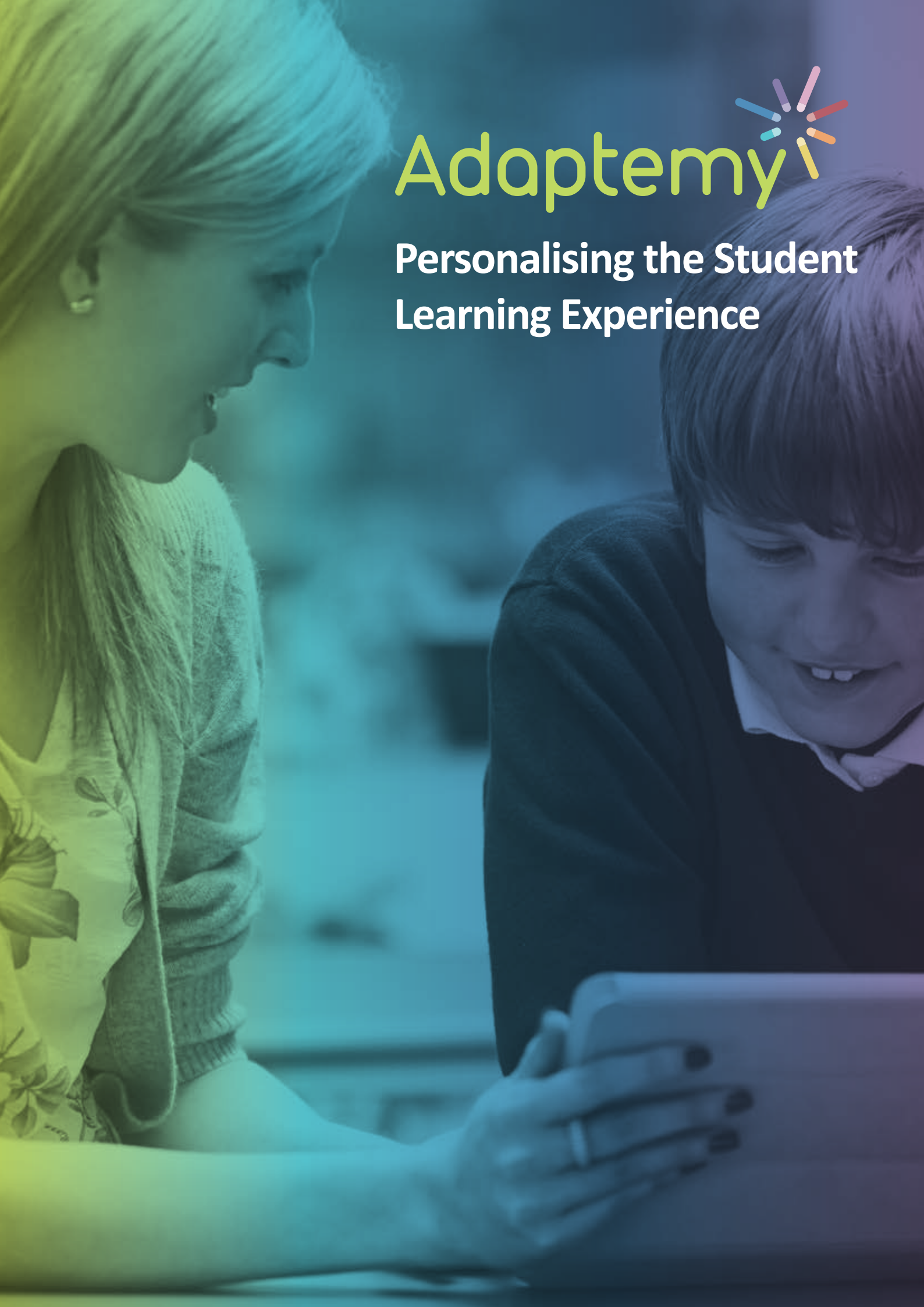
Adaptemy
Personalising the Student
Learning Experience

To deliver profitable personalised learning solutions for educational publishers that advance learner, teacher and classroom experience, improve educational outcomes and are tailored to local educational context.

Introduction

Education is evolving. The classroom environment is changing. And educational publishers must adapt if they are to remain relevant today and in years to come.

