

To Be, or Not To Be?

The New Challenges of Educational ePublishing



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Everyone learns differently

Table of Contents

INTRODUCTION

CHAPTER 1 4

The Future of Educational Publishers

How an Educational Publisher becomes a Technology Company.

CHAPTER 2 9

From Print to Digital

Steps Towards Truly Interactive Education.

CHAPTER 3 13

Authoring Tool Selection

Your Strategic Decision: a Technological Mess or ePublishing Tranquility.

CHAPTER 4 16

Adaptive Learning

The Next Generation of Educational eContent.

CHAPTER 5 24

Big Data in Education

How can K12 publishers leverage Big Data to boost their business?

CHAPTER 6 29

BYOD

How to deal effectively with the growing presence of BYOD.

CHAPTER 7 34

Flipped Classroom

Why and How to Flip Education?

Intro

Technology is inevitably entering into the classroom reality. It affects practically every aspect of education, including teaching and learning materials and methodologies, collaboration platforms, assessment methods and much more. It is clear that technology can potentially and greatly enhance the classroom experience in all these areas.



However, it is also true that not every technology solution is the right choice. There are many examples worldwide where big investments have been spent without measurable results or true adoption in schools. Buying a tablet for each student is not a solution if not supported by a carefully designed educational digital ecosystem.

Artur Dyro
CEO at Learnetic SA

Development and maintenance of new methodologies and technologies must include many stakeholders, including ministries of education, publishers, schools, individual teachers and students.

In this tutorial we have collected a number of articles where we share our experience in implementation of modern, technology-supported teaching & learning environments along with the teaching methodologies arising from their adoption. We present also a spectrum of possible tools and technologies to build educational digital ecosystems, and we describe the consequences resulting from their selection.

We hope this will be informative for all educational stakeholders making decisions concerning digital strategies.



CHAPTER 1

The Future of Educational Publishers

How an Educational Publisher becomes a Technology Company.

Author: Karolina Grochola
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As digital learning quickly grows in the educational environment, publishers are changing their attitude towards digital solutions from “nice-to-have” additions to the core paper offering, to an important and often strategic part of their business. With that shift of priorities in the portfolio comes a transformation of a publisher’s long established model of operations; now the publisher must perfect a set of skills suited to a more digital-oriented company, without losing their original core competencies. Where will this transition lead?

The tried and tested paths

Let's take a look at the basic business model of a print educational publisher that has proven to be effective for decades. One of the publishers' existential threats, and a constant challenge, has always been the second-hand textbook market. The used books competition market cuts off the publishers' revenues and authors' royalties, and thus impairs return on investment.

Therefore, publishers operate in a cycle – the first edition of a textbook and its revised version that substitutes the original one after a predetermined period of time. Constant efforts are made to force new editions to replace the previous ones. This cycle has been used to allow for driving stable, predictable revenue. By the time sales of a particular edition fall noticeably, the next edition will have appeared and the cycle is repeated.

After a while, an additional incentive to purchase new textbooks has been appended to this model: a CD with various multimedia resources supplementing the print core. Not only have such assets added substantial value to a textbook, but they also enhanced a publisher's image as a forward-thinking content producer. They have usually been ordered from third-party companies and regarded as a nice bonus to the 'real teaching' available in the textbook.

Decline in print sales

Recently we have observed a significant decline in print sales on the educational market, and the first edition/revision model is losing its effectiveness. A few factors that have brought on this trend are worth mentioning.

- Over the last decade, we have observed huge growth among the companies that rent and resell used books via the Internet (e.g. Amazon, Chegg, AbeBooks, Half.com BookRenter.com), especially for higher education. As a result, previous editions of textbooks that cannot be obtained from their publishers or bought in bookstores can be purchased online. Thanks to the Internet, subsequent sales of the same title are far easier than a decade ago.

- The EdTech disruptors are winning significant parts of the educational market by offering effective and attractive educational solutions. This especially influences the sales of hard copies developed for revision or exam preparation, as well as supplemental ‘afternoon education’ courses. Moreover, technology giants such as Google or Microsoft have also invested in educational technology projects. These new players accompanied by the presence of OER have significantly intensified the competition in the educational market.
- But we should not forget about some direct print limitations in the technology of books, which also influence sales. Print courses cannot be aligned with educational trends that nowadays drive the income of many digital educational disruptors. A print book is not adaptative, it does not offer personalized learning, does not deliver Big Data and simply is not that attractive for ‘digital natives’.

This change in the educational market landscape forces educational publishers to reinvent themselves or simply lose the race for the future. Many publishers, particularly key players, have made a strategic choice to widen or even remodel their portfolio creating single-use, personal online products which cannot be shared or reused and offer attractive 21st-century education. Many of them have already reported that their digital solutions exceed hard copies sales. After reporting Pearson's revenue decline and the resulting shares value collapse, the company's Chief Executive John Fallon said: 'So we are taking more radical action to accelerate our shift to digital models, and to keep reshaping our business'.

A Digital Transition

The shift from hard copies to software solutions has opened new possibilities for publishers.

They can collect licensing fees for textbooks that finally cannot be resold. Moreover, in comparison to the hard copies, the extra copies of their digital courses are created practically without cost. They can regularly upgrade their textbooks, leverage Big Data, and experiment with educational trends that may soon become a must-haves with adaptivity as well. Such solutions

not only reduce demand for used and rented print textbooks, but also (and critically) provide functionalities that are not available within OER solutions.

In addition, don't forget that a modern digital portfolio influences a publisher's image of an innovative, trends embracing educator.

This digital shift is also supported by a rising readiness for such education in schools. For instance, according to a study released in 2014, [almost 70% of schools in the UK use tablet computers](#). Such numbers are constantly rising and, accompanied by BYOD, establish critical mass for digital education being adopted in schools. Another example is the fact that hiring technology specialists in schools becomes a standard – a teacher now has school's digital solutions ready at his or her disposal with full technology specialists support.

