



Adaptive Learning - A Personal Tutor for Each Employee

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About Adrian Britten, PhD C.Psychol

Adrian is a Chartered Psychologist who improves individual and organisational outcomes by enabling lasting behavioural change. His corporate and consultancy success includes major transformation programmes, business turnarounds, mergers and acquisitions and crisis response. Experienced across many sectors (defence, financial services, retail, FMCG, government, telecoms, pharma and international bodies) with a truly global range including Europe, Asia, Middle East & the Americas.

Introduction

Intensive and personalised one-to-one instruction delivers the gold standard in training outcomes. In a widely cited paper, Bloom (1984) reviews research on instructional methods and concludes *“the most striking of the findings is that under the best learning conditions we can devise (tutoring), the average student is 2 sigma above the average control student taught under conventional group methods of instruction.”*

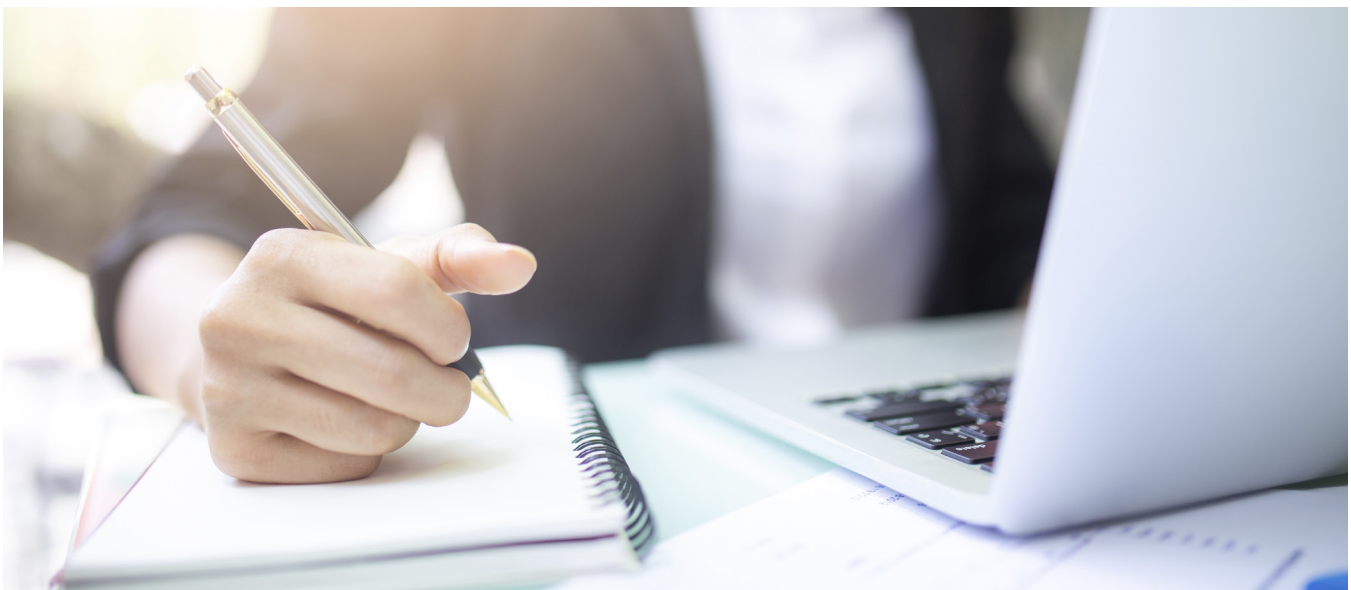
The challenge for workplace learning and development has therefore been to find an economical and practical way to duplicate the benefits achieved from personalised tuition. Until recently this has eluded us, but technology is now sufficiently developed to provide the solution in the form of adaptive learning where, in real time, data capture and algorithmic analysis replicate the decisions of a human tutor.

Adaptive learning is a computer-based instructional method where the system gathers data from the learner as they progress through the material and adapts what is presented according to the learner’s individual needs and developing mastery of the content. Typically, the learner is presented with questions and tasks that assess knowledge transfer or skill mastery and the level of learner confidence. By using this information to determine what to present next, each student experiences a course that is personalised to their own abilities, interests, and preferences in real time.

