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Active learning in business disciplines using flipped classroom and project learning

ABSTRACT

Rapidly changing technology combined with vast depositories of accessible material on the web offer opportunities and challenges to instructors to adapt and enhance student learning experience with “engaged learning” as the key goal. It is critical that the instructor offers a teaching approach that will enhance the self-paced learning for today’s generation of students. Flipped classroom combined with project based learning approach has shown positive results in pedagogical experiments conducted by the authors in different time periods, geographical locations and cultures, and different business disciplines. This paper presents the results of the studies that utilized such approach and confirmed the hypothesis will effect improvements in student learning across time, disciplines, and cultures.

KEYWORDS: Flipped classroom, Engaged learning, Learning Style, Technology

INTRODUCTION

Rapidly changing technology and learning styles of students combined with vast depositories of accessible material on the web offer opportunities and challenges to instructors to adapt and enhance student learning experience with “engaged learning” as the key goal. As the technology continues to advance, and each generation becomes more tech-savvy, it is critical that instructors align their teaching practices so that they can reach out to the new generation in addition to the traditional students. It is critical that the instructor offers a teaching approach that will enhance the self-paced learning for today’s generation of students. Flipped classroom combined with project based learning is an approach that has shown positive results in pedagogical experiments conducted by the authors in different time periods, geographical locations and cultures, and involving different business disciplines. This study presents the results of the studies that utilized such approach and confirmed the hypothesis will effect improvements in student learning across time, disciplines, and cultures. The authors plan to continue to test the effectiveness of the approach in future time periods and analyze the results.

LITERATURE REVIEW

Two key factors that have given a major impetus to the enhancing growth of flipped classroom are the exponential growth of technology that has capability of creating and storing massive information and the second factor is the channels by which the stored information can be delivered and shared. (Bishop and Verleger 2013). Flipped classroom is an approach that can get the maximum leverage from the advances in technology. Flipped classroom approaches remove the traditional lecture and replace it with active in-class tasks and pre-/post-class work. (Abeysekera and Dawson 2014). Incorporating active learning strategies into the classroom is critical in order to reach millennial students. (Roehl at al. Spring 2013). Bishop (2013) defines flipped classroom as an educational technique that consists of two parts: interactive group learning activities inside the classroom, and direct computer-based individual instruction outside the classroom.

In order to understand the impact of the “flipped classroom” approach on students’ learning and whether they perceive the approach as a good alternate for effective learning, it is critical to examine the details of implementation and measure the results. There are 2 reasons for understanding how this approach can be used for a class. One, flipped classroom is not just a

single design of the process, but can be done in different ways depending upon the availability of resources, students' capability, instructors' attitude towards the whole process and other environmental factors. True flipping should include a careful redesign of learning environment, but this is often overlooked (Nielsen October 2011). Second, the flipped classroom needs to be designed and be aligned to the requirement and suitability of the course.

A common aspect of flipped classroom is that it offers an interactive and dynamic learning environment and the success of it depends on how effective the approach is executed and used for teaching a course. Past studies indicate that the flipped classroom approach adds a motivating factor in students' learning and alleviates the cognitive load on them.

([Abeysekera](#) and Dawson, 2014). McLaughlin et al. (2014) study also suggests that the flipped classroom approach motivates students to higher level of learning. In this study also, although the motivation was not measured but the enthusiasm displayed by the students indicates that they were motivated with this approach. Jensen et al. (2014) concluded that the flipped classroom does not result in higher learning gains or better attitudes compared with the non-flipped classroom when both utilize an active-learning, constructivist approach. They further propose that learning gains in either condition are most likely a result of the active-learning style of instruction rather than the order in which the instructor participated in the learning process. However; our study suggests that active-learning is an element that is implied in the basic concept of the flipped classroom i.e. since the students are interactively involved in solving a specific problem, active learning is taking place. In other words, active learning and flipped classroom are not mutually exclusive, instead they co-exist in the same time.

The traditional teaching-learning process that happens in a close classroom environment is a non-natural learning style and that includes 'teaching', 'education', 'instruction' and 'learning' (Eilam and Trop). Multidisciplinary and multidimensional learning builds the system approach among the students and they require more active engagement in the learning process under the guidance of the instructor. Multidimensional learning happens across the time and space, meaning the learning of the same happening at different times as well as same time but different places. The multidisciplinary and multidimensional learnings are useful for cognitive learning. However, that does not bring behavioral change in the students. Therefore, ethics and value clarification elements must be built into the natural learning style, which is done if the students get immersed in the learning of a topic and get the feeling of ownership.

ERIC Development Team (1997) observed that Gen-X workers resent the labels describing them as slackers, arrogant, disloyal and having short attention spans. In fact, these descriptions are more of a perception of those who do not understand their new ways of learning. The ERIC investigated ways in which the learning characteristics of the young adults classified as Generation X reflect the need for the new teaching and learning strategies promoted by cognitive scientists, such as learning in context, cooperative learning and real-world application of knowledge.

Duxbury et al (2016) describe a 3-semester experiment using flipped class room, and found that it improved student learning in 3 different subjects at their University. Enfield (2013) and McLaughlin et al (2014) both reported improved student learning using flipped classroom pedagogy at their Universities.

