

**ACTION RESEARCH IN EDUCATION : EFFECTIVENESS OF FLIPPED
CLASSROOM ON ACADEMIC PERFORMANCE OF STUDENTS**

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ABSTRACT

This study is an action research in the field of education. In this research paper I have tried to gauge the effectiveness of flipped classroom as a strategy to improve the academic performance of students. The present study involved a sample of 14 AS and A level (CAIE curriculum) psychology students from an International School in Mumbai. Active learning strategy of flipped classroom was used to foster teaching and learning process among students. The data collection was done using self-report, observation and objective assessment. The results supported the effectiveness of flipped classroom on academic performance. The strategy helped improve the grades of students who were at the lower end of academic performance.

KEY WORDS

Flipped Classroom, academic performance, CAIE Curriculum

INTRODUCTION

The field of education has transformed in the past couple of decades. There are many innovations that have crept in. From active learning strategies which focus on a participative approach in teaching, to virtual classrooms that have brought schools into our homes, we have it all. The focus has changed from content to concept. The demographics of education have changed and so has its purpose. The academic performance still remains an important criterion of determining success in one's educational life. However, in the present time the importance of skill building and easing the transfer of learning to workplace has also found a place in discussion of academics. The schools today cater to a wide range of students ranging from academically bright to those with special educational needs. As a teacher our accountability has increased and we are expected to teach all the different types of students and help all of them excel. On the face of it, it's a very tough task.

As teachers we try our best to ensure that our students achieve marks according to their maximum potential. This involves helping them understand the material and apply the concepts aptly. After years of teaching it might be difficult for a teacher to understand exactly where to start from. The judgement about the level of understanding of students might be coloured by the level of understanding or performances of the previous batches. Hence having a student revise the concept instead of the teacher might come handy as a teaching strategy as the ground zero will be the same for both the teacher and the learner.

I decided to conduct this study as I realized that sometimes the concepts and examples that I thought as being easily understandable and simple were not absorbed by all the students equally well. In spite of having similar capability and absolutely no learning disability they

did not seem to connect with the concept or example. During one such instance in my classroom despite going over the concept and examples again and again the student did not understand. At this point another peer gave a very “every teenager ever” kind of example and this student could instantly see the connection. This made me think that probably the examples that I find relevant might not be as well understood by students as someone of their own age and those who share their lingos and lifestyle. Thus I thought of using the strategy of flipped classroom to help students perform better in academics as this strategy would not just help students connect with a teacher of similar mental age, but also expose students to a variety of teaching and learning aids and strategies.

IDENTIFICATION OF THE PROBLEM

Students failed to score on specific concepts despite the teacher giving relevant examples or simplifying the concept.

HYPOTHESIS

Flipped Classroom will help promote understanding of concept that will increase the academic performance

The research questions that I am focusing on are:

1. Will Flipped Classroom aid understanding of the concept?
2. Will the students be able to improve their scores after having revision class using Flipped Classroom?

REVIEW OF LITERATURE

FLIPPED CLASSROOM

The origins of Peer teaching and learning can be traced back to the time of Aristotle where he used archons i.e. student leaders to help their peers understand what is taught. Scotsman Andrew Bell in 1795 was the first to come up with a theory of Peer learning. During the 19th Century this strategy had been used in English and French Schools. Over the past few years this method has been used in various schools to teach students with mixed ability.

Jonathan Bergmann and Aaron Sams (2012) could be credited as pioneers of flipped classroom. Flipped classroom is an active learning strategy where the student learns the concept at home and practices it in school. It involves role reversal of the traditional pedagogy of teaching. Here the students take active role in the classroom rather than being a passive spectator. Flipped classroom involves the amalgamation of traditional face to face learning and modern technology such as videos, online simulations and pre-recorded lectures. According to Prensky (2001) an average college graduate spends 10,000 hours playing video games and around 20,000 hours watching television. Emails, computer games, cell phone, internet and instant messaging have become an important part of their life and hence they will be more open to studying using these means.

Flipped Classroom is in line with the constructivist approach to teaching where new ideas are built on previous learning experience (Schunk,2011). It also supports another principle of constructivism where the learner is responsible for their own learning.

