# Adaptive Learning: How Publishers Can Transform the Learning Experience

By understanding the full range of adaptive learning models and strategies, educational publishers and institutions can more effectively deliver enhanced digital learning to students while expanding their product portfolios.

## Executive Summary

Adaptive learning can transform the way students learn. Because tailored content and teaching resources strive to understand what a student knows, and how he or she is approaching the task at hand, they can personalize the learning experience. However, unless an organization has a clear implementation strategy, adaptive learning can become a complex and expensive endeavor. So, how can publishers and educational institutions (which often act as publishers) take advantage of this opportunity? This white paper asserts that publishers must ensure that their adaptive learning strategy is closely aligned with and supportive of their overall publishing strategy.

This paper offers a point of view on how publishers can achieve this, through the following means:

- **Understanding the different approaches to adaptive learning.** Publishers must step back and understand the variety of adaptive learning techniques, and consider which they would like to exploit.

- **Aligning adaptive learning strategies with publishing strategies.** Publishers need to decide whether adaptive learning will protect their existing revenue streams or generate new revenue (or some combination of the two).

## Classifications of Adaptive Learning

Adaptive learning solutions come in various flavors, each of which impacts the publisher's workflow and customer base in different ways.

Many products are now branded as "adaptive," meaning they, in some way, respond to the needs of the student. While in some cases this is largely marketing messaging, the label can also be genuine; therefore, it is important to understand what the different types of adaptivity imply (see Figure 1, next page).

When determining which approach to take, publishers need to first determine whether the adaptive product will be marketed and sold on its own; merged into its existing product portfolio as a module of hybrid adaptive/traditional e-learning materials; or offered as an enhancement to an electronic product. The decision will impact the underlying commercial model.

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## The Flavors of Adaptive Learning

| Adaptive Approach | Description | Examples |
|---|---|---|
| **Suggested review** | The student accesses learning content from any source and takes a test. Results are analyzed, and the student is directed to review identified sections of stimulus material. | Coursera courses and MOOCs (massive open online courses) often work with existing content. |
| **Adaptive at the assessment level** | The student accesses content either within the system or externally and takes a test. Learning content is provided, and an adapted test is offered, focusing on areas of weakness. | LearnSmart uses this approach. |
| **Adaptive at the assessment and content levels** | Learning content is accessed within the adaptive system, and a test is taken.  This generates a learning plan that uses statistical analysis; tailored content is then presented to the learner.  The student is then re-tested on prior weaknesses. | Knewton and RealizeIT (and most platforms) can be used in this way. |
| **Highly adaptive** | The system records each step a student takes on the way to solving or answering a question.  Feedback is given at each step or when the student gives a final answer.  This feedback is compared with the model solution, and the next question is selected. | Intelligent tutoring systems such as ALEKS or Carnegie Learning's Cognitive Tutor use this approach. |

Figure 1

Second, the publisher must weigh the extent to which existing content can be re-used, or whether new content must be developed. This question has wider implications for the content workflows of the publisher, in terms of repository, granularity and tagging (see Figure 2).

## Connecting Adaptive to the Publishing Strategy

Once publishers understand the various approaches to adaptive learning, they must identify a strategic focus, whether it is to provide a better educational experience for students, or to conduct research into potential technologies. A foray into adaptive can also be seen as a way to drive customers to e-delivery when an adaptive course is offered alongside a print alternative. However, commercial goals underlie all possible approaches; for instance, is the publisher looking to protect existing revenue streams, generate new revenue or something in between?

Publishers can choose from several commercial models, including:

- **Using adaptive learning to enable marketing messaging.** This means applying minimal resources to adaptive development (i.e., adding a few short tests directing students to specific content) but still enabling a product to be labeled as "adaptive," for competitive purposes.

- **Enhancing a current publishing program.** This requires adding adaptive functionality to an existing electronic product or assessment tool that will enhance the user experience and facilitate increased revenues (both from price increments and volume). In this model, the adaptive element is not sold separately.

- **Developing adaptive modules to complement an existing product family.** With this approach, adaptive learning modules are sold individually.
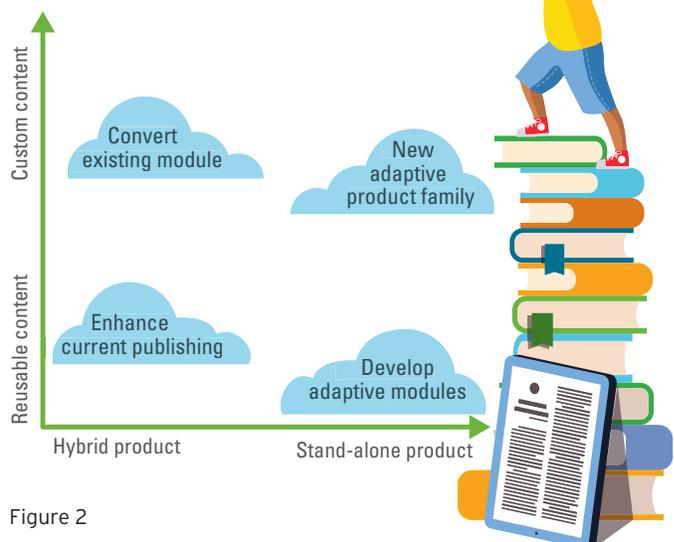
## Adaptive Products



