

# International Perspectives in the Learning Sciences: Cre8ing a Learning World

PROCEEDINGS of the Eighth International Conference  
for the Learning Sciences – ICLS 2008

## **Volume 3**



# Colofon

Title: International Perspectives in the Learning Sciences: Cre8ing a learning world. Proceedings of the Eighth International Conference for the Learning Sciences – ICLS 2008

Copyright 2008 International Society of the Learning Sciences, Inc.



**International Society of  
the Learning Sciences**

All rights reserved. No part of this book may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without the prior written permission of the International Society of the Learning Sciences.

The International Society of the Learning Sciences is not responsible for the use which might be made of the information contained in this book.

Published by: International Society of the Learning Sciences, Inc.

[www.isls.org](http://www.isls.org)

Printed Proceedings Printed and Distributed by: Lulu

[www.lulu.com](http://www.lulu.com)

ISSN: 1573-4552

## About ISLS

The International Society of the Learning Sciences, incorporated as a non-profit professional society in September, 2002, unites the traditions started by the Journal of the Learning Sciences, the International Conferences of the Learning Sciences (ICLS), and the Computer-Supported Collaborative Learning Conferences (CSCL) and offers publications, conferences, and educational programs to the community of researchers and practitioners who use cognitive, socio-cognitive, and socio-cultural approaches to studying learning in real-world situations and designing environments, software, materials, and other innovations that promote deep and lasting learning.

Researchers in the interdisciplinary field of learning sciences, born during the 1990's, study learning as it happens in real-world situations and how to better facilitate learning in designed environments – in school, online, in the workplace, at home, and in informal environments. Learning sciences research is guided by constructivist, social-constructivist, socio-cognitive, and socio-cultural theories of learning.

The society is governed by a Board of Directors elected by the paid-up membership. Officers of the society include the President (chosen by the Board of Directors), Past-President, President-Elect, an Executive Officer, and a Financial Officer. Much of the work of the society is done by committees whose members are drawn from both the Board and the membership at large.

## About ICLS

The International Conference of the Learning Sciences (ICLS), first held in 1992 and held bi-annually since 1996, hosts keynotes, symposia, workshops, panels, submitted paper sessions, poster sessions, and demos covering timely and important issues and reporting research findings across the entire field of the learning sciences.

Recent conferences have had invited keynotes and sessions centered on timely themes. The 2000 conference theme focused on the complexities inherent in learning and in studying learning; the 2002 conference theme focused on diversity. The 2006 conference focused on making a difference – issues in scaling learning sciences findings for broad dissemination and impact.

Previous ICLS Conferences

- ICLS 2006 – Bloomington, IN, USA
- ICLS 2004 – Santa Monica, CA, USA
- ICLS 2002 – Seattle, WA, USA
- ICLS 2000 – Ann Arbor, MI, USA
- ICLS 1998 – Atlanta, GA, USA
- ICLS 1996 – Evanston, IL, USA
- ICLS 1992 – Evanston, IL, USA

# **Volume 3**

## **Table of contents**

## Posters

### **Open community authoring of worked example problems**

*Turadg Aleahmad, Vincent Aleven, Robert Kraut*

3-3

### **The Organization and Management of Informal and Formal Learning**

*Kimberly Austin, Nichole Pinkard*

3-5

### **Representing history: On structuring history lessons as design**

*Flavio Azevedo, Heather Batchelor*

3-8

### **The Potential of Computer-Supported Collaboration and Knowledge Awareness for Supporting Analogical Problem Solving**

*Antonia Baumeister, Tanja Engelmann, Friedrich Hesse*

3-10

### **The classroom as a complex adaptive system: an agent-based framework to investigate students' emergent collective behaviors**