Flipped classroom has numerous advantages: (a)It helps a student come prepared for the lecture at least with some background knowledge,(b) it helps increase collaboration among student, (c)it helps a teacher gain better understanding about the potential of a student,(d) it also helps increase student engagement and student involvement,(e) it helps students with special educational needs to learn at their own pace through a medium that they understand.

Bergmann and Sams (2012) mention in their book that use of flipped classroom reduced the time taken by the students to learn and was found to be very useful for those students who missed their lectures due to sports practice.

In a study conducted by Graham (2013), three high school math classrooms that had flipped the instructional procedure were surveyed to examine students perceptions of the flipped Classroom. It aimed to assess the role of social media, educational technology, mastery learning and self-pacing in flipped classroom environments. The results revealed three major findings: students were having less homework in a flipped classroom than in a traditional lecture-based classroom, students enjoyed learning in a flipped classroom environment, and students benefited from watching their lectures in condensed lesson videos. Thus, highlighting the effectiveness of this method.

Another study was conducted by Kenna (2014) to identify the effect of the flipped classroom on student self-efficacy and the difference in self-efficacy between genders using this model. It had 22 Physics students in two classes, a traditional and a flipped classroom. Self-Efficacy Survey was used to score the self-efficacy of students. The results showed an increase in their average self-efficacy score with the flipped classroom while the traditional classroom decreased their average score.

In a study conducted by Chen, Lui, and Martinelli (2017), they conducted a systematic review of 46 articles on the effectiveness of flipped classrooms in medical education with different learning outcomes such as effectiveness, perception of students towards flipped classroom, attitude and changes in knowledge, skill and behaviour. The results indicated that the effectiveness was inconsistent as some studies suggested benefits while some suggested marginal improvement over traditional teaching method. However, the perception and attitude of the students towards flipped classroom was positive as they reported less boredom, more enjoyment and greater task value. The results for changed knowledge, skill and behaviour compared to the traditional methods were again mixed. This implies the need for further research in this area.

METHOD

SAMPLE

This study consisted of 14 AS and A levels Psychology students. The age range was 15-18 year-olds. There were 2 boys and 12 girls in this study. 6 students from A levels and 8 from AS level participated in this study. 3 of the students in this sample were diagnosed with learning disability. Opportunity sampling was used.

PROCEDURE

The study was conducted in an International School. The students were not aware of being a part of the research of this research study so consent was not taken initially. However, they were informed about it at the end of the year and consent was obtained to publish their data. Consent was not taken initially because along with the objective assessments this study also involves self-report in the form of a questionnaire. I did not want the responses of the students to be coloured with any factor other than what they genuinely felt about this strategy.

I taught the students all the chapters. The strategy of flipped Classroom was used during revision. This was done because students take psychology directly at AS level without any background knowledge. So, expecting them to teach a discipline without knowing about it would have marred the purpose of this study. Also, the A level curriculum is tough for students to understand by themselves.

After teaching all the concepts or topics, these students were asked to choose the topics they wanted to present and the topics were locked. Each student got a minimum of one week to prepare for the topic. They were given access to resources that could be used and were encouraged to use other resources that they find easy to understand. The purpose of using flipped classroom was to aid the understanding of the students about the topics and promote

peer learning. It serves multiple purposes. Firstly, since students have to take charge of the class they get serious about the topic and come well prepared. Secondly, it becomes easier for the teacher to understand where the student teaching is going wrong and rectify it. Thirdly, students who have difficulty connecting concepts or understanding topics can find easier examples when a peer presents the topic. Lastly, students realize multiple perspectives on the topics and different ways and sources to study them.

The grades of the term 1 exam and the mock 1 exam were only taken into consideration as they are equal in terms of seriousness and can be accounted for the extent to which the strategy has been effective. Term 1 exam has pre strategy grades while Mock 1 will reflect post strategy grades. Mock 1 exam had taken place immediately after all the students had finished presenting their topics. Thus, we can be sure that the results reflect effectiveness of this strategy and allows minimum contamination of data due to use of other hard core revision strategies that we usually use during final exams.