Reinventing the company

Digital products are no longer unimportant additions to a textbook (or a never-opened CD). They are solutions specially designed to be actively used and bring measurable teaching and learning results. Moreover, they cannot be just simple digital versions of textbooks. Teachers and students expect educational solutions to be as interactive as any other content they exploit on their phones, tablets, and desktops.

In consequence, publishers need to be able to design the right products, market them efficiently and keep their roadmaps on track with control over the time and budget.

The development of internal corporate competencies, both cultural and technological, is a must to operate in this new area. For a digital offer to be coherent with a publisher's developed methods and brand identity, a mix of new blood and the experience of an internal team ensures the best results.

This leads to some challenges to overcome:

- The publisher's editorial teams have perfected themselves for years in a traditional way of designing information layout and preparing exercises and tests. Now the authors need to become content experts adjusting the whole process of presenting information to a modern form of expression. They need to rebuild their model of thinking from creating books to creating

eCourses. In this transition, all content authoring tools that provide ready-made interactive activities and editable templates are invaluable. This helps them become better acquainted with all available options, examine various approaches, and make their processes more efficient.

- The publishers should become competitive employers to attract and retain the engineers and other digital specialists who currently prefer prestigious technology companies or exciting startups over working at a publishing business. It is necessary to provide proper tools, attractive working environments, and dynamism. Another approach is to engage in ready-made solutions (e.g. LMS platforms) whose maintenance and further development are left up to the companies that specialize in this area.

It is necessary for educational publishers to gradually increase their set of technological skills and implement systems that not only support but also drive their future businesses. Similarly to banking institutions that nowadays rely mostly on their IT systems rather than brick & mortar agencies to secure safe contact with their clients, educational publishers should build their competencies around the systems supporting creation, distribution and uninterrupted usage of their new digital methods. It does not mean that they have to build such systems by themselves. However, they should have a certain level of knowledge so as to define their technological needs, select the right solutions, monitor their services' uninterrupted operation or be aware of maintenance needs and systems adaptations due to frequent technological changes.

SUMMARY

The challenges are high as educational publishers' ultimate users are counted in millions, and access to media-extensive materials is practically concurrent. Moreover, these learners are mostly digital natives accustomed to top quality, user-centric experiences that quickly implement new technology.

The K-12 educational publishing has its very distinctive needs which are very different from those in corporate training or higher education, which is where most LMS systems and authoring tools are focused. Thus, selecting the right authoring

tools capable of developing highly interactive materials and relevant platforms ready to deploy them is the strategic decision for years to come. In order to begin this process, it is a good idea to start from the evaluation of [mCourser and mAuthor](#) – a unique ecosystem of an LMS platform and an authoring tool focused specifically on educational publishing business requirements.



CHAPTER 2

From Print to Digital

Steps Towards Truly Interactive Education.

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There are many forms of digital delivery of learning resources. We can call all of them ‘digital learning’. But which of these forms really bring value to digital education? Which are best to choose now and which will become must-haves in the future? There are some key decisions to make when moving content to digital. If you decide to deliver your courses in a particular format, check whether you will be able to utilize them in the coming years and, even more importantly, how they will be received by the market.

We are considering the needs here of two very different stakeholders. Publishers want productivity and cost effectiveness at scale, at the same time aiming to provide products that will help them to win the market. Students and teachers want a course providing a quick and effective way of learning, and they also expect learning to be engaging and intriguing. If you want to find a balance between these needs, it is good to know the options to choose from and what publishing processes are behind them.

PDF

For starters, there is a PDF file of a printed version. In practice, all currently printed textbooks already exist in the PDF format. The only processing needed might be to adjust the image resolution to diminish the file size of the resulted PDF. This solution is simple, cost effective and compatible with almost every delivery system, but is by far inferior to what ‘digital natives’ expect.

Interactive PDF

The next step in digitalization. A traditional PDF might be enriched with multimedia resources like sound and video, hyperlinks or navigation buttons. Such PDF enrichment can be done at relatively low cost and may enhance the effectiveness of a simple PDF version of a course. However, you need to keep in mind that such format will not allow you to track students’ performance. Also, its layout is not suitable for the small screens of mobile devices.

PDF converted to flash

An original PDF textbook can be converted to the Adobe Flash format. After this conversion, some additional functions can be added using the Adobe Flash tools: improved navigation, embedded multimedia resources and supplementary interactivities. The process of conversion is automatic; however, the complex source file format makes it extremely difficult for editors to incorporate any changes or improvements (all, even the smallest corrections, must be made by software developers only). There is still no way to track students’ performance and, of course, delivering a course in Flash limits its use to a desktop. Finally, the technology is limited by the lifecycle of Flash, which is coming to an end.

Static background with hotspots

An original PDF textbook can be converted to a static background overlaid with various hotspots linking to multimedia resources or more complex interactivities. A PDF textbook is usually converted to an Adobe Flash file or a JPG file. Then, various tools are used to create additional resources that are linked from hotspots located on this static background. This process brings a risk of using manual coding, unstandardized tools and file formats. In consequence, any update of a course becomes at a very high unit cost. Once again, we will have no performance tracking, and desktop-only usage here as well.

ePub

This is a popular and freely available format that can be effectively displayed on mobile devices, eBook readers and desktops. It allows for the addition of some multimedia resources and limited interactivities. There are many tools that help to prepare an ePub publication; unfortunately, an automatic conversion of a print-oriented textbook is usually unavailable, especially for complex layouts. Transformation of an existing textbook into a correct ePub format requires extensive manual work. The most important benefit of this format is that it is standardized and therefore allows delivery through many distribution channels. ePub is a popular format, but not fully suitable for LMS-oriented platforms, as it does not allow for performance tracking.

HTML5

A textbook can be converted directly to the mobile-friendly HTML5 format. It is a standardized and popular format that provides almost endless possibilities of adding various resources and interactivities. Broad use of eContent is ensured by HTML5 cross-platform compatibility. But bear in mind that, although there are many tools to automatically convert a PDF file to HTML5, complicated and expensive work by web and software developers is needed to prepare the final version. This also results in complications with corrections or updates. And again, there is no standardized way to track students' performance.

