

DO STUDENTS WANT TO BE ACTIVE?

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ABSTRACT: While the literature on active learning demonstrates positive results, adopting this model of teaching involves change for students and faculty. This study examines the reactions of 113 students after a one-semester experiment involving active learning in the classroom to determine student attitudes toward changing classroom expectations. The results, while positive, also indicate areas that need to be addressed by faculty as they change their teaching style to assist students in the transition.

Introduction

The literature on active learning is positive about the benefits of engaging students in the process of their own learning (Bellamy & McNeill, 1994, Page, 1990). Definitions of active learning may differ, but there is some consensus that for a professor to say they are doing active learning in a class the students must be reading, writing, discussing or actively engaged in problem solving activities (Bonwell & Eison, 1991). Overtime, many classroom activities have evolved under the rubric of active learning. These range from brief interventions such as concept quizzes where the class is given a brief quiz after a short period of lecture, to more longitudinal interactions as peer instruction which involves students teaching students (Mazur, 1997) to totally redesigning the class model as in collaborative learning models (Johnson, Johnson & Smith, 1991). Ruhl, Hughes & Schloss (1987) demonstrated that students provided with three two-minute breaks during the course of a lecture did significantly better on free recall and comprehensive tests. This study demonstrated that allowing students to interact with each other for six minutes in activities involving problem solving resulted in an increase in student learning.

Despite strong evidence, active learning is still relatively new to some faculty. Bonwell and Eison (1991) identified six barriers to faculty adopting this mode of teaching, one barrier being fear of change. But what about the students in the classroom?

Change is difficult for them as well, more so because they often do not have control over whether or not to be part of a change model. This reality can be a factor in determining whether or not a faculty member maintains the active learning mode past an initial trial period. How do students perceive the shift from a more traditional model to actively being engaged in learning in the classroom? Do they enjoy coming in and “interacting” with material and each other or would they rather sit quietly and take notes (and perhaps sleep)?

In an applied science department in a Research I institution that is piloting a model of education grounded in the theory of active learning, we decided to find out. At the end of the first semester of this pilot project, students from five active learning based classes, from sophomore to senior level, were surveyed about the new style of teaching. Prior to this new model, the majority of classes the students had been exposed to were in the traditional chalk/talk lecture format. Pilot classes ranged in degree of “active” from traditional lectures with a few small group or individual activities such as think-pair-share or concept quizzes, to classes that were redesigned to be project-based. The faculty who taught these courses were interested in the students' reactions to this new form of pedagogy. Felder and Brent (1996) demonstrated the transition to a more active, student-centered learning environment could be difficult and problematic in sciences classes. At our institution there were many anecdotal complaints from students to their advisors and student services personnel about the affective quality of the classroom experience. Students complained the classroom environment left them feeling extremely stressed and intimidated by faculty and fellow classmates. They often expressed the concern that if they did not understand something in class they were too intimidated to ask for clarification since they perceived asking questions as being a sign that they were not as smart as their classmates. In other words the classroom climate for learning was negative both in terms of their relationship with their faculty and their peers. This experiment in changing the teaching approach in the five pilot classrooms was one venue the

department was experimenting with in the hope that it would help alleviate student dissatisfaction with the classroom atmosphere. The faculty were not concerned with measuring the learning outcomes in classes which had modified their pedagogy. The graduation and placement rate at this institution was in the high 90th percentile and 97% of the students who were accepted to the university came from the top 10% of their high school graduation. Therefore, while the background and experience brought to the classroom was variable; it can be assumed that the ability level of the students across the five classes was fairly consistent. The faculty involved in the pilot study were interesting in examining the effects of changes in the curriculum on the quality of the educational experience as perceived by students: does an active learning approach contributed to a more positive classroom environment.

To measure if students felt that this new model of classroom teaching created this more positive environment, we administered an anonymous survey to students using the following four questions:

1. Discuss the relative strengths and weaknesses of the active learning teaching techniques relative to traditional blackboard/lecture format.
2. Discuss the effect of the active learning techniques on their perceived ability to understand material relative to traditional blackboard/lecture format
3. Discuss the inclusion of active learning techniques and their effect on the enjoyment level of the class.
4. Reflect on their experience as a learner, and describe how they perceived the changed teaching methods matched their style.

Methodology

The above survey was distributed at the last class of the semester to the five pilot classes. One hundred and thirteen responses were returned from a possible one hundred and fifty six. Qualitative methodology was utilized because it is an analysis mode

designed to describe different perspectives of the same event and help understand how individuals interpret their social context which was the major thrust of this research (Bogdan & Biklen, 1992). The data was coded to see what themes emerged from the student's response to active learning in the classroom. Because there was a single researcher, the transcripts were coded using Miles & Huberman's (1994) check coding process. In this qualitative methodology a single researcher codes a transcript until there is 90% reliability in the codes. This process was repeated throughout the analysis. Codes were reviewed for redundancy and collapsed under appropriate headings.