The driving force behind this disruption is two pronged. On one side is the huge advancements being made in technology, and accessibility to that technology. On the other is an ambitious idea of what education is (and can be). Best illustrated by the Partnership for 21st Century Learning and its focus on critical thinking, creativity, collaboration and communication.

Bringing the two together, proactive publishers are utilising new technologies, intertwining them with deep understanding of education, to deliver better educational experiences to digitally native students. This is the world of education technology (EdTech).

Set to attract an estimated $252 billion in investment by 2020, EdTech is a hot market. It's ability to generate new revenue streams and establish real points of differentiation have made it a primary focus for education publishers. In fact, the potential of the market is so great that it has drawn the attention of multiple companies, not traditionally associated with education publishing, eager to utilise the technology and establish themselves in what would once have been considered a relatively closed market.

One of the most prominent areas of interest is in adaptive and personalised learning. Identified earlier this year by Gartner as one of the top five strategic technologies impacting K-12 education, it is being used to "solve the challenge of providing scalable personalized learning" and is "at the leading edge of significant technologies in education today".

But just what is adaptive and personalised learning? How can the technology be utilised to support the curriculum and the students it's intended for? And what are the ultimate benefits of investing in this technology?

What is Adaptive and Personalised Learning?

Despite its growing reputation among education publishers and educators, the industry is still defining what is meant by adaptive and personalised learning. Understandably, this makes the adoption and transition process a more complex exercise for publishers.

Simply put, adaptive and personalised learning is the tailoring of the learning experience to the unique needs of each student, based on a process of continuous feedback and evaluation of each student's progress and behaviour. Recent dramatic improvements in technology, both in online devices and A.I. systems, make this a reality for schools today.

In the school, adaptive and personalised learning provides an excellent resource to hone skills and achieve a fundamental understanding before elevating that to mastery. Adaptive learning serves to spot holes in understanding and provide individual learning plans to bring students back on track.

Incrementally establishing this with statistical evidence from the solution, enables teachers to carve out a more relevant learning path for students and direct them towards an educational future that will see them thrive. It can be fast and accurate with adaptive learning, capturing information from students quickly and easily.

The development of core skills and confidence, delivered through adaptive learning experiences, provides a powerful foundation for teachers to build higher-level skills in the classroom, such as collaboration, critical thinking and creativity.

From a publisher's perspective, adaptive and personalised learning presents a commercial opportunity too. Technology can empower publishers with data on how a product performed and how to improve it. The feedback loop doesn't end with, 'the textbook didn't sell' or, 'the teacher didn't like it'. It continues with incremental changes that enhance performance and subsequently, saleability.

Contrary to popular belief, adaptive and personalised learning in no way seeks to replace the teacher. It can't. Education is inherently human and no technological innovation can replace the intuition, emotion and experience of a teacher. What it does, is arm a teacher with immediate and accurate insight into the learning experiences and outcomes of each student in the room.

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Applying Technology to the Curriculum?

To deliver an effective solution, a deep understanding of the curriculum is required. How else can you expect to provide the right content, at the right time, to each student. Publishers have perfected this process in print over decades.

