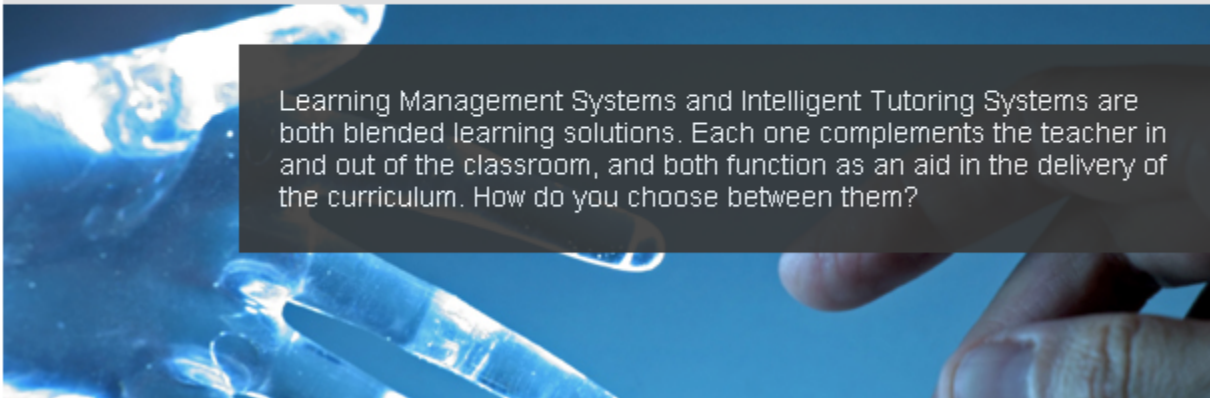


A Learning Management System ... or an Intelligent Tutoring System?

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Learning Management Systems and Intelligent Tutoring Systems are both blended learning solutions. Each one complements the teacher in and out of the classroom, and both function as an aid in the delivery of the curriculum. How do you choose between them?

For the second consecutive year, the eLearning Guild survey, which measures use of over 100 professionally-developed LMS products and excludes in-house created systems, shows that Moodle™ is ranked as the #1 LMS product among eLearning Guild members with over 24% of respondents selecting it as their primary LMS.

Comparing the systems

Learning Management Systems (LMS) and Intelligent Tutoring Systems (ITS) alike store electronic content and deliver an interactive experience to the learner. They present any number of content interactions, from basic gap fill exercises to sophisticated simulations, evaluating user input and offering assessment and grading based on their performance.

The key difference between the LMS and the ITS is that the latter provides direct customized feedback to learners based on their input into the system. It employs Artificial Intelligence (AI), meaning that it can employ a variety of AI techniques to understand, inform, and direct the user after completing exercises. It seeks to replicate the role of a tutor, effectively guiding and coaching the student through the content.

The ITS essentially comprises four component modules. The *student interface* provides the interface with which the student interacts with the system. The *expert module* references an expert or domain model containing a description of the knowledge or behaviors that represent

expertise in the subject-matter domain the ITS is teaching, while the *student model* describes the knowledge and behaviour of a sample student of the subject. A mismatch between a student's behavior or knowledge, and the expert's presumed behavior or knowledge, triggers a signal to the final component, *the tutor module*, which can subsequently act to provide feedback or remedial instruction. To fulfill this function it needs information about what a human tutor in such situations would do.

As an example, the Carnegie Learning Cognitive Tutor product assesses a student's aptitude of mathematical concepts, customizing prompts to focus on areas where the student is struggling, and presenting new problems that address those specific concepts.

The ITS sounds ideal, but it is intensive in terms of the expert knowledge and resources required to build it. This increases if the subject is qualitative rather than quantitative, with qualitative knowledge containing a greater degree of tacit knowledge. The timeframe for delivering an ITS within an organization is longer, owing to analysis of content, student, and tutor roles, though if successfully delivered it can offer a rich student experience as well as being an accurate barometer of subject knowledge.

Alternatively, the LMS can use individual exercises to offer paths through the learning experience. Content can easily be edited in a variety of different formats. Logical rules do not have to be associated with content. The LMS can provide correct answers to learners when each exercise has been completed, but cannot offer intelligent feedback like the ITS can. An ITS could offer greater learning value where the requirement is to learn faster within a shorter space of time, with direct customized feedback offering the learning provider a tangible way of delivering their learning.

Decisions

Integrating both types of system could be feasible, though this would depend on a coherent and focused e-Learning vision within an organization. Functions such as student communication and assessment could be managed within the LMS, while maintaining the ITS could deliver the learning experience.

Detailed technical analysis would be a pre-requisite to providing the scope of integration, but clear strategic benefits would have to be identified prior to this. Effective semantic analysis of the subject area would be critical to be able to fully exploit the capabilities of the artificial intelligence system.

With the LMS it is simpler to continue adding content, but when adding content to the ITS, administrators would have to consider context in addition to student and tutor outcomes. Content standards such as SCORM or IMS exist for LMSs, but migrating content between ITSs, or between an ITS and LMS, would be trickier, with capability required for any logical rules and associated sequencing relevant to ITS content.

Both types of system are blended learning solutions, not seeking to replace the teacher but to aid the teacher both in and out of the classroom, and function as an aid in the delivery of the curriculum. ITS would have an obvious advantage in student testing, as direct customized feedback is essential in student assessment. Perhaps the ideal learning environment would have a combination of the two.

When faced with the choice, business considerations would have to be paramount. Using an ITS would require considerably more resources and investment, depending on the level of customization. Until a simple product-based rules system is released that covers a range of subject areas and offers a low set-up cost, unless time, cost, and expert resources are available, the learning management system will remain the preferred option of learning providers.