XML Version with a Player

A significant step towards interactivity is the conversion of a textbook to an XML file format that may be rendered to the user by a dedicated Player. Such a Player dynamically creates the HTML5 format based on the XML source file of a publication. This format allows a course to deliver data on student's performance (e.g. number of errors, time spent with a lesson, or a course bounce rate). Also, there are many options to add various resources and interactivities.

Standardized XML source file format eases maintenance of the course and enhances cross-platform compatibility (depending on the Player). This is a future-proofed approach as the publication compatibility with future devices, Internet browsers and operating systems is dependent only on the Player and not the content itself (one Player for all

your publications). But on the minus side, there arises a dependence on a third-party controlled Player. Moreover, a course development process may be complicated and expensive if no proper authoring tool to create XML is available. A natural step after the decision to engage in this format is to find an appropriate authoring tool with, preferably, an open-source Player. As the selection of a proper tool will have a great, long-term influence on a publisher's offer, it's good to spend some time comparing the authoring tools' pros and cons. To do this, it's best to start from [here](#).

SUMMARY

SO, WHAT FORMAT TO CHOOSE? The choice of format depends on the planned usage scenario, reach, and 'lifespan' of your digital publications. Basic formats may be a good choice when there the need is a quick delivery of a short-term solution. If you expect your digital offer to be future-proof, it's better to choose a future-proof format. A simple and cost-effective production process may result in complicated and expensive maintenance. Also, don't forget your users' expectations – most of them are 'digital natives' that take the interactivity for granted. If your courses are really aiming to mark their presence on the market, they should meet the expectations of this demanding group.

Check out our free 'Print to digital' handbook describing the textbook migration: <http://printtodigital.learnetic.com>. It will guide you through the publishing processes and pros and cons of the most important digital formats for K12 textbooks.



CHAPTER 3

Authoring Tool Selection

Your Strategic Decisions: a Technological Mess or ePublishing Tranquility.

Author: Karolina Grochola
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There may come a moment when your company decides it is time to take the next step in interactive publishing. You might reject the model of supporting a panoply of products driven by diverse and outdated technologies, relying on a variety of outsource companies, all imposing their own development concepts. When you take this next step, a crucial step is the selection of an authoring tool allowing the creation of products perfectly aligned with your content identity and your company's heartbeat. This is a strategic decision, as this tool will become a part of your organisation's ecosystem. Moreover, this is a long-term choice because it is difficult to change an authoring tool after having invested a substantial amount of time to get your team savvy and your eCourses done (consider in print the migration years ago from Quark to InDesign as an example). Sometimes, taking such a decision may be postponed for a long time, which makes it even more difficult.

So, what do you need to know to avoid the hassle? How is the market changing and what will be important in the future? Here are some important factors that you should be aware of when choosing the tool.

Productivity

The more intuitive the tool, the faster the work goes: an eCourses are created in a shorter time and on lower budget. It is usually more efficient when the authoring tool is intuitive enough for your internal editors with good knowledge of your products and proven methods to work with the content. This way, instead of bringing a completely new team on board, you may simply enable your people to quickly gain new skills. Therefore, WYSIWYG editing should be one of the main points to check as it provides comfort of use and allows quick and accurate work of a non-technical team. Another example is the availability of a sufficient number of ready-made interactive activities and flexible templates and their alignment with your needs. It may significantly increase productivity as it allows avoiding manual page-by-page layout composition.

Standardisation

What if you want to add some external content to what already exists? What if your courses are to be edited later on by a third party? The standardised XML source file format is something that allows elasticity. Also, the created course should be compatible with the eLearning standards used by LMS platforms. The possibility of creating SCORM or xAPI packages extends the ways of future utilisation of your existing eCourses. A special and unique format working in a bespoke environment will sooner or later become an obstacle to growth.

Versatility of applications

The course you create should be device and system agnostic, because the digital environment changes constantly and educational trends such as flipped classroom or BYOD are becoming more and more prominent. Offline or online use, mobile or desktop? It's best to have it all. The tool should allow wide possibilities as it directly influences your market reach.

Cloud based

Cloud-based eLearning authoring tools allow for efficient collaboration – many users can take part in the creation process of the same course, as it is not nailed down to a single device. It improves the workflow and smoothes the cooperation of project team members who bear different roles in the content development process. Also, avoiding installation or local hosting allows cost reductions and simple tool updates.

Big Data

All data collected when students work with eContent brings completely new opportunities not available for traditional paper-based textbook publishers. The eContent created with your tool should be capable of generating information about the actions taken by your users, e.g. the results obtained while solving interactive activities, number of attempts, errors made or a course bounce rate. Together with the events collected by a particular LMS platform, this creates an invaluable pool of data allowing educational publishers to truly assess the efficacy of their materials. For example, by analyzing the interaction of thousands of students with a particular activity, they can see how difficult it is for the learners and take corrective actions to make it clearer and thus more effective.

Readiness for adaptivity

There is no hotter eLearning topic than adaptivity. An authoring tool should definitely be open to this eLearning trend. Your educational courses could bring powerful results when they dynamically match the presented content with student progress. Highly adaptive content that adjusts to actual learner's abilities may become a must in a few years.

Future-proof approach

Finally, when it comes to the eLearning business, nothing is written in stone. Things that seem to be sufficient now may not meet your needs later. Your publications should be compatible with future devices, Internet browsers and operating systems. Make sure that the tool is constantly developed and open for change. Dependence on a third-party controlled Player is also a trap. An open-source Player ensures that the investment in eContent production is safe and maintainable in the future. Openness for change is a must in this day and age.

SUMMARY

Truly interactive and engaging eContent is something that will have a direct influence on your courses' success. There are many great authoring tools on the market, but you can really ease the challenge of finding a proper one by limiting your choice to the ones that provide the above-listed benefits. [Click here to start your research](#). I also recommend signing up for mAuthor [30 days free trial](#). Check the tool for yourself!