Coding categories were analyzed and the resulting themes were generated into a report format for the department. Faculty from the pilot courses then reviewed the report prior to its dissemination to see if the results matched their perceptions of what was occurring in their classroom.

Results

The students' responses were enlightening, dismaying, helpful, and hopeful at the same time. Four important themes emerged from the analysis: (1) the students had an overall positive attitude toward active learning, (2) active learning was perceived to enhance their ability and efficiency in studying, (3) active learning was perceived to improve the learning environment, and (4) active learning promoted their thinking about their learning and thus helped them to better understand their individual learning style.

The negative perceptions were manifested in three areas. Students reported concern about: (1) the in-class time these activities took, (2) fear that they would not cover all the material in the course, and (3) anxiety around change in classroom expectations.

Listen to the students' voices as they tell us how they felt about the experience of active learning in an educational environment that had previously been predominately lecturing.

In responding to the strengths and weaknesses of active learning, students were overwhelmingly positive. Less than 10% of those who answered the survey mentioned only weaknesses.

Students in classes that were project- based with real problems presented by industry partners were the most enthusiastic.

“Three words – real world experience! I cannot emphasize the value of learning through doing, and the experience capitalizes on every possible facet of this concept. The (active learning) idea is very strong, very very strong. I’ve learned to deal with many real-world problems and issues that are inconceivable in a traditional lecture/blackboard environment. This class has been the single most educational experience I’ve undergone here. Furthermore, this class has been the most exciting class I’ve had.”

“Very good. Stronger than other classes in the fact that it is hands-on experience which is very important. You can compare it to (this class in the past) and you get to do hands-on work and that makes this class better, you have integration of material.”

But even students in the classes that involved lecture with think/pair/share activities or concept quizzes still valued the experience.

“The (new techniques) breaks up the monotony, changes the focus, which helps keep us awake, let’s us see whether or not we’re processing information correctly and let’s us have it explained differently by peers.”

Students also viewed active learning as a “connecting mechanism”. For some of the students it helped connect and integrate the course material in a more coherent fashion, and for others, it allowed them to connect in a more personal way with their faculty.

(Active learning) helps me see the relationship between what we’re doing (in class) and real life. It cements what we do”

“In class exercises are good because you put the material into practice right away. I feel a better relationship with the professors.”

However, as in all change, there was resistance and concern about changing the expectations. The largest impediment to embracing active learning from a student perspective was the time element. Half of the students who answered the survey felt that

engaging in active learning exercises in class took away from the time that could be used to gather more factual information. This was expressed by fear that they would not cover all the subject matter in the syllabus or that taking time to do something would negatively impact workloads in projects that were team based. Interestingly, no student mentioned the amount of material that might be learned or that their retention would be different, only the amount covered.

“Fun and helps me learn but TOO TIME CONSUMING”

“I think that the active learning approach may be hard to swallow at first. It stimulates more motivation in the individual but the weakness is that many times more motivated individuals (in a team) might do more work than the less motivated ones”

There is also a degree of anxiety in some of the techniques that the faculty utilized to get them involved in the more lecture-based classes. The most disliked activity was a technique called cold calling which refers to randomly calling student names from a deck of cards and reading quizzes. Students felt these techniques increased their anxiety.

“I don’t like cold calling, the lectures are fast enough that sometimes it’s hard to keep up at the simplest level and then if you get called on it’s frustrating to have to try and answer a question”

Lastly, it is a matter of perspective!

“New techniques are sometimes stressful, you actually have to think actively in a class!”

In assessing if students felt that the active learning techniques improved their ability to study more efficiently, students were overwhelming positive. As they described their experiences, the new techniques created a cycle which made them feel more secure (see figure1) and led to more efficient studying and more effective studying.

“This is a good way to check my understanding of the material along with homework.

“Examples and working them in class are improving my ability to absorb and learn the material in class instead of taking notes and having to go over them in detail later (when I can’t ask questions). Stopping to work an example gives me time to ponder the material

and formulate questions. Most of my time in the traditional method is spent copying the notes on the board”

For a few students though, it appears to be a matter of change. These students felt the active learning techniques did not match their learning style or else created new and different expectations about the classroom culture that made them uncomfortable.

“No (active learning) didn’t help, but I think I’m being reluctant to change.

“I’m a big fan of blackboard use because it actually puts the student through the thinking process, rather than just putting up pages of equations on the overhead.”

