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Using Multi-Instructional Teaching and Technology-Supported Active Learning Strategies to Enhance Student Engagement

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Abstract: University professors are developing an increasing awareness of how creative teaching is contributing to active learning in the classroom. Much is being learned from research that explores the significance of engaging students in activities designed to increase their learning. This article examines essential components of active learning, discusses ways in which multi-instructional teaching and technology can be used to generate active learning in the classroom, and provides examples of strategies, models, and tools that can be implemented to enhance student engagement and active learning in today's classroom.

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Keywords: *active learning, student engagement, technology-supported active learning, instructional strategies, professor-student relations, teaching methods*

INTRODUCTION

Barr and Parrett (2003) state that “teacher quality is the most influential factor in student achievement” (p. 15). This statement highlights perhaps the most essential element indicative of a successful teacher. University professors are developing an increasing awareness of the extent to which creative teaching is contributing to active learning in the classroom. Traditional methods of lecturing, testing, and holding class discussions are not sufficient for optimal stimulation of active student learning (Exeter et al., 2010). A number of studies examining the relationship between teaching styles, student engagement, and learning have been conducted. A review of their findings indicates that successful professors often employ and are adept at using a variety of instructional strategies in their classrooms and those who intentionally motivate students to learn are characteristic of true master teachers and effective purveyors of knowledge (Covino & Iwanicki, 1996; Langer, 2001; Molnar et al., 1999).

Active learning consists of three key attributes: (a) communication, (b) collaboration, and (c) reflection (Bonwell & Eison, 1991). According to Meyers and Jones (1993), active learning “derives from two basic assumptions: (1) that learning is, by nature, an active endeavor, and (2) that different people learn in different ways” (p. 20). Though active learning consists of the same key attributes, it does not look the same, nor should it. “Active learning allows students to take charge of their education and to make knowledge their own” (Meyers & Jones, 1993, p. 20). Traditional methods of learning should not be totally discarded from teaching. For example, active learning is not a strategy that should encourage students to seek and acquire all learning through discovery. Active learning needs to be prefaced with students already having an understanding of some basic concepts. This foundational knowledge can often be effectively provided

by the professor in the form of short lectures. Students react positively to short lectures utilized as informative supplements to other engaging classroom learning events. According to Bonwell and Eison (1991), students are involved in more than listening, less emphasis is placed on transmitting information and more on developing students’ skills, students are involved in higher-order thinking (analysis, synthesis, evaluation), students are engaged in activities (e.g., reading, discussing, writing), and greater emphasis is placed on students’ exploration of their own attitudes and values. Professors who understand the true process of differentiation find active learning an essential part of daily instruction.

Essential Components of Active Learning

Teaching Philosophy

A viable teaching philosophy provides the foundation that enables a professor to employ effective active learning exercises in the classroom. A professor’s educational philosophy serves as an important complement to the activities and exercises employed in her or his teaching style.

Professors perform several roles in the classroom including being a source of inspiration to students, stimulating their interest in subject matter, and serving as a resource to students. Dedication and passion are required to be an effective teacher. In the commission of teaching, a combination of teaching paradigms is required to maintain the momentum and to transform the classroom into a learning laboratory of excitement and interest. Some of these strategies include

- assisting students with developing critical and deep thinking skills;
- motivating students’ interests in exploration, inquiry, and investigation; and

- guiding students' investigatory activities toward an optimum attainment of a comprehensive, accurate, and honest view of reality.

During the classroom sessions, it is important that professors provide clear instructions and speak in an audible tone at an appropriate pace. Professors need to be willing to repeat new and complex information when necessary. It is also important that professors communicate genuine enthusiasm about teaching and are intentional about encouraging students to engage fully in the learning process.

Course Content

Course learning outcomes serve as a platform for the content of an active learning environment. It is important to incorporate student learning outcomes and class objectives in the syllabus in order to inform students of class expectations. It is important to be sure that students are aware of the class activities and assignments. One way this can be accomplished is by organizing each class using course objective sheets – similar to lesson plans – which outline the activities and exercises employed for each class and providing them to students.

