Web 2.0 Tools in a "Flipped" Classroom: Meeting the Needs of Diverse Learners

Discoveries in cognitive neuroscience over the past three decades cause us to question seriously many traditional practices (e.g., teacher-centered, discrete, paper and pencil approaches to teaching content). Scientists and educators now know that the connectivity between learners and the context within which they work and play is critical (Caine & Caine, 1997; LeDoux, 1996; Ochsner & Phelps, 2007; Tokuhama-Espinosa, 2010). Further, a broader and more meaningful context stimulates academic achievement and fosters social and emotional skills. Developmentally appropriate technology, such as Web 2.0 tools, serves to connect students to the world and to the content being taught.

Collectively, we have taught for more than sixty years in a variety of settings (i.e., homogeneous classrooms, inclusive classrooms, open classrooms, and on the college level). We have taught many children, all beautiful in their own special ways, each arriving from different contexts, with different talents and needs, and each with different potentials for success. Some years ago, we found ourselves among the increasing numbers of educators around the world who are embracing the idea of a digital classroom, one purpose of which is to broaden and enrich the learning context (Chatel, 2005; Dede, 2012; Hughes & Ooms, 2004).

One model, the Flipped Classroom, (Bergmann & Sams, 2007) teaches students to take responsibility for their "*to do*" assignments in the various content areas via technology. The in-class activities of Web 2.0 tools stimulate meaningful interaction between students and their instructor and students and their peers.

The flipped classroom is a learning model that encourages scaffolding by reversing the typical lecture-then-homework paradigm. Rather, students do homework in preparation for a lesson. A key feature of the Flipped Learning Model (FCM) is the opportunity to maximize student-learning opportunities in the classroom by deliberately shifting direct instruction to outside of the group learning space. The emphasis on maximizing one-on-one interactions turns the focus to student-centered instruction that more actively involves students in the learning process. These approaches are commonly said to involve "active learning," defined as "the process of having students engage in some activity that forces them to reflect upon ideas and how they are using those ideas" (Michael, 2006; Kim, 2012). The evidence for the instructional use of technology in classroom teaching abounds and comes from multiple sources. (Oblinger & Oblinger, 2005; Allen, Seaman, & Garrett, 2007; Musallam, 2011; Gojak, 2012).

Our own experience has taught us that with careful planning, there are many excellent Web 2.0 tools available that can be utilized in face-to-face classrooms, in hybrid (partially online) courses and in 100% online courses. Careful planning also means consideration of the instructor's comfort level and thoughtful selection of complementary software. The idea of a "flipped" classroom reflects these ideas. Bergmann and Sams (2007) put the concepts together for the "flipped" classroom "that started with a simple observation: students need their teachers present to answer questions or to provide help if

they get stuck on an assignment; they don't need their teachers present to listen to a lecture [which can be recorded] or to review content" (pp. 4, 5).

The "flipped" classroom approach has been presented to organizations around the world including The International Society for Technology in Education (ISTE), the trusted source for professional development, knowledge generation, advocacy and leadership for innovation. Schools across our country are trying it, finding it especially helpful for children who need more personal assistance in the classroom. Even those children with limited technology at home can use DVDs on old devices, and there can be extended after-school computer lab hours.

Currently, in the College of Education at our university, the "flipped" classroom approach is being used with success. For example, in a language development and phonics hybrid course students work on line and in class via e-Collaborate (web conferencing), PowerPoint, Video Clips, and our campus Learning Management System (Desire2Learn). The assignments are given to students to complete on their own, followed by questions and reflections that must be posted in a Discussion Forum. In class, the professor and students work together to demonstrate and simulate the teaching and learning of reading, spelling and writing using letter/sound correspondences. The purpose here is to offer direct instruction and individual assistance if needed. Teachers who have adopted the flipped classroom repeatedly reported the effectiveness of this model in terms of increased engagement, improved student interaction, and the flexible use of class time, with positive effects reported on both high and low achievers. It has especially been found that FCM significantly ameliorated the academic achievement of students who frequently missed end-of-day classes to travel to other schools for competitions, games or other events. In addition, researchers saw the benefits of FCM for students who were behind and needed more individual attention.