*Paulo Blikstein, Dor Abrahamson, Uri Wilensky*

3-12

### **A Microgenetic Classroom Study of Learning to Reason Scientifically through Modeling and Argumentation**

*Clark Chinn, Richard Duschl, Ravit Duncan, Luke Buckland, William Pluta*

3-14

### **Self-Assessment and Self-Explanation for Learning Chemistry Using Dynamic Molecular Visualizations**

*Jennifer Chiu, Marcia Linn*

3-16

### **Knowledge convergence in CMC: The impact of convergence-related external representations**

*Jessica Dehler, Daniel Bodemer, Jürgen Buder*

3-18

### **Problem-Solving in History: Strategy Games and Schema**

*Ben DeVane, Shree Durga*

3-20

### **Joint and Individual Knowledge Elaboration in CSCL**

*Ning Ding*

3-23

### **A Metacognitive Strategy for Training Preservice Teachers: Collaborative Diagnosis of Conceptual Understanding in Science**

*Osnat Eldar, Bat-Sheva Eylon, Miky Ronen*

3-25

### **Turn-taking and mode-switching in text-based communication in the classroom**

*Judith Enriquez, Shaaron Ainsworth, Charles Crook, Claire O'Malley, Giulia Gelmini Hornsby, Marie Buda*

3-27

### **Support in self-assessment in Secondary Vocational Education**

*Greet Fastré, Marcel Van der Klink, Jeroen Van Merriënboer, Dominique Sluijsmans*

3-29

3-V

<b>Culturally Relevant Mathematics: Students' Cultural Engagement with Statistics</b> <i>Deborah Fields, Noel Enyedy</i>	3-31
<b>Roles of Parents in Fostering Technological Fluency</b> <i>Karin Forssell, Brigid Barron, Caitlin Kennedy Martin, Lori Takeuchi</i>	3-33
<b>Scaling Technology-Enhanced Science Curriculum: Leadership Development in a Community of Principals</b> <i>Libby Gerard, Jane Bowyer, Marcia Linn</i>	3-35
<b>Online/onsite activity in elementary and secondary classrooms using advanced collaborative technologies</b> <i>Fernand Gervais, Jacques Bordages, Therese Laferriere</i>	3-37
<b>Example from a Framework for Future Learning Environments: Human Factors and Learner Engagement in Collaborative Workspaces with Tablet Computing</b> <i>Eric Hamilton, Andrew Hurford</i>	3-39
<b>How learners share and construct metacognition in social interaction?</b> <i>Tarja-Riitta Hurme, Sanna Järvelä, Kaarina Merenluoto, Pekka Salonen</i>	3-41
<b>Teachers' Beliefs about Knowledge and Learning: A Singapore perspective</b> <i>Michael Jacobson, Hyo Jeong So, Timothy Teo, June Lee, Suneeta Pathak</i>	3-43
<b>Designing an Augmented Reality Game-based Curriculum</b> <i>Mingfong Jan, James Mathews, Christopher Holden, John Martin</i>	3-45
<b>Effects of Representational Guidance during Computer-Supported Collaborative Learning</b> <i>Jeroen Janssen, Gijsbert Erkens, Paul Kirschner, Gellof Kanselaar</i>	3-47
<b>'Current is the one that's mean': The development of an engineering student's trajectory of identification</b> <i>Andrew Jocuns, Reed Stevens</i>	3-49
<b>Analysis of Tablet PC Based Learning Experiences in Engineering Classes</b> <i>Aditya Johri, Vinod Lohani</i>	3-51
<b>A Needs Analysis for Instructional Support in LegSim</b> <i>Mahesh Joshi, Yi-Chia Wang, John Wilkerson, Carolyn Rose</i>	3-53
<b>Self-directed learning in pre-vocational secondary education: An analysis of difficulties and success factors in workplace simulations</b> <i>Helen Jossberger, Saskia Brand - Gruwel, Henny P. A. Boshuizen, Margje Van de Wiel</i>	3-55
<b>Common Ground Can be Efficiently Achieved by Capturing a Screenshot in Handheld-Based Learning Activity</b> <i>Kibum Kim, Deborah Tatar, Steve Harrison</i>	3-57
<b>StarLogo TNG – Science in Student-Programmed Simulations</b> <i>Eric Klopfer, Hal Scheintaub</i>	3-59