Even in the same generation of students different people have different learning approaches. The learning approach depends on several factors like learning styles, learning preferences, prior knowledge, social setting, perceptions, cultural-historical psychology, learning environment, learning space and more. Therefore, it is very important for an instructor to choose the right mix of pedagogy keeping in mind the learning generation as well as the level of students in the group.

METHODOLOGY

The 3rd author of this paper experimented the guided learning pedagogy from 1987 to 2000 in a residential University before the concept developed in the literature, but strikingly it largely blends most concepts listed therein and the outcomes demonstrate the benefits of this approach in an academic setting. The pedagogy referred hereto in the following section was experimented for more than a decade (from the year 1987 to the year 2000) with the select group of students of postgraduate diploma in management [PGDM (BM)] program at XLRI, Jamshedpur now called as Xavier School of Management. XLRI is a premier and one of the oldest business schools of India established and run by Jesuits. It selects top notch students from the entire country through the rigorous process of written test and personal interviews, and there is not much intellectual and academic performance gaps between the top and the last student in any batch of PGDM (BM), and collaborative competition is very high. All students lived on campus, along with most faculty members. This setting allowed extensive interaction among the students as well as between the students and the faculty. Time, place and space become no constraint. The said period of experimentation coincide with the Gen-X students.

The process of the guided learning of this course was divided into (a) enrolment of students and allocation of topics, (b) Guided preparation by the groups, (c) validation and approvals by the instructor, (d) preparation of a list of thought-provoking questions as well as short quiz covering basic reading material, (e) preparation and approval of delivery plan, (f) delivering the topic in the class and (g) evaluation as learning components. Each group of 2 students work on a topic after discussion with the instructor, with the objective of gaining in-depth understanding of concepts and interfaces. Only after the instructor validates the complete understanding, the group proceeds to the next step of preparing the sequence of sub-topics and make a small list of thought provoking questions for the other students. A copy is provided to all the remaining students at least one week before the schedule date of delivery of the assigned topic. The group is required to prepare a ten-question quiz from the basic reading material, and this quiz is administered in the first five minutes of the class assigned to this topic. The group is asked to prepare the topic delivery plan with one or more pedagogical approaches for the collective best learning of the students. Different sub-topics can be delivered through different pedagogical choices (like traditional explanation with or without use of power point, inquisitive questions, discussion, examples and narrations, hands-on exercises, role play, case discussion etc.). The group has to justify the use of selected pedagogy and prove the adequacy of preparation for the same. The instructor approves the flow and pedagogical plan. It has been noticed that many groups wrote real-life cases, developed hypothetical role play around the real life events and carefully used a mix of suitable pedagogy for ensuring learning effectiveness. Each group of two students is required to search for prospectus issued by any public limited company for financing their new project. The issue must have happened in the previous two years only and not older. The final examination will be based on their project analysis.

In the continuous evaluation scheme the components used are: (a) quizzes administered on each topic, (b) preparation for the topic and effectiveness of delivery in the class by each group, (c) class participation of students in making the classroom experience rich in content and analysis, (d) a project by each group and (e) final examination. There is no midterm examination. The students uniformly expressed confidence in their grasp of topics, and the positive impact in their career growth.

The 1st author of this study conducted a study using flipped classroom approach to teach the students in an undergraduate capstone MIS course offered in Spring 2016 (14 students) and Spring 2017 (24 students) and graduate capstone MIS course offered in spring 2017 (19 students) in an urban University in the US. Each course had 2 parts and the following narrative covers the details of how the approach was implemented in these courses.

In one part of the undergraduate course, the students are required to work on multiple case studies related to use of technology in developing the solutions for the business problems

addressed in the case study. After developing the solution for the problem the students are required to implement the solution by using the application software such as Excel, Access, Web development and submit the completed case analysis in a predefined format. The instructors will then go over the students' submitted work and provide score based on the predefined metric. The metric considered for grading is typically the accuracy of responses to the various questions in the respective case studies. In the second part of the course the students are assigned various topics on the current technology and their implications for businesses. The students have to research at least five articles related to the topic and are required to summarize the overall findings in the form of a report. These reports are then graded based on the relevance of their findings related to the assigned topic. The instructor used this approach for several semesters in the past. However, the difficult part of this approach was ensuring that the students maintain the professional integrity in completing their assignments. In several instances the instructor had to reject the work submitted by the students and were asked to redo the assignment. In addition it was not clear whether the students really learned from the assignment.

