RUNNING HEAD: THE ROLE OF ADAPTIVE LEARNING

The Role of Adaptive Learning Systems to Maximize Student Achievement

Martha Osei-Yaw

New Jersey City University

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Our nation is at the forefront of providing K-12 students in the public education sector with the 21st century skills needed to support college and career readiness. The New Jersey Core Curriculum Content Standards (2014) aim to “enable students to make informed decisions that prepare them to engage as active citizens in a dynamic global society and to successfully meet the challenges and opportunities of the 21st-century global workplace” (p.1). With this end product in mind, schools will need to rethink how technology can best be utilized to maximize student achievement. Adaptive learning, also known as Intelligent Tutoring System is one of the areas that can be further explored to personalize instruction and meet the needs of all learners. A closer examination of the adaptive learning models and the possible classroom implementation practices can provide further insights on how schools can make well-informed decisions when considering this design.

Freedman (2000) notes “the traditional Intelligent Tutoring System is comprised of four components which include the Domain Model, the Student Model, the Teaching Model and a learning environment or user interface” (p.1). The Domain Model can be as simple as providing lessons and tutorials which students can easily access. The Student Model, on the other hand, is based on a set of algorithms to determine a student’s skills level. This method is employed in Computer Adaptive Testing (CAT) and has the ability to fine tune the level of difficulty to a student’s skills in a specific content area. The instructional model often relies on the student model and can be designed to analyze the collection of weaknesses and tailor a lesson plan

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accordingly. Reva Freedman (2000), a professor at Northern Illinois University, explains “one reason that ITS is such a large and varied field is that ‘intelligent tutoring system’ is a broad term, encompassing any computer program that contains some intelligence and can be used in learning (p.1).”

One factor to consider is the learning style of each individual student. Adaptive learning has been recognized as being an effective approach for helping students improve their learning performance; few studies have been conducted to investigate whether students can choose the best fit e-learning system for themselves (Hwang, G.-J., Sung, H.-Y, Hung, C.-M., & Huang, I., 2013). Graph, Liu and Kinshuk (2010) “further investigated the navigational behavior of students in an online course within a learning management system to look at how students with different learning styles prefer to use and learn in such a course. They found that students with different learning styles used different strategies to learn and navigate through the course.”

Another approach to adaptive learning systems is the user-centric model for e-learning 2.0 which is a relatively new trend. “With this model, the learners share their knowledge, search for the knowledge they need, and decide learning content by themselves through social software platforms” (Huang & Shiu, 2012). This model is designed to be collaborative in nature and user-centric. Safran, Helic, & Gutl (as cited in Huang & Shiu, 2012) state the challenge with this approach is that it can be a tedious and time-consuming task which can cause cognitive overload There is no “one size fits all” model within the confines of adaptive learning. The models and approaches vary depending on the instructional outcomes.

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“The aim of the adaptive personalized system is to offer the most appropriate learning path and learning materials to learners by taking into account their profiles. These systems enhance the usability of learning materials, and thus make the e-learning system more effective” (Salahli, Özdemir &Yasar, 2013). The concept based approach for adaptive personalized course learning system provides students with an effective way of learning and includes parameters such as students’ knowledge level, and understanding degree, as well as the difficulty of course topics and course learning materials. The Item Response Theory and the Law of Total Probability are also applied to this model.

With the immense amount of research that exists, it is essential to analyze and further investigate the day to day applications of adaptive learning systems to measure the effectiveness in existing classrooms today. One such study can be found at the Rocketship Si Se Puede Charter School in San Jose, California. This K-5 elementary school model consists of a personalized learning lab in which students work independently with the guidance of an individualized learning specialist. The students practice math and literacy skills for an hour a day and instruction is differentiated. The computer is able to track their progress to determine if basic skills are needed or if the lesson calls for a more challenging assignment.

What educators at the school are noticing is that some of the students are off task and just guessing throughout the process. One of the faculty members also discussed the challenge of not knowing enough about what is happening in the language lab to assist students when they return to her classroom. Andrew Elliott-Chandler, the principal of Rocketship Si Se Puede Charter School stated, “We don’t have data available to guide the teachers on how to re-teach the skills

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that the students are struggling with in the learning lab” (2014). The challenge that Rocketship is facing is not a unique situation. Many educators share some of these same concerns in schools all across the country. In an era of high stakes testing, with the technology at the forefront, educators want to ensure that students are getting the most of the technological tools being utilized to make greater academic gains in the classroom.

One fact is certainly clear, further research needs to be conducted on how to utilize adaptive learning systems to personalize and maximize student learning. “As the body of knowledge around learning analytics from projects and studies continues to grow over the next few years, school and government leaders will be much more informed about how to use them to guide learning outcomes and educational policy” (NMC Horizon Report-Learning Analytics, 2014).

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