When integrating technology into curriculum, it is critical to consider developmentally appropriateness of instruction to meet the needs of diverse learners. Developmentally appropriate technology, such as Web 2.0 tools, stimulates and enriches a child's cognitive, linguistic, socio-emotional, and psychomotor development in a nurturing and democratic environment (NAEYC, 2009; Noddings, 1992, 1995; Kim, 2014). The focus is on choice (Piaget, 2001), dialogue (Vygotsky, 1987), authenticity, responsibility toward oneself and others, and reflection. For example, *Animoto*, offers children the freedom to choose meaningful activities (e.g., developing, producing, then sharing slides or videos) which stimulate creativity, critical thinking, and reflection (Copple & Bredecamp, 2009; Dewey, 1901, 1902, 1916; Kohn, 1993).

In order to create successful learning environments with Web 2.0 tools, we argue that technology personnel (and teachers) must have a clear understanding of child development and theory before choosing technological equipment. In our case, we propose developmentally appropriate technology strategies for children grounded in theory and the principles of child development. We also present theory-based developmentally appropriate Web 2.0 tools that can be used in a "flipped" classroom.

References

Animoto Production (2011). *Animoto*. Retrieved from http://animoto.com/education

Becker, H. (1998). Running to catch a moving train: Schools and information technologies. Theory into Practice, 37(1), 20-30.

Bergmann, J. & Sams, A. (2012). Flip Your Classroom: Reach Every Student in Every Class Every Day. *International Society for Technology in Education.*

Chatel, R. (2005). Computers used in preschool: Trixie gets a screen name. *The New England Reading Association Journal, 41*, 49-52.

Copple, C., & Bredekamp, S. (Eds.). (2009). *Developmentally appropriate practice in early childhood programs, (3rd ed.)*. Washington, DC: National Association for the Education of Young Children.

Dede, C. (2012). *Six challenges for educational technology*. Retrieved from www.virtual.gmu.edu/pdf/ASCD.pdf

Dewey, J. (1916). *Democracy and education*. New York, NY: Macmillan Company.

Gagné, R. (Ed.). (1987). *Instructional technology: Foundations*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Garner, R. (2003). One in five lessons taken by teachers untrained in subject. *The Independent*. UK: Independent Co.

Hughes, J., & Ooms, SA. (2004). Content-focused technology inquiry groups: Preparing urban teachers to integrate technology to transform student learning. *Journal of research on Technology in Education, 36*(4), 397-411.

Kearsley, G. (1998). Educational technology: A critique. *Educational Technology, 38*(2), 57-61.

Kim, H. Y. (2012). Dropping Out of High School: The Role of 3 D Alice Programming Workshop. In M. Simonson & M. Crawford (Eds.), *35th Annual Proceedings of Association for Educational Communications and Technology*. North Miami Beach, Florida: Nova Southeastern University.

Kim, J. H. (2014). Beyond textbooks: E-textbooks as a classroom tool. In M. Khosrow-Pour (Ed.), *Encyclopedia of Information Science and Technology*, Hershey, PA: IGI Global.

Kohn, A. (1993). Choices for children: Why and how to let students decide. *Phi Delta Kappan, 75*(1), 8-20.

Lightfoot, L. (2011). Half of IT teachers are untrained. *Telegraph*. UK: Telegraph Co.

Mageau, T. (2012). *Make it stop! T.H.E. Journal and Campus Technology*. Retrieved from the journal.com/articles/2012/01/04/make-it-stop.aspx

McCall, L. A. (2002). *The Label Gifted: A Critical Analysis*. Diss. Georgia Southern University, Statesboro, GA.

McKenzie, J. (2001). Head of the class. Retrieved from http://www.electronic-school.com

National Association for the Education of Young Children. (2009). *Developmentally appropriate practice in early childhood programs serving children from birth through age 8*. Retrieved from www.naeyc.org/files/naeyc/file/positions/psdap.pdf

Michael, J. (2006). Where's the evidence that active learning works? *Advances Physiology Education*, 30, 159–167.

National Association for the Education of Young Children. (2012). *Technology and interactive media as tools in early childhood programs serving children from birth to age 8.* Retrieved from www.naeyc.org/files/naeyc/file/positions/PS_technology_WEB2.pdf

Needleman, M. (2012). *How to waste money on technology in schools*. Retrieved from creatinglifelonglearners.com/?p=602

Noddings, N. (1992). *The challenge to care in schools: An alternative approach to education.* New York, NY: Teachers College Press.

Noddings, N. (1995). *Philosophy of education*. Boulder, CO: Westview Press, Inc.

Piaget, J. (2001). *Studies in Reflecting Abstraction*. Hove, UK: Psychology Press.

Skinner, B. (1968). *The technology of teaching*. New York, NY: Appleton-Century-Crofts.

Vygotsky, L, S. (1987). *Thinking and speech* (N. Minick. Trans.). New York, NY: Plenum Press.