<b>The Effects of Expertise and an Eye Movement Cue on Self-Generated Self-Assessment Criteria</b> <i>Danny Kostons, Tamara Van Gog, Fred Paas</i>	3-61
<b>Acquiring Mastery</b> <i>Brian Krisler, Richard Alterman</i>	3-63
<b>Student teachers' discursive voices of the meaning of digital case material for their professional learning</b> <i>Kristiina Kumpulainen, Auli Toom, Merja Saalasti, Mari Puroila</i>	3-65
<b>Visitor Movement as Implicit Human-Computer Interactions in Museums</b> <i>Fusako Kusunoki, Shigenori Inagaki, Hiroshi Mizoguchi</i>	3-67
<b>Two distinct ways of attending to the substance of students' ideas</b> <i>Matty Lau, Andy Elby</i>	3-70
<b>Do Higher Levels of Arousal Predict Better Learning? An Investigation of Learning and Physiological Responses</b> <i>Tiffany Lee, Joan M. Davis, Nancy Vye, John D. Bransford</i>	3-72
<b>Undergraduate Cognitive Psychology Students Evaluations of Scientific Arguments in a Contrasting-Essays Assignment</b> <i>Jordan Lippman, Frances Amurao, James Pellegrino, Trina Kershaw</i>	3-75
<b>A Comparative Discourse Analysis of Online and Offline Knowledge Building Activities</b> <i>Hans Lossman, Hyo Jeong So</i>	3-77
<b>Challenges of and Resources for Reform-based Science Teacher Learning: A Case Study of a Preservice Science Teacher</b> <i>April Luehmann, Liz Tinelli</i>	3-79
<b>Digital Media Designs with Scratch: What Urban Youth Can Learn about Programming in a Computer Clubhouse</b> <i>John Maloney, Resnick Mitchel, Rusk Natalie, Kylie Pepler, Yasmin Kafai</i>	3-81
<b>Cross-cultural online collaboration: Challenges and strategies</b> <i>Larissa Malopinsky, Gihan Osman</i>	3-83
<b>Understanding Student Comics: Using Comic Books as a Data Collection Tool to Investigate Learning on Field Trips</b> <i>Sandra Martell</i>	3-85
<b>An aesthetic for adaptations: Going beyond knowledge and skills in explanations of adaptations</b> <i>Lee Martin</i>	3-87
<b>Sick at South Shore Beach: A Place-Based Augmented Reality Game as a Framework for Building Evidence-Based Arguments</b> <i>James Mathews, Christopher Holden, Mingfong Jan, John Martin</i>	3-VII

	3-89
<b>What kind of difficulties may teachers encounter, in the process of constituting a virtual learning community?</b> <i>Anastasios Matos, Vassileios Kollias, Athanassios Davaris</i>	3-91
<b>Entertaining Evolution: Understanding Science from Animations</b> <i>Camillia Matuk, David Uttal</i>	3-93
<b>Why are Online Games So Compelling and What Can We Learn from Them to Improve Educational Media?</b> <i>Susan Maunders, Hilda Borko</i>	3-95
<b>Understanding Professional Vision in Inquiry Science Teaching</b> <i>Scott McDonald</i>	3-98
<b>Bridging Principles and Examples through Analogy and Explanation</b> <i>Timothy Nokes, Kurt VanLehn</i>	3-100
<b>Global Text Processing in CSCL with Learning Protocols: A Coding Scheme for Eye Movement Analyses</b> <i>Michael Oehl, Hans-Rüdiger Pfister, Anja Gilge</i>	3-103
<b>Questioning Teacher Goals in Professional Development: Do Goals Really Make a Difference?</b> <i>Chandra Orrill, Sandra Geisler, Rachael Brown, Victor Brunaud-Vega</i>	3-105
<b>Change in students' internal scripts for knowledge building: A challenge to capture epistemic agency</b> <i>Jun Oshima, Ritsuko Oshima</i>	3-107
<b>Identifying Threshold Concepts in Learning Nanoscience by Using Concept Maps and Students' Responses to an Open-ended Interview</b> <i>Eun Jung Park, Gregory Light, Thomas Mason</i>	3-109
<b>Models of Expertise in Process- and Content-Dominated Areas of Bioengineering</b> <i>Anthony Petrosino, Vanessa Svihla, Manu Kapur</i>	3-111
<b>Digital Youth Network: Fusing School and After-School Contexts to Develop Youth's New Media Literacies</b> <i>Nichole Pinkard, Brigid Barron, Caitlin Kennedy Martin</i>	3-113
<b>Sociocognitive Apprenticeship: Mediating Practices and Identities</b> <i>Joe Polman, Diane Miller</i>	3-115
<b>Measuring Mathematics Discourse in Technology-Supported Collaborative Activities</b> <i>Ken Rafanan, Jeremy Roschelle, Ruchi Bhanot, Torie Gorges, William Penuel</i>	3-117
<b>Worked Examples and Tutored Problem Solving: Redundant or Synergistic Forms of Support?</b> <i>Ron Salden, Vincent Aleven, Rolf Schwonke, Alexander Renkl</i>	
3-VIII	