The main objective of teaching from an active learning model is to design the course to meet the expectations of the students while assisting them in developing critical thinking skills and a keen interest in the learning process. Professors must ensure that students are engaged in the learning process and that their expectations are being met. This can be achieved through textbook selection, incorporating the delivery of technology by using blogs and Twitter, inviting expert speakers to class, linking library services to course content, and structuring the overall instructional design elements of the course in a manner both exciting and innovative. Each of the above examples provides the benchmark

for teaching effectiveness in an active learning environment.

Design

When professors are attempting to develop texture and a stimulating environment conducive to active learning, they can incorporate the Collaborative Inquiry Learning (CIL) design into class exercises. The CIL philosophy of teaching uses an interactive participatory learning method which encourages students to work together, learn together, and partner in an effort to acquire knowledge relative to course objectives. CIL provides students with the opportunity to analyze, evaluate, and synthesize content material. They are encouraged to practice inquiry-based solutions for solving problems (Bell, Urhahne, Schanz, & Ploetzner, 2010). CIL assists students with their interpretations of course materials, allows them to share their ideas with their classmates, and allows them to exchange ideas and personal concepts from their learning experiences. This method of teaching design has been very successful in getting the majority of students engaged in the subject matter and soliciting their views in class discussions.

Organization

Professors using the active learning model should sequence and organize teaching materials to motivate students and to heighten their interests in the content of each course. Classrooms need to be strategically organized to enhance the learning experience and to engage students in a meaningful manner. It is critical that professors, while delving into and exploring wider concepts pertaining to the content of their courses, help students understand they can overcome many personal and intellectual limitations. Professors need to structure the teaching and learning environment so that the resulting design and its applications create a classroom milieu that stimulates

REAP Form

Read, encode, annotate, and ponder (REAP) is a content literacy strategy first developed by M.G. Eanet & A.V. Manzo at the University of Missouri-Kansas City in 1976 and is a commonly used method of literary analysis (Manzo & Manzo, 1995). Since its creation, it has been modified and adapted over time to best meet the individual needs of education. Although there are many variations of REAP, the primary objective of improving reading comprehension remains a prevalent element in all.

REAP is a strategy that incorporates high order thinking and analysis. It is designed to teach students a variety of ways to respond to a literary piece using the four key steps: read, encode, annotate, and ponder. The first step is to read the text and note the author and title. This step normally consists of the student reading the text on her or his own and beginning to think critically about the work as a whole. This intrinsic work helps to develop each individual's critical thinking and avoids any "bandwagon behavior." The second step is to encode the work in question. A reader can encode a literary piece by writing down a summary of the literature in the readers' own words. It is important to think about the work as a whole and not dwell on particular quotes or ideas. Encoding is an important step of analysis and as such it is important for the ideas generated to stem from a student's own thoughts. The third step is to annotate the text. The annotation step is where many REAP templates vary. While some REAP documents ask the reader to simply write down the main ideas and quotes of the author, other templates ask the reader to write notes for personal use in a thought book or electronic response system. Some templates take it further by requiring the reader to analyze the work critically, using high order thinking and design. The fourth and final

step is to ponder the text. In this step, the reader is to reflect further on the text under review. The reader may then work with a partner and discuss ideas about the writing. Another variation of this final step would be to have the reader draw relationships between the content being analyzed and other literary works, history, and/or personal experiences. Making personal connections to the text is essential for true application and reader content retention.

Technology-Supported Active Learning Strategies

The Vital Role of Technology

According to a national survey conducted by Rideout, Foehr, and Roberts (2010), 8- to 18-year-olds devote approximately seven hours a day to using multimedia technologies outside of the classroom. Additionally, a study conducted by the Pew Internet and American Life Project revealed that among undergraduate students, more than nine out of ten (95%) are home broadband users; that undergraduate students are more likely than other college-aged-non-students to own a laptop computer and an iPod or other mp3 device; and that undergraduate students are much more likely than the overall cell phone owner population to use the Internet on their phones (Smith, Rainie, & Zickuhr, 2011). From an early age, today's students are immersed in technological environments where they engage in social online networks sharing information, collaborating with others across the Internet, and creating rich multimedia content.