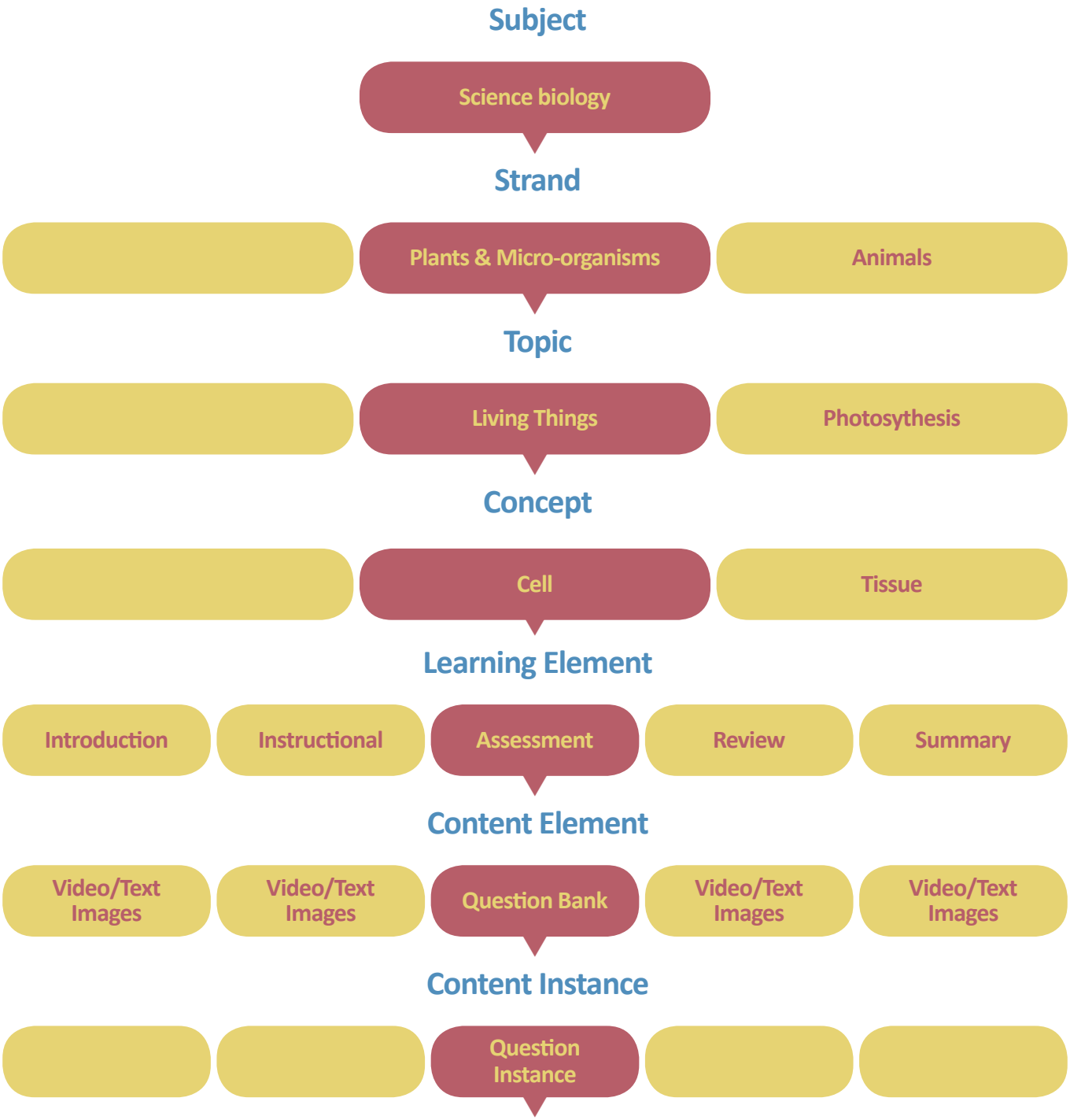
But digital content differs from paper content in multiple and varying ways. The layout is different; there's UX (user experience) to consider. The 'digital brain' adds another layer to this. That is, the way the brain absorbs digital information versus 'offline' or hard copy information.

Technology also brings interactivity to the game. Where a textbook is passive and (quite literally) flat in its engagement with you, technology can present a range of learning styles for the user to enjoy. From immediate feedback to text input, to chatbots, speech recognition and virtual reality (VR/AR), new formats of learning activities, enabled by technology, are at our fingertips. They create engaging, immersive experiences that drive deeper learning.

Because of our extensive experience in technology, teaching and publishing, we understand the nuances and what is required to seamlessly transition from print to digital. We work with a publisher's subject matter expert to understand the curriculum. This information is then interpreted through a number of theoretical frameworks, including Knowledge Space, Bayesian Theory and Delivery of Personalized Adaptive Content (DPAC).

Through bespoke curriculum mapping tools, we are able to organise educational content on a curriculum framework, but maintain a clear separation between curriculum and content. The curriculum is represented by a hierarchical organisation and network of prerequisite links.

The hierarchical organisation of the curriculum (i.e., strands, topics inside a strand, and concepts inside a topic) facilitates easier navigation and higher granularity for the assessment. Content is attached to the curriculum.

