AN AUTHORING TOOL FOR ASSISTING TEACHERS ON PEDAGOGICAL DECISION MAKING

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Agenda

- Contextualization
- Problematic
- Research Questions
- Objectives
- Pedagogical Decision-Making Process
- Conceptual Framework
- Next Steps
- References
• eLearning Worldwide

- Worldwide E-Learning Market by 2016: $51.5B
- Annual worldwide growth rate over the period 2012-2016: 7.9%
Contextualization

- eLearning Worldwide

![Growth by region chart]

The chart illustrates the growth of eLearning by region. The regions are categorized as North America, Latin America, Western Europe, Eastern Europe, Asia, Middle East, and Africa. The chart highlights that the growth is driven by Russia and by India, China, and Australia.
eLearning in North America

- In 2012, about 6.7 million college students were enrolled in, at least, 1 online course
- In 2013, this number increased about 6% (7.1 million college students)

Source: Babson Survey Research Group, 2014
• eLearning in Brazil
  – In 2012, about 5.8 million students were enrolled in distance learning courses
  – In 2013, this number increased about 52% (8.8 million students)

Increasing number of online courses
- Online courses are based on Online Learning Environments
  Source: Chrysafiadi, 2013

A Paradigm Shift in Education
- AAA Learning
  - Anytime
  - Anywhere
  - Anyone
  - Brings new challenges
  - Relies on Information and Communication technology
  Source: Bittencourt, 2009
Imagine a teacher that, in the end to the course, faces the following pedagogical scenario...
Problematic

Source: [DUKE, 2013]

Bioelectricity: A Quantitative Approach
Roger Coke Barr
Nerves, the heart, and the brain are electrical. How do these things work? This course presents fundamental principles, described quantitatively.
Problematic

first and last video for each week

Week 1 Intro... Week 1 Review Week 2 Intro Week 2 Review Week 3 Intro Week 3 Review Week 4 Intro Week 4 Review Week 5 Intro Week 5 Review Week 6 Intro Week 6 Review Week 7 Intro Week 7 Review Week 8 Intro Week 8 Review

Total Views

Total Views

9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Online environments almost inevitably produce huge volume of data [...] [FOLEY, 2006]

Web-based learning environments are able to record most learning behaviors of the students, and are hence able to provide a huge amount of learning profile. [ROMERO, 2007]
• What happened?
• How could the teacher have figured out what happened?
80% of teachers surveyed felt uncomfortable using computers, and reported difficulty in understanding how to use technology to support an engaging and meaningful learning environment.

[DUHANEY, 2000]
Let us imagine this teacher discovers the characteristics of this problem.

Students could not answer week’s 1 exercises]

Which (pedagogical) decisions could be made?
Teachers’ pedagogical decision making is a complex process. In the teaching and learning process, a pedagogical decision making involves intuitive, analytical and deliberative decisions.

[SAAD, 2009]
Let us imagine the teacher made a decision.

[The teacher created new exercises]

How could he know he made a good decision?
Among the reasons for the lack of deeper technology knowledge by teachers, the greatest is that it takes many hours of specific training to acquire it.

Teachers’ technology knowledge is limited, consequently applying it to a meaningful learning context needs direction and support.

[MOREHEAD, 2005]
Let us imagine this teacher was able to make appropriate decisions.

How could he have done that...
... before it was too late?

Source: [DUKE, 2013]
Research Questions

• **RQ1:** How can we assist teachers in discovering pedagogical issues within a learning environment?

• **RQ2:** How can we assist teachers in making good pedagogical decisions?

• **RQ3:** How can we assist teachers in constructing pedagogical solutions, on the fly?
Objectives

• **O1**: Propose a process for pedagogical decision-making

• **O2**: Propose an authoring tool for constructing pedagogical approaches
Pedagogical Decision-Making Process

- Lessons Learned from an Online Open Course: A Brazilian Case Study
  - ACM SAC 2014
  - First version of the process
- A Systematic Approach for Providing Personalized Pedagogical Recommendations Based on Educational Data Mining
  - ITS 2014
  - First version of the process
- Improving Pedagogical Recommendations by Classifying Students According to their Interactional Behavior in a Gamified Learning Environment
  - SAC 2015
  - Extended version of the process
- A Systematic Approach for Assisting Teachers in Pedagogical Decision-Making
  - Computers and Education
  - TO BE SUBMITTED
Conceptual Framework

Authoring Tool

Scenario 1
Scenario 2
Scenario 3
Scenario N

Pedagogical Process

Educational Data

Online Learning Environment

Teacher

Students
Next Steps

• Systematic review on educational authoring systems
  – In progress

• Propose the authoring tool

• Evaluate
Thanks for Your Attention!

Questions?
An Authoring Tool for the Creation of Pedagogical Scenarios
UI

Recomendações

Mineração

Controlador

Persitência

Cenário 1

Cenário 2

Cenário N

API 1

API 2

API N
With this new paradigm, teachers have new responsibilities:
- Deal with large volume and diverse data
- Promote personalization
- Discover and filter relevant information
- Use relevant information
Pedagogical Scenarios

According to (RALSTON, 2006) scenarios are a chain of events that unfold to an imagined conclusion.

Adapting this definition to fit it in the Computers in Education area, Pedagogical Scenarios are a series of related pedagogical events, occurring in a learning environment, that leads to a pedagogical consequence or state.