

Flipping the Undergraduate Classroom: A Case Study

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Abstract

Rapid development in information and communication technology (ICT) is changing the instructional strategies in Higher Education. This study aimed to identify the level of self-efficacy of B.Ed. (IT) undergraduates of a local University in a flipped classroom. Further it also investigated gender difference among the undergraduates self-efficacy in the classroom. A group of 35 student selected using convenience sampling method. This group divided into Group 1 as control group and Group 2 as intervention. Group one consists of 17 students and two consist of 18 students. Initially the two classes answered pre-survey questionnaire of self-efficacy. Then control group was exposed to conventional teaching whereas intervention group intervened with Padlet. Data were analyzed with SPSS and revealed the intervention group has high Cohen effect ($d = .53$, which is considered moderate size compared Cohen effect ($d = .17$, considered small. This study clearly exhibits intervention group has better self-efficacy than control group. Further, the effect size of control group revealed decline in self-efficacy. In study exhibits there is no difference by gender in terms of self-efficacy. It is expected further study should be conducted by taking in to account sample size, duration of intervention, and method.



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1. Introduction

One of the blended learning (BL) approach is flipping a classroom. In this BL method, in person communication is combined with independent study via technology. Flipping the classroom modifies direction by switching from teacher-centered towards student centered. This method actually change the role of instructor and learner assume greater responsibility for completing learning activities outside of class. Further, material usually checked out in lecture is supplied outside of class through video lectures, lecture slides, digital modules, and/or various others on the internet media. Research right into the performance of flipping a classroom proceeds to establish, with combined results as to their greater effectiveness over traditional structures. A few studies recommend that turning the classroom can enhance students' conceptual understanding of web content beyond memorization as well as standard expertise Berrett (2012) and Casasola *et al.* (2017). In their variable nature, flipped class can also provide students with a higher mixture of tasks, media, and possibilities to get involved, thus serving even more varied populations as well as ensuring even more comprehensive learning opportunities (Lage *et al.*, 2000). Although conventional classes are still dominant, the National Science Foundation prompts educators to begin utilizing a "mix of varied content via the mixed technological abilities of the Internet, high performance computing, advanced networking, at home electronics, as well as mobile interactions" (Flumerfelt and Green, 2013). These innovation initiatives recommended by the NSF are required due to the absence of pupils choosing profession fields in scientific research, math, modern technology, and engineering (STEM) with females under-represented in these fields (Louis and Mistele, 2012).

2. Literature Review

Most of the past studies observed variables such as performance, communication skills, collaboration attitudes and practical skills in flipped classroom setting. However, very few studies focused on self-efficacy (Kenna, 2014; Smith, 2015; Yu, 2016). Self-efficacy, or confidence as it is typically recognized, is just one of the most enabling psychological science designs to have been taken on right into favorable psychological science. It is actually the positive self-belief in our competence or even opportunities of effectively completing an activity and also generating a beneficial end result. Self-efficacy plays a primary part in establishing our chances for effectiveness; in reality some psychologists fee self-efficacy above ability in the dish for excellence. When establishing goals, weightage must be given to self-efficacy to ensure its belief align with them and not antagonizing them. The inventor of the concept, Albert Bandura listed 4 bases of efficacy views namely i) mastery experiences, ii) Vicarious Experiences, iii) Verbal Persuasion, and iv) Emotional & Physiological States. The most importantly resource of self-efficacy is actually by means of mastery experiences. Nothing at all is actually effective than possessing a direct experience of knowledge to raise self-efficacy. Possessing a triumph, for example in mastering a task or controlling a situation will

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definitely create self-confidence by contrast a failure weaken that self-efficacy. To possess a tough feeling of self-efficacy requires knowledge in conquering hurdles by means of initiative and perseverance. The second resource of self-efficacy happens from our observation of individuals around us, particularly people of our team consider as role models. Observing individuals comparable to our own selves be successful through their sustained initiative elevates our beliefs that our experts too possess the abilities to grasp the tasks needed to have for success in that place. Thirdly, significant people in our lives such as parents, trainers, managers or teachers can boost our ideas that we possess what it needs to succeed. When problems occur, being actually urged that our experts possess the functionalities to grasp specific tasks implies that our team are much more likely to place in the effort and sustain it. The last base is Emotional & Physiological States. The state you're in will affect how you evaluate your self-efficacy. Clinical depression, for example, can dampen self-confidence in our abilities. Tension responses or stress are actually analyzed as signs of susceptibility to inadequate performance whereas favorable feelings can easily improve our self-confidence in our abilities.