Information and Communication Technologies

The prevalence of technology use by students outside of the classroom makes a compelling case for schools to use the latest information and communication technologies (ICT) to create technology-supported active learning instructional environments. Today's ICT

can be leveraged to create an instructional environment that supports active learning by offering tools that place students in the center of the learning experience. ICT offers powerful tools such as online journals, communication apps, online collaboration and communication tools that allow students to engage in authentic problem-based instructional activities. There are several technological devices that hold promise, most notably the iPad, for creating a technology-supported active learning instructional environment. The iPad uses a touch screen interface to read, write, collaborate, and communicate with anyone in the world that has access to the Internet. Additionally, there are several interactive websites that allow students to build online collaborations, share data, communicate ideas, and explore concepts as they construct knowledge. Imagine an instructional environment where students are empowered to collaborate with others, exchange ideas with content specialists and other students, reflect on their learning, and communicate their findings to the world. The abundance of these technologies and the high usage of technologies outside the classroom by students make a perfect fit for schools to adopt ICT to support communication, collaboration, and reflection which are the three key attributes of active learning (Bonwell & Eison, 1991).

Communication

ICT allows students to form learning communities with groups both inside and outside of their school using digital networks. Learning communities allow students to share their thoughts with others and build a sense of community that will help (a) inform their knowledge base, (b) clarify explanations, and (c) provide multiple perspectives. Students can also form learning communities with content experts such as scientists, book authors, and community leaders. The interaction between the students and outside community allows the

students to form a virtual apprenticeship where they can gain valuable practical knowledge and insights from content experts. These types of learning communities foster a model of creating new ideas that build in the contributions of each member. They also encourage a sense of empowerment as students have ownership of the new ideas as they apply to the instructional activities.

Collaboration

Research on student learning suggests that students learn best when they are motivated and engaged in authentic tasks that relate to their own lives. ICT now allows students to connect with content specialists, such as scientists at a national research laboratory, and collaborate with them to solve real world research problems. The students get a chance to share their ideas and propose solutions while learning research and communication skills. These collaboration strategies used in an active learning environment promote critical thinking, student engagement, and fact acquisition. The latest ICT offers educators the ability to create technology-supported active learning environments with little extra cost. Most of these collaboration tools are Internet based or can be downloaded as apps for the iPad, iPhone, or iPod Touch.

Reflection

When learning subjects such as mathematics and science, simulation and modeling software allow students to quickly test their initial concepts, obtain feedback, and revise thinking if necessary. In a static model, students cannot visualize alternative interpretations and build different models by changing the variables. Simulation software allows interaction and empowers the students to gain a deeper knowledge of the phenomena being studied through variable manipulation and instant

feedback. Thus, students are able to monitor their own thinking and make necessary changes through the interaction with the technologies. This allows misconceptions to be quickly addressed as students learn to monitor their own progress and make the necessary adjustments in their initial conceptual understandings. For example, students can work with visualization and modeling software that allows them to ask different types of questions. Additionally, students can test their own hypothesis by doing a quick computer simulation to verify their thinking.

ICT tools for active learning

In this section, several iPad/iPhone/iPod apps that promote active learning are described. Additionally, several websites are described briefly. This list is by no means exhaustive; it represents a small sampling of hundreds of ready-to-use resources available to teachers at very little cost. The iPad, iPhone, and iPod have several features and apps that expand student motivation and encourage intellectual curiosity. The following is a brief description of some of the more popular iPad apps.

