

THE POWER OF DIGITAL TECHNOLOGY: ACTIVE LEARNING APPROACH

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ABSTRACT

Interactivity in instruction takes on a more complex meaning. In good instruction, interactivity refers to active learning, in which the learner acts on the information to transform it into new, personal meaning. In a constructivist sense, the learner co-constructs meaning by exploring an environment, solving a problem, or applying information to a new situation that he/she helps to define.

The role of the teacher is to lecture less and instead direct the students in a direction that will allow the students to "discover" the material as they work with other students to understand the curriculum. Active learning can encompass a variety of techniques that include small group discussion, role-playing, hands-on projects, and teacher driven questioning. The goal is to bring students into the process of their own education.

This paper examines the effectiveness of using active learning methods versus the traditional lecture method of learning as means for improving student performance and educational experience. Survey results imply that students enjoy the opportunity of interacting with the different methods used in the active learning method than the traditional lecture method. Students using these methods feel that they have more interaction and positive experience with their classmates and instructor enjoy the experience of using the interactive and active learning methods, and would recommend this learning experience to others. In the end, this study provides evidence that using the active learning approach helped students develop critical-thinking and problem-solving abilities.

INTRODUCTION

Learning is naturally an active process. It involves putting our students in situations, which compel them to read, speak, listen, think deeply, and writes. While well delivered lectures are valuable and are not uncommon, sometimes the thinking required while attending a lecture is low level comprehension that goes from the ear to the writing hand and leaves the mind untouched. Active learning puts the responsibility of organizing what is to be learned in the hands of the learners themselves, and ideally lends itself to a more diverse range of learning styles.

Computers and software are tools, and their purpose is to help people interact with words, numbers, and pictures. What is different today is that computers are being used for activities that never used to be considered interactive - such as reading, watching, or simply being entertained. Interactivity in instructional refers to active learning in which the learner acts on the information to transform it into new, personal meaning. Farah (1995), Boschmann (1995), and Randall (1995) believe that, in a constructivist sense, the learner co-constructs meaning by exploring an environment, solving a problem, or applying information to a new situation that he/she helps to define.

Active learning is appropriate for problem-based instruction where learners have to discover rules to solve a problem, multiple representations of reality, viewing events from multiple perspectives, and hypermedia environments. Bonwell and Eison (1991) wrote that strategies that promote active learning have five common characteristics: Students are involved in class beyond listening. Less emphasis is placed on transmitting information and more emphasis is placed developing the skills of the students. The students are involved in higher order thinking such as analyzing, synthesizing, and evaluation. The students are involved in activities like reading, discussion, and writing. Finally, greater emphasis is placed on the exploration of student values and attitudes.

Active learning can also overcome the individualistic and competitive nature of traditional education. Johnson, Johnson, and Smith (1991) Wrote, "When engaged in cooperative activities, individuals seek outcomes that are beneficial to themselves and to all other members of the group. Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other's learning."

Mabry wrote that authoritarian teachers would find it difficult to integrate active learning in the classroom. Active learning requires a different sort of work. Mabry (1995) wrote, "The most problematic step for the instructor is the first one: accepting a new role in the classroom that involves some loss of control. Highly authoritarian teachers will probably resist the free-flowing nature of this new method. But more teachers, eager to try new teaching models, will find a fruitful pathway in the principles of cooperative learning."

Active learning appears to be a great method of instruction. However, it probably should not be considered the only way to teach, Kolb (1995). Active learning requires vast amounts of work and a clear objective for it to work. Using active learning for the sake of active learning may backfire. Ennis (1987) agrees that incorporating active learning techniques must secure a purpose to carry out specific and important objectives, and must require students to use the higher order skills of analysis, synthesis, and evaluation.

The World Wide Web has proved to be challenging for academic teaching. Simply ask the students to get on the Web in groups, look for certain types of information, and report back to the class what they found. These types of discussions prove much more useful in teaching about the Web than lecturing about it. Barr and Tagg (1995) used a similar strategy to teach students about mass communications using the Web. They asked the students to use the Web to find information on an emerging technology.

Penhale wrote (1997), "The merits of cooperative learning and of introducing students to the chemical literature argue for the development of assignments that include both. Chemistry students become more engaged, they learn more effectively, and they emulate the activities of the professionals in the discipline."

Pellegrino (1995), Johnson & Johnson (1987) agree that the web provides an avenue to help us develop our students' critical literacy. Confronted by the expansive resources of the Internet, students will learn how to manage information by mastering evaluation skills. As a directional tool, it helped readers assess information on related web sites. As an evaluation tool, it gave the students practice in assessing and integrating information found on the web.

Research Problem

What is the effect of using active learning methods versus a traditional lecture method on teaching college students?

Hypothesis

The average score of students taught using active learning method is different from the average score of students in a traditional lecture class setting.

