Stimulating Deep Learning Using Active Learning Techniques

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ABSTRACT

When students and teachers behave in ways that reinforce learning as a spectator sport, the result can often be a classroom and overall learning environment that is mostly limited to transmission of information and rote learning rather than deep approaches towards meaningful construction and application of knowledge. A group of college instructors set out to change this in the context of their own classrooms. The instructors formed a community of practice and embarked on an action research project on seeking ways to stimulate deep learning approaches in their classrooms. Active learning techniques such as role-playing, student-led discussions, and debates are discussed. Each member of the community chose techniques that he or she was comfortable with and which could best meet the desired learning outcomes of their respective classes. This article describes the process, successes and challenges based on the experience and the quantitative and qualitative data collected by the community of practice functioning as an action research team.

Keywords: *Deep learning, active learning, action research*

INTRODUCTION

Surface learning approaches arise from the intention to give an impression of meeting task requirements while exerting minimal effort, often relying on memorization instead of understanding (Biggs, 1999). This approach to learning can easily be observed when students and teachers behave in ways that reinforce learning as a spectator sport (Chickering & Gamson, 1987). The result is a learning culture and approach that is mostly limited to transmission of information and rote learning rather than deep approaches towards meaningful construction as well as application of knowledge. Scholars and researchers in this area refer to these as deep and surface approaches to learning (Marton & Saljo, 1976; Entwistle and Ramsden, 1983; Biggs, 1987, 1993, 1999).

A deep approach arises from the need to understand and seek meaning, leading students to attempt to relate concepts and ideas to existing experience, and critically evaluate the emerging knowledge for patterns and meanings (Biggs, 1999, p.16). A surface approach to learning can be characterized as an intention to complete the learning task usually with minimal effort, often by memorizing information while making no attempts to relate concepts and ideas to existing experiences, or evaluate for patterns or meanings (Biggs, 1999, p.14).

In this project, a group of college instructors who were concerned about their students' learning formed a community-based action research group to explore different ways to stimulate deep learning approaches in the context of their own classrooms. They were guided by the following research questions: a) How can instructors stimulate deep learning in their classrooms using active learning techniques? b) How would the students respond to these instructional approaches? The students were generally contented to be passive recipients of the teacher' lectures, but it was hard to ignore that much of what was learned remained largely inert. The instructors recognized the need to change pedagogical methods to increase the

opportunities for students to engage in deep learning approaches in each of his or her respective classrooms. Ultimately, the students must learn to talk and write critically about what they are learning, relate it to their experiences, attempt to look for patterns or meanings, and apply it to their daily and future lives (Chickering & Gamson, 1987; Biggs, 1999, Driscoll, 1994, 2002). But where do we begin? How do we begin to stimulate the use of deep learning approaches?

In terms of pedagogy, active learning techniques discussed by Silberman (1996) as well as Bonwell and Eison (1991) provided initial ideas. In this regard, there was a need to design appropriate assignments or activities such as case study approaches, problem-based discussions and essays, and field visits to create more conducive environments for students to shift towards a deep approach of learning. In contrast, procedures perceived by students as requiring no more than the accurate reproduction of information lead to predominance of surface approaches (Thomas & Bain, 1984; Scouller, 1998). On the other hand, adopting teaching and learning strategies that move away from procedural tasks and memorizing to a more conceptual and analytical form of learning is helpful in promoting deep learning approach among learners (Hall, Ramsay & Raven, 2004).

Gordon and Debus (2002) reported that modifications to teaching methods, task requirements and assessment processes are able to influence students' approaches to learning by firstly reducing their use of surface approaches and later increasing the use of deep approaches. Case studies, group-based learning, collaborative learning approaches, jig-saw group discussions, role-play and field trip are examples of methods and techniques used to facilitate deep approaches to learning (Bonwell, 1991; Booth, Luckett, & Mladenovic, 1999).

These basic ideas combined with the support of the community of critically questioning, caring colleagues helped prepare and support each instructor (McNiff & Whitehead, 2002, e.g. p.25, p.67) for the initial experimentation of using active learning techniques to stimulate deep learning approaches. The community came together voluntarily with the common general interest of wanting to improve the learning that occurs in their classrooms. Each member of the community chose an active learning technique that he or she was comfortable with and which they thought would best meet the desired learning outcomes, and the subjected their lesson designs to feedback by the community. Some of the methods used in the eventual lesson designs were mind-mapping, group discussion, think-pair-share, and written critical reflections. Other methods that were attempted include peer assessment, round robin, debate, video recording, student-led discussions, hands-on-experiments, case-based learning, problem-based learning, summarizing and interviewing. The instructors did not restrict themselves to just one method, while continuing with lecture method in selected situations.

