

# Implementation of Technology Enhanced Active Learning (TEAL) classrooms: Preliminary Findings

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**Abstract:** The implementation of Technology Enhanced Active Learning (TEAL) classrooms at Bishop Lynch High School (Dallas, TX, USA) is in its second full year. This study will examine the initial deployment of the concept and report preliminary (largely qualitative) findings. Data will be gathered by observation, survey, and interviews with teachers who use the classrooms on a full-time basis as well as those who use them only occasionally, for targeted lessons. The implementation will be examined from both pedagogical and technological perspectives.

## Introduction

This study is a continuation of one begun last year at the same institution. The educational community appears to be in a continual search for the next great technology to solve a variety of problems in various levels of education (Berk, 2010; Suppes, 1969). From giving iPads to pre-K children, to problem-based learning (PBL), to 1:1 and Bring Your Own Device (BYOD) initiatives, the search for the magic technology bullet appears to be never-ending. There are a variety of problems with this approach, from funding to politics, and there is considerable doubt as to whether technology alone will ever solve problems faced by educators and students (Johnson, et al, 2015).

Technology Enabled Active Learning (TEAL) classrooms have been used in university settings, often in physics classes, since the late 1980's (Beichner, 2014). Early history can be traced to the University of Maryland, with additional contributions from North Carolina State University. They rose to prominence when MIT changed their introductory physics classes to be TEAL-based in the early 2000's. Bishop Lynch High School (BLHS), a private, co-educational, college-prep Catholic high school, now in its 54<sup>th</sup> year, in East Dallas (Texas, USA) chose to build five TEAL classrooms in 2016, the first of their kind in Texas high schools.

Relevant questions include: to what extent have the initial goals of the TEAL initiative at BLHS been met, to what extent are the affordances of the classrooms being used and what are lessons have been learned from the first full year of their use?

## Background and Literature Review

In the 2013-2014 academic year, BLHS implemented a BYOD program and requires each of their roughly 1,100 students to have a personal laptop available for use in every class. Teachers are required to make use of the school-wide learning management system (LMS) but are not required to integrate laptops into their curriculum. The school provides technology resources, including Smartboards and campus-wide wireless access to the Internet but teachers are given a great deal of autonomy regarding the use of technology in their individual classrooms. A point of emphasis beginning with the 2015-2016 academic year was active learning and the further inclusion of technology enhanced active learning classrooms was a logical extension of this direction. In short, BLHS found itself teaching 21st century students in 20th century facilities using 19th century methods. The TEAL initiative is one way BLHS intends to change that.

The experiences and comfort level of BLHS teachers with technology in the classroom vary greatly. No teacher is required to use a TEAL classroom at any time, however teachers have been given a mandate to either teach in one of the rooms or observe a class at least once per academic quarter. Five classrooms were built and three have been assigned to teachers for the duration of the academic year. The other two rooms, one standard size room (24 students) and one double-size room (48 students) are available for check-out to any teacher who has a lesson plan that will benefit from TEAL resources.

Spector (2012) gave a clear definition of human learning, saying it is that which is characterized by stable and persistent changes in what a person or group of people know and are able to do. What remains unclear is the overall effectiveness of the TEAL methodology and its impact on learning. Shieh (2012) found that in the small number of classes he studied, the TEAL class outperformed the two control classes on both instruments that were used, though the learning gains it achieved on one of them was lower than that achieved by one of the control classes. This was possibly an outlier but, unfortunately, no explanation was provided. Shieh (2012) also found that teacher beliefs about their teaching had a significant impact on the effectiveness of the tested system.

There is insufficient data at BLHS to draw any firm conclusions about the effectiveness of the TEAL classrooms on learning outcomes. However, the first six months have yielded preliminary feedback and lessons learned with regards to the implementations of these classrooms.

## **Research Questions**

1. To what extent have the initial goals of the TEAL initiative at BLHS been met (qualitative)
2. What are the lessons learned from the first full year of their use? (qualitative)
3. To what extent are the affordances of the classrooms being used? (quantitative)

## **Methodology**

This study is a continuation of one begun last year at the same institution. It is projected to be the subject of further study as well, including at least one doctoral dissertation.

This report draws upon firsthand experience of the author, voluntary anonymous online surveys, data collected from lesson plans and observation, and teacher interviews. Midway during the first semester, the three teachers who have been assigned the classrooms will be interviewed, informally. Teachers will be asked 1) What worked well, 2) What didn't work well, and 3) Was there anything you wanted to do that you were unable to do? As well as questions regarding their use of the affordances of the classrooms (see below)

Students will be asked 1) What did you like about using the TEAL classroom, 2) Do you think it enhanced the learning experience, and 3) What would have made the experience better?

## **Preliminary Findings**

Enthusiasm for the classrooms among students was, and remains, high, and some initial technological hurdles that hindered teacher's ability to make full use of the classrooms have been overcome. It took some time for the novelty of the technology to wane so that lesson plans that did not intend to use the technology weren't negatively impacted by the distractions presented by the various devices. Student feedback will be captured at the end of the first semester.

Informal teacher feedback has thus far been positive and focused on the need for continued training and professional development, especially for those teachers not assigned to the rooms. There were also constructive comments made regarding specific technology choices (for example, the monitors in the pods are simply monitors and are not touchscreens; teachers indicated that they would prefer touchscreens).

## **Affordances**

There is no single, universal standard for TEAL classrooms. Different institutions implement the concept differently. In higher-ed organizations, where instructors generally have offices and/or work spaces separate from their classroom(s) there is little need for a teacher workspace co-located with the learning environment. This is not the case in secondary schools such as this high school. One of the affordances of the TEAL implementation here is that there is a teacher workspace (desk, chair, and storage) in addition to the student-centric learning environment. Student seating is arranged in "pods" of five to seven chairs around a group-centric set of tables (on wheels, for easy rearrangement) and a monitor that can be used by the student groups or can broadcast what the instructor is showing on the main screen. The main screen is an interactive NewLine monitor with an onboard Windows computer. The NewLine has multiple ports, facilitating the use of other input devices (Mac and Windows laptop computers, for example). The walls of the classrooms are IdeaPaint™ which facilitates students and teachers writing on all surfaces

in the classroom. This study will quantify which of these features are used, and to what extent lesson plans incorporate their use, over the course of a semester.

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## Appendix

### Sample images of the TEAL classrooms

