Development of inverse pedagogy through the implementation of a wireless response system: lessons learned from the Geomatics course

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UN-GGIM academic network

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Objectives of Academic Network

- The **UN-GGIM Academic Network** will be a coalition of recognized universities, research and education centers or equivalent involved in the research, development and training on geospatial and land information and related matters.

- The **Academic Network** will be a platform for the academic community to provide input and to support UN-GGIM in achieving its vision and goals by generating a platform for academic community to input to the UN-GGIM process in the form of strategic knowledge, research, education and training, and will be a strategic arm to empower UN-GGIM to achieve their vision and goals.

- The **Academic Network** will provide both research and education capabilities for UN-GGIM and affiliated members to identify and response to challenges and opportunities in which UN-GGIM and related UN offices can achieve their visions.
Academic Network Task

Team Members

- Prof Abbas Rajabifard, The University of Melbourne, Australia (Chair)
- Prof Daniel Páez, University of Los Andes, Colombia (Secretary)
- Prof Huayi Wu, Wuhan University, China
- Prof Joep Crompvoets, KU Leuven, Belgium
- Prof David Coleman, University of New Brunswick, Canada
- Prof Harlan Onsrud, University of Maine, USA
- Prof Menno-Jan Kraak, University of Twente, Netherlands
- Prof Josef Strobl, University of Salzburg, Austria
- Prof Maria Antonia Brovelli, Politecnico di Milano, Italy

Academic Network Report

Helsinki Finland
29 May - 2 June 2017
Have you seen this?
Mobile Phone Usage By Age

Source: Nielsen, February 2013
INTRODUCTION

This article describes and evaluates INVERSE PEDAGOGY in two undergraduate student classes taking the Geomatics course at Universidad de los Andes.

In the case of Universidad de los Andes:
- the Geomatics course is mandatory in the Civil Engineering and Environmental Engineering curriculums
- Covers basis surveying and spatial analysis
- an average semester has 90 students in each class
- 3 lecture hours and 3 practice hours per week, for 15 weeks.
METHODOLOGY

Ensure that courses are comparable
- Size, content, instructor

Choose the tools:
- Videos, clickers, forum

Apply a survey
- Satisfaction, interactive class, commitment, learning perception
Tool used
FIG WORKING WEEK 2017
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Tool used

Comosite sketch
Confidence
Data collection
Direction

Expression
Highlighting
Image upload
Long answer
Many choice
Matching
Multiple choice

Priority
Ranking
Region
Short answer
Sketch
Word cloud
Slide

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A positively charged rod is held near a neutral conducting sphere as illustrated below. A positively charged particle is moved from point A to point B at constant speed. The potential difference from A to B is:

A. positive
B. zero
C. negative
D. depends on the path taken from A to B
E. cannot be determined without knowing more about the polarization induced in the sphere
The survey given to the students asked about specific learning activities. These were based on prior experiences from literature (Conole, 2007; Marcelo, Yot & al., 2014), and covered aspects such as: satisfaction, interactive class, commitment and learning perception.

As strategies to isolate the effects of the use of virtualization and clickers, the following was considered:

- The contents or class themes to be covered should be exactly the same in both sections.
- Tests, as well as their weight in the students’ final scores also had to be exactly the same.
- Tests were administered at the same time and under the same conditions for both groups.
- Students in each section were not aware of the differences in the pedagogies used.
## RESULTS

<table>
<thead>
<tr>
<th>Exam #</th>
<th>Section A</th>
<th>Section B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>3.12</td>
<td>3.07</td>
</tr>
<tr>
<td>Exam 2</td>
<td>3.67</td>
<td>3.65</td>
</tr>
<tr>
<td>Exam 3</td>
<td>3.08</td>
<td>3.50</td>
</tr>
</tbody>
</table>

Take-outs: not direct correlation with exam results

However, the performance of those students who used the Learning Catalitycs tool throughout the semester displayed a **15% improvement** when compared to those who did not use it.
Results from the surveys (only those using tools)
 RESULTS

Perceived strengths

- Makes the class more dynamic, active, and interesting
- Facilitates teacher follow-up on subjects
- Encourages debate
- Educational and interactive
- Eco-friendly assessment tool
- Improves learning
- Helps prepare class
- Ease of use
- Promotes class attention
- Increased participation
- Allows self-assessment
- Improves interaction
- Facilitates scoring
- Efficient
- It is a tool for studying
- Speed and immediacy
Disadvantages

Inconsistent questions
- Poor management on the teacher's behalf
- Little interaction with the teacher
- Generates distrust
- Time is lost
- No learning
- Boring
- Insufficient response time

Use of personal data plan
- Disorder
- Important subjects are left behind
- Inefficient
- Technical failures (answers are deleted)
- A device is required

Students copying each other

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CONCLUSIONS

The study shows that the use of TC tools enables self-learning and promotes interactivity with the teacher in large sized classes. Likewise, Learning Catalytics is a user friendly tool that enables variety and a wealth of learning activities that few tools offer.

In order to use the Learning Catalytics, preparation is required regarding the questions that may contribute, to a larger extent, to a learning environment, in the short time that they are applied. Logistical challenges are inevitable when performing trials; however, once they are solved, it contributes to a reverse pedagogy.

Even though the tool does not generate a significant increase in test scores, it has many other positive effects such as: interaction with the teacher, increase in class engagement, and greater participation.
THANKS