	3-119
<b>Game Practices and Educational Design: Applying an Ethnographic Analysis of Game Play to an Educational Design Problem</b> <i>Thomas Satwicz</i>	
	3-121
<b>On Learning Electricity With Multi-Agent Based Computational Models (NIELS)</b> <i>Pratim Sengupta, Uri Wilensky</i>	
	3-123
<b>SPACE: Online Tools for Supporting Formative Instruction</b> <i>R. Benjamin Shapiro, Louis Gomez, Denise Nacu</i>	
	3-125
<b>Cybertext redux: Using interactive fiction to teach German vocabulary, reading and culture</b> <i>Brett Shelton, David Neville, Brian McInnis</i>	
	3-128
<b>Shared Inter-generational Collaborative Problem Solving Play Spaces</b> <i>Sinem Siyahhan, Sasha Barab, Micheal Downton</i>	
	3-130
<b>Matching Model Representation to Task Demands</b> <i>Bert Slof, Gijsbert Erkens, Paul Kirschner</i>	
	3-132
<b>Mindful of Process: Scaffolds for Collaboration Discourse in Design Education</b> <i>Daniel Steinbock</i>	
	3-134
<b>Distributed Cognition and Interactions in the Context of Bioengineering Design</b> <i>Vanessa Svihla, Anthony Petrosino, Kenneth Diller</i>	
	3-136
<b>The ZooLib Tuplebase: An Open-Source, Scalable Database Architecture for Learning Sciences Research</b> <i>Chris Teplov, Andrew Green, Marlene Scardamalia</i>	
	3-138
<b>What is learned from computer modeling? Modeling modeling knowledge in an experimental study</b> <i>Sylvia P. Van Borkulo, Wouter R. Van Joolingen, Elwin R. Savelsbergh</i>	
	3-140
<b>The role of compression and refinement in visualization tools for crime analysts</b> <i>Susan van den Braak, Herre Van Oostendorp, Gerard Vreeswijk, H Prakken</i>	
	3-143
<b>From dialogic to trialogic learning</b> <i>Jakko Van der Pol</i>	
	3-145
<b>Teacher Strategies for fostering collaborative historical reasoning in whole-class discussions</b> <i>Jannet Van Drie, Carla Van Boxtel</i>	
	3-147
<b>An Exploratory Study on Promoting Students' Critical Thinking by Using Weblogs</b> <i>Qiyun Wang, Huaylit Woo</i>	
	3-149
<b>Perceptual Supports for Sensemaking: A Case Study Using Multi Agent Based Computational Learning Environments</b>	
	3-IX

# Media Designs with Scratch: What Urban Youth Can Learn about Programming in a Computer Clubhouse

John Maloney, Mitchel Resnick, Natalie Rusk, MIT Media Laboratory,  
77 Massachusetts Ave. E15-020, Cambridge, MA 02139, USA

Email: jmaloney@media.mit.edu, mres@media.mit.edu, nrusk@media.mit.edu

Kylie A. Peppler, Indiana University, 201 N Rose Ave, Wright 4024,  
Bloomington, IN 47405, USA, kpeppler@indiana.edu

Yasmin B. Kafai, UCLA Graduate School of Education and Information Studies, 2128 Moore Hall,  
Box 951521, Los Angeles, California 90095-6293, USA, kafai@gseis.ucla.edu

**Abstract:** We report on the programming learning experiences of urban youth ages 8-18 at a Computer Clubhouse located in South Central Los Angeles. Our analyses of the 536 Scratch projects, collected during a two-year period, documents the learning of key programming concepts in the absence of instructional interventions or experienced mentors. We discuss the motivations of urban youth who choose to program in Scratch and the implications for introducing programming at after school settings in underserved communities.