METHOD

The project team relied primarily on action research methods to guide and capture the changes in the teaching and learning processes implemented in classroom settings (McNiff & Whitehead, 2002). The basic steps as recommended by McNiff and Whitehead (2002) was used as a guideline: 1) Review the current practice i.e. teaching practice with the goal of deep learning; 2) Identify an aspect that needs improvement i.e. teaching approaches; 3) Imagine a way forward i.e. ideas derived from Silberman (1996), Bonwell and Eison (1991), and Biggs (1999); 4) Try it out i.e. with the community and short activities in the classroom; 5) Take stock of what happens i.e. discuss with the community about possible improvements; 6) Modify initial plan and continue with the action; and, eventually, 7) Evaluate what happened i.e. evaluate data collected, including student reflections as well as their assignments. In other words, it was a reflective as well as an active process of progressive problem solving as individuals working together within a community of practice learning how to better stimulate deep learning approaches in their own classrooms.

Guided by the aforementioned research questions, this study focused on the aspects related to active learning techniques used by the instructor, and the students' response to these instructional techniques. Data collected was in the form of teacher observations and reflections, student reflection or feedback, as well as unobtrusive data sets such as students' assignments and lesson plans. These data were analyzed through the lens of Bigg's (1999) notion of deep learning. This include indicators such as demonstrating a need to understand and seek meaning, relating concepts and ideas to prior experiences and future needs, as well as critically evaluating the emerging knowledge for patterns and meanings. The revised version of the

Study Process Questionnnaire, or SPQ-R-2F (Biggs, Kember, & Leung, 2001) was also used to investigate the students' self-reported learning approaches at the beginning and at the end of the course (this was only administered with the second group of students, as requested by the course instructor). The various data sources allowed for triangulation to promote validity.

RESULTS

For the purposes of reporting, data and findings from two cases will be reported in the form of two brief vignettes. Group A comprised of 14 third-year business students who took a course on industrial relations; Group B consisted of 14 first- and second-year students (of different majors) in an advanced writing course. The industrial relations course is taught by an instructor with 10 years of teaching experience. The writing course is taught by an instructor with 13 years of teaching experience.

Vignette 1: Making connections. Students in Group A were learning about collective bargaining and the negotiation processes in the context of employee-employer relations. In addition to lecture method, the instructor used active learning techniques such as group-led discussions in responding to case studies, a field trip combined with classroom discussions, as well as role-playing employee-employer disputes.

In the first activity to attempt to stimulate deep learning approaches, students were divided into small groups of 3-4 students, and were asked to respond to a case study. After they had discussed it with their groups in class and outside of class, each group presented how they would respond to the case study. Various ideas and approaches were discussed during this time. When the students were asked to reflect about this experience, they pointed out that this activity helped them to see the applications of concepts learned in the course to real-life settings. Consider what one student had to say:

> *"real-life cases are helpful … able to compare among the companies when we work next time …make us aware of the current issues regarding employers, union and employees opinion … benefit us when we work … eg: fight for our own rights, able to put ourselves in the employee's shoes if we are at the management level (S6,466-SR)."*

In the following major activity that took place at mid-semester, students were taken out for a field trip to experience and exchange knowledge with the director of National Employer Foundation (NEF), an organization representing employers. During the trip, the students were eager to ask questions and attentively took notes during the field trip. The instructor wrote in her journal that the directors was so overwhelmed by the students' response during the question and answer session that he offered to "discuss further … during a tea session (TRC5)."

A debriefing session was carried out by the instructor immediately after the field trip. The students submitted a one-minute reflection paper about this trip. In their one-minute paper, the students compared and contrasted what they saw and heard on the field to what they were learning in class. The following is one such instance:

> *"A lot of current labor issues such as Malaysia's lack of skilled worker which affected Malaysian economic development, minimum wage, legal issues such as the amendment of the acts which will affect IR as a whole … Now I can relate that the views and goals of both parties (NEF and National Trade Union [NTU]) are not parallel - NTU fight for employee's rights while NEF would only think of employer's rights (S13,466-SR)".*

Similar connections were made when students engaged in role-playing activities involving employer-employee negotiations. One student talked about learning to negotiate more effectively, giving the example of himself as a future employee to negotiate for better salary. Another student wrote about the deeper understanding he had developed just from experiencing and seeing the "real feeling" of a round-table discussion. Another wrote:

> *"… Now I know that it is very hard for both parties (employer and trade union) to have harmonious negotiation in order to win the demand and benefits … (S11,466-SR)".*

At the same time, the instructor also noticed a lot of emotional engagement while students played the role of their respective characters during the round-table discussion. Students who were generally

passive in the past also became very engaged. Reflecting on the activity, the instructor wrote that "even after the role-play ended, a few of the students were still talking about it with full of emotion (TRC8)."

