

OASIS: An Online Professional Learning Community for Inquiry-based Teaching

Robbin Chapman, Shaundra Daily, G8four, LLC, 1116 20th Street South #421, Birmingham, AL 35205
Email: robbin.chapman@g8four.com, shaundra.daily@g8four.com

Abstract: OASIS is an online professional learning community to support teachers in learning to facilitate technology-infused, inquiry-based lessons. OASIS enables capturing and sharing of inquiry-based teaching and pedagogical insights through activity modules and teacher community networking. We conducted focus groups and interviews to probe system usability, efficacy of technology implementation, and teacher understanding of inquiry-based teaching methodology. Teachers cited standards alignment, videos with teacher perspectives, inquiry-based activity modules, and community networking as features teachers they intended to use.

Introduction

Inquiry-based curriculum has been shown to develop independent and critical thinking skills, positive attitudes and curiosity toward science (Wilson, et al., 2010). There is a national push toward inquiry-based teaching in schools and high density computing (4:1 down to 1:1 ratio of students to computers) in the classroom. An opportunity exists to utilize these computers for inquiry-based learning, however; teachers need training in how to deliver inquiry-based teaching in these new, complex classroom environments.

Overview

OASIS (Online Application to Support Inquiry-based Science) is a professional learning community intended to support teacher delivery of technology-infused, inquiry-based lessons that *align* with curriculum standards. Some teacher products have focused primarily on developing an online community but without the resources to support teacher understanding of *how* to deliver inquiry-based lessons. OASIS provides media-rich resources and enables dissemination of teacher learning by supporting them sharing their learning experiences and pedagogical insights. OASIS framework has three core components: professional development, inquiry-based activity modules, and teacher community networking. Teachers attend professional development workshops on inquiry-based pedagogical methods. Back in the classroom, OASIS provides support for class preparation, lesson delivery, and interactions with other teachers. Inquiry-based activity modules contain: activity overview, required time and appropriate class grade level, educational standards, teacher preparation information, links to teacher guides and student worksheets, links to related activities, questions for class discussion, comments viewable by other teachers, video(s) of a teacher engaging in the activity with students then reflecting on the experience, and subscriber capability for notification of module updates. The teacher community networking component of OASIS provides social-networking functionality with discussion forums and commenting capability. Teachers may identify others who are teaching particular classes or have similar teaching interests, share teaching insights and strategies, and connect across a broader teacher community in ways they could not without the OASIS technology.

Methodology and Experimental Design

Study aims were to understand how OASIS contributes to: improved teacher understanding of inquiry-based pedagogical strategies, bolstered teacher self-efficacy with inquiry-based lesson delivery, and peer mentoring amongst teachers. Research questions included: do OASIS system features meet the needs of teachers providing inquiry-based science curriculum, and how might OASIS enhance teacher efficacy in using inquiry-based teaching strategies? We employed a participatory design framework focused on developing approaches to reconciling teacher learning and performance disconnects while iterating OASIS design refinement.

The research site was the Junos Elementary School in Birmingham, Alabama. School demographics: 800 students, 97% African American, 2% Hispanic, 1% Caucasian, and a teacher student ratio ranging between 1:24 to 1:30. Study participants were 5th grade teachers consisting of 3 Caucasian females, 1 Caucasian male, 2 African-American males, and 6 African-American females. We conducted observations of inquiry activities before OASIS introduction, and again after OASIS introduction.

We interviewed teachers about the design of OASIS. Then they received an overview of the purpose of the software, a list of the features not included in the early prototype, and a task list that stepped them through the use of the system. They answered questions about the design and usability of OASIS, their desire to use the system, and recommendations for system feature changes or additions. Then teachers participated in professional development workshops to learn how to facilitate each of the six 5E inquiry-based activities. Prior to implementing the activity in their classrooms, they will utilize OASIS discussion forums, community networking, and activity modules to further enrich their pedagogical understanding inquiry-based lesson

delivery. They then utilize the commenting feature to suggest changes to improve lesson delivery. Subsequent surveys and interviews about these simulated OASIS experiences enable us to converge on a more robust and relevant system design.

Analysis

Our independent variable is teacher use of inquiry-based strategies. The Reformed Teaching Practice Observation classroom observation protocol is used to measure the degree of change in delivery of science instruction. Our dependent variable is student engagement. We measure student engagement using adapted measures from the Goal Orientation and Learning Strategies Survey, along three dimensions of student engagement: 1) mastery, 2) performance, and 3) work avoidance. Interview protocols include the Science Teaching Efficacy Belief Instrument and Technology Acceptance Model. Semi-structured interviews follow non-OASIS and OASIS classroom experiences. Questions relate to teacher efficacy of technology implementation and science teaching, and teacher understanding of inquiry-based teaching methodology, and system usability. Students will take a 15-minute unit test using questions from the National Assessment of Education Progress and Alabama Science Assessment.

Results

For the design questions, teachers used a rating scale of “4 = Very Often” to “1 = Never” to indicate their intentions to utilize particular OASIS features. Teachers pinpointed standards alignment ($m = 3.5$, $s = 0.90$) and teacher videos with teacher perspectives ($m = 3.5$, $s = 0.52$) as features they were most interested in utilizing. The activity modules ($m = 3.41$, $s = 0.67$) and commenting ($m = 3$, $s = 0.62$) were features teachers cited they would use “often” to “very often.” The teacher community networking ($m = 2.5$, $s = 0.79$), discussion forums ($m = 2.58$, $s = 0.99$), and online courses ($m = 2.41$, $s = 0.90$) were features teachers said they would use “occasionally” to “often.” On a seven-point Likert scale from “1 = strongly disagree” to “7 = strongly agree,” teachers indicated OASIS is easy to use ($m = 5.83$, $s = 0.93$) and user friendly ($m = 5.83$, $s = 0.93$).

Discussion

OASIS was evaluated for usability and design potential in transforming pedagogy for teaching technology-rich, inquiry-based lessons. Themes emerged regarding the videos that teachers viewed and rated for usability. Regarding the activity module videos, all teachers agreed: they were pleased to be able to observe the use of sensors in the teaching lesson, it was important that they could see an implementation of an inquiry-based lesson, it was critical to observe those lessons and students’ reactions to the lesson delivery, and video incorporating 5E activities was more engaging than those without. Participatory design is critical to developing an OASIS product with broad appeal across a diverse array of teachers. We will use social network analysis to examine and describe the diffusion of the OASIS along three dimensions: diffusion of innovation, diffusion of data or content, and emergent user behavior.

Conclusion

Learning opportunities emerge when people engage each other to find solutions to specific goals. With OASIS, we give teachers opportunities to learn from the system content and each other. OASIS empowers teachers to do something they could not before our technology was available; map their training to how they teach. OASIS aids internalization of inquiry-based learning skills and connects teachers to their community of colleagues. As this project continues, we hope to see an emergent teacher community of practice of exchanging teaching strategies, uploading video and other content to the activity modules, and reflecting of teaching experiences.

References

Wilson, C., Taylor, J., Kowalski, S., & Carlson, J. (2010) The relative effects and equity of inquiry-based and commonplace science teaching on students’ knowledge, reasoning, and argumentation. *Journal of Research in Science Teaching*, 47(3), 276-301.

Acknowledgements

This research is supported by U.S. Department of Education Contract #ED-IES-09-C-0014 0014.