Figure 2

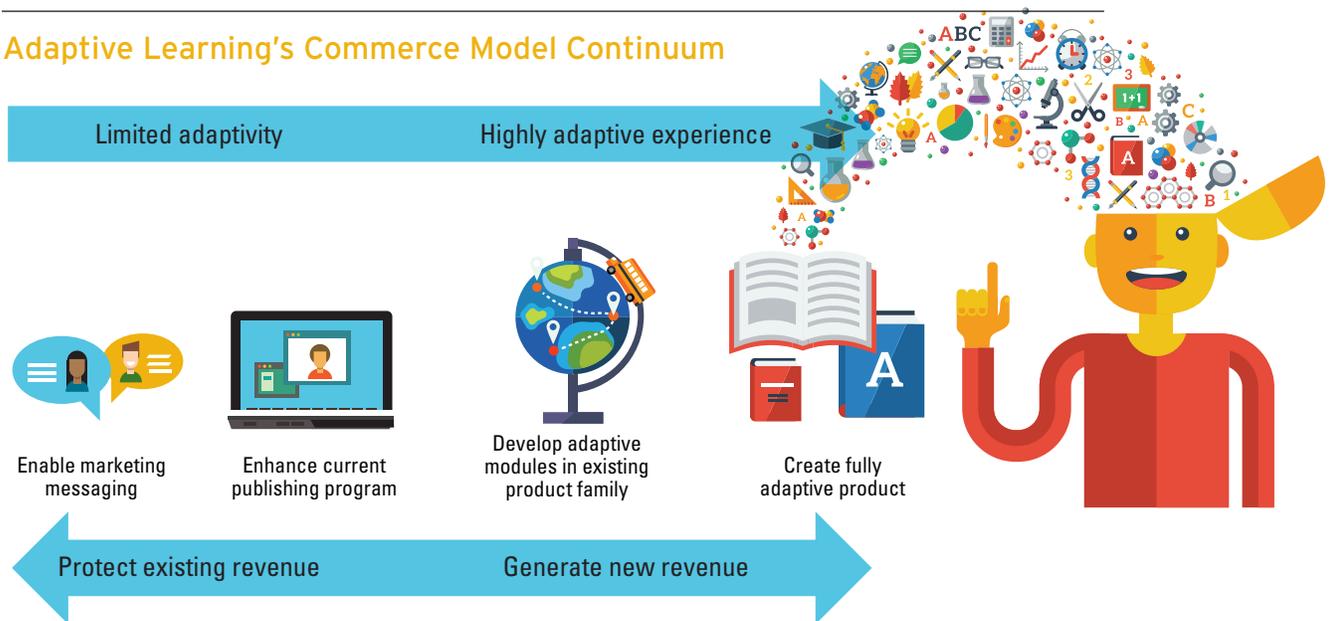## Adaptive Learning's Commerce Model Continuum



Figure 3

- **Developing entirely new adaptive products.** With this approach, the products would be marketed as alternatives to traditional products.

Depending on the approach chosen, the user experience will be transformed to differing extents. Each approach can be seen as a way to support different positions of the "revenue spectrum" (see Figure 3).

### Choosing Content Areas

In addition to determining how adaptive will support the wider publishing strategy, publishers need to select the content areas within which to conduct trials of adaptive learning. Two criteria to consider include:

- **Linear content is easier to adapt than non-linear.** Structured subjects (e.g., areas of mathematics) are typically better suited for developing the learning maps that sit behind adaptive learning. This does not mean that non-linear subjects (e.g., English) cannot be adaptive; it's just that the level of adaptivity will differ.

- **Some subjects are easier to assess than others.** Again, certain subjects (mathematics and science) can be assessed with closed questions (questions with an exact correct answer), making reliable assessment more straightforward. Subjects such as reading can

**≡Quick Take**

### Adaptive Learning: Math

When teaching the multiplication of fractions, a course must cover basic multiplication, fractions and top-heavy fractions before the student can dive deeper into the subject. These modules also support other areas of mathematics, and an adaptive system will keep track of which ones a student has accessed.

be assessed electronically, but they require additional investment to develop question types and long-answer marking approaches.

Commercial considerations may drive the subject choice, in which case the issues above must be taken into account. Whichever approach is chosen, publishing workflows will be affected in the following areas:

- **Creating bespoke content.** Creating content for adaptive purposes is an involved process. Generally, a learning map must be built that identifies all the potential steps leading to a learning goal. These steps then need to be populated with granular content and extensively tagged for re-use.

- **Re-using existing content.** Again, the first step is the generation of a learning map. Existing content must be mapped to this, and any gaps identified and populated. Content may not be adequately granular or tagged appropriately, requiring extra work.

