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Technology Integration into Differentiated Mathematics Instruction: Teacher Attitudes

Ardyth Foster

Armstrong State University, ardyth.foster@armstrong.edu

Jackie Kim

Armstrong State University, jhkim@georgiasouthern.edu

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Technology Integration into Differentiated Mathematics Instruction: Teacher Attitudes

Abstract:

The purpose of this presentation is to engage teacher educators and pre-service/in-service teachers in discussion and dialogue regarding the potential value of integrating technology tools into differentiated mathematics instruction for elementary teachers. The opportunity afforded teachers for investigating the various types of technological tools that are appropriate for introducing, reinforcing, remediating, and enriching mathematics instruction, and the potential impacts on students' academic performance, will be discussed. The ongoing assessment of the attitudes and perceptions of teachers who attended a summer professional development initiative: "Technology Integration into Math Engagement (TIME): A Professional Development Workshop Integrating Technology Tools in Differentiated Math Instruction for Elementary Teachers" will be shared, along with evidence of effectiveness for differentiating instruction, and the potential impact of technology-based activities on academic performance.

The popularity of differentiated instruction as an instructional strategy has increased in recent years, and its value in maximizing learning potential is a focus of much current research. Differentiated instruction is based on the idea that students differ significantly in their interests, learning styles, and readiness, and therefore teaching strategies and decisions involving issues of content, process, and product should vary accordingly¹. Differentiated instruction is responsive instruction that occurs as teachers become increasingly proficient at understanding their students as individuals, increasingly comfortable with the meaning and structures of the disciplines they teach, and increasingly expert at teaching flexibly in order to match instruction to student needs. The goal therefore becomes one of maximizing the potential of each learner in a given area². Grimes and Stevens (2009)³ refer to its usefulness in meeting the needs of diverse learners, and they point to the benefits for those who find academic concepts difficult, as well as those who find them easy.

Differentiated classrooms include several common elements, such as: student responsibility, student choice, peer tutoring, flexible grouping, and modified instruction. Grimes and Stevens (2009) reported on a study where the use of differentiated instruction resulted in a positive correlation between students' academic success and their motivation and self-efficacy. They state that the use of differentiated instruction in a mathematics class resulted in students who traditionally scored low on math assessments scoring as well as their high-performing peers, and increased student motivation among all the students. In addition, students were observed to be more engaged in the learning process, their desire to do math and improve in math increased, and their confidence in their math abilities also increased.

After implementing differentiated instruction, other studies found improvement in student test scores on district and state assessments in every subject, and at every grade level. The

¹ Tomlinson, C. A. (2014). *The differentiated classroom: Responding to the needs of all learners*. Alexandria, VA: ASCD

² Strahan, Kronenberg, Burgner, Doherty, & Hedt. (2012). Differentiation in Action: Developing a Logic Model for Responsive Teaching in an Urban Middle School. *RMLE Online*, 35 (8). Retrieved from <http://www.questia.com/library/journal/1P3-2678594721/differentiation-in-action-developing-a-logic-model>

³ Grimes, K., & Stevens, D. (2009). Glass, Bug, Mud: A Self-Assessment System Enables Teachers to Differentiate Elementary Mathematics Instruction, Which Boosts Both Student Learning and Students' Sense of Themselves as Mathematicians. *Phi Delta Kappan*, 90 (9). Retrieved from <http://www.questia.com/library/journal/1G1-200105549/glass-bug-mud-a-self-assessment-system-enables>

achievement gap between socioeconomic groups also decreased dramatically with differentiation of instruction. Beecher's study (2008) further supports the idea that "building upon students' strengths with a differentiated approach to instruction and enriched learning experiences could help close the achievement gap between the rich and poor, and among different ethnic groups." ⁴

The link between technology use and student achievement is evident throughout the field of education. Technology can be used as a tool to enhance differentiated instruction to meet a variety of student learning needs and learning styles. Educators have found that the use of technology tools significantly improves student achievement, student engagement, peer interaction, collaboration, and communication, and extends the place and time of learning^{5 6}. The study to be shared at this conference seeks to investigate the perceptions and attitudes of elementary teachers who were engaged in a workshop that allowed them opportunities to interact with various technological tools, for the purpose of planning for the differentiation of their mathematics instruction.

⁴ Beecher, M., & Sweeny, S. (2008). Closing the achievement gap with curriculum enrichment and differentiation: One school's story. [Electronic version]. *Journal of Advanced Academics*, 19(3), 502-530.

⁵ Fulton, K. (2012, April). The flipped classroom: Transforming education at Byron High School. *THE Journal*, 39(3), 18–20.

⁶ Kolb, L. (2011). *Why and How: Teachers Using Mobile Phones in K-12*. Education Leadership. February 2011.