CHAPTER 4

Adaptive Learning

The Next Generation of Educational eContent

Author: Artur Dyro (CEO at Learnetic SA)

“Adaptive Learning” has been a frequently used term in education for many years but today, with the advent of more ubiquitous technology in schools, education systems are placing more emphasis on the advantages of leveraging adaptive techniques within both assessments and instructional programs. Adaptive Learning, in the domain of computer-delivered instruction, is now used as a fairly generic term and can describe a wide range of functionality from the fairly simple to the highly complex. The basic idea of adaptivity in learning is the ability to modify the presentation of material in response to a student’s performance.

Building Effective Adaptive Learning Content

From the 1970s to 1980s “integrated learning systems” were developed that deployed complex and hidden algorithms to determine an individual student’s path through a given set of materials. This type of complex adaptivity today is found in research-based, specialist programs such as DreamBox (Math) or Carnegie Math where the program adapts the sequence and material presented based on analysis of specific learning style and a deep, complex and iterative analysis of a student’s understanding of a mathematical concept. Complex adaptivity is also seen in programs such as Knewton which adapts and personalizes its presentation of material based on its system’s cumulative experience of student responses and errors.

Outside of these specialist developments, the challenge today for any developers of instructional content is whether and how to add some level of adaptivity to their programs or courses, in order to better “personalize” or tailor instruction to a student’s needs. At its simplest level this adaptivity is often referred to as branching technology, where a student’s actions and responses in a task can be calibrated to determine the level and scope of the next activity. In this discussion, I would like to outline some of the issues involved in creating this simple type of adaptivity and describe a set of tools that is available to authors and publishers to create such adaptive content. I will present some descriptions and examples of adaptive resources to illustrate how they work and then introduce one new, simplified approach to building adaptive learning content.

Content Structure

Learning materials, or instructional courses designed to teach new concepts, usually have a hierarchical structure, and adaptivity can be introduced at different levels of this hierarchy. Let me first start with a definition of these levels, and I will then go on to discuss adaptivity at each of the levels. The proposed levels may not match every kind of learning content exactly but in my opinion they should broadly cover most types of instructional resource, course or program.

The basic building block of the hierarchy is usually a Learning Object traditionally represented by a single screen (sometimes with pop-ups and scrolls) usually containing text, various multimedia resources and interactive activities. Learning Objects are usually grouped into a Sequence that in practice

corresponds to a user's single learning session. You might think of a Sequence as a Lesson or a Chapter. The next level of this organization would be the "Course" which is a set of Sequences organized by a hierarchical table of contents. There may also be a higher level of organization, which corresponds to a set of Courses.

Content Or Learning Management System

In most cases, we can assume that all functions and navigation features are performed entirely within the Learning Object and Sequence. In other words, all the content features of a Learning Object and Sequence are not dependent on a Learning Management System (LMS). This also means that all adaptive learning features introduced within the Learning Object or Sequence at this level should work on any Learning Management System.

At the higher level of Course and Set of Courses, we need to assume that these structures are usually managed by the Learning Management System. This also means that the Learning Management System will be responsible for navigation between the Sequences in the same Course, as well as between different Courses and their Sequences.

The above assumptions are critical to our discussion. With a simple authoring tool, we can provide adaptive learning features at the Learning Object and Sequence level and these features will work on each and every Learning Management System, while all adaptivity involving more than one Sequence needs to relate to Learning Management System functionality because the Learning Management System is responsible for navigation between the Sequences and assigning learners to Sequences or Courses. This means that the development of adaptivity at the level of the Course and Set of Courses is more complex and to date has been more difficult due to the lack of industry standards for interoperability.

Learning Material: How To Measure Students' Performance

This is why it is easier for content developers to focus on the first two levels of adaptivity: the Learning Object and the Sequence. Focusing on the Learning Object and Sequence level may, on first consideration, seem very limited but in fact this should be sufficient to enhance the quality of the learning experience for many subjects and topics.

Traditionally, we have used interactive activities, and sometimes adaptive paths, for assessment purposes to evaluate and measure students' knowledge and skills. Interactive activities and, particularly those with adaptivity inbuilt, are not yet so widely used in learning content. Research shows that using interactive activities can retrieve students' knowledge, enhance results as well as making the learning process much more efficient and engaging. Just to digitize the textbook model and provide large chunks of instruction followed by questions is not the most effective way of presenting instructional material. A more subtle approach is to interlace interactive activities with learning material that also offers metacognition – the crucial element of retrieval practice that gives students immediate feedback on what they know and what they do not know.

The additional challenge today when creating instructional content is to add adaptivity to personalize the learning alongside the interactivity providing engagement. First, it is important to enable the student to receive feedback on their interactions, and then to provide more content appropriate to his or her responses. Using one simple authoring tool from which I show examples below, it is possible to create Learning Objects and Sequences that do both these things. With interactivities created in this tool a student answers all the questions (which can be in multiple interactive formats such as select, drag & drop, edit, fill in gap, complete graph etc.) and then selects the “Check” icon available in each Learning Object. All correct and wrong answers are marked respectively. Depending how the learning path is constructed, the student can move on to the next set of content or repeat the whole process until all answers are correct and the overall result is 100%. During this process, the Learning Object adds up a cumulative number of wrong answers after each selection of the Check icon. Without any extra programming of the Learning Objects, the tool will collate and reveal to student and teacher the number of attempts, the wrong answers selected and build a rich report of the student's interactions.

More importantly to today's discussion of adaptivity, the tool can then use those responses, to select what Learning Object

or Sequence of Learning Objects the student is presented with next, based on the number and type of errors in previous interactivities. With the simple authoring tool being described, content authors can build adaptivity logic at both levels: The Learning Object and Sequence. The type and number of errors used to create the algorithms in each activity depends on the type of instructional material being created and its level of difficulty, and should be established by the content authors themselves in each case.

Practical Examples

Two Adaptive Learning Examples

Let me now present two examples of Adaptive Learning content at the two levels: The Learning Object and Sequence.