Numerous approaches to broadening participation in computing have been discussed in K-12 and college education, such as mentoring, revised curricula, tool development outreach programs, and programming courses for non-majors (Margolis & Fisher, 2003). A surprisingly neglected area of research is the learning of programming in community technology centers. In these venues, the learning of programming is more casual and takes place at the discretion of the learner rather than part of a formal curriculum. Such out-of-school activities also present opportunities for youth to succeed who may not flourish in traditional school environments. As a case in point, we focus on the use of Scratch (see Figure 1 or [www.scratch.mit.edu](http://www.scratch.mit.edu)), a block-based programming language designed to facilitate media manipulation for novice programmers (Resnick, Kafai, & Maeda, 2003), at a Computer Clubhouse—an urban community technology center (Resnick, Rusk, & Cooke, 1998). Scratch is not the first programming environment aimed at novice programmers (for an extensive overview, see Kelleher & Pausch, 2005). It follows the Logo tradition (Papert, 1980) but emphasizes media manipulation and supports youths' interests, such as creating animated stories, games, and interactive presentations. The Scratch vocabulary of roughly 90 commands includes commands for relative motion like the Logo turtle, image transformations, cell animation, recorded-sound playback, musical note and drum sounds, and a programmable pen, in addition to standard control structures, global and local variables, and simple Boolean operations.

During a period of two years, we collected youths' Scratch projects, which included animations, digital art, and games, on a weekly basis in order to track which programming concepts were taking root in the Clubhouse culture over time. As information sources for this study, we exported project summary files, which contained text-based information such as the date, file name, and author of the project as well as information about the number and types of commands that were used and the total number of stacks, sounds, and costumes used in the project. During the study, mentors were regularly at the site. The mentors had little or no experience programming and were new to Scratch (Kafai, Desai, Peppler, Chiu, & Moya, 2008).

## Findings

We collected 536 Scratch projects, which constituted 34% of all the projects created at the Computer Clubhouse during the course of this study. Scratch was more heavily used than any other media-creation tool, including Microsoft Word, which was the next most widely adopted software ( $n = 461$  files). These findings demonstrate that Scratch became a successful part of the local culture. It's also one of the few programming initiatives that successfully engaged equal numbers of boys and girls – all of them youth of color. Of the 536 Scratch projects, 111 of them contained no scripts at all. These “pre-scripting” projects illustrate the use of Scratch simply as a media manipulation and composition tool. Of the remaining 425 projects, all of them make use of sequential execution (i.e., a stack with more than one block) and most (374 projects, 88%) also show the use of threads (i.e. multiple scripts running in parallel). These are core programming concepts that confront every Scratch user when they begin scripting. In addition, we examined a number of other programming concepts: user interaction, such as use of keyboard or mouse, was used in 228 projects (53.6%), loops in 220 (51.8%), conditional statements in 111 (26.1%), communication and synchronization in 105 (24.7%), boolean logic in 46 (10.8%), variables in 41 (9.6%), and random numbers (4.7%). Unlike sequential execution, the aforementioned concepts are not needed in every project and were therefore used less frequently.

We also examined programming trends over time. When we compared the percentage of projects containing the various programming concepts over time, we found that five out of the seven concepts that we targeted for our analyses demonstrated significant gains ( $p < .05$ ) during the second school year. Among these

were the less obvious concepts of variables, Boolean logic, and random numbers. Chi-Square tests were used to analyze differences in the percentages of projects containing targeted programming concepts from Year 1 to Year 2 (see Figure 2). Overall, four of the seven programming concepts (Loops, Boolean Logic, Variables, and Random Numbers) demonstrated significant gains in the number of projects utilizing the targeted concepts ( $p < .001$ ). One of the remaining concepts (Conditional Statements) had marginal gains ( $p = .051$ ) and one concept (Communication/Synchronization) demonstrated a reduction in the projects utilizing this concept.