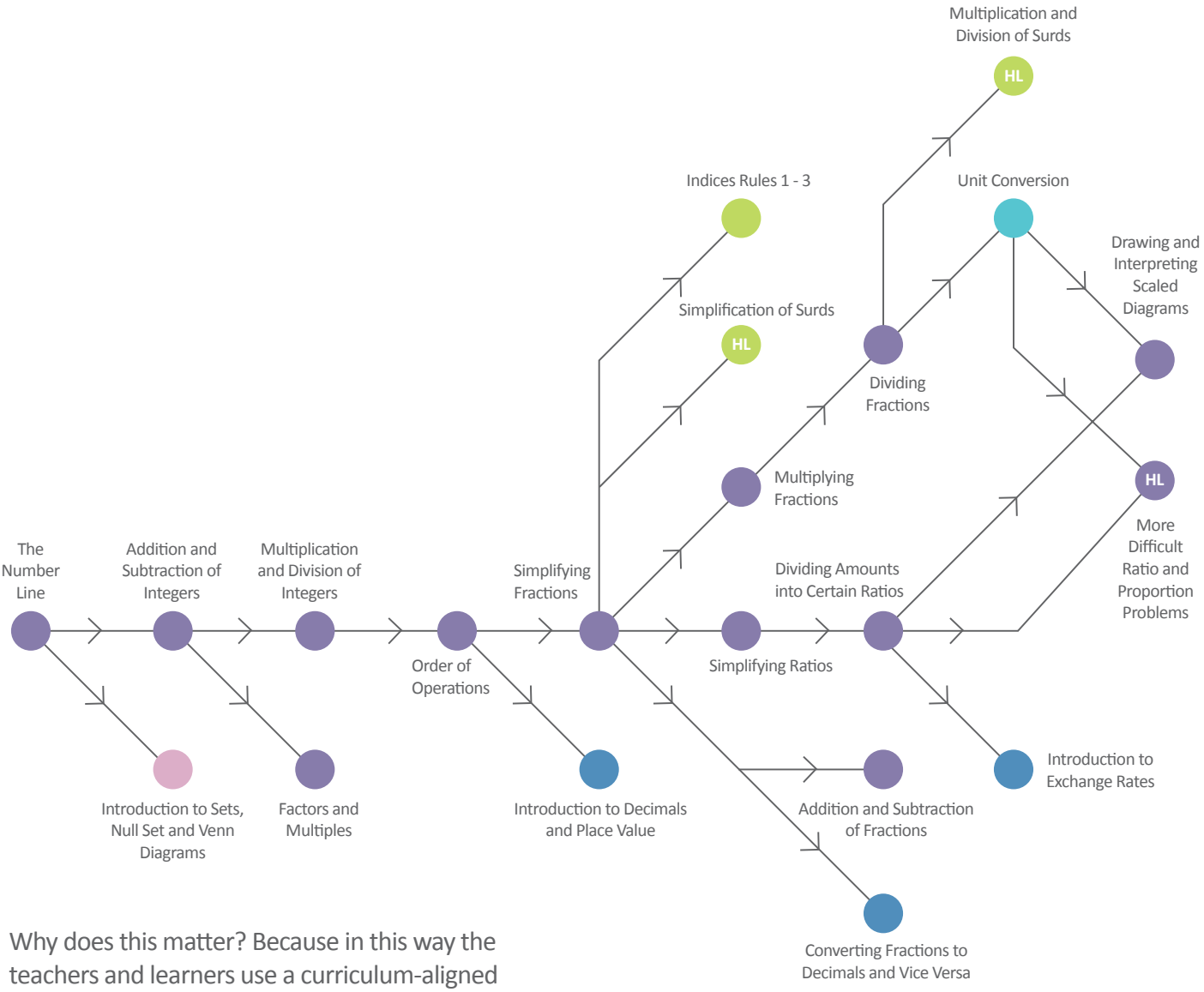


The prerequisite network contains all the prerequisite relationships between concepts. At Adaptemy, we can encode the subtle links between concepts, and the system learns about the strength of these links over time. This enables us to support learning paths across all subject areas, beyond the capability of most other adaptive learning systems.

The content is defined for each knowledge item, supports various content formats and standards (ranging from text to audio, video and animations), and is applicable to any learning domain.

This enables various and unique learning experiences that can be adapted to different teaching and learning styles. The content is divided into pieces of learning materials (e.g; introduction, presentation, work examples, etc.) and assessment sections.