Individuals along with much higher self-efficacy set much higher personal targets and have actually been revealed to have a better commitment to accomplishing those targets (Bandura, 1997). The suggestion is actually that when a learner believes they can perform an activity, they are even more academically stimulated to accomplish the activity (Clayton *et al.*, 2010). The usage of modern technology such as computers or even calculators have been shown to enhance self-efficacy and also revealed a favorable correlation to assessments and grades, in addition to a negative correlation with time required to resolve problems (Joo *et al.*, 2000; Zheng *et al.*, 2009). Hommes and Van der Molen (2012) pinpointed that learners with strong self-efficacy were actually certainly not simply steered to find material yet also utilized that newly obtained knowledge. Efficiency in online knowing might be connected to self-efficacy because the more self-efficacy a student possesses, the much better they perform in these sorts of classes (Wang and Wu, 2008).

Learners who trust in their capabilities in the classroom (i.e. high self-efficacy) are able to rely on their own brainpower when instructional challenges are displayed to them (Bandura, 1997). There are many researches done on student self-efficacy and its place in the classroom (Arslan, 2013; Louis and Mistele, 2012; Peters, 2013). For instance, Arslan (2013) recognizes an equivalent impact in between self-efficacy and also academic success with self-efficacy predicting achievement as well as accomplishment as a resource of self-efficacy. Peters (2013) found that learners with much higher self-efficacy have actually also shown to do much better in mathematics and science courses which leads to STEM.

Gender in academic self-efficacy variable has been researched widely. However, the findings are varying. In a meta-analysis of US and also Canadian attendees, Whitley (1997) examined gender variations in computer self-efficacy and located that the mean result measurements was poor to modest. Pajares (2003) concluded that female learners basically more confident than male learners. Lerdpornkulrat *et al.* (2012) recognized that, generally, female students in 10th, 11th, as well as 12th level classes' revealed lower self-efficacy compared to the male learners in science and mathematics as a result of gender stereotype promotions. On the other hand, Kiran and Sungur (2012) determined no distinction in self-efficacy in between sexes at the secondary school level. There were contrasting outcomes reported with self-efficacy, female turned up more anxiousness when it arrived to scientific research courses (Desy *et al.*, 2011; Kiran and Sungur, 2012). Additionally, Desy *et al.* (2011) reported women were actually less inspired in class and revealed lower pleasure in the sciences. The turned class could reveal differences in sexes because of differences in research study habits in between guys as well as girls with girls devoting even more opportunity to academic work and also revealing more significant scholastic motivation (Fischer *et al.*, 2012).

Although studies have revealed the flipped classroom model is an appealing resource in the industry of education and learning, there is actually little research study offering analytical evidence to the effect of a flipped on self-efficacy in the high institution setting (Bergmann and Sams, 2012; Fulton, 2012). More research study needs to have to be done to pinpoint if there is a connection between learners self-efficacy and learning in the flipped classroom.

1.1. Objectives of the Research

- i) To identify the difference of self-efficacy levels of group 1 (control group) and group 2 (intervention group).
- ii) To measure the difference in the mean score of self-efficacy by gender for the intervention group.

3. Methodology

This study employed quasi-experimental non-equivalent groups design since the testing certainly not randomized as a method of convenience sampling. Pre-service teachers to be in a specific class at a certain time might be granted permission to change right into their preferred course. Therefore the researchers have no control on groups. The sample consists of 35 pre-service teachers from a local university of School Education and Modern Languages. The sample consisted of 9 male (25.7%) and also female 26 (74.3%) pre-service teachers. All of the participants enrolled for Bachelor of Education – Information Technology (Honours) programme totaling 134 credit hours. One of the core courses is Mathematics for IT. The researchers obtained permission from present lecturer of the group to conduct the intervention. In order to identify the self-efficacy of the pre-service teachers, the researchers adopted 'The Self-Efficacy Scale' (Greene *et al.*, 2004). This instrument is developed to identify students' opinions concerning their viewed self-efficacy of their discovering and also to analyze their views regarding a traditional classroom mentor version compared to the flipped classroom. The survey was validated (Greene *et al.*, 2004; Miller

et al., 1996) with reliability Cronbach alpha .91. The questionnaire was rated from 1 (strongly disagree) to 4 (strongly agree).

4. Intervention

Instructor generated Padlet was used during the flipped classroom intervention. Padlet is totally free (upgrade for a charge) and very easily mixes the simple thinking about brainstorming along with the application of technology to make learning much easier. After the instructors develop a Padlet, promptly personalizing it-setting up blog posts in a free-form, grid, or even flow style and also modifying wallpaper. After students have viewed an instructional video, provide them with an opportunity to reflect on the content. In this study the instructor posted the question on a Padlet wall based on video presented. Pre-service teachers add response to the Padlet wall at the exact same time their friends were actually contributing feedbacks then at that point the instructor instruct students to form a small group to examine the responses of everyone in the class. For instance, when introducing Mathematics in IT for the first year students the instructor started the class by asking question in a Padlet wall: What is the difference between discrete mathematics and computer science? How you will conduct the search in search engines to get best results? Instructor could see all the responses from the students. Some students type phrases, while rest may use XOR or AND or NOT. This instruction was conducted via <https://padlet.com>.