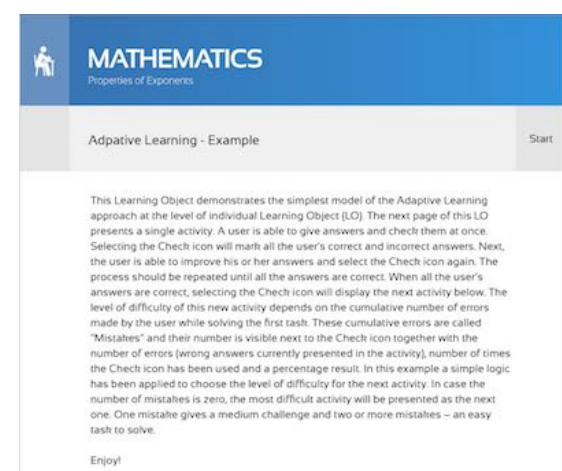
1.) Adaptive Learning at the Learning Object Level

[This Learning Object](#) demonstrates the simplest model of the Adaptive Learning approach at the level of individual Learning Object (LO).

The second page of this LO presents a single activity. A student is able to give answers and check them at once. Selecting the Check icon will mark all the user's correct and incorrect answers.

Next, the user is able to improve his or her answers and select the Check icon again. In this case, the process has to be repeated until all the answers are correct.

When all the user's answers are correct, selecting the Check icon will display the next activity below. (Other approaches that don't demand all answers be correct can also be substituted. For example, a student could also have the option of seeing answers after one or more attempts at a question and then can move on.) The level of difficulty of this new activity depends on the cumulative number of errors (Mistakes) made by the user while solving the first task. This number is visible next to the

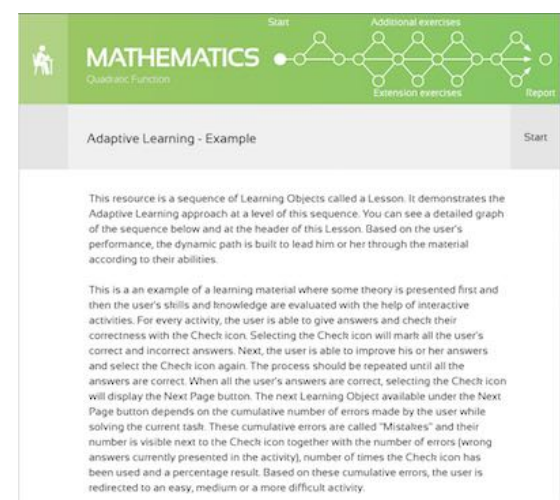


Check icon together with the number of errors (wrong answers currently presented in the activity), number of times the Check icon has been used and a percentage result. In this example, a simple logic has been applied to choose the level of difficulty for the next activity. For the user with zero Mistakes, the most difficult activity will be presented as the next one. One Mistake gives a medium challenge and two or more Mistakes – an easy task to solve. If more than one attempt is made at a question it can help provide better analysis of the type of mistake the student is making and therefore what activity is delivered next.

2.) Adaptive Learning at the Sequence Level

[This resource](#) is a sequence of Learning Objects called a Lesson. It demonstrates the Adaptive Learning approach at the level of the Sequence.

You can see a detailed graph on the first page of this Sequence and at the header of this Lesson. Based on the user's performance, the dynamic path is built to lead the learner through the material according to his or her abilities. This is an example of a learning activity where some instruction is presented first and then the user's skills and knowledge are evaluated with the help of interactive activities.



The way students work with their content is the same as in the above example. A user cannot navigate to the next Learning Object in the Sequence before the a 100% result is achieved. When all the user's answers are correct, selecting the Check icon will display the Next Page button. The choice of the next Learning Object depends on the cumulative number of errors made by the user while solving the current task (Mistakes). Based on the Mistakes number, the user is redirected to an easy, medium or a more difficult activity. Particular numbers of Mistakes for the navigation algorithm were decided on individually for each activity by the course author. The report page at the end of the Sequence is also built dynamically,

depending on the particular path the user has gone through. Only the visited pages are listed in the report and contribute to the overall result of the Sequence. Please note that you can also evaluate this sample by clicking on the graph available at the header of this Lesson. However, if you use this approach, the reporting page (the last page of the Sequence) will not work properly.

The Tool

All the above examples were prepared with the [mAuthor](#) authoring tool and its standard features. You can see more examples of various types of instructional content by visiting the [mAuthor samples section](#). Due to the WYSIWIG nature of the tool, the content was prepared by editors without help from software programmers. One of the key advantages of this tool is that it enables non-specialist developers to build complex Learning Objects and Sequences including Adaptive Learning features.

SUMMARY

Adaptive Learning features can be incorporated at various levels of content organization. Four levels have been proposed in this discussion: Learning Object, Sequence, Course, and set of Courses. In general, only the first two levels are suitable for building Adaptive Learning features so they are available on every Learning Management System platform. Higher levels of adaptivity require a close relation between the tool used to create the content and the Learning Management System to deliver it to the users.

As for the learning materials, counting and analysis of Mistakes (the cumulative number of errors) has been proposed to build Adaptive Learning algorithms as the measure of students' performance as it is useful both in terms of the retrieval practice and metacognition.

It is also clear that the Adaptive Learning content preparation requires more effort than traditional single track content, since more content has to be developed to cover every track yet only a portion of it will be used by an individual student. Unfortunately there is no mystical algorithm will remove this requirement!

Choosing the right authoring tool is crucial as its capability, functionality, and usability determine whether Adaptive Learning content can be built by authors and editorial staff or whether the development process has to be outsourced to software programmers.



CHAPTER 5

Big Data in Education

How can K12 publishers leverage Big Data to boost their business?

Author: Karolina Grochola
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Modern tools for eCourse production and LMS delivery platforms provide a plethora of data that can have an invaluable influence on a publisher's product line. Consumer product companies have long been monitoring such streams of data; now, leveraging Big Data has also found its place in digital publishing. Big Data analysis should be publisher's day-to-day work, as it allows for multiple small-scale case studies leading to constant improvement. This is a chance to understand users and properly meet their needs and expectations.