The questions are defined using templates which are used to represent question forms. The question form is used to generate a question at runtime, enable more practice and minimise the possibility of students gaming the system.



Why does this matter? Because in this way the teachers and learners use a curriculum-aligned solution that measures progress, shows the relevance of each knowledge item and drives goals.

As any good publisher knows, however, developing good content is only part of the puzzle. Over the years, despite testing well and showing promising results in delivering adaptive and personalised learning experiences, numerous Adaptive eLearning Systems (AeLS) and Intelligent Tutoring Systems (ITS) have struggled to reach wide scale adoption and ultimately failed. Why? Because they didn't fully understand the interpersonal and human side of the classroom environment: the complex workflows of teachers, the social relationships within the classroom that are key to motivating behaviours, and the unique contexts and challenges day-to-day in each school.

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Classrooms bring together students who will each be experiencing different emotions and have different interests, needs and wants. Teachers accumulate many years' experience which allows them to intuitively grasp how to deliver effective learning to this diverse group of people. How can a tech company even begin to unpick this nebulous space?

Through extensive research we have found that while a publisher might create one text book, it might be used in a hundred different ways. Tech developers typically create solutions based on 'this is the behaviour that I expect'. But in a classroom, it is very difficult to predict the individual wants and needs of students. You can't pre-code a sequence of questions or force people down a predetermined path and expect to achieve impactful learning outcomes. That is not adaptive or personalised learning.

Rather, any solution introduced to a classroom must add significant, measurable value. In order to do that it must comply with, and bolster, certain 'laws of learning'.

Law of READINESS	**Students learn more easily when they have a desire to learn. Conversely, students learn with difficulty if they're not interested in the topic.**
Law of EFFECT	**Learning will always be much more effective when a feeling of satisfaction, pleasantness, or reward is part of the process.**
Law of RELAXATION	**Students learn best and remember longest when they are relaxed. Reducing stress increases learning and retention.**
Law of ASSOCIATION	**Learning makes sense (comprehension) when the mind compares a new idea with something already known.**
Law of INVOLVEMENT	**Students learn best when they take an active part in what is to be learned.**
Law of EXERCISE	**The more often an act is repeated or information reviewed, the more quickly and more permanently it will become a habit or an easily remembered piece of information.**
Law of RELEVANCE	**Effective learning is relevant to the student's life.**

Law of INTENSITY	A vivid, exciting, enthusiastic, enjoyable learning experience is more likely to be remembered than a boring, unpleasant one.
Law of CHALLENGE	Students learn best when they're challenged with novelty, a variety of materials, and a range of instructional strategies.
Law of FEEDBACK	Effective learning takes place when students receive immediate and specific feedback on their performance.
Law of RECENCY	Practicing a skill or new concept just before using it will ensure a more effective performance.
Law of EXPECTATIONS	Learners' reaction to instruction is shaped by their expectations related to the material (How successful will I be?).
Law of EMOTIONS	The emotional state (and involvement) of students will shape how well and how much they learn.
Law of DIFFERENCES	Students learn in different ways. One size does not fit all!

When selecting an adaptive learning solutions partner, educational publishers must ask how the solution supports these laws and aides the teacher in delivering the curriculum in an engaging, relevant and measurable fashion.

In doing so, it significantly raises the likelihood that students will be kept 'in flow', meaning when the level of difficulty is perfectly adjusted to their individual abilities. A personalised, adaptive, and intelligent learning environment can provide each student with this learning experience.

What are the Benefits of Adaptive and Personalised Learning?

When the curriculum and a real understanding of pedagogy come together with authentic AI technology, it creates an environment for amazing results.

One of the greatest advantages of the technology to students, teachers and publishers are the in-depth insights gained from the masses of data captured. These insights show clearly what's working, what's not, which learning journeys are most effective, and which actions have the best and worst results.

Ultimately for publishers, it balances and informs their intuitions, allowing them to develop products with ever increasing efficacy, and making them active contributors to educational success, both academically and personally.

Through our work with publishers around the world, Adaptemy has demonstrated the value it adds, boosting pass rates, increasing engagement and raising grades.

Grade Improvements

For every five-minute lesson completed, Adaptemy sees an 12.4% improvement in grade. In practice, that means C-level students increase their grade by 24% in 2-3 revisions of one concept.