As a way to help consolidate their learning, the instructor designed a project for students to do. In this activity, they were required to critically appraise and evaluate collective bargaining issues and demonstrate a range of industrial relations skills in a selected sector/industry. They were expected to conduct both primary and secondary research for this assessment.

From the group report it was evident that the students were able to construct knowledge by using a variety of resources from a literature review and link these to the information they collected during their NEF field trip. This one in particular stood out as it was never discussed in class:

> *"There are three (3) types of collective agreements in the industrial relations system …Type A for example is National Trade Union Congress has a collective agreement with the National Employers Federation (NEF). However, NEF was not pleased. … the NEF director indicated that employers prefer to let market forces determine the employees' wage because in Indonesia and Philippines, minimum wage does not guarantee high productivity.(GR1 pg 6, para 2.2:1)".*

In addition, students successfully made connections by identifying appropriate real-life examples to explain collective bargaining type B which was also never discussed in class:

> *"… the negotiation between National Union of Plantation Worker (NUPW) and IOI Corporation Bhd. … commence collective agreement negotiations concerning the wages and terms of employment of their workers, but was rejected on the grounds that they did not recognize the NUPW … (GR1 pg 6 - 7, para 2.2:3)".*

Students were also able to connect concepts and strategies of collective bargaining learnt in classroom to real life scenario when they interviewed Industrial Relations Officer of a bank:

> *"… ABC Bank employees are not satisfied with their current retirement wage. They then need to find evidence to prove that the current retirement wage can affect their productivity as well as their commitment towards their job. Employees can search for the company's annual report to prove that they are performing very well. If that is the case, the company needs to justify the reason of not being able to provide with better retirement wages for those employees who are affected. They are still able to perform; hence, they are qualified to get better wages. Besides that, they should perform a research whether the company abides to the EA 1955 in giving the retirement wages. (GR1 pg 9, para 2.3:2)".*

The students also gave a commendable solution to overcome the negotiation deadlock. They did this by making connection between their prior knowledge on key performance indicator and this new collective bargaining concept:

> *"… it would be advisable for ABC bank and XYZ bank to revisit the Standard Operating Procedures (SOP) of each company that has been listed in the guideline book when managing Human Resource issues. … where the bank can realign the Key Performance Indicators as a way to provide the salary increment. … it would generate a win-win situation as both the banks do not lose on anything when increasing their employees salary because the KPI evens out the cost as well as the unions parties of both the bank employees will also win the case because the employees get their salary increment with the condition that they would have to increase their standard of performance from time to time as a way to maintain the increment. (GR1 pg 21-22, para 4.3.1: 2)".*

The instructor was very excited to see how active learning techniques stimulated deep learning among her students. As the instructor recorded in her log:

> *"… in the past, my students' work was usually filled with citation of empirical studies without analyzing critically and synthesizing by suggesting recommendation. But now I am thrilled to see my students were able to make connection between prior knowledge to new*

knowledge, link theoretical concepts to real-life situation and more importantly recommend solution for employee-employer disputes". (TRC14).

The students' reflection below also suggest enthusiasm in engaging in deep learning approaches:

… this assignment has equipped us with in-depth knowledge on the areas of collective bargaining issues, challenges, deadlocks through real events examples gain from the interview that was carried out in completing the task … allow us to expand our thoughts on diverse employee and employer relations issues within the Malaysian Banking Industry ... this assignment has encouraged us to be creative in proposing ideas to resolve employer-employee issues on the related topic. (GR1 pg 23, para 5.0:1)

Vignette 2: Differentiating cause and effect. Students in Group B were learning to write effective cause and effect essays where they were required to construct knowledge, link prior knowledge to new knowledge and reach their own conclusions after analyzing the different concepts, ideas and arguments. The instructor mainly used group discussion that incorporated research, presentation and video viewing to consolidate what they had already learnt about this type of essay in their previous writing course. The topic was covered over three classes during which group discussion was held first followed by jigsaw group discussion. Research was encouraged as part of generating ideas and videos were shown to further spur discussions. One group which discussed on "What factors contributed to Obama's victory in 2008 presidential election?" had only 1 point (the first point) initially and was not able to develop further points. The group discussion, however, helped them to identify other possible reasons, including Obama's charisma, promise for change, economic policy, promise to close the Guantanamo prison and to return American soldiers from Iraq, as well as being the general frustration with Republican rule.

