Instructional Decisions and Strategies of Math and Science Teacher Educators in Synchronous Online Teaching Environment

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The educational milieu in the United States has recently prioritized the much needed focus on STEM (Science, Technology, Engineering, Math) based education to encourage students to pursue STEM related careers in college if they master these subjects in school. This initiative has shed light on teacher preparation programs to engage and motivate more and more students in STEM related subjects (Lee, Chauvot, Plankis, Vowell & Culpepper, 2011). The graduate program under study, drawing from the STEM initiative, is focused on developing a research based online instructional model for teaching teachers how to teach integrated math and science to middle school students across the state of Texas. The two unique components of the program are (1) subject integration (math and science), and (2) synchronous online learning environment. The program is a 2-years online master’s degree for middle school math and science teachers entirely funded by a non-profit foundation and completely online to accommodate the diverse locations of the enrolled teachers. This presentation will focus on the second component of the program, namely synchronous online teaching and learning environment.

The instructional model of the program derives from Vygotsky’s and Piaget’s social constructivist and student-centered learning theories as a foundation for development of instructional pedagogies that foster knowledge construction through inquiry and collaboration. The emphasis is on social interaction in learning and formation of meaningful understandings of concepts through collaborative participation in course related activities, not just on part of the students but also the instructors. Consequently the student-centered and collaborative learning
tenets inform the choice of online learning activities and experiences for the program instructors. The need for collaborative knowledge construction informed the instructors’ decision to teach courses using mostly synchronous online environment with a small component of asynchronous discussion forums. All the online instructors believe in teaching that involves constructing knowledge together interactions and immediate responses between students and instructors. Therefore they thought of teaching online using a synchronous environment (Wimba Classroom and Blackboard Learn) as a viable option that would fulfill their own teaching beliefs as well requirement for a graduate level online program. In addition various technological tools and Web 2.0 resources are used to create an engaging teaching-learning environment. Thus the purpose of this presentation is showcase key strategies, course design and delivery decisions and challenges as experienced by four online instructors teaching in a synchronous online environment.