Settings

Students log on to the course Web site for the current lecture, assignments and supplementary materials. They then work to integrate these ideas into their practice, working with them in their classroom or other educational environments. In addition, learners participate in small discussion groups in which ideas, projects and feedback are shared with other course participants. The course instructor will provide advice, tips, and raise questions to students for consideration to lead these small discussion groups.

The role of the instructor in the active learning approach include:

- Talking informally with students as they arrived for class.
- Expecting that students would participate and act accordingly.
- Arranging the classroom to encourage participation such as putting chairs in a cluster or circle.
- Using small group discussion, questioning, and writing to allow for non-threatening methods of student participation.
- Drawing the students into discussions by showing the relevance of the technology to their studies.
- Allowing students time to ask questions at the end of class.

Results

A t-value of 12.34, p-value = .05, indicates a significant difference in the final exam performance across the two instructional format. The results imply that students’ performance is enhanced when using the active learning format rather than just using a traditional lecture class setting. In conclusion, this study provides evidence that using an active learning format is a positive step toward bridging the quality gap often associated with the traditional learning environment.

Students enrolled in two Business courses have the option of choosing the way they learn, either by just sitting in what is called a “traditional course” which is strictly a lecture approach by the instructor, or the active learning method which is a variety of techniques that include small group discussion, role-playing, hands-on projects, and teacher driven questioning.

The students were asked to respond to a short end of the semester survey. One hundred and twelve students responded to the survey that was passed to them during the end of course review session before their final exam. Students were asked to answer five short questions and use a liker scale to post their answers. The ratings were from 1 (strongly disagree) to 5 (strongly agree). The middle item in the scale was neutral.

The t-statistics test was used.

$$(t = (x-\mu/\sigma) * \sqrt{(n-1)} ; H_0 : \mu=3).$$

As seen in table 1, all five of the means are positive, while three of the five means are significantly different than neutral. The responses to the first two questions are positive and statistically significant. Several students added comments at the end of the survey saying that they know more about their professor and classmates through the discussion groups than in most traditional campus courses and they like the fact that they can use the internet to access the lecture notes from anywhere to study or send their homework electronically.

The third and fourth questions in the survey did not support the hypothesis. Although the third and fourth questions were positive they are not statistically significant.. This is not surprising because role-playing sometimes is intimidating to some people and they feel uncomfortable to play a different role.

Questions	Mean	t-statistic
Discussion groups are an effective way to know my classmates and professor	3.79	2.71*
The Web site and the interactive multimedia presentation is very helpful	3.68	3.32*
Role-playing facilitates the learning process	3.20	1.14
The small projects helped motivate me to complete course requirements	4.24	1.77
My overall opinion of the active learning techniques is positive	4.24	5.79*

*p-value < .05

Table 1

The fifth question and the last in the survey provided strong evidence those students using the active learning method like the discussion group very much and the interaction with other classmates through study groups. Therefore, the group discussions may not be a significant motivating factor but it makes class participation in activities more interesting and indirectly increases motivation. The overall experience of the active learning method concept is positive.

Students’ comments

Some of the students’ comments include the following:

Ø I like the fact that I chat privately with my classmates and my professor over the Internet almost at any time.

Ø The small discussions group was a good way to get to know my professor and classmates.

Ø I like the fact that I can access the Internet from anywhere and view class notes and send my homework to the teacher via the Internet.

Ø I like the interactive quizzes and practice testes and the quick feedback.

Ø I like the fact that I can access the lecture notes from anywhere to study.

Ø I like that I can choose the best learning method for me based on what really works for me and not what the teacher "thinks" the best for everyone!

Ø I like the way the teacher treated us, the structure of the class and discussions group

publishing and institutions reward instructors who invest their time in course development, we will see an increase in instructional projects that include the WWW.

Conclusions

In the field of education, the instructor stands in front of students and slips his or her own mental constructs into the minds of students in the form of descriptions, equations, and, maybe, a few line drawings. Students use them as building blocks to recreate the construct. In contrast, active learning occurs when multimedia tools, like the web, are used to present students with complex situations and problems with information embedded in multiple representational forms. This encourages students to use numerous and varied representational strategies and explore new ways of thinking, switching back and forth from linguistic to visual. The result of this study implies that using an active learning method with small group discussion, role-playing, hands-on projects, and teacher driven questioning can have a positive overall impact on the students' learning process of their own education.

The active learning web project element was a successful application of information technology to an instructional setting. As a tool, the web allowed the students to research the vast resources of the Internet, improve their evaluation skills, create an informative product of their own, and communicate their work to their classmates and instructor. This helped students develop critical-thinking and problem-solving abilities.

Furthermore, will the web become a "core tool" of academe? It is hard to say. Overall, curriculum enhancement and innovation using the web will remain largely dependent on the interaction between individual initiative (the way faculty design their syllabus and structure their classes to include web projects) and institutional infrastructure (hardware, software, and support services). As technological advances facilitate web

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