Here's an extract of the instructor's reflection on students' learning at this juncture:

"… I could see that students were actually learning a lot on a variety of issues and were able to differentiate between causes and effects. Some even commented that they should start reading newspapers or follow the news more regularly. (TRC2)."

As a way to consolidate learning, the instructor designed an assessment that required students to analyze the topic in more detail. To scaffold their learning, the instructor showed two videos on the assignment topic without revealing the topic. This was meant to serve as a brain-teaser for students to comprehend the issue and analyze the cause and effect of the given topic. The topic given was to analyze the causes and effects of any humanitarian crisis that happened as a result of armed conflict in the second half of 20th century or is currently happening. Though both the videos showed news excerpts and interviews with people about the fight and the sufferings experienced by them, the students were able to realize that there could be other issues involved to cause the sufferings than just the fighting. Though they could not immediately identify the real causes for the suffering, they were open to that possibility.

This is reflected in the instructor's log:

"…their understanding improved where students said that the suffering could be due to other causes as well and not the fighting alone (TRC3)."

Students also reflected on the benefits of referring to other sources to better grasp this unfamiliar topic:

I have learned that the best way to gain immediate exposure, both intellectually and emotionally, for this kind of topic, is by watching videos of the topic; whether they are movies or documentaries. Preferably the movie first, then the documentary. It also helps with synthesizing the huge amount of info. (S2 A2-SR)

Then, the instructor conducted a jigsaw group discussion to exchange ideas and to learn from each other about the process of writing. The whole class was divided into two. One group was given the task of researching on the humanitarian crisis and the other on skills of writing cause and effect essay. In the following class, the students were reorganized into groups with each group having some students who had researched on the topic as well as some who had researched on the essay writing skills. Next, she gave them time to discuss the topic and how they would use their knowledge of essay writing skills to write on the causes or effects of the topic. When she walked around asking questions of each group, she could see

evidences of deeper analysis when they were able to differentiate between causes and effects, identify root cause, secondary causes and contributory causes and also differentiate between immediate and long-term effects of the chosen topic.

Traces of deeper learning could also be seen in their assignments. For instance, one student identified the root cause of Darfur crisis as environmental issues rather than political issues. She wrote this concept in a clear thesis statement that can be the basis for a causal chain essay:

> *"It would be more precise to say that the humanitarian crises in Darfur were triggered by environmental issues".(S1 A2 para 1)*

Another student also traced the root cause of Rwanda genocide to the colonial rule:

> *"The inequality between the Tutsis and Hutus of Rwanda led to a serious humanitarian crisis leaving many people suffering physically, mentally and emotionally… The core of the famous Rwanda genocide started from their colonial period… (S4 A2 para1)*

Finally, students finished their essays with effective conclusion. For example, the following conclusion from one student's assignment ends with a thought-provoking question:

> *"Nevertheless, it is still astounding to know that much could have been done to halt the killings before it had escalated to such levels … the world's major powers knew exactly what was happening in Rwanda….How many lives could have been saved had there been but one single and steadfast show of international solidarity with victims of impending disaster? Living in a world where there are no friends, and only interests, it is possible that we will never know." (S2 A2 para9)*

Students' self-reflections give an insight into how they viewed the skills they acquired in this class. The following are some of their reflections:

> *"I think it would be nice to learn more on the proper ways on writing as well as to expand my vocabulary. I plan to major in Journalism, so I would definitely want to perk up my writing skills to be able to relate to the readers and capture their attention." (S1 A2-SR)*
>
> *Firstly, hunting around databases for articles can be very time-consuming. It helps to know exactly what you are looking for, and to find material to support your idea. (S3 A2-SR)*
>
> *Secondly, the research skills I learnt will be applied to all my current and future classes. I will be able to find information from many different sources, provided I use the right technique such as eliminating unnecessary words in search engines. (S4 A2-SR)*

The students also examined their strengths and weaknesses in writing on general issues. The following is one example:

> *Beyond any doubt, I would love to learn more on the current real world issues. It helps me broaden my general knowledge and boost my self-confidence when speaking to other people in future. There were many topics and issues I was unaware of until it was discussed in class. Truly, it is a good exposure to myself. (S4 A2-SR)*

The instructor later wrote in her log that the different applications of group discussions were "effective in making (students) learn this essay with less pain and their understanding of the assignment topic was better than expected." (TRC5)

The revised version of the Study Process Questionnnaire, or SPQ-R-2F (Biggs, Kember, & Leung, 2001) was used to investigate the students' self-reported learning approaches at the beginning and at the end of the course. There was a generally positive change by Group B students, with the mean score for using deep motive and deep strategy increasing from 2.92 at the beginning of the semester to a score of 3.45 at the end of the semester. This data—as have the qualitative data—seems to suggest that the teaching and learning context have stimulated students to move towards deep learning approaches. However due to a small sample size (n=14), further statistical analysis was limited.