The participants had access to online classroom that connected via Learning Management System (Moodle). Activities such as quiz, forum, and assignments were posted before intervention. The instructor assigned Group 1 ($N=18$) as intervention group and the Group 2 ($N=17$) as control group (randomly assigned). Both groups exposed to the introductory lessons (mathematics in IT) for 90 minutes each. Group 2 intervened through direct instruction. The questionnaire was distributed after 3 three weeks of the traditional classroom conducted. This pre-test is occurred before flipping the classroom. Consequently, post-test was carried out after 3 weeks of flipped classroom intervention. Then both pre-test and post-test were compared to identify to what extent the change in learners' self-efficacy (if any).

5. Results

The data was analyzed using SPSS version 23. The means of the two groups were compared. The findings of the descriptive statistics are recorded in Table 1. Both groups were exposed to pre-test. Therefore, group 1 and 2 compared in terms of mean. The group 1 (control group) had mean score of 21.50 and the post-test mean score of 21.75. The difference is in the mean score between this two groups is considered small ($21.75-21.50$) 0.25. Whereas, group 2 which is exposed to flipped classroom had pre-test mean score of 22.75 ($SD=.7$) and the post-test mean score of 23.15 ($SD=.8$) with mean score difference of ($23.15-22.75$) 0.4. It was found that Cohen's (d) effect size is .53 and considered 'medium effect size'.

Table-1. Mean score of control and intervention groups

Group	Mean Score (SD)	Mean Score (SD)	N
Control (pre-test)	21.50 (1.1)	21.75 (1.7)	17 (Male=5, Female=12)
Intervention (post-test)	22.75 (0.8)	23.15 (0.7)	18 (Male=4, Female=14)

However the Cohen's (d) for pre-test is small 0.17. Further the data was analyzed to test the research hypothesis "There is no difference in the mean score by gender for the flipped classroom". To measure the difference researchers used t -test to decide either reject or fail to reject the suggested hypothesis. The t -value is -1.82. The p value is .088. The result is not significant at $p < .05$. Therefore we can conclude there is significant difference between male and female learners in the flipped classroom.

6. Discussion

This study clearly exhibits intervention group has better self-efficacy than control group. Further, the effect size of control group revealed decline in self-efficacy. The intervention group concentrated learning via Padlet. The flipped classroom reduces inquiry sessions as well as reducing time. Learners would list their inquiries while watching the Padlet as instructor address them independently.

There is no difference in flipped classroom in terms of gender. This finding aligned with Pajares (2002) who proposed male and females have similar levels of mathematics self-efficacy. It is recommended that further investigation on the usage of the flipped class ought to be actually administered on a bigger sample along with example sizes of 100 or even more demonstrating a lot more analytical assurance. The result dimension and also statistical value may modify distinctly with a rise in sample size. A continuing recommendation would certainly be an extension of time during the treatment and also implementation of the flipped classroom. The control class showed a reduction in self-efficacy throughout the time and this may have been from the uniqueness of the education a method. An increase in time from 10 full weeks to 18 or 36 weeks will perhaps show some perk. The flipped class could additionally begin at the beginning of the year to decrease learner bias in the direction of the conventional class version.

7. Conclusion

In summary, the use of the flipped class version assists students be more aware of their need for external assistance in their research studies and to be able to recognize the person/people that might address their academic troubles. When educators choose a training method, along with providing the students the choice to pick, they should additionally take into consideration using the flipped class model if the educator wishes to train students to utilize the self-regulation ability of proactively raising questions. This version offers students with adequate opportunities to interact with the teachers and their peers, while instructors can also offer learners with support and help personally. It is suggested that if the sources and atmospheres permit, instructional experts need to assign a sufficient number of technical assistants to aid with the in-class activities throughout the turned classroom instruction.

Flipped Learning can have numerous benefits for the greater education. Normally, students learning in such environment might start to more effectively as well as effectively educate each various other, as well as embark on taking the duty for their understanding. Numerous research studies in the area of flipped class additionally disclose that when this method is made use of, the outcome will certainly be more discovering. This research also has revealed that undergraduates who were exposed to the flipped class had actually delighted in the experience with a considerable number believing that it was a reliable rearing approach. The repeatability of the videos any time and also area permitted pupil educators to prepare completely for course, as well as the displacement of classroom talks suggested additional contact time for better and also engaging discovering tasks that likewise aided them accumulate their confidence and enjoyment of the subject. Depending on the active discovering activities picked for class time, there might likewise be much more opportunities for pupils to interact as well as learn from one another. The flipped classroom benefited the trainee instructors as they are able to duplicate the video clips as many times as needed and checking out the videos in your home "conserved time" so that even more can be carried out in class. As a matter of fact, some undergraduates rejoiced that they were "required" to find to course ready. The flipping class had produced a positive modification to students' possession and also duty towards understanding. Much higher engagement throughout class time was observed because of ability to easily and also effortlessly create and make use of multimedia on Computers, cellular phones, tablets Web-based tools for the objective of collaboration. It is advised that the turned classroom be incrementally introduced to other programs in Universities.

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