Traditional e-learning was linear: students progressed through material in a pre-determined sequence. Some more advanced systems could provide different material to students who answered correctly, incorrectly or asked for more information, but this ‘group-based’ adaptation is different from adaptive learning. Adaptive learning uses data to adapt to an individual student’s progress at a speed that reflects how their learning is progressing. The result is a more effective, positive, and engaging learning experience.

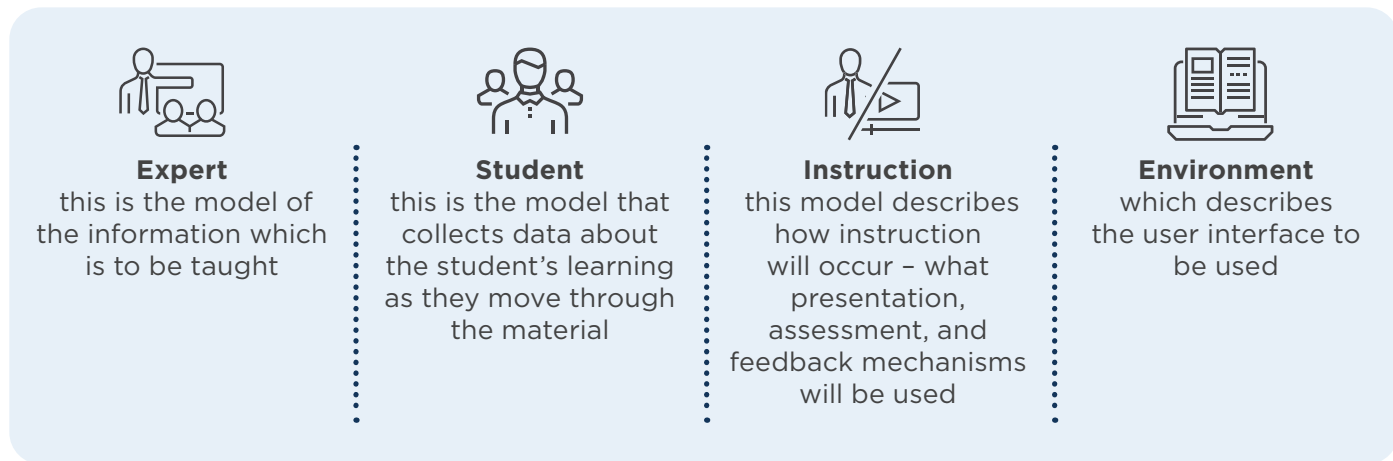
At its heart adaptive learning is a ‘mastery-based’ approach, meaning that progression through the material is based on the student demonstrating proficiency with the materials or skills. Success is not based on the amount of time spent studying or the amount of material covered.

“The most striking of the findings is that under the best learning conditions we can devise (tutoring), the average student is 2 sigma above the average control student taught under conventional group methods of instruction.”



How It Works

There are typically 4 interrelated components to an adaptive learning system which are referred to as 'models.'



Well-designed systems use the principle of 'instructional scaffolding'. As the student progresses, they are tested on their knowledge acquisition or skill mastery, and their level of confidence with the material. This information is used to tailor the specific feedback and support that the individual student needs for any specific content component.

This means the learner gets the right content at the right time from the scaffolding that is available within the system.

What can adapt?

In an adaptive learning system, three components can adapt, which means that even the simplest of learning materials rapidly become a complex, interconnected set of components.

- **Content** - The system uses the student's answers to determine what to present next. For example, the student may receive feedback on their performance, specific hints or more information, additional materials using different modalities, material that elaborates and expands on the content or skill, a repeat of the skill practice, or an introduction to the next step in the skill sequence.
- **Assessment** - The system uses the student's responses to change the questions that are presented, increasing or decreasing the difficulty and varying the question format to maintain engagement. Truly adaptive systems do not only look at whether a response is correct or incorrect, they also take account of the nature of any error that is made and use that information to provide specific guidance or hints to the learner. Feedback is more than simply right or wrong; it is corrective, providing the instructional scaffold around the student's learning.
- **Sequence** - Using algorithms and predictive analytics, a variety of data from the student is combined and the system uses this to automatically decide on what the student sees next.

Why does it perform so well?