“No they’re not helping. Usually even if I get lots of sleep, I simply don’t feel like actively participating in class because it requires too much effort”

In answering the question about whether the learning environment was more enjoyable, answers varied positively along a continuum from less boring to actually fun. Students expressed the feeling of a less pressured classroom atmosphere and the enjoyment of learning and working with peers.

“Absolutely! While I sometimes fear being called on if I’m lost on a concept, it keeps me alert. I also derive immense satisfaction and learning out of figuring out a problem in class and explaining it to partner next to me”

“As I said, I enjoy the class a lot. Equations are actually fun and I feel less pressure in this class because we’re all working together”

The few negative responses in this category were basically around the anxiety of cold calling and reading quizzes. But even students who were ambivalent about these techniques still had some positive feelings

“The method (active learning) makes it frustrating at times since you’re not sure where to go next, but ultimately the sense of accomplishment achieved is greater”

“Reading quizzes are a subject of dread, but other than that the added elements make the class more interesting”

Finally, students were asked to reflect on what had occurred this semester and describe how they learn and how the active learning techniques related to that style. Almost to the person, these students described themselves as hands-on learners and the active learning techniques made them more aware of that fact. These techniques also encouraged them to think about the material in more creative ways. A student best summarized this who said:

“I best learn in an environment where I am asked to think for myself and come up with solutions. When I feel encouraged to think a lot and be creative and work the problems out, I learn far more than when I am asked to memorize solutions. I like how (with this method) we’re given credit if we come up with some weird idea and fail to succeed in the task. You really encourage us to think for ourselves in addition to remembering formulas and such”

Limitations:

While the faculty involved in these courses felt positive about the results and agreed to continue teaching in this model as well as encourage their colleagues to adopt some active learning techniques, there are some limitations that must be taken into account.

There is an issue of compatibility in the findings because of the various degrees of active learning that faculty chose. As the data indicated the more active the class, the more enthusiastic the students were, but part of that enthusiasm could be ascribed to the type of projects students were assigned. Having authentic problems presented to them from industry could be strong contributing factor in their feeling toward the teaching methodology.

There may also be a bias in the questions that were presented to students. Faculty had informed students at the beginning of the semester that they were trying a new type of teaching methodology that they hoped would improve the class for students. But the faculty did make it clear when they distributed the questionnaires that the answers would be totally anonymous, and that the students' candid responses were important in the

decision process of whether to continue with this type of teaching. The faculty involved in their courses were not themselves totally convinced that active learning would create an improved classroom environment. These faculty were top researchers, but they were also caring teachers who were concerned about the students' negative attitude toward their learning environment and did approach this semester as a true experiment.

Further Reflections

The themes indicate that students feel that active learning has real value to them and to the improvement of the environment in which they learn. They felt positive when these techniques helped them 'own' material in a way that made it easier to interact in class, study, and problem solve with peer. They also felt that these techniques provided a closer relationship to the professor who they now perceived really cared whether or not they got something out of class. Through the active learning techniques students were better able to connect to the material in the course and to the faculty member teaching it. Students also reported that the material they learned in class was more useful when tackling problems out of class. Perhaps most importantly for these students and this faculty, student reported feeling better about their classroom experience. They enjoyed working with their peers and felt a sense of achievement when they accomplished a difficult task together. With active learning techniques they were able to get to "know" the student at the desk next to them and develop a more collegial/team-based style of learning. This skill of working in teams is often part of the hidden curriculum that never makes it to the formal curriculum because it is assumed students will learn to do this in some mysterious way. Active learning techniques make the learning of team work more overt, especially if students are then asked to reflect on the cooperative aspect of the exercises.

But the data also illuminate the challenges ahead. The most important need to be addressed is the inability of some students to deal with change. Many of these students come to higher education with expectations of very passive classroom experiences and

those expectations must be uncovered, probed and altered. For some students it may go as far as the necessity to reframe what learning is: learning is not about “covering material” or “gathering facts”, learning is about integrating and using information in a meaningful way. Learning is also about feeling comfortable in the learning environment. There are a number of ways to help students cope with this change. Students need to understand from the very first day what is being done in the classroom and more importantly why it is being done. While the students surveyed here were told that the style of teaching used in the class would be different, they were not told the value of this new style in improving the learning environment. This cognitive or affective value is often obvious to faculty who use it, but for many students it is something new and different. By continually clarifying and reinforcing the purpose of active learning exercises and tying these activities to the learning objectives and environment of the class, students are made aware of the assumptions by which the faculty member conceives and conducts the class.

