Learning</i>. Edited by Katie Salen. The John D. and Catherine T. MacArthur Foundation Series on Digital Media and Learning. Cambridge, MA: The MIT Press, 2008. 21–40.</p> <p>Barab, S; Gresalfi, M; Ingram-Goble, A (2010) Transformational Play: Using Games to Position Person, Content and Context. <i>Educational Researcher</i>, Vol 39, N 7 pp525-536</p>
Design studio	Swinx game
Assignment due	Virtual community proposal presentation

April 28 Final virtual community proposals due. Students should leave a printed copy in Prof. Bers mailbox by noon and should also e-mail them as word documents or PDF's to marina.bers@tufts.edu