Adaptive learning systems can deliver many of the advantages typically seen in individual personal tuition.

- Because the experience is individual, it feels more engaging and empowering to the learner.
- It is a more efficient use of employee time; learners only spend time on material they do not already know or skills they do not already have.
- By creating a learning path at the speed that suits each person, it accounts for learner diversity (rather than more advanced learners waiting for others to catch up).



What are the issues?

Every new development brings some challenges. The first is that while data from the student is important, it's not at all the most important part. The success of adaptive learning relies entirely on the quality of the content and the quality of the instructional model. A learner progressing on an individual path through poorly designed, inaccurate or inappropriately sequenced content will simply produce poor outcomes – and probably won't want to repeat the experience.

- The content must be thoroughly developed and tested (expert model)
 - Which means the content has to be broken down into the components that will deliver cognitive scaffolding for different types of learner and provides material which has multiple levels of detail and sufficient variety that will facilitate the integrative and elaborative cognitive processing that is necessary for learning
 - For skills-based learning, each skill area must be broken into its smallest components, again with a variety of opportunities to practice and demonstrate mastery that retains engagement and interest
- The linkages between components (instruction model) and the underlying algorithm must allow the diverse range of learners to proceed through the material based on their individual progress. Using multiple sources of individual learner data and thoroughly tested decision-rules.
- The same content must be available in different forms (e.g. presentation modalities) to reflect learner styles and encourage more elaborative cognitive processing

There are challenges for course creators too. First, the course content needs to improve engagement and outcomes over other methods. In particular, the acquisition and mastery of behavioural skills requires human-to-human interaction. Even the most advanced virtual reality simulations will produce poorer outcomes than human contact in these areas. Second, it is essential to understand whether and how the sequence in which content or skills are learnt has an impact on mastery and performance.





Changing Training

These new learning systems provide instructors with real-time analytics, which means an instructor, as part of the instructional scaffolding, can use the feedback to adapt their own instruction, effort and targeting to focus on the needs of individual learners.

Blended solutions can also combine adaptive learning with traditional instructor-led sessions. This means instructors must be able to work with students who are progressing at different pace and on different learning paths throughout a course. For instructors, this means less 'all-class' instruction and more time coaching and supporting individual students.

And For The Future

What's exciting about the L&D landscape now is to finally have technology that matches previously expensive and inefficient one-to-one tuition. Technology that makes these ideas real and scalable and, in the process, delivers dramatically better learning outcomes. Adaptive learning technology inexpensively scales the benefits of individual tutoring, providing each learner with their own personalized course, which adjusts in real-time for his or her performance and engagement level. Although still some way off, we are excited developments are expected in collaborative group or team learning, where adaptive learning technology is used to use the different knowledge of ability levels in a group to enhance the learning of others and to adapt the methods of presentation to different learning style preferences.

Bloom, Benjamin S (June-July 1984). The 2 Sigma Problem: The Search for Methods of Group Instruction as Effective as One-to-One Tutoring. Educational Researcher. 13 (6): 4-16

