

UDC 371.315

DOI: 10.31548/hspedagog2020.02.021

THE USE OF ADAPTIVE LEARNING TECHNOLOGIES IN EDUCATION

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Abstract. *With advances in neuroscience and educational technology, student learning has been lifted into a new stratosphere. Rather than a default learning model, there's now fluidity in the way educators can deliver content, interact with students, take on feedback, and modify their teaching approach. Students have access to seamless e-learning experiences influenced by behavioural psychology and the latest research on how the brain works. This study provides insight into adaptive learning and the ways technology is transforming the 21st century education.*

Keywords: *technology; adaptive learning technology; neuroscience; adaptive learning*

Introduction. The problem setting.

It has been reported that the traditional teaching model of education does not allow learners to develop many 21st century skills. Conceived for another era, it is based largely on memory learning, active instruction by the teacher and passive reception of knowledge from the student. In this model, students are unlikely to develop their own initiative and creativity, or learn to collaborate with others, as just a few examples [8].

Preparing 21st century citizens requires a paradigm shift that starts with prioritizing the student, allowing them to learn at their own pace, and doing so more actively and according to their context.

With the spread of adaptive technologies that customize the user experience in response to individual users, it is not surprising that such experiences are increasingly found in educational settings or in tools to facilitate learning. Recent progress in the development of adaptive educational technologies builds on several decades of efforts to use computer systems to offer tailored instructional experiences to students. Adaptive elements can be found in many forms and formats that support learning. The growth of adaptive educational technologies

presents new opportunities for education research that can advance our understanding of student learning and performance. The full participation of the education research community is necessary to create the conditions that will guarantee that the promise of adaptive educational technologies is fully realized for research as well as practice.

Adaptive tools provide a system that evolves and tailors itself to each student, allowing them to effectively understand new material at their own pace. Unlike traditional learning methods, adaptive learning gauges the ability of individual users and adjusts to challenge each individual user. This new technology can help colleges move away from teaching a one-size-fits-all curriculum. Lessons and exams can be tailored to students' ability, allowing them to learn at a pace that suits them best. Thus, adaptive technology is believed to improve productivity and focus, leaving more time for meaningful discussions with professors and valuable in-class periods [1].

Therefore, **the purpose** of this study is to provide insight into adaptive learning and the ways technology is transforming the 21st century education.

Research methods

In our research we utilize literature review as the main method of research. This technique makes it possible to answer the main research question and explore the concept of adaptive learning, its advantages and limitations.

Results. Adaptive learning refers to the technologies monitoring student progress, using data to modify instruction at any time [7]. Adaptive learning technology uses algorithms to track student performance and modify the presentation of material based on this tracking. It's built on the understanding that we all learn differently. Analysing trends in online behaviour, it adapts the way e-learning is delivered to better suit individual needs. Adaptive learning technologies dynamically adjust to the level or type of course content based on an individual's abilities or skill attainment, in ways that accelerate a learner's performance with both automated and instructor interventions [2].

A key component of the use of technology in education is the ability to collect and analyze data in real-time, and, when done appropriately, this can support teachers. Adaptive learning platforms, for example, modify tasks or exercises according to a student's specific needs. Students can play games or complete tasks that demonstrate their proficiency in a topic, while learning analytics determine when students are ready to move to the next level, rather than allotting a fixed amount of time for a lesson. These platforms can provide direct feedback for educators, highlighting where individual students need more attention.

Data collection and analysis can help teachers identify the strengths and weaknesses of individual students, get accurate attendance data, and help personalize lesson plans or evaluations to target specific skills students need to master. For data to be useful and have a positive impact, teachers and staff must not feel burdened by the task of collection. Technology can facilitate this, integrating

collection into day to day activities such as roll call and evaluations.

This adaptive approach benefits the entire educational eco-system, from student to facilitator, helping deliver:

- personalised learning: combining data, analytics and the latest in neuroscience and pedagogy, to customise e-learning and assessment

- automated teaching: reducing in-class time, and making learning more scalable, accessible, and transparent

- closer student-teacher relationships: where students can master content in their own time, and educators can take on facilitator and leader roles

It's important to understand exactly what adaptive learning is. In our article we define adaptive learning as a solution that:

- responds to the learner's individual learning journey

- adapts to the curriculum, context and culture of the school and country

- focuses on the people using the solution, and use technology only to add value

- continually seeks feedback and adjust its behaviours accordingly

- collaborates with learners, teachers, parents and publishers to perfect its proposition.