What data is available? The examples are endless, because we can apply the term "Big Data" to all the data produced during the use of an eLearning solution. We can look for patterns in users' behaviour: teachers, students, school administrators, and any other players undertaking actions in the eLearning environment. We can check the effectiveness of delivered courses, e.g. number of mistakes, time spent or a course bounce rate. We can

create user profiles, analyze the intensity of use in various regions and cities or check the proportions between course usage at home or in school. This data not only provides information about the delivered digital solutions, but may also tell us a lot about related products, such as the print line.

There has been a lot of academic discussion about Big Data, but how can they really be used in practice in the K12 publishing? Here are some practical examples of how the gathered data influence the quality of the courses, user loyalty, sales results, precision of marketing actions, and much more.

Fine-tuning the eCourses

The most common way of utilizing Big Data by a publisher is regular eCourse analysis and improvement to gradually increase effectiveness. The publishers or editors responsible for creation of digital textbooks can assess whether their materials present the initial concepts and ideas clearly and effectively. They learn how difficult it is for students to understand concepts, which particular part of an electronic page or activity creates a problem for learners or is not challenging enough. Analyzing user interactions with a course allows finding relevant pages or even single activities to improve. It consists of looking for exercises with the highest number of mistakes, requests for hints or lessons with the highest bounce rates.

A huge advantage here is that instead of waiting for the next edition of a paper-based textbook, publishers can make all corrections and improvements practically in real time and instantly check the results of their actions. What is more, such constant perfection may, after a while, increase user satisfaction with the materials, and thus lead to greater loyalty and openness to the publisher's other offerings.

But course effectiveness is not the end of the story, as there are other areas ripe for potential improvement. For example, a publisher can verify whether a proposed amount of teaching materials is provided accurately for a particular period of time. Some of the publisher's print and digital textbooks are divided into parts that may, for instance, reflect a school semester. The second part of the course may be opened only two weeks after the semester start date – this could mean that the first part has been overloaded. Moreover, verifying eCourse structure is a great best practice. We can look for patterns within our eCourse – whether it is used in accordance with the

created structure or the sequence of utilizing certain topics is noticeably different from the one proposed. Maybe there are topics that are omitted by a substantial number of users? There is a lot of space for improvement here, and Big Data provides us what we need to get this done.

Comparing methods

It is often the case that a publisher has two or even more methods in the portfolio created for the same subject and the same educational level. Big Data is an important source of information to compare these methods, find their strengths and better position them against each other. Such analysis is particularly important when making strategic decisions concerning discontinuation of an offering.

Maybe one method is used more frequently at school and the other one is more often utilized outside the classroom? When it comes to the level of difficulty – is one method more difficult than the other? The popularity of methods may vary depending on a region or can be correlated with using other methods provided for a different subject or an educational level.

Publishers can also test effectiveness. Sometimes there are different approaches applied in the methods in order to explain the same subject matter: a publisher can check which one is more effective. This can also apply to one eLearning course. If the used tools and platform allow implementing changes easily in a course, a publisher can apply different teaching approaches to one topic and check students' behaviour and results. This leads to identifying a more effective pedagogy.

Rationalizing production

If an eCourse contains elements that are complicated to produce, it is possible to estimate their contribution and importance to the whole course. How heavily are they used in comparison with other course modules? Are they used as home assignments or supplementary exercises at the end of a lesson? And finally, how has replacing a chosen module with a simpler one influenced user's behaviour? The advantages of using Big Data surely outweigh the effort.

Enhanced marketing and sales

Knowledge about users is a key for effective communication – building a knowledge of user profiles on the basis of observed behaviour in the context of e.g. region, educational level, and even gender helps to segment customers and adjust our methods. Recognition of users' preferences and the strengths of offered solutions can be achieved through identifying the most popular lessons or resources. This knowledge is a huge aid in building proper market communication. A publisher knows which values to underline, what is truly appreciated by a user, which problems the solution can solve. Going even further – a publisher knows which lessons will be well received when presenting a course.

The knowledge of the user's behaviour and preferences is a powerful tool for enhancing the sales of print products. Imagine a case where a publisher provides digital courses on an LMS platform to schools and sells print textbooks and other supplementary products to schools. There may be schools that use digital courses of this particular publisher, but buy print products from the competition. The field sales forces may be provided with information what digital courses are most appreciated by school teachers. This can help them to interest a school in acquiring a relevant print product.

SUMMARY

Leveraging Big Data made possible

These examples are definitely not the end of the list. A publisher can explore the applications of Big Data and identify those that best suit his or her business, bringing together their business model with their pedagogical mission. In some cases the data provided by the standard web analytical tools like Google Analytics may be of use, but they do not provide all the information required by the specifics of educational publishing. In order to achieve the above-mentioned possibilities, it is necessary to have a perfect match of an LMS and highly interactive eContent deployed in it. Not every LMS or Authoring Tool available on the market provide access to the data necessary to capture the above-mentioned information. The unique combination of the commercially available [mCourser eLearning Platform](#) and the interactive content created with the [mAuthor ePublishing Development Platform](#) offers all the capabilities described above. All data generated by mAuthor's eContent (and optionally by the

Learnetic's mCourser LMS) is stored in a Google BigQuery database, making it fully accessible by a variety of tools (such as Google DataStudio, Tableau, QlikView, etc). This enables a publisher to perform thorough analysis and attractive visualizations of relevant data.



CHAPTER 6

BYOD

How to deal effectively with the growing presence of BYOD.

Author: **Karolina Grochola**
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BYOD has been discussed for many years. We have witnessed debates over its positive and negative influence on teaching results, its financial pros and cons and its organizational aspects. There is still a lot to consider in order to elaborate the best ways to leverage BYOD, but one thing is certain: it's not going away, and it's a trend that will strongly influence digital education. Therefore, a question now is how a publisher can adjust to BYOD in education.