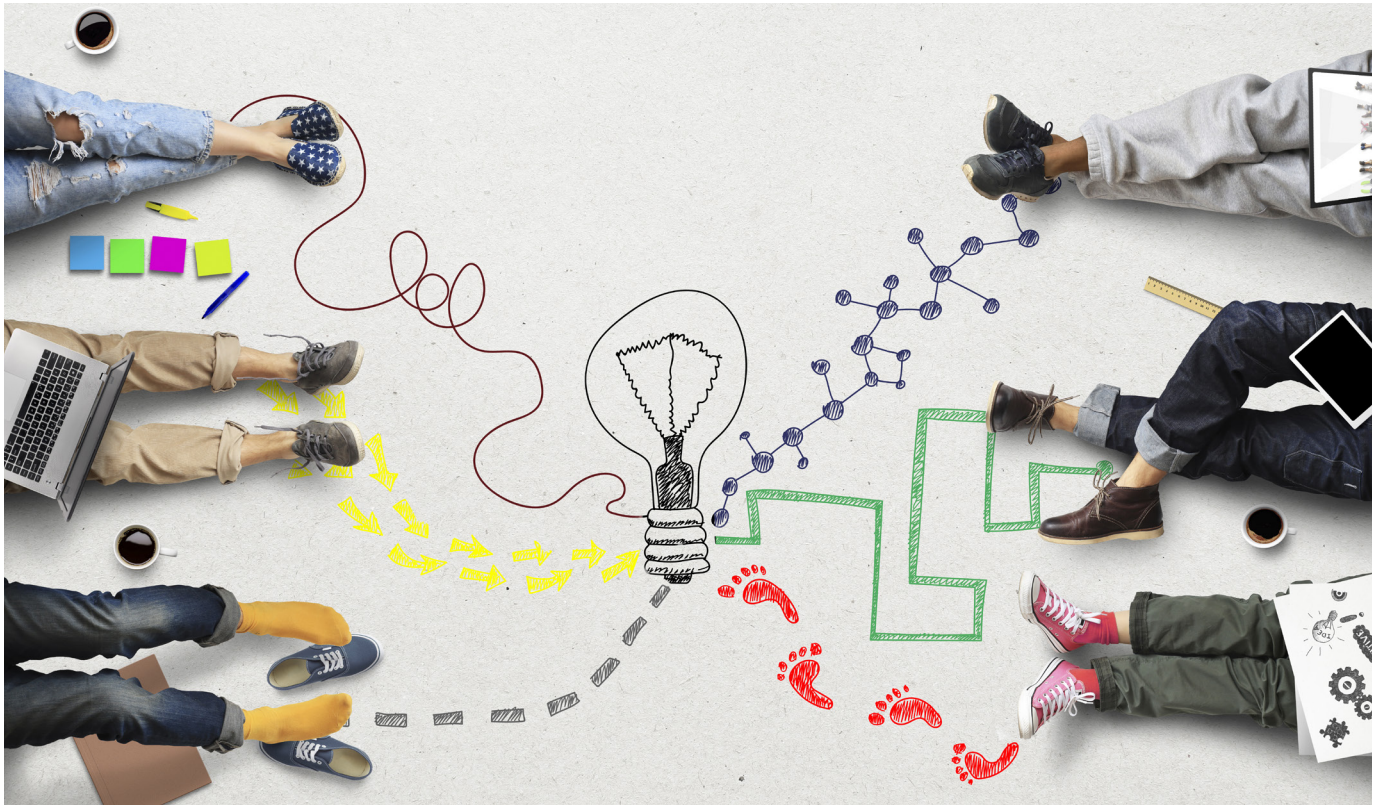
Conclusion

Economies and practicalities meant that, until now, only group-based, linear training methods could be provided in the workplace. With the advent of these exciting new adaptive learning technologies, organisations can now plan for significant change in the contribution from L&D spend. In particular:

- An individualised experience focusing on what each learner needs should improve engagement and motivation.
- Effective adaptive learning systems will give the learner a sense of empowerment over their learning experience, again improving engagement.
- By adapting to different levels of competency and providing sufficiently multi-modal content that adjusts to individual learning styles, future technologies will better reflect the diversity of the learning population.
- Freed up from working through the materials, instructors will have time to deliver one-to-one support, guidance and remedial help as each learner follows their individual learning journey.

Learning Tree has developed the world's first adaptive ITIL 4 Foundation course which gathers data from each learner and responds to create a tailored learning journey adapted to individual learner needs in real time. First to be launched from its emerging adaptive learning portfolio, Learning Tree is excited to be at the forefront of the current learning revolution and proud to be amongst the first to bring the benefits of personal tutoring to its global client base.





Give Adaptive Learning a Try

Ready to give adaptive learning a test drive and see how it works real-time?

Explore Learning Tree's full library of free adaptive learning modules and advance your skills in cloud computing, project management, ITIL, cyber security, Agile and more — **and faster than ever before!**

How To Tell If It's Really an Adaptive Learning Solution

For a learning system to be considered an adaptive learning solution it needs to pass the following tests.

- Is it collecting and analysing real-time data?
- Does it respond in real-time to a student's responses?
- Will it provide individualised support and not just group-based responses based on correct/incorrect answers?
- Does it have multiple ways of presenting content to meet individual needs?
- Will it change the individual learning path based on individual responses?
- Does it do all of this automatically without human intervention?

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