DISCOVERY TEACHING -- A CLASSROOM APPLICATION FOR INTERACTIVE AND AGILE PEDAGOGY

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Summary: In work we present ...

1. A feature overview of a web-based classroom application called Discovery Teaching that is designed for use in the higher education classes to facilitate interactive and active pedagogy.

2. A summarization of several feasibility and intervention studies where features of the application were used to facilitate various pedagogical activities in introductory computer science courses.
Motivations

1. Design a platform for interactive and agile teaching as a way to improve academic results and methods by using real-time classroom interactions, feedback exchanges, and adapting pedagogy based on evidence and insights from classroom experience.

2. Provide several open-ended tools for learning and teaching in the classroom that allow several interactive pedagogy techniques to be practical and realized in the classroom. I.E. Scholarship of teaching and learning.
Literature Review

- Current developments in computer and educational technologies have shown more integration and potential in the classroom [1].
- Current practices and research in online and hybrid learning technologies have shown desired improvements in collaborative and active learning, individualized and timely feedback, integration of globally diverse perspectives, establishment of equal, flexible and affordable access to information and learning [2].
- Despite the increasing interest and investment in educational technologies, studies show the persistent disconnect between the technologies, research results, design and practice [3].
- Empirical research studies highlight various teaching and learning theories or methods that are associated with improvements to both teaching and learning outcomes [4], [5].
- However, there is little evidence that these theories are employed in the design of the educational technologies and in the pedagogies supported by them [6], [7], [8], [9].
- Research argues that a more theoretically consistent approach to adopting educational technologies is to inter-relate theory with the desired features of learning and teaching and then to map the relevant technology tools and resources against these [17].
Discovery Teaching

A web-based application designed to support interactive teaching and learning in the higher education classroom. The application provides in-class interactions such as:

- **Feedback**: allowing students to give feedback to the instructor,
- **Questions & GroupWork**: allowing instructors to conduct individual and group (collaborative) formative assessments
- **Forum**: providing avenues for students, instructors and Teaching Assistants (TAs) to engage in discussions and provide real-time assistance through supervised back-channel forums.
- **Stats**: It also provides the instructor and individual students with statistics on student performance in formative assessments, engagement, and participation in class activities.
Discovery Teaching

The Discovery Teaching platform is accessible at the web address: discoveryteaching.com. The application is free to use by other instructors and schools – the author can be contacted for support and inquiries.

- Discovery Teaching was designed and developed over the last four years as part of the doctoral dissertation work titled Computer-Supported Agile Teaching (CSAT) [23].
- The platform and its several tools have been used in several prior studies [19], [20], [21], [22], [24].

- NB: Discovery Teaching was formerly called: TeachBack
User Accounts

John Doe

**My Current Courses**

- **DEMO2: Teachback Workshops**
  - Mediterránean 2: Wed 14:00-15:00
  - Instructor: Teachback Team

- **DEMO1: Intro to Computer Science**
  - Volen 101: M, W, F 10:00-10:50
  - Instructor: John Smith

**Announcements**

- NO CURRENT ANNOUNCEMENTS. Create new in a Course page.
Feedback - Instructor view

Latest Feedback Summary:
- Confused: (Count: 13, Percentage: 15.9%)
  - Can't play echo 360
  - Going a bit too fast for the people in the class
  - Engaging, but a little overwhelming

Class Feedback Timeline:
- Student Count

Engaged - Confused - Bored

Highcharts.com
Questions: A clicker-style assessment tool
Peer Review: Allows students to review/grade their peers’ answers in Questions

Question: What are the two parts/cases of any recursive function?

| Response |
|-----------------|-----------------|
| **Base case and recursive case** (calls smaller and smaller versions of itself) |
| Points: 2.0 |
| **A statement that lets you know when the task is finished, and another statement that performs a function until the final goal is achieved.** |
| Points: 1.0 |
| **General case and base case** |
| Points: 2.0 |
| **BASE CASE AND RECURSIVE CASE** |
| Points: 2.0 |
| **Base Case Recursive Case** |
| Points: 2.0 |
| **Base Case and recursive case** |
| Points: 2.0 |
| **if statement and then calling the function** |
| Points: 2.0 |
| **base case and recursive function** |
| Points: 2.0 |
Participation & Performance Stats
Studies using Discovery Teaching to support of Interactive & Agile Pedagogy
#1: The use of computers in the classroom

1. Computers in the classroom do not harm learning outcomes
2. Students prefer computer-supported pedagogy, over traditional
3. Computer distraction largely depends on pedagogy design
4. Students prefer active learning, especially when it’s practical


#2: Monitoring & Prediction of learning outcomes

Data collected from an interactive classroom platform can provide timely measures for monitoring and predicting progress, students at risk and learning outcomes: For example:

Overall participation in activities and performance in formative assessment activities, each have strong correlations to learning outcomes.

#3: Support for synchronous mixed online/physical classrooms?

Discovery Teaching can support a feasible and pedagogically justifiable alternative/supplement to face-to-face class attendance

#4: Support for collaborative & cooperative learning

Using the Group-Work assessment tool, we can achieve the short-term and long-term positive impacts of cooperative and collaborative learning during assessment and problem-solving activities.

References


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