Figure 1. Screenshot of the Scratch User Interface

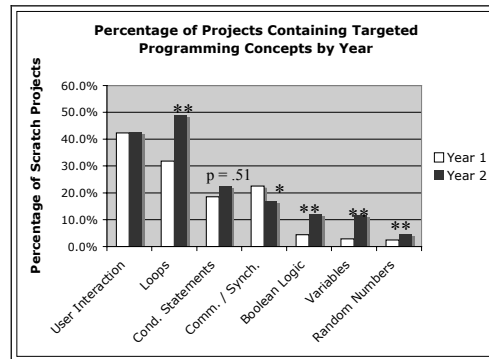


Figure 2. Graph demonstrating the change in the percentage of projects that used various programming concepts over time  
 $**p < .001$   $*p < .05$

## Discussion

Our findings illustrate youths' sustained participation in programming activities. Clubhouse youth utilized commands demonstrating the concepts of user interaction, loops, conditionals, variables, Boolean logic, random numbers, and communication & synchronization. These findings are remarkable given the lack of formal instruction and the mentors' lack of prior programming experience. A more pressing question is: why did Clubhouse youth choose to get involved in Scratch programming given that they had many other software options? The best answer might have been provided by Kelleher and Pausch (2005) who noted how systems can make programming more accessible for novices "by simplifying the mechanics of programming, by providing support for learners, and by providing students with motivation to learn to program" (p. 131). We think that Scratch addresses all three of these areas. The design of the Scratch blocks simplifies the mechanics of programming by eliminating syntax errors. The social infrastructure of the Computer Clubhouse is also important in providing support for novice programmers. Finally, the multimedia aspect of Scratch facilitated urban youth's participation in programming. The project archive provided evidence that youth interest in technology starts with digital media and serves as a promising pathway into programming. The broad spectrum of media designs – from video games to music videos and greeting cards – is a true indicator of youth's interest in not only consuming digital media but in becoming creators themselves, a role often denied to urban youth.

## References

- Margolis, J. & Fisher, A. (2003). *Unlocking the Clubhouse: Women in Computing*. Cambridge, MA: MIT Press.
- Kafai, Y. B., Desai, S., Peppler, K., Chiu, G. & Moya, J. (2008). Mentoring Partnerships in a Community Technology Center: A Constructionist Approach for Fostering Equitable Service Learning. *Mentoring & Tutoring, 16*(2), 191-204.
- Kelleher, C. & Pausch, R. (2005). Lowering the barriers to programming: a taxonomy of programming environments and languages for novice programmers. *ACM Computing Surveys, 37*(2), 88-137.
- Papert, S (1980). *Mindstorms*. New York: Basic Books.
- Resnick, M., Kafai, Y. B., & Maeda, J. (2003). ITR: A Networked, Media-Rich Programming Environment to Enhance Technological Fluency at After-School Centers. Proposal [funded] to the National Science Foundation, Washington, DC.
- Resnick, M., Rusk, N., & Cooke, S. (1998). Computer Clubhouse: Technological fluency in the inner city. In D. Schon, B. Sanyal and W. Mitchell (Eds.), *High technology and low-income communities*. Cambridge, MA: MIT Press.
- Papert, S. (1980). *Mindstorms*. New York: Basic Books.

## Acknowledgments

This work was supported by a grant from the National Science Foundation (NSF-0325828) to Mitchel Resnick and Yasmin Kafai and by a dissertation fellowship from the Spencer Foundation to Kylie Peppler. The views expressed are those of the authors and do not represent the views of the supporting funding agencies or universities. We wish to thank Zrinka Bilusic for her preparation and initial analysis of the Scratch archive.

