

Adaptive Learning Technologies  
in Higher Education

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## Adaptive Learning Technologies in Higher Education Courses

Across all levels of education, adaptive learning technologies are gaining popularity, especially in higher education. These technologies allow educators to easily personalize learning environments to suit the individual needs of students. Each individual student has his/her own way of studying, learning, and completing course-related tasks. The amount of time needed to review course content and levels of achievement vary among students.

Available adaptive learning systems help instructors personalize the learning process while keeping areas of studying, learning, and coursework completion in mind. As Chen (2018) explains, “a key component of an adaptive learning system is a recommendation system, which recommends the next material (video lectures, practices, and so on, on different skills) to the learner, based on the psychometric assessment results and possibly other individual characteristics” (p.24). These automated features assist students with varying needs and characteristics.

### Producers of Adaptive Learning

#### Learning Management Systems Options

Learning Management Systems, such as Blackboard Learn, provide adaptive release settings for content items and learning activities. Content can be released to students based on scores, date or time ranges and reviewed status of specific course content items ([https://help.blackboard.com/Learn/Administrator/Hosting/Tools\\_Management/Adaptive\\_Release](https://help.blackboard.com/Learn/Administrator/Hosting/Tools_Management/Adaptive_Release)).

### Publishers

Publishers, such as Pearson and McGraw-Hill, have produced their own online adaptive learning platforms (MyLab and ALEKS) based on the content which students are reading in their

textbooks. The online platforms can be linked to the Learning Management Systems used by institutions. This integration allows for easy retrieval of data (related to student success in course modules) to the instructors who are facilitating the courses (Riddell, 2013).

### Third-Party Vendors

Educational technology developers team up with educational institutions to offer alternative personalized learning environments to students. In an effort to reduce the cost of publishers' textbooks and access to online personalized learning systems for students, institutions have worked with third-party vendors like "Smart Sparrow" to develop personalized adaptive learning systems (Riddell, 2013). Although there is a cost for institutions to work with these vendors, it decreases the cost for students as they are no longer required to purchase textbooks with online access to personalized learning systems. As Chang et. al. (2009) explains, "Because e-Learning systems are usually developed in accordance with learners' requirement in terms of platforms, materials, presentation styles and virtual communities... tremendous manpower and costs must be spent in making changes" (p. 4). Adaptive learning technology implementation costs can be transferred to students in the form of additional course fees.

### Strengths in Adaptive Technologies

#### Personalized Learning

Adaptive learning technologies provide students with course content and activities in a format that is best suited for their own learning styles and level of understanding of the course content. The varied learning needs of students are effectively addressed by adaptive learning technologies. Hwang (2013) explains that "students who learned with [an] adaptive learning system showed better learning achievements and attitudes than those who learned with a

conventional e-learning system” (p. 190). These positive results imply that the integration of adaptive learning systems will benefit students with a wide range of learning needs.

### Keeping Students in a Forward Path

Keeping students on track with course learning objectives is a priority for all educators. Educators must alter teaching strategies in order to keep students with different learning needs on the same path to successfully meeting course objectives. Adaptive learning technologies offer students a personalized path to reaching the expected outcomes for a given course. Chen (2018) explains that, in adaptive learning environments, “students are enabled to take different learning trajectories according to their unique characteristics...Adaptive learning makes it possible for each student to learn on his or her own pace, so that fast learners do not need to wait for the entire class and slower learners have more time to digest the materials” (p. 24). Adaptive learning technologies create a personalized learning environment where students who are excelling in a course learning module are not slowed down by students who need additional time in certain areas.

### Easy to Facilitate and Integrate

Studies have found that adaptive learning technologies are easy to integrate into existing learning environments. Ease of infusion of adaptive learning technologies coupled with the realization of the positive effects of adaptive learning increases the adoption of these tools. Griff and Matter (2013) conducted a study on the integration of McGraw-Hill’s adaptive learning technology, *LearnSmart*. They found that the technology was easy to use and did not require an excessive amount of time to integrate the system. They state that “students in the *LearnSmart* sections were more engaged in the class and asked more challenging questions...an instructor suggested that *LearnSmart* combined with online quiz questions selected by the instructor would

provide the optimum learning platform” (p. 175). Educators must weigh the strengths of the adaptive learning technologies in their own course environment with any potential challenges.

### Enhancements Needed for Adaptive Technologies

#### Time Inequality

A recurring complaint about the use of adaptive technologies is that the amount of time that it takes students to complete activities is excessive due to possible repetition of content to ensure understanding. Each student has different curriculum needs. As Griff and Matter (2013) explain “a common minor complaint is that [adaptive learning systems] took more time than some students wanted to spend” (p. 175). Since these complaints are subjective, it is difficult to address this issue. Students who successfully complete course activities at a high level are likely to spend less time than those students who are not completing activities at a satisfactory level on their first attempt.

#### Varying Computer Literacy Requirements

Adequate computer literacy skills are needed for students and educators who utilize adaptive learning technologies. The specific level of these skills depends on the adaptive learning system adopted in the learning environment. If students’ technology skills affect the access and utilization of the adaptive learning system, educators may be provided with inaccurate information on the students’ understanding of the course content. Nakic, et. al. (2015) explain that “prior experience in using computers is a good predictor of user performance...background knowledge should be clearly distinguished from knowledge acquired in system usage, referred to as current knowledge, and often used as a trigger for adaptivity mechanisms in learning systems” (p. 464). The developers of adaptive learning systems must provide Computer literacy

requirements for students to both students and educators/adopters of adaptive learning technologies.

### Addressing Multiple Learning Styles

Adaptive learning technology platforms have been found to leave out some student learning styles from the programs' coding. In order for these technologies to effectively encompass the needs of all learning types and conform to all students' characteristics, product enhancement is imperative. Yang (2013) explains that "only one or two dimensions of a learning style model are considered while developing the adaptive learning systems. Moreover, in most systems, only a fixed type of user interface is provided" (p. 196). Addressing the needs of all types of learners will affect adaptive learning systems' levels of success in a positive way. Adaptive learning technology systems must be designed with a "user-centric" approach in order to effectively deliver personalized and adaptive learning environments (Shiu-Li & Jung-Hung, 2012, p. 214).

### Summary

Adaptive learning technologies provide educators an effective way to gauge students' understanding of course content. More importantly, they provide a way to personalize learning based on students' varying learning styles and level of comprehension of the subject matter. Understanding the multiple adaptive learning systems and how they will integrate with different courses is important for educators to understand before these tools are implemented. The strengths and weaknesses must also be considered in order to assess the utility to the specific student population that will be interacting with the technologies.

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