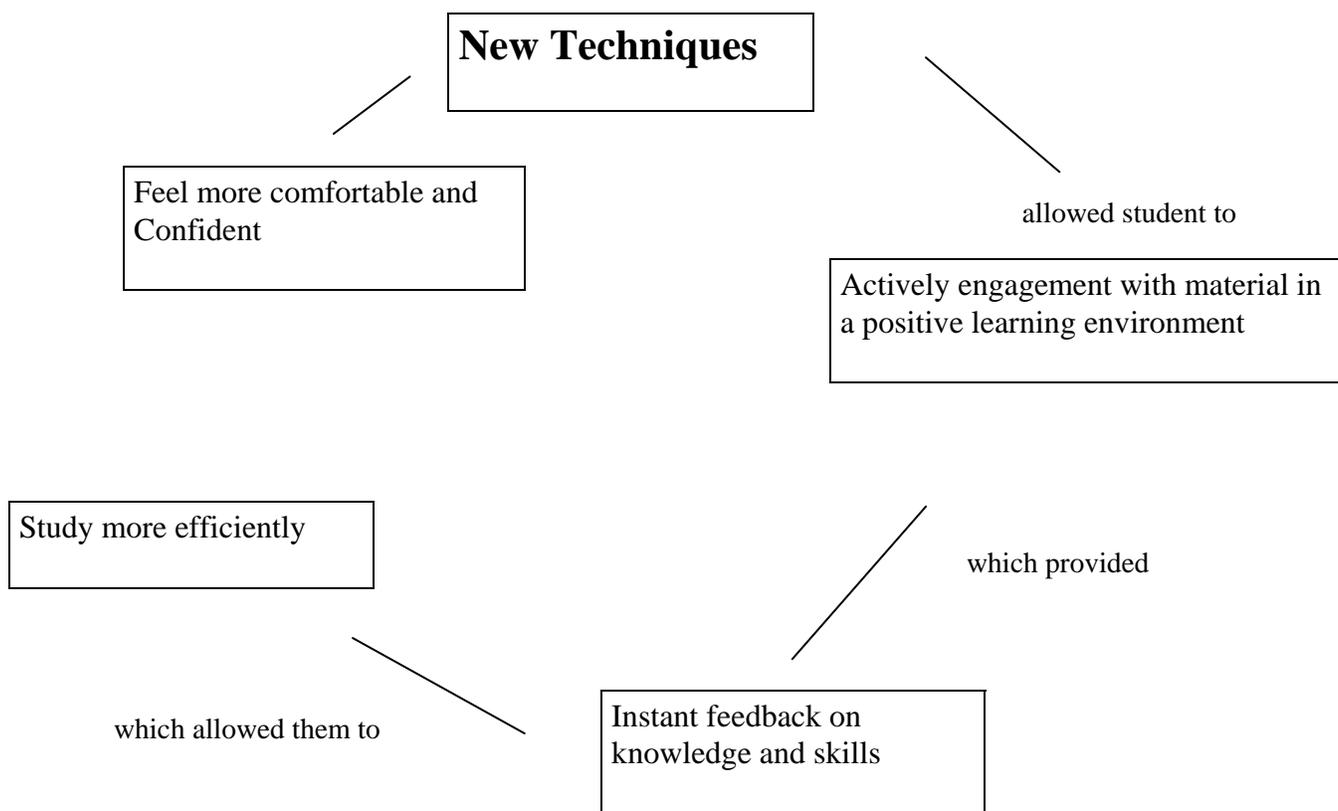
Secondly, students need to be made aware of what they are gaining by engaging in active learning activities in the classroom. Briefly surveying students about their attitudes, asking them to keep learning journals, and engaging in dialogue between faculty and students about the cognitive and affective results of classroom activities are all ways to have student appreciate and understand, at a metacognitive level, that by actively engaging in their own learning they are understanding and often learning by interacting with the content and with their peers. Again, it returns to the idea of communication between students and faculty. The students may realize they feel more confident about their learning and more comfortable with the learning environment, but they may not be able to identify why. Making this connection more clear for students will ease the transition.

Lastly, faculty need to understand that in the process of change there is always going to be some level of resistance. This is often manifest in the form of negative

teaching reviews. Administrators who recognize and validate that students go through stages of change, will make it easier for faculty to continue to practice and perfect a different style of teaching free from fear of initial negative student evaluations impacting their promotion or tenure.

The thematic findings of this study were actually a pleasant surprise. It was anticipated that resistance would be much higher after only one semester, especially as this institution has a first year model where courses are conducted in large lecture halls with little student involvement in the class. The culture of passive learning is very strong by the second year. Yet with rare exception, students were comfortable, and in many cases enthusiastic, after just one semester about participating in an active learning environment. As one student so eloquently put it: *“They (active learning techniques) ask me to embrace the knowledge such that I can begin to work with it which makes me much more careful about understanding!”*

Figure 1
Active Learning Cycle



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Web Sites

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