# Cross-cultural online collaboration: Challenges and strategies

Larissa V. Malopinsky, Gihan Osman, Indiana University, P.O. Box 5877, Bloomington, IN 47407-5877 USA  
Email: lmalopin@indiana.edu, gosman@indiana.edu

**Abstract:** In this presentation, we share the experience of a partnership project between two teams representing Azerbaijani and American higher education institutions. The researchers (a) examine the challenges of collaborative work in the context of cultural differences related to applying learner-centered pedagogy, sustaining collaboration and managing learning process, and (b) introduce the strategies developed for addressing those challenges. This study seeks to advance educators' understanding of the critical aspects of cross-cultural collaboration in online learning environments.

## Introduction

Teaching and learning processes are seen as grounded in the unique social practice of the cultures involved. Epistemological dissonance can make it challenging for representatives of different cultures to establish effective communication and collaboration (Kanu, 2005). These challenges are often compounded when a partnership project takes place online. The three-year partnership project between Indiana University and the Azerbaijan Research and Education Network Association had two goals: developing online teaching capabilities in Azerbaijani universities and implementing learner-centered pedagogical concepts. The project was focused on offering an online certification program for a group of Azerbaijani faculty and staff who would lead the distance education (DE) implementation effort in the country. Since gaining independence from the Soviet Union in 1991, Azerbaijan, has been seeking to reform and westernize its educational system (Bagirov, 2001). Although in its infancy, DE in Azerbaijan is viewed as the strategy for overcoming a rapid decline of participation in education and training due to increased societal difficulties (ANHD Report, 2003).

## Research Project

Early project experience revealed the differences in the approaches to learning and collaborative work between the U.S. and Azerbaijani teams and suggested a systematic study of the challenges experienced by the partner teams from the cross-cultural perspective. A greater understanding of the role of cultural attributes in educational contexts can provide guidance for researchers and practitioners involved in international educational projects in terms of the design and implementation of instructional interventions. The following research questions guided the study: (a) What are the challenges experienced by the project partners in the process of collaborative design of learner-centered instruction for online delivery? (b) What cultural differences are relevant to understanding those challenges? (c) What strategies can be used to respond to those challenges to ensure successful implementation of the project goals?

The challenges were analyzed from epistemological, social interaction and learning management perspectives applying Hofstede's (2001) and Trompenaars and Hampden-Turner's (1997) frameworks of cultural dimensions: high vs. low power distance, individualism vs. collectivism, masculinity vs. femininity, high vs. low uncertainty avoidance, achievement vs. ascription, universalism vs. particularism, external vs. internal control and specific vs. diffuse orientation. The cross-cultural researchers find that these dimensions have an impact on learning situations (Chapman *et al.*, 2005; Paulus *et al.*, 2005). Language proficiency and difficulties using online technologies were also considered in our analysis as non-culture aspects affecting collaboration. The study utilized a case study approach (Stake, 1995) and used mixed methods of data collection and analysis (Creswell, 2003). Study participants were four Azerbaijani faculty members who were students in the certification program and three U.S. facilitators (one senior faculty member and two advanced graduate students). The research project was led by the U.S. team. Several types of data were collected: (a) background survey (epistemological beliefs (Schommer, 1990), demographics, DE implementation strategies); (b) pre- and post-chat student surveys focused on individual work efforts, challenges, and learning needs; (c) pre- and post-chat facilitator surveys focused on assessment of students' design work, learning needs and strategies for upcoming chat sessions; (d) transcripts of 1.5 hour weekly chats focused on pedagogical and instructional design issues; and (e) semi-structured interviews with students focused on project experience and expectations for learning transfer. Data was collected during 12 weeks. Epistemological questionnaires were analyzed quantitatively. Qualitative data was independently coded by two researchers to identify emergent themes. These were subsequently modified upon reaching 96% agreement resulting in three categories and six sub-categories that reflected major challenge areas: (a) adopting a learner-centered pedagogy (concept of learning process, teacher-student roles); (b) communication and collaboration (teamwork and peer feedback, collaboration with a foreign partner team); and (c) managing learning process (independent work, time management). Every item was discussed from the cultural dimensions perspective and alternative causes were explored.