Adaptive learning first and foremost provides insight into which students are working hard and when. If students are asked questions that are too easy or too hard, learning is not optimised. All effective learning happens when you're working hard. With an adaptive learning solution, teachers can access real-time data empowering them to pin-point who needs assistance and how. This is the real and most immediate impact of adaptive learning. One more benefit is adaptive learning's ability to challenge the student to gauge their understanding of the material and to then challenge them further on from that. Stretching a student's understanding while ensuring learning is thoroughly embedded is in the algorithmic DNA of adaptive learning.

Adaptive learning strategies create a student experience that is modified based on a student's performance and engagement with the course materials. At its heart is an approach to instruction that relies on technology and data about student performance to adjust and respond with content and methodologies that develop a pathway to the student's mastery of a particular learning objective (Waters 2014).

Adaptive learning technology allows instructors to engage with students more as a coaches, mentors, and leaders. According to the McGraw-Hill Education study, it enables instructors to spend 72 % less time on administrative tasks and 90 % more time on active learning experiences, and with the kinds of insights it offers up, that means much more dynamic semesters [6].

While instructors still need to plan curriculum, lessons, and set goals and learning objectives, adaptive learning technology offers real-time feedback. They can use that feedback to quickly identify areas to emphasize in instruction based on student engagement with things like last night's homework or in-class group work. Teachers are empowered to incrementally fine-tune learning within the bigger framework of the course or semester and engage with learners more authentically and meet their needs more proactively, providing personalized guidance based on deeper insights.

Adaptive learning can really make a difference in the classroom. According to the McGraw-Hill Education study [6], colleges employing an adaptive learning environment that integrated assignments, grading, and course content saw a 15 % increase in the number of students that earned A's and B's. Student engagement with practicing concepts and homework tends to be higher with adaptive learning technology than without it because students are engaging with learning activities that are presented at the right time for the right purpose.

It comes down to students spending more productive time on tasks based on the ability to progress at a rate that's more comfortable to them. And, by enabling insightful instructor feedback and providing screen-based awards and badges to promote and reward progress, adaptive learning technology instils confidence in students, particularly those that struggle. It changes the way learning happens and that's a powerful thing.

However, simply using technology doesn't guarantee an impact on learning [4]. The introduction of technology has often focused on reinforcing traditional teaching and learning practices, instead of what is truly needed to leapfrog education: applying, evaluating, and creating knowledge. Recent research has shown that, rather than using technology for intense "drill and kill" exercises, technology is successful when it is interactive, includes real-time feedback, and allows students to creatively apply and evaluate what they have learned [5]. When used effectively as a tool to enhance learning, technology has the power to transform the interactions between students and teachers and to lead to increases in student learning.

Conclusion. The use of technology facilitates the transformation of learning processes that allow teachers to focus more on each student and support them to develop 21st century skills and abilities.

Neuroscience and educational technology have not only reshaped the way learning is delivered but revolutionised the way we think about education as a whole.

Learning is transformed into a highly personalised process that's deeply invested, not only in getting results, but in building stronger minds, more expansive neural pathways, and individuals with a love for education.

Educators can take a dynamic, data-driven approach that challenges students to think critically, solve socially, and diversify how their learning occurs.

Students transform from passive learners into active engagers who take control of their academic pathways.

However, adding education technology to a learning environment doesn't guarantee better learning. Using education technology to replace teachers or to scale ineffective practice guarantees poorer learning outcomes. When it comes to teaching and learning, it's not what you use, but how you use it that counts.

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ВИКОРИСТАННЯ АДАПТИВНИХ НАВЧАЛЬНИХ ТЕХНОЛОГІЙ В ОСВІТІ

Цимбал С. В.

Анотація. У зв'язку з досягненнями в області нейробиології і освітніх технологій, викладання і навчання перейшло на якісно новий рівень. Адаптивне навчання являє собою підхід, який максимально враховує індивідуальні потреби того, хто навчається. З активним розвитком інформаційних технологій все більше застосування в сфері освіти знаходять електронні середовища навчання, які дозволяють реалізувати ідеї адаптивного навчання на практиці. Використання адаптивних технологій передбачає інтеграцію інформаційних і педагогічних технологій, що забезпечують інтерактивність взаємодії суб'єктів освіти і продуктивність навчальної діяльності із застосуванням нових інформаційних технологій, що забезпечують адаптивність в рамках освітнього процесу. Це дослідження дає уявлення про адаптивне навчання і про те, як технології перетворюють процес навчання в XXI столітті.

Ключові слова: технологія; адаптивна технологія навчання; нейронаука; адаптивне навчання.