Tools behind a self-regulated, adaptative, learning in the online educational environment
AGENDA

Reflections about learning

Adaptative Learning

Iron triangle in education

Evolution of technology in education

Types and tools of adaptative learning

Results „Learning to Adapt 2.0“

My experience on online teaching and learning

Didaktik-Forum der THB 2018
Learning is VERY personal

Learning is an autonomous activity initiated and controlled by the learner. The same stimulus presented to multiple learners may result in learning for some, but not others. For learning to occur there needs to be a connection, interaction or context identified.

The work of educators can no longer be confined to presenting or exposing learners to common information or stimuli.
Adaptive learning theories

**Constructivist Theory** emphasizes that individuals learn best when they actively construct their own knowledge and understanding.

Theory of **Cognitive Flexibility** is the ability to restructure knowledge in multiple ways depending on the changing situational demands (i.e. difficulty or complexity of the situation).

**Learning Style Theory** advocates that individuals are all different and they should learn in different ways.
Learner Independence Continuum

Knowing how to learn, un-learn, and relearn. We need learners who can problem-solve, collaborate, analyze and think critically to foster independence in all our learners.

James Rickabaugh, PhD, Institute for Personalized Learning
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Students in the 21st Century

• Non-traditional students are the “new normal.” Different initial knowledge and learning rates.

• Mastery (Competency) is the goal.

Only 22% of the world finishes high school, and only 55% finish sixth grade. As a species, we're wasting almost 4/5 of the talent we produce.
CUSTOMIZATION IS IN!

PERSONALIZED YOUR PRODUCTS FOR YOUR CUSTOMERS
A definition....

Adaptive learning is a more personalized, technology-enabled, and data-driven approach to learning that has the potential to deepen student engagement with learning materials, customize students’ pathways through curriculum, and permit instructors to use class time in more focused and productive ways. Adaptive learning aims to make a significant contribution to improving retention, measuring student learning, aiding the achievement of better outcomes, and improving pedagogy.

Tyton Partners Resources
• **Personalized Learning Technology** is referred to by many names, including individualized instruction, student-centered learning, and adaptive learning (Glossary of Educational Reform, 2015)

• **Personalized learning** is defined as a “highly focused learning path for each student” (Educause, 2015)

  “teach to the middle” means leaving behind those who need more support and underserving those who need more advanced content.

• It lets students choose **where, what, how, and when** they learn, thus providing flexibility to ensure mastery of the educational content” (Abel, 2016)

• Personalized learning can be used with adaptive technology platforms to automate and scale the individualization process to **tailor the learning experience for each student**.
• In 2015, it is estimated that U.S. educational technology companies received $3.6 billion in angel and venture capital funding specifically designated for learning technology (Ambient Insight, 2016)

• A shift away from “student access to curriculum” and toward “degree completion” (LeBlanc, 2016)
Three components of every adaptative learning platform

- **Learner profiles** are the driving force behind personalized learning. They are data-rich, easily accessible, with usable information to plan and assist learning. They reflect how students learn best, their current level of learning, information on progress made and next challenges to address, and hints and tips for success. They provide the real-time information to inform instructional decisions.

- **Customized learning paths** are the unique roadmap developed with each student toward the learning objectives they need to master. Learning paths typically are jointly developed by the educator and the learner. Learning paths are more than a course selection guide. They should cover the specific learning objectives aligned with the standards that a learner has yet to master and the way they will go about gaining and then demonstrating mastery. Progress along the path leads to college, career, and life readiness.

- **Proficiency-based progress** enables learners to progress based on the learning objectives they have mastered, not on a grade they have received on a test or a course. This allows real learning to be the currency, not grades. Authentic, direct assessment is paced according to learner needs and readiness of the learner to demonstrate what they know and can do.
Personalized learning elements

©The Institute for Personalized Learning
Model based adaptive tutor

Domain Model

Pedagogy Model

Learner Model

Algorithms
Processing the knowledge represented in the model

Learner Interface

Adaptive Content
Learning content (e.g., text or video) adapted to the needs and capabilities of the individual learner

Data Capture
The learner's interactions, achievements, affect (emotion), speech...