Voices in the discussion

BYOD is marking its presence in schools worldwide for many reasons – financial, educational, organizational and technological. The major reasons are:

- lack of funding to provide school-owned devices for each student,
- numerous devices supporting wireless internet belonging to students,
- the comfort of using a device a student knows and is attached to,
- pressure from students along with rising parental support for the BYOD idea.

What is more, the most commonly indicated benefit associated with BYOD is increased level of student engagement.

Using a private device makes learning more personalized and student-centered and, as a result, the educational setting becomes better connected to the student's personal world.

Even though there is a big wave of appreciation towards BYOD, there are also voices proving that it disturbs the educational environment and even contributes to the idea that education is not worthy of increased investment.

BYOD already takes place at a large scale

Regardless of various opinions, it is a fact that implementation of BYOD is not just a collection of single cases being a topic of academic discussions. School budgets are never comfortably sufficient and there is a continuous struggle to fulfill a variety of needs. From the budget perspective, BYOD is a tempting cost-saving solution. Schools don't have to spend money either on buying each student a device or on their later maintenance. Especially when a school has made its investment in WiFi and technology infrastructure, BYOD seems to be a natural next step to leverage it.

The number of BYOD implementations is increasing rapidly. [In May 2016 in the UK](#) 9% of secondary schools reported they had some form of BYOD in place and a further 26% were exploring it. Also, the New York City schools began this process widely at the beginning of 2015. In The [Hechinger Report](#), 29% of New York school districts encouraged BYOD already in 2014, and another 20% were developing such a program.

An interesting example of a decisive, broad implementation is Denmark's City of Copenhagen, where BYOD has been implemented in 72 different schools totaling more than 37,000 students and staff. The students are using either school-owned personalized devices or their personal ones.

These are not just things that have been around for a couple of years. BYOD has made its presence in the educational environment for some time now. An interesting survey called '[Impact of BYOD on Education](#)' was conducted in May 2013 by Bradford Networks. It questioned more than 500 IT professionals from colleges, universities and K-12 school districts across the US and the UK. In the survey results, 72% of students used personal mobile devices for class assignments with 52% actually used their devices in classrooms. This trend is even more visible in higher education, as 89% of respondents stated they allow students to use their own devices on campus networks. The rising pressure from students and teachers is also visible, as the respondents from 84% of schools who do not currently allow BYOD stated that they received frequent requests from students and teaching staff to use their own devices on the school network.

The obtained learning environment

If BYOD has such a wide reach, did it contribute to creating any standards among the devices used for education? It did. In short – no standard became the standard.

BYOD school policies often include a 'Device Requirements' section with the requirements concerning the minimum hardware and software parameters; however, there are no specific standards there. Moreover, there are many schools that do not set any specific criteria for the devices and a student can literally bring any device that can be connected to the Internet. In consequence, the learning environments created when students bring their own devices to school are completely diverse. We are dealing not only with various operating systems or screen resolutions but also with varied quality and capabilities of the devices.

In the light of this, educational content must be prepared for all methods of use. If it is not working properly for a considerable part of a class, it won't be used in the class at all. On the other hand, if the provided educational materials allow for an effective

experience on all or at least most of the devices available in class, we can count on a wide and steady use of such materials in schools.

4 pillars for creating a BYOD-ready teaching content

At Learnetic we have been watching the BYOD trend for some time now. When developing our [mAuthor Authoring Tool](#) we always take into consideration its growing presence. Here are four principles we use to assure effective compliance with an unstructured diversity of devices.

1. Device agnostic content player

When content is created in Learnetic's mAuthor, its data, structures, and look & feel is separated from its functionality. The data is interpreted by the player that generates HTML5 code and can be run on different operating systems and devices. Thanks to this approach, once a new device or an operating system appears on the market, instead of adjusting thousands of content pages, it is sufficient to make an appropriate update of the player. There is no need to touch the previously created content.

2. Semi-responsive design

It is possible to predefine layouts of the teaching materials created in mAuthor. When opening a lesson, depending on a screen size, an appropriate layout is automatically chosen and displayed to a student. How is it different from responsive design? The layouts are still in the publisher's control. Therefore, the educational concept of each screen and the instructional design settings will not be lost. The educational content is delivered in a structured and controlled way and can play its role properly, in accordance with the author's initial concept, on any device a student brings to class.

3. No need for the newest & hottest devices

Any middle-shelf, middle-aged smartphone will do. The lessons created in the tool do not have significant system demands and can work smoothly on many less powerful devices. Without sufficient performance, a BYOD lesson can turn into a chaotic and uncomfortable event that

will not bring expected educational results. Therefore, any new features implemented in mAuthor are sure to be working on all devices supporting HTML5, not only powerful new ones. You never know which device a student will use.

4. **Keeping with the digital natives' expectations**

And of course, there is one thing we cannot forget: the digital natives that utilize our content! With all devices, the created content must be interesting, intriguing and truly interactive. Digital education cannot stay behind other digital solutions of today's world. mAuthor provides over a hundred of functional modules that aid the creation of all kinds of engaging interactive activities.

SUMMARY

Regardless of all the discussions about the pros and cons of BYOD, we can assume that it will become more prevalent moving forward. When browsing the web, we can see more and more schools sharing their BYOD experience and BYOD policies. Therefore, along with the constant growth of BYOD, the importance of elasticity and device agnosticism of the provided courses will also grow. An authoring tool that aids in keeping up with this trend and allows providing a high level of interactivity at the same time is a must-have for every ambitious digital publisher of today's education.



CHAPTER 7

Flipped Classroom

Why and How to Flip Education?