In order to remedy this situation the instructor decided to incorporate the "flipped classroom" approach for overall assignment submission and grading. In the new approach the students were required to provide the demonstration to their colleagues about how they developed the solution to the case problem. The approach was interactive in which the students were allowed to ask questions and also could suggest alternate approach to the solution developed by the student. The instructor acted as a mentor and will interject only when the students ask for guidance or had any disagreement between them regarding the solution. This interaction between the student presenting the assignment and the other students created a very dynamic learning environment. This approach allowed instructor to reveal if the student had really understood the case assignment. In the process it was observed that students were enjoying the whole experience and when asked if they prefer this approach in doing their assignment and the response was positive. The interactive approach also allowed the instructor to inject questions other than the questions in the case assignment to ensure that the presenting student really understood the problem addressed in the case. The flipped classroom approach served double purpose -- improved the overall student learning and grading of the assignment at the same time. As a result the outcome of this approach was effective and efficient permitting the instructor to have more time to engage students in learning the concepts. The performance of the students on assignments and the exams was better than that of the students in the previous semester. Based on the positive outcomes of the new approach the instructor adopted the same approach on the next batch of undergraduate capstone students. Students in the second batch also expressed their interest in the new approach and in addition had good performance compared to the students in the past semesters.

In the graduate capstone course, the instructor used the flipped classroom with different technique. In the past semesters the students were required to work on several projects in the form of exercises and submit the completed assignments. In addition the students are also required to read the chapters in the course textbook for conceptual understanding of various topics. The instructor presents the concepts in each chapter during regular class periods. The students are then tested to see if they understood the material. The overall grades are then determined based on students' completion of the project assignments and their performance on the tests. In the flipped classroom approach the instructor told the students to do the project exercises during the class and were allowed to consult each other for any difficulty in the presence of the instructor. The instructor will keep note of how often the students are consulting each other and for what specific purpose. This was necessary to ensure that students are trying to solve the problem on their own first and they ask other student only if they really need to ask. In some instances the instructor will provide guidance. Once the students complete the

exercise they are given full points for completion. Since the grading of the assignment was based on the completion of the exercises the students expressed a sign of relief that they do not have to speculate what scores they will have on the assignments. This approach allowed them to focus more on understanding the details of the exercise and at the same time giving instructor a first-hand observation of their work.

For the textbook chapter presentations, the instructor decided to have students present the contents of the chapter to the class. Since the instructor wanted to experiment the new approach, in the first trial, only three students were asked to present three different chapters to see how the interaction works between the students. The instructor will step aside while the student is presenting the chapter material and observe the interaction between the students. Similar to undergraduate capstone course, in this course also the instructor noticed enthusiasm in students' attitude when their colleagues were presenting the chapters. The students at times will make funny comments about the student presenting the chapter. At times the student presenting will ask instructor to intervene if he or she has difficulty in presenting certain aspect of the chapter content. The instructor will then have other students participate in the discussion to see if they can provide the understanding of the specific content. Thus it encouraged everyone in the class to take active role in learning the concepts. Overall this approach provided instructor the clear insight about students' learning the concept. Interactive discussions during the students' presentation of the chapter helped instructor find out if the students really understood the concepts. Exhibit 1 shows the distribution of students and course content.

Exhibit 1: General activities in the Graduate (MIS685) and Undergraduate (MIS470) Capstone Courses

Assignment	Graduate (19) SP17	Undergraduate (24) SP17	Undergraduate (14) SP16
IT Topic (UG)		5	8
Case Study (UG)		6	5
Project/Exercise (G)	19		
Textbook Chapter (G)	2		
Outside class (Both G and UG)	16	7	11
Participation (Both G and UG)	95% of the students participated in the class	70% of students participated in the class	78% of students participated in the class
Average Attendance	18 to 19	16 to 19	10 to 12

NOTE:

Type of participation - questions asked, suggestions made, questioned the approach, funny comments

Nature of IT topics – ERP, Outsourcing/Cloud Computing, Big Data, IT infrastructure and so on

Case Study – Business Problem requiring building an application using Excel, Access and Web building tool for effective and efficient decisions making

Project/Exercise – SAP transaction exercises such as Purchase Order, Sales Order, MRP, Production Process, Predictive Analytics application and Dashboard designs, Simulation software (commercial software package) to develop a production plan using historical forecast

Textbook chapter – Presented two chapters related to production and Supply chain, Production exercises

Outside the Class – Variety of questions related to either case, project/exercises, and general questions asked by students (either via phone or visiting office or meeting on Blackboard Collaborate). Sometimes students were asked to refer to another student

Results

In both time periods and settings, one of the key outcomes of this approach was the increase in participation of the students in the development of the case study solutions. Anecdotal evidence confirmed that the students were motivated learners, and were encouraged to express their views. They seemed to retain the knowledge better also. Based on the outcomes of the “flipped classroom’ approach the authors have decided to continue it, and make changes if necessary in future courses. Our results will be documented in a future paper.

Conclusion

Academics are always looking for different techniques for improving student learning and flipped classroom is one such method that is practiced by a number of institutions. The unprecedented growth of technology is enhancing the growth of flipped classroom. In this paper the authors present their use of this method in the classes they teach and have reported the findings which support their hypothesis that the flipped classroom is an effective and efficient approach for enhancing the student learning. One of the challenges of this approach is the time commitment needed, limiting the participation by all the students in a course. It forces the instructor to be creative in implementing the process so that majority of the students can participate. The authors present a few examples of how the participation of the students can be improved. Overall, the authors feel that as the instructors gain more experience in using such approaches, the outcome of in-depth student learning will continue to improve.

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