Week-on-week, that has a significant bearing on grade. Moreover, as the technology becomes smarter, we can expect this improvement in grade, and the resulting benefits for students, improve even further. A trend is already starting to emerge in the data we've captured, where improvement has increased from 6.9% in 2015, to 8.3% in 2016, to 12.4% in 2017 (as stated above).

Pass Rates

In 2016, the pass rate for tests conducted through Adaptemy was 67%. The range for e-learning courses is 60-70%, putting the solution at the higher end of the spectrum. Research and refinement over the subsequent 12 months has seen this rise to 82%.

And no, the content has not become easier. Rather, the content has been presented in such a way that it is better understood by students, increasing their ability to grasp concepts and embed learning.

Enjoyment

Ensuring Adaptemy products empower teachers is central to its premise. This technology puts the student centre-stage. Even the most flexible and experienced teachers can be disconcerted by this shift in focus. Yet Net Promoter Scores rate Adaptemy at +44 - the very top of the scale for teacher feedback.

Engagement

It is well-known that learning happens when you're working. The goal then, of an EdTech solution, is to have more students engaged or, as mentioned earlier in this document, in 'flow', more of the time. Students are mostly out-of-flow, dabbling with content that is too easy or too hard. Experts estimate 'flow' accounts for around 20-30% of learning time. Adaptemy's ability to present the next, best, most relevant content to an individual, sees engagement (or flow) soar to 88%. A substantial leap.

Bringing the Numbers to Life

But Adaptemy goes beyond just numbers. Through our solution, publishers have directly impacted the lives of students.

Two stand-out cases deal with subtleties that would otherwise have been overlooked.

The first is the story of a student who, in the classroom, exams and homework assessments, performed brilliantly. There was no hesitation in declaring this child as competent and 'keeping-up'. Adaptemy however, revealed a different story. Capturing the time to complete an assignment, the technology revealed this student was spending hours accomplishing what should have taken minutes.

The product's real-time data highlighted this anomaly and empowered the teacher to pay closer attention. It was found the student had been compensating for difficulties in learning throughout their school career and would have continued to do so unaided had the technology not been in place. The student was putting an unsustainable amount of effort into keeping up with the class, and due to this effort was not receiving enough personal attention. This insight from using Adaptemy gave enough evidence to the teacher to request and receive additional resources for personalised help for the girl, avoiding future stress and underachievement for that student.

The second student had been labelled 'unfocussed'. They had earned a reputation for being scattered, taking an unconventional approach to learning. Perceived as disorganised and a weak student, Adaptemy revealed something else.

While their approach to learning may have been different to their fellow students, academically they were on a par, with results averaging the same grades as everyone else. Human perception would have coined this student a failure, even by an experienced teacher's vote. And yet the technology exposed the academic truth.

In terms of understanding the concepts, the student was achieving a good score. The teacher gave specific learning, test strategies and tactics to the boy which quickly addressed the student's difficulty in achieving grades in summative testing. Sharing this insight with teachers for other subjects, the student's complete academic performance turned around.

And it's here, beyond the figures and the grades, that we see the true value of adaptive learning. In such an intrinsically human estate as education, it is the stories a student tells of their education that can arguably have the biggest impact on the rest of their lives. If the story of study moves from 'it was difficult', 'isolating' and 'I was misunderstood' to 'inclusive', 'counted' and 'accommodated', the technology has done its job.

About Us

Our journey started in 2013, when we launched our first prototype course. Later that year, we launched our first full curriculum product. By September 2014, our first publisher partnership had begun. A year later, our adaptive classrooms were in use in three countries across Europe.

In September 2016, Adaptemy completed a major investment round, and today we're continuing to build the future of personalised learning with publishing partners around the world.

We are constantly researching and trialling new teaching ideas and technologies.
In collaboration with our pilot schools, partner companies and leading universities, we are committed to delivering more effective learning for different age-groups, subject areas, markets and cultures.

In-depth research is the backbone of our technological advancements. You can read our published research papers at;
adaptemy.com/research

To find out how we can help your organisation develop truly adaptive, market leading adaptive and personalised learning solutions, please get in touch:

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Introductions to Linear Equations

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