Data Analysis
AI techniques (such as machine learning and pattern recognition)

Open Learner Model
Making the learning explicit, for teachers & learners to see

Feedback
Iron Triangle in education

Cost

Access  Quality

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AVERAGE INSTRUCTION AND STUDENT SERVICE SPEND PER COMPLETION, FALL 2013*

<table>
<thead>
<tr>
<th>Level</th>
<th>Low Distance</th>
<th>High Distance</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Year</td>
<td>$32,125</td>
<td>$25,450</td>
<td>-21%</td>
</tr>
<tr>
<td>Public 4-Year</td>
<td>$51,738</td>
<td>$41,728</td>
<td>-19%</td>
</tr>
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</table>

AVERAGE COMPLETIONS PER 100 FTES

<table>
<thead>
<tr>
<th>Level</th>
<th>Low Distance</th>
<th>High Distance</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Year</td>
<td>27</td>
<td>33</td>
<td>20%</td>
</tr>
<tr>
<td>Public 4-Year</td>
<td>25</td>
<td>28</td>
<td>9%</td>
</tr>
</tbody>
</table>

NOTE: Low distance = up to 25% and high distance = 25%+ portion of undergrad students taking at least 1 course at a distance.
* Analysis only includes institutions with greater than 2,000 FTEs.
Sources: IPEDS; Tyton Partners analysis
Arizona State University’s re-designed a mastery-based math courses with adaptative learning have revealed an 18 percent increase in pass rates and 47 percent drop in student withdrawals. ASU leadership estimates that the institution has retained $12,000,000 in what would have been lost tuition revenue to date.

A study consisting of nearly 700 students across two state universities and four community colleges indicated that the community college students using adaptative learning, as compared to those using end-of-chapter testbank questions, achieved higher course pass rates across all students – i.e., 7 percent average increase – and an average increase of 8 percent in retention rates.

Six public universities participated in a randomized controlled study, with statistically reliable control and treatment groups, in which students enrolled in Open Learning Initiative’s introductory statistics course. The study found that students completed the OLI course 25 percent faster than students in a face-to-face version of the course while achieving similar performance levels, findings that remained consistent irrespective of the demographic, gender of the students.

At the University of New South Wales, the introduction of online adaptive tutorials in a foundational first-year Engineering Mechanics course led to a decline in the course drop-out rate from 31 percent to 14 percent, even as course enrollments increased by nearly 30 percent to more than 350 students.

McGraw-Hill Education adaptive learning technology improves student retention by as much as 20 percentage points, and pass rates by as much as 13 percentage points. It enables instructors to spend 72% less time on administrative tasks and 90% more time on active learning experiences,
# Enrollment Growth by Type of Institution and Delivery Method

<table>
<thead>
<tr>
<th></th>
<th>4-Year Public</th>
<th>2-Year Public</th>
<th>4-Year Private Nonprofit</th>
<th>2 or 4 Year Private For Profit</th>
<th>Total Institutions**</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exclusively Online</strong></td>
<td>6%</td>
<td>4%</td>
<td>5%</td>
<td>-6%</td>
<td>2.2M</td>
</tr>
<tr>
<td><strong>Blended</strong></td>
<td>10%</td>
<td>1%</td>
<td>9%</td>
<td>9%</td>
<td>3.1M</td>
</tr>
<tr>
<td><strong>Face-to-Face</strong></td>
<td>-2%</td>
<td>-3%</td>
<td>-1%</td>
<td>-13%</td>
<td>12.2M</td>
</tr>
</tbody>
</table>

### Undergraduate Enrollment (2016) & Compounded Annual Growth Rate (2014-16)

- **Undergraduate Enrollment (2016)**: 5.2M, 4.1M, 2.2M, 2.0M, and 3.0M.
- **Compounded Annual Growth Rate (2014-16)**: Green bar for ≥ 5%, yellow bar for 0 to 5%, red bar for ≤ 0%.

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* Blended defined as students enrolled in some but not all online courses.

** Total institution enrollment does not include institutions categorized as less than 2-years and 2-year private not-for-profits.

Sources: PEDES, Tyton Partners analysis.

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Digital Trends in Higher ED

- 85% of students use mobile devices to study, up 40% since 2013
- 77% of students say adaptive technology has helped them improve their grades
- 62% of students say that technology helps them feel better prepared for classes
- 48% of students say that technology helps save them time

*Results based on survey of nearly 1,000 college students aged 18+ who are currently enrolled in higher education institutions across the U.S.*
The evolution of technology in education. A paradigm shift occurs with each introduction of enabling technology, resulting in a prevailing implementation.
History


Noam Chomsky- cognitive science- revealing the mental representations and rules that underlie our perceptual and cognitive abilities.