In our experience, it can be more cost-effective to develop content from scratch when building an adaptive system. A Dutch publisher of English language teaching (ELT) materials with which we have worked chose to develop an adaptive product in the area of English learning that was complex and rule-based (grammar). It had originally planned to use existing content, but when it began building its learning map, the publisher discovered many gaps and incorrectly structured content.

The organization changed its approach, deciding to generate the content from scratch. Once it had the structured content, it found that generating new products in different media using this content became simpler. It has now implemented this process:

- Develop learning map.
- Populate the map with content.
- Define learning objectives.
- Deliver product across its portfolio.

## Looking Ahead

Clearly, publishers believe there is demand for adaptive learning solutions. The rise of innovative approaches to learning – such as MOOCs and the "flipped classroom," in which lectures are delivered via video outside of class hours, and in-class time is spent on assignments and discus-

## The Ups and Downs of Adaptive Learning



**PROS**

- Develop a potential new revenue stream
- Refresh existing brands
- Improve learning outcomes for students
- Increase LMS "stickiness"
- Justify increased pricing (around platforms)
- Neutralize curriculum content
- Minimize risk from new start-ups

**CONS**

- Re-engineer content
- Invest in content development
- Transform content workflows
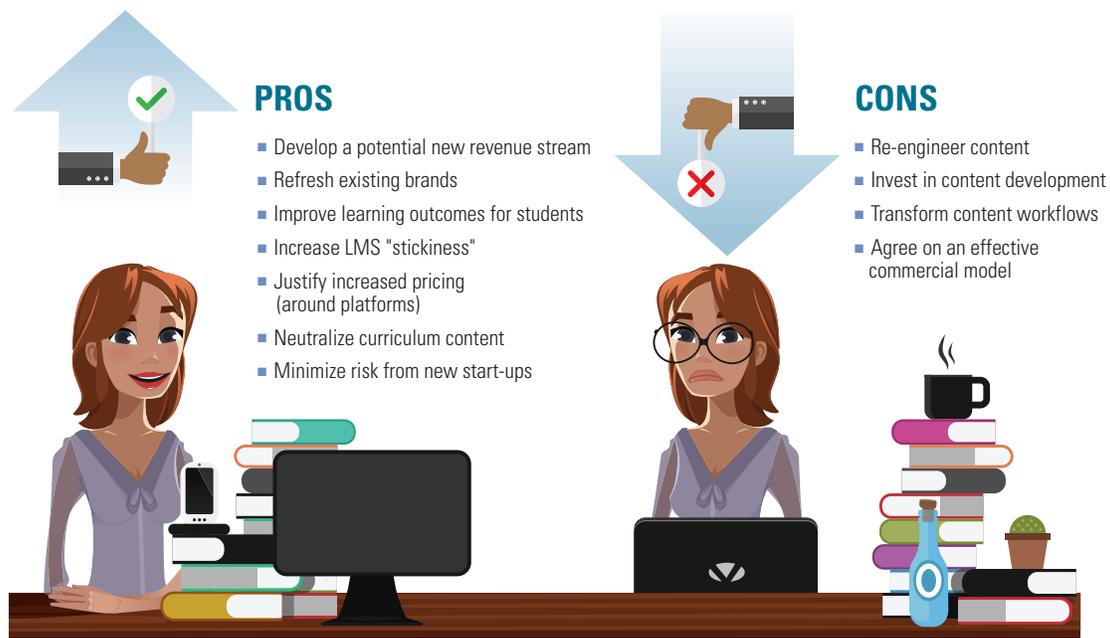- Agree on an effective commercial model

Figure 4

sions – require the personalization that adaptive approaches can provide. For publishers, there are advantages and disadvantages to the approach (see Figure 4, previous page).

To successfully build and deliver an adaptive strategy, we recommend that publishers apply the framework shown in Figure 5. In addition, they need to consider the wider implications within their organizations:

- Workflow changes.
- Enhanced approaches to content management and digital asset management.
- New skills that reflect changes in how content is envisaged, from a linear journey to a series of building blocks.

By following these guidelines, publishers can unlock the potential of adaptive learning and begin their journey to the future of education.

## Cognizant's Adaptive Learning Framework



**DEFINE OBJECTIVES**
Assess what the business is seeking to achieve from adaptive learning.

**DEFINE STRATEGY**
Identify the best approach to adaptive that will help achieve the strategic goals.

**IDENTIFY CONTENT REQUIREMENTS**
Determine whether reusing existing or developing tailored content is the way forward.

**SELECT VENDOR/ PARTNER**
Build a list of potential partners, and select.

**ROLL OUT AND COMMUNICATE BENEFITS TO CUSTOMERS**
Ensure internal and external stakeholders are aware of implications/benefits.

**BUILD**
Develop implementation plan.

**DEFINE ENTERPRISE ARCHITECTURE**
Identify dependencies with existing infrastructure (content management/enrollment/CRM).

Figure 5

## About the Authors

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## Note

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