DISCUSSION

When this project started, there were serious concerns about how our students approached learning. For many students, their primary motivation is to perform well in their assignments and exams to earn a paper qualification that will land them in a job. Their motives, strategies and approaches towards learning

can severely limit their overall learning experience (Biggs, 1999). However, as the project progressed, a deeper realization began to emerge – how students respond in the classroom is significantly affected by the pedagogical choices we made as instructors. Were we—the instructors—reinforcing learning as a spectator sport because of the pedagogical choices we were making?

Realizing the shortcomings of using predominantly the lecture method, the members of the community of practice decided to look into different ways to encourage students towards deep learning approaches. Active learning techniques discussed by Silberman (1996) as well as Bonwell and Eison (1991) provided initial ideas, and ideas grew as a result of discussions and personal reflections. In both vignettes, the goal was to create a learning environment where students are encouraged to learn by doing, by interacting with other learners, by reflecting on their learning and by learning in contexts (Driscoll, 2002). For instance, the field trip activity was to provide a rich context for students to begin to see the connections between theory and practice (Hickcox, 2002; McCarthy & McCarthy, 2006). This gradual strengthening of such connections was visible in their oral and written work. For example, the students reported a more nuanced understanding of the tension between employees and employers. In second vignette, the video documentary seemed to provide an emotional connection and exposure to experiences they are not familiar with.

Role-playing had similar effects, but perhaps more emotionally charged (Bolton & Heathcote, 1999; Raphael & O'Mara, 2002; O'Toole, 2002 cited by Dracup, 2008). Now, they were literally not the spectators anymore. Here, they were given the opportunity to personalize a task and making it meaningful (Biggs, 1987). As a result, the students became cognitively and emotionally immersed in the learning context. Perhaps the best indicator was students who did not want to let the discussions end when the assigned time for the class had ended. The students saw different perspectives and drew meaning from the character they had played, and found a learning experience they wanted to pursue further (Dracup, 2008). This, for instructors and students alike, had rarely or never occurred before.

Other techniques such as small and large group discussions were used extensively in both vignettes. Although there were concerns that discussions were higher risk activities in that they require careful planning, constant facilitation and full engagement from the students (Bonwell, 1991), both the instructors and students generally reported positive experiences particularly when the students actively engaged in activities such as brainstorming, exchanging of ideas, and persuading peers by articulating and defending their ideas (Chickering and Gamson, 1991; Johnson, Johnson, and Smith, 1991; McKeachie, Pintrich, Lin, and Smith, 1986). In many instances, without much directed instruction, students were motivated to read widely from a variety of resources before engaging in discussion with group members. This is reflected as one of the characteristics of deep learning approaches (Biggs, 1989).

However, this project was not without significant challenges. Firstly, experimentation with different teaching and learning contexts and approaches can be time-consuming, and, physically and emotionally draining. Much of what was made possible in this project can be attributed to the support that members had from the community of practice.

Secondly, particularly in the earlier part of the project, we had to learn through hard knocks. For example, one of the instructors had happily reported the successful use of student-led discussions. The students were physically active, and seemed to be cognitively engaged too. As a follow-up activity to the discussion, the students had to write a report. This is where the instructor found out that some of the most engaged students wrote some of the poorest reports. One of the many questions that ensued was: what techniques can be used to better consolidate the learning after a discussion or any relatively open ended activity? Needless to say—and consistent with the action research steps—improvements were made based on feedback from the community as well as discussion of the available literature on deep learning.

CONCLUSION

Apart from ensuring that the learning outcomes were achieved, the instructors realized that they needed to play a bigger, but a different, role. Instructors need to take responsibility for ensuring that the pedagogical choices they make in the teaching and learning system are constructively aligned to promote deep approaches to learning (Biggs, Kember, & Leung, 2001). These responsibilities must come with the ability to be more aware of how students are learning, to be able to track their gradual cognitive achievement from comprehension to evaluation, and to constructively design our daily lessons towards the intended learning outcomes. Ultimately, we need to also learn to design, develop and facilitate opportunities for our students to engage in deep learning approaches.

**Note: Names of individuals and organizations in this article have been changed for confidentiality purposes. Earlier versions of this paper was discussed at campus forums and a conference.*

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