Technology Infusion for Undergraduate Education

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Technology infusion is the introduction of new technology whether hardware or software into the classroom that will enhance the learning experience of the student. Some examples of technology in education can be as simple as an instructor bringing in a touch screen computer and using either the journal or power point programs to articulate notes during class on the overhead. This is a replacement or supplement of the overhead projector, which are also moving to an overhead camera which performs the same action. While there is a benefit to having the older technology when showing pre-made articles or graphs, the touch screen can be used live and helps create an electronic record of the class. This can be beneficial to both the instructor and student. For the instructor, revisiting notes from a section of class may help better craft exams or help remind an instructor to cover a concept that due to lively discussion was not covered in the time allotted for the previous class. For the student, the notes may be posted to a WIKI, allowing the students to review the covered material. An example of a large scale technology infusion project is the U.S. Army Classroom XXI. In this paper I will discuss technology infusion using a couple case studies and possible ways to evaluate this infusion.

Technology infusion

In a class where technology is truly infused into instruction, the learning environment changes greatly from the traditional classroom. When technology is truly infused, the learning environment changes from instructional to constructional [9], the student benefits from the technology. Technovators is a term that is applied to instructors who embrace technology and implement the technology when necessary, and these technovators effectively use technology in innovative ways to improve teaching and learning. The infusion of the technology is critical when the next generation will be Digital Natives and the students today are all “native speakers” of the digital language of computers, video games and the Internet.[3]

With this construct of the continuously emerging educational system trying to keep pace with the every changing needs of society, we need to look at the process and rate in which these
technology changes are infused. One model of looking at the methods of instruction is offered by table 1.[9]

<table>
<thead>
<tr>
<th></th>
<th>Instructional</th>
<th>Constructional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instruction</td>
<td>Teacher-Centered</td>
<td>Learner-Centered</td>
</tr>
<tr>
<td>Teacher Role</td>
<td>Fact Teller</td>
<td>Collaborator</td>
</tr>
<tr>
<td>Student Role</td>
<td>Listener</td>
<td>Collaborator</td>
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<tr>
<td>Instructional Emphasis</td>
<td>Memorize facts</td>
<td>Relationship through inquiry and invention</td>
</tr>
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Table 1. Model of Education and Learning

This model could exhume much discussion, but the discussion will be limited to active learning and collaboration to aid in changing the way the student sees and interacts with the world.

**Technology examples**

The first case study is the implementation of the WIKI into a classroom environment. A WIKI is a set simple websites that allow their users to create and edit content. Different wiki services offer different features, although they commonly include the ability to compare previous versions of a page, discuss issues prior to making changes and track who edited what and when. Probably the most well known public wiki is Wikipedia, an online encyclopedia.[3] Although this study was not in the university setting, other universities are starting the use of WIKIs in higher education, one example is at Virginia Commonwealth University in which the Dr. Primueax introduce a wiki for his artificial intelligence course. He then encourage student to collaborate with information that they found while reading the course text or other research, and similarly with the above study, students would correct the comments of other if they were deemed to be incorrect. The key principle is the collaborative nature of the experiment engaged the students into their learning.

Introducing hands-on experimentation into the classroom through the introduction of software and hardware components is another method of infusing technology. As many colleges look to increase their enrollment while reducing a footprint, they are going to virtual labs and
video teleconferencing as a means to teach. Whether it is completely online or a hybrid system, colleges are reaching out to fill a need in various skill sets in a community that may not have the means to support the academic infrastructure.

Virtualization is changing the abilities and allowing for minimizing the footprint and overhead this integration of technology has on an organization. Rochester Institute of Technology (RIT) is developing on-line laboratories that allow students to work on labs from remote locations on their schedule. Compared to West Point which has a cipher lock on the lab requiring the cadet to physically be in the lab when working on the lab, the remote access could be beneficial to both cases. Other Universities have split classrooms in which the remote location calls into the classroom when the class starts. They then get streaming audio and video showing the PowerPoint slides to the distant end.

Virou defines the process of learning as a very complex cognitive task that can be very imposing on students since it requires a lot of effort from them. Consequently, they need a lot of motivation to cope with it. In view of this, it is within the benefit of education to create educational software that is interesting and stimulating for students. [1][9] They showed the introduction of a game like learning environment actually increases the understanding of the student, because they were more willing to participate in the gaming environment. Other developers have also shown that introduction of a game interface increases the ability of the student to locate errors in the computer code.

**Conclusion**

I am a strong believer in the introduction to new technology in the classroom and could be called a technovator, but after researching the vast amount of technology infusions that have occurred dating back to the 1990’s, I am cautioned by the necessity to ensure learning takes place due to the technology infusion. Instructor should engage in conversations and critique of new technologies, rather than to accept them blithely and unquestioningly.[8] As the Digital Natives enter into higher education, the Digital immigrants[9], those who were not raised in the digital world, will have to realize the students of tomorrow will think differently than the instructors and to stay relevant, Instructors will have to continue to embrace new technology infusions. These same instructors will also bear the responsibility of ensuring the correct technology is implemented.
References:
4. David Collins, USING VMWARE AND LIVE CD’S TO CONFIGURE A SECURE, FLEXIBLE, EASY TO MANAGE COMPUTER LAB ENVIRONMENT,

Annotated Bibliography:
   This paper discusses the implementation of technology to reach a broader audience in their area and shows that the technology infusion is not a new topic but reaches back over sixteen years. The technology at the time is antiquated to today’s standards but a corollary can be drawn to the podcast of today, but the impact if far greater reaching.

   This article discusses the change in thought that has occurred as the technology has grown, and the motivation of the growth is sometimes shifted to reaching more students or increasing the enrollment, but at the same time, increasing the ability for potential student to increase their skill sets.

   Discussion about the virtual university and the role it will play in the future.

This article looked at the infusion of computers into the classroom and discussed the issues that can happen if everyone is not prepared to embrace the technology. As the instructors ramped up to infuse the computers they created lesson plans that used the technology at first and then waned. To use technology as an effective instructional tool, training and time is needed for teachers to infuse technology into their curriculum.


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This article shores up the technology advancements in the writing centers in which they forecasted that people would have online writing center and use list servers, which has more than come to fruition.


This paper discusses the responsibility the teacher has to continue to challenge their students by giving the student the tools to contextually compare various texts, but this applies to all fields of study.