Computer assisted intelligence (CAI), often synonymous with (ITS) Intelligent Tutoring Systems.

All spring from the melding of computer science, cognitive psychology and educational research into what we know as cognitive science.
Types of adaptive learning

Common introductory courses, such as college-level algebra or remedial math, responding to students like an automated tutor. Example: My math lab, Math Maverick. Software keeps track of what correlates with each student's successful and failed attempts to learn and apply different lessons. Example: Cerego, Adaptive Learning.

Customizable adaptive platforms, which faculty members can tweak and also be used with more abstruse course material. Example: Smart Sparrow.
Digital adaptive learning tools

Adaptive Content
Feedback & Hints
Additional Learning Resources
Content Scaffolding or Branching
Adaptive Assessment
Practice Engine
Benchmark Assessment
Adaptive Sequence

Pearson MyLab
What’s Behind Adaptive Sequence: How are Instructional Decisions Made by Adaptive Learning Tools? Steps to changing Sequence

1. Collect
2. Collect
3. Collect
4. Collect
5. Collect
6. Analyze
7. Analyze
8. Analyze
9. Analyze
10. Adjust

**Change path**

- **Learner Analysis**
  - How does it analyze the students' performance data?

- **Skill Selection**
  - How many skills can it choose from to assign next?

- **Content Analysis**
  - How does it select the specific pieces of content a student will use next?

**Type**
- What type of data is collected and used?

**Granularity + Difficulty**
- What levels of knowledge are captured?

**History**
- Does the tool consider a learner’s previous performance?

**Match**
- **Delivery**
  - How is the content delivered?

- **Amount**
  - How much content is provided?

- **Design**
  - Is there a relationship between the content?
WHICH TYPE OF ONLINE COLLABORATION DOES YOUR ADAPTIVE SOLUTION FACILITATE?"

Percentage of profiled vendors which select communication and collaboration features

Learning to Adapt 2.0
SUPPLIERS TO DESCRIBE THEIR PLATFORM’S CONTENT MODEL AND CUSTOMIZATION FEATURES

Percentage of profiled vendors with select faculty customization capabilities

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Percentage of profiled vendors using selected sources of content

- Open Educational Resources: 70%
- Publisher Content: 65%
- Customer-Generated Content: 60%
- Vendor-Generated Content: 50%
- Real-Time Media: 15%

*Note: Vendors, on average, reported the use of 2-3 different sources of content.*
• [https://www.youtube.com/watch?v=UB4bm96clTw](https://www.youtube.com/watch?v=UB4bm96clTw)
Advantages and disadvantages of adaptive learning in higher education

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accelerate students time to graduation</td>
<td>Cost for institution</td>
</tr>
<tr>
<td>Prevent excessive course taking</td>
<td>Faculty reliance on computer instruction</td>
</tr>
<tr>
<td>Cost saving for students</td>
<td>Limited research</td>
</tr>
<tr>
<td>Customized learning path</td>
<td>Conflict with teaching paradigm</td>
</tr>
<tr>
<td>Measures student learning</td>
<td>Used incorrectly can take place of teacher</td>
</tr>
<tr>
<td>Personalized, immediate feedback</td>
<td></td>
</tr>
<tr>
<td>Allow faculty to utilize class time for more focused ways</td>
<td></td>
</tr>
<tr>
<td>Deepen student engagement</td>
<td></td>
</tr>
<tr>
<td>Higher quality learning experience</td>
<td></td>
</tr>
</tbody>
</table>

EdTech Review
• My experience at Universidad Isabel I
Psicología de Grupos

Equipo Académico  Guía Docente  Temporalización

* Tablón de anuncios
* Cafetería
* Elección de vía de seguimiento (opciones de evaluación)

Unidad didáctica 1

• Foro de dudas UD1

Contenidos teóricos

• Unidad didáctica 1: Composición y estructura de grupo

Actividades evaluables

• Estudio de caso UN1: Didaktik-Forum der THB 2018
There is no greater education than one that is self-driven.

Neil deGrasse Tyson