- The Elements – this app allows students to visually interact with the elements of the Periodic Table in an unprecedented way. Not only are the objects animated, but students are able to spin and rotate the objects using their fingers.
- Overdrive Media Console (free) – this app allows users to access audiobooks and eBooks available through many public libraries across the world.
- Dropbox (free) – this app and computer program allows students to share files and keep them in sync across multiple users and computers.
- Google Docs (free) – Students can use this app for online editing of documents, spreadsheets, and

presentations.

- NASA Visualization Explorer (free) – this app allows users to access images and stories from NASA’s fleet of research spacecraft. The images and stories can be shared with anyone via Facebook, Twitter, or email.
- HMH Fuse: Algebra I – this award winning app is a comprehensive Algebra I course specifically designed for the iPad. It contains videos, assessments, interactive mathematics tools, and related resources. It allows students to progress at their own pace anytime and anywhere.
- Frog Dissection – this app allows users to explore the organs and organ systems by dissecting a virtual specimen. This app is complete with an interactive quiz and detailed descriptions of the organs.
- GTTZOO – this app contains video clips and all kinds of habitat information for animals. It is like having your own private zoo on the iPad. Users can watch videos or read more about the animals with the built-in encyclopedia (no internet connection required).
- OneVoice – this app converts the iPad into an augmentative and alternative communication (AAC) device which enables people with speech difficulties to communicate with friends and family. By using built-in or custom categories, images, and phrases, a user can send a message by using a series of icons. This app cost a fraction of what AAC devices cost.

The following are examples of Web tools.

- Penzu (<http://www.penzu.com>). This Web-based tool can be used by students to create an online journal and digital materials. The journal entries

can be edited, shared through email, and printed. Penzu is also a good tool for teachers to model process writing and store lesson summaries.

- Voxopop (<http://www.voxopop.com/>). This Web-based audio tool allows users to record their voice for others to listen and respond to. Users can create threaded audio discussions that anyone can have access to. This tool allows students to exchange perspectives with other students, scientists, and community leaders. Students can also subscribe to the feed and be automatically updated (on their iPad, iPhone, or iPod) when new messages are added.
- Discovery Education (<http://www.discoveryeducation.com/aboutus/>). This award-winning website provides high dynamic digital content that allows students to tap into their intellectual curiosity and create digital stories that can be shared online with anyone with Internet access. This website also has an assessment tool that focuses on student achievement and free resources for teachers and parents.

The few examples mentioned above offer a platform for students to participate in a technology-supported active learning environment similar to what Vygotsky (1978) envisioned when he argued for the social dimension of learning. He stated that intellectual development is interwoven in social interactions. Therefore, learning is a process of meaning negotiation. Today's ICT allows for the presence of multiple voices in the classroom and ensures students' meaning-making will be informed by many points of view, including the perspectives of teachers'. Incorporating various viewpoints allows students to gain a deeper understanding of concepts through discussion,

debating, reflection, and elaboration. Further, this process of meaning negotiation facilitates cognitive transformation from the social level to the individual level. As educators redefine learning, making efficient use of the ICT already being used by students to create technology supported active learning environments is very possible.

Final Comments and Considerations

Umbach and Wawizynski (2005) state that "the educational context created by faculty behaviors and attitudes has a dramatic effect on student learning and engagement" (p. 173). They indicate that faculty attitudes and beliefs can contribute greatly to a culture and climate that fosters student learning. Though not specifically discussed in their work, one might consider the implication that negative faculty attitudes and behaviors could also preclude the creation of a climate for student learning. From this perspective, a faculty member in a classroom on a college campus plays a pivotal role in the building of a culture and climate conducive to the best practices of student learning and engagement.

Active teaching is a pedagogical approach in which one must be intentional about her or his attempts to engage and excite students about the process of learning. It is the firm belief of the authors of this article that active teaching strategies can provide students with fresh perspectives on the value and significance inherent in the acquisition of new learning. There are numerous teaching models for introducing new subject matter to students, but the question as to which are the best strategies to engage students in the process of learning still remains. It appears that the active learning approach, while not the only viable teaching method, is certainly among one of the most effective.

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