Author: Ariel Wrona
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The development of technology is gradually entering into school reality. The desire to convert this trend into tangible benefits is a key determinant of many experiments and innovations in education today. One such project is the flipped classroom – a method well recognized around the world. Its main characteristic is the fact that students learn before class from materials prepared and shared by a teacher. The creation and distribution of these educational materials is aided by new technologies (Internet, e-learning platforms, etc.). However, the flipped classroom is based not only on such superficial principles. This method represents a paradigm shift in the approach to teaching. It constitutes the transition from an education process focused primarily on the teacher – Sage on the Stage, to the one centered on the student and his or her needs, where the teacher is the guide leading students through the twists and turns of knowledge – *Guide on the Side*. The flipped classroom creates a more personalized experience of learning. Therefore, it is what a school should provide pupils regardless of technology, by default.

The Origins of the Flipped Classroom and its Benefits

This method does not have one creator or a common model. The flipped classroom initially functioned in different forms and ranges as an experimental method conducted on individual university courses. Academics provided their students with printed materials before the classes to be able to proceed immediately to a substantive discussion during the next gathering. Then, thanks to the increased involvement of technology in everyday life, all materials gradually became digitized and distributed through e-mail. The use of ICT devices enabled sharing not only the usual texts but also videos, audio files, or illustrations in high resolutions. Pioneer initiatives were established such as OpenCourseWare of the Massachusetts Institute of Technology (2001) and Khan Academy (2006), which offered free access to high quality resources and educational films.

The flipped classroom is assumed to have been officially established in 2007 by two American teachers: Jonathan Bergman and Aaron Sams. They recorded their lectures and shared them on the internet with students unable to participate in their classes for various reasons. They quickly observed that these recordings were very popular beyond their own student base, and that the digital form significantly increased their impact.

One of the most spectacular examples showing the benefits of using the flipped classroom method was the case of the American Clintondale High School in the suburbs of Detroit, Michigan. Its students' results placed them in the ranking of the worst 5% of the state. The effects of the evaluation carried out in 2010 by teachers at the end of the first year of school education (grade 9) showed that the percentage of subjects failed by the students was very high. As many as 52% of students did not pass English classes, 44% failed mathematics, 41% had problems with natural sciences (biology, chemistry, physics), and 28% did not pass social sciences (economics, history, psychology, social studies). In addition, an increasing truancy rate indicated that there would be no improvement. This situation forced the headmaster of the institution, Greg Greene, to seek unconventional solutions that would change his students' attitude to learning and improve their results. A 20-week experiment carried out by a teacher, Andy Scheel, who was leading two groups of students: one

in the traditional manner, the other through the flipped classroom method, it turned out that the results of the second group were so good that they decided to turn education upside down at this school.

With the help of the company TechSmith, the school developed useful methods for registering teachers' presentations and distributing them among the students. The system introduced in Clintondale assumed that at-home students would get to know the materials recorded and shared with them by the teachers and their previous homework assignments would be solved during classes under the teacher's supervision. Thanks to this process, the amount of time teachers spend in direct contact with their students has quadrupled. After one year of classes conducted in this form, students' performance has changed significantly. The percentage of failed exams at the end of the first year of studying English has fallen to 19%, mathematics to 13%, natural sciences to 19%, and social sciences to 9%. The school still uses the system, which has gained fame among both teachers and students.

The case of Clintondale High School is described in detail on the school website, where you can find more information on flipped education based on a specific example, the opinions of students and teachers about the method and, most importantly, the materials created by teachers. This gives you the unique chance to read through the well-proven way of teaching through the flipped classroom method, or to adapt the ready-made materials to your lessons.

How to Flip a Classroom

There are many opportunities to start working through the flipped classroom method because, as mentioned before, there is no officially accepted model, which would impose the tools or ways of changing the education process. It is possible to freely adjust the method depending on groups' needs, preferences, and teachers' abilities. The flipped classroom is commonly associated with short video films and tutorials prepared by the teacher, in which he or she presents important issues for students to learn and understand before the next class meeting.

The advantages of using video films for this purpose were already noted in 2004 by Salman Khan when he conducted and

recorded math tutorials for his niece. He explained that by using a film we give students an opportunity to stop at any time and rewind the material to a chosen point and, what is most important, we give them a chance to return to the material at any time. Another advantage is that the film distributed via public and free services such as YouTube or Vimeo can be used by other teachers in their classes. In addition, it is assumed that creating and using educational materials in the form of multimedia is much more attractive for today's teenagers and better appeals to their lifestyle. However, the film itself is not the most impressive and effective asset to be used in the flipped classroom. Currently available tools give teachers the ability to integrate video, audio, animation and dedicated interactive exercises in order to engage students in learning to the greatest possible extent.

How can the flipped classroom be executed by a teacher? Learnetic's [mCourser eLearning Platform](#), where highly interactive content packages can be deployed and assigned to students, can be a great aid in this respect. A teacher registered in the platform can select a particular digital lesson or other part of available eContent and instruct students to go through it at home. They can then either get acquainted with the material at home using the platform or even download it to the dedicated offline mLibro application and comfortably prepare for class anywhere they want. Working in class can, later take a form of discussion or focus on the difficulties and further questions from students.

Operating such platform is also a good way to conduct effective repetition classes. A teacher can provide selected repetition lessons before class and then analyze the results via the platform and diagnose students' difficulties. Moreover, students can view their progress reports, identify their weak points and ask a teacher relevant questions later on. School classes can mainly focus on helping students in their problematic areas.

SUMMARY

The main advantage of the flipped classroom is the possibility of making students more independent. The ability to manage their own learning process is the basis for making future efforts related to self-education, which in the era of web resources is becoming increasingly important. In the flipped classroom,

students review the material before the classes, and therefore they can adjust the speed of acquiring new information to their abilities. The teacher, on the other hand, is relieved of the obligation to present new material in class, and the time thus saved can be used for creative discussions or solving problems. Moreover, thanks to a more frequent teacher - student contact and with the help of eLearning platforms, an educator is now able to read a detailed report on specific problems faced by particular students. Applying the flipped classroom method with the use of such tools allows students to learn not only by reading texts previously prepared by the teacher or watching his recorded presentation, but also through solving interactive exercises. This way of learning is more engaging, helps the learner acquire new information, and gives him or her a chance to create a well-established and multi-tiered knowledge.



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