## Findings

The Azerbaijani team demonstrated strong dependence on the U.S. facilitators as providers of “right” information and step-by-step guidance, which was characteristic of the beliefs grounded in high power distance, external control and high uncertainty avoidance. These findings were consistent with reluctance of the Azerbaijani students to reflect on facilitators’ performance and their frequent concerns with ill-structured learning tasks. The greatest difficulties in collaboration for the Azerbaijani students came in developing an instructional product as a team and having to critique each other’s ideas. While the students expressed strong competitiveness and preference for individual projects, they often hesitated to critique peers’ performance, regarding such feedback as a breach of peer-loyalty or disrespect to varying levels of expertise and positions in the team. The students’ explanations could be linked to a high-context, particularistic and ascriptive cultural tradition, where tasks are inseparable from personal relationships and individuals hesitate criticizing a friend, a senior person or a higher-ranking colleague. Azerbaijani and U.S. teams had different expectations regarding the amount of support required for students for organizing their learning process. The students’ comments indicated frequent confusion with guidance to set their own learning goals and establish a process for accomplishing them. Student expectations grounded largely in earlier experiences in didactic education were consistent with uncertainty-avoiding cultures where people feel uncomfortable in new learning situations and prefer direct guidance. Time management was another area where the teams’ approaches differed. An analysis of chat sessions revealed that socializing took approximately 30% of a chat session (Osman & Herring, 2007). While the U.S. facilitators expressed concerns with overly lengthy socializing periods, the Azerbaijani students felt that facilitators were too task-focused. This difference in managing the time planned for the task-related activity presents communicational difficulties between low-context (specific) and high-context (diffuse) cultures that can put a strain on cross-cultural collaborative work and lead to interpersonal conflicts.

In order to help students develop more learner-centered approach to designing instruction, facilitators presented materials in multiple ways, modeled the constructivist approach and encouraged self critique. Several strategies, such as using real life examples and real-life metaphors, encouraging peer facilitation, peer critique and self-reflection were implemented to both provide structured support and challenge the students to develop independent learning skills. Both teams continuously worked on implementing strategies for managing learning processes more effectively while addressing the needs for social interaction: providing forums and setting specific time for discussing personal matters during online learning sessions and developing structured agendas for face-to-face and online meetings. Although the differences between the teams challenged collaborative work in a number of ways, they provided useful insights into the importance of considering the values and beliefs of people working on cross-cultural educational projects. Awareness of the differences led both teams to discuss the feasibility of applying new pedagogical approaches in the Azerbaijani context and helped the U.S. participants consider the implications of cultural differences in the design and facilitation of cross-cultural instruction.

## References

- ANHD Report, 2003. Available at: [http://www.un-az.org/undp/nhdr2003/content\\_eng.html](http://www.un-az.org/undp/nhdr2003/content_eng.html).
- Bagirov, H. (2001). The birth of Western University. *Azerbaijan International*, 9(4), 38-78.
- Chapman, D.W., Weidman, J., Cohen, M., & Mercer, M. (2005). The search for quality: A five country study of national strategies to improve educational quality in Central Asia. *International Journal of Educational Development*, 25, 514-530.
- Creswell, J. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage.
- Hofstede, G. (2001). *Culture’s consequences: Comparing values, behaviors, institutions, and organizations across nations*. London: Sage.
- Trompenaars, F. & Hampden-Turner, C. (1997). *Riding the waves of culture. Understanding cultural diversity in global business*. New York, NY: McGraw-Hill.
- Kanu, Y. (2005). Tensions and dilemmas of cross-cultural transfer of knowledge: post-structural/postcolonial reflections on an innovative teacher education in Pakistan. *International Journal of Educational Development*, 25, 493-513.
- Osman, G., & Herring, S.C. (2007). Interaction, facilitation, and deep learning in cross-cultural chat: A case study. *The Internet and Higher Education*, 10, 125-141.
- Paulus, T.M., Bichelmeyer, B., Malopinsky, L., Pereira, M., & Rastogi, P. (2005). Power distance and group dynamics of an international project team: A case study. *Teaching in Higher Education*, 10(1), 43-55.
- Schommer, M. (1990). Effects of beliefs about the nature of knowledge on comprehension. *Journal of Educational Psychology*, 82, 498-504.
- Stake, R. (1995). *The art of case research*. Thousand Oaks, CA: Sage Publications.