The research methods were as follows:

- **Observation-** This research method was used to examine the extent to which the student participated and were taking this strategy seriously. Student involvement was observed along with the different methods they used to teach in the class.
- **Self report-** This research method was used to analyse the extent to which the interventions seemed helpful to the students. Open ended and Closed ended questions were used in order to understand the effectiveness of this strategy and identify suggestions for improvement in the future use of this strategy.
- **Objective assessment-** The students were marked according to the CAIE criteria on knowledge, understanding and application type questions. For comparison we have used the data of Term 1(before intervention) and Mock 1 exam (after intervention). These tests were taken into consideration as they are taken seriously by students and

there is no absenteeism thus helping us understand the full potential of students at the point of time when the assessment is taken.

ANALYSIS OF DATA

1. SELF REPORT

Students were asked 4 questions in order to ascertain the effectiveness of this strategy. There were three open ended questions and one closed ended question. No leading questions were asked so that we have accurate data. The questions were posed in the form of a questionnaire that they had to return.

The themes identified in the **open-ended questions** were analysed and the following data was obtained:

Q1. What do you feel about the Flipped classroom strategy that we used in the past academic year?

Most of the students found this strategy helpful. They liked the fact that while revising, some of the topics that they found difficult to understand were now clear due to the use of simpler examples and various strategies shared by their peers. They were also receptive to the strategy of flipped classroom as they found it different from the mundane teaching learning approach. More than learning from others this strategy helped the students understand the topic that they were teaching in a better manner due to intense preparations that they had done in order to present the topic. However, the students have mentioned that the peer teaching the topic largely impacted the effectiveness and experience of this strategy. A good peer teacher helped while a poor peer teacher left them confused. It was also seen that the students who were high achievers were not very receptive to this method as they felt that a teacher would have done a better job than most of their peers.

Q2. Did listening to your peers teach, help or deter your understanding in anyway? Please substantiate your choice with an explanation.

Most of the students have mentioned that peer teaching helped. They have stated that learning the topic from another perspective helped them gain better understanding. Also, when this peer teacher made an error the subject teacher corrected it and this in turn helped clarify doubts of students who had similar lack of clarity about that topic. Students also stated to have been benefited by learning new strategies like use of mnemonics, acronyms or diagrams that helped them in understanding the concept and retaining it in a much better way. However high achievers said that it sometimes led to confusion.

Q3. Any suggestions to improve the strategy?

Students emphasized that the strategy can be improved by ensuring that the student going to take the class is well prepared. The teacher can ask student going to take a class to give a demo or review the materials to be used in the class during the teaching process. Overall students were satisfied with this strategy. High achievers mentioned the need for some other revision strategy to be done by teacher instead of a peer.

Only one **closed ended question** was asked to the students:

Q4. Rate the method of flipped Classroom on a scale of 1-10, where 1=not good and 10=very good.

The mean rating that the students gave this strategy was 6.68. This indicates that the students were mostly receptive to this strategy. Again, the resistance came from students who were high scorers.

2. OBSERVATION

The teacher was always present during these classes and observed the teaching process that the students engaged in. This was done to ensure that students are taking this task seriously. Feedback was taken from the students after the class about the lecture. Doubts were cleared. All the students enthusiastically participated in this strategy. They used a variety of materials for this strategy like making PowerPoint Presentations, using the white board, showing videos, drawing on the board to explain relationships and reading out their notes. The most effective strategy was the PowerPoint as it engaged the students the most. The least effective was reading from their book and then trying to explain it to the other students. This is because the students could not connect the points and found the lecture boring and confusing.

3. OBJECTIVE ASSESSMENT

The grades of term 1 exam were compared to the mock 1 exam grades. The grades represented the level of academic performance of the student where A*=90 and above, A=80-89, B=70-79, C=60-69, D=50-59, E=40-49, U=39 or less. These are percentage uniform mark range. In general grade A to C are considered good at A level.

After using the strategy of flipped classroom, the percentage of students scoring C and above was 71.42% as compared to 50% before intervention. This shows improvement in the academic performance of the class. The following table shows the distribution of the number of students that achieved respective grades pre and post intervention.

Grades	No. of students scoring the grade in Term 1Exam	No. of students scoring the grade in Mock 1Exam
A	2	1
B	4	3
C	1	6
D	3	4
E	3	0
U	1	0

Table 1. Comparison of grades of AS and AL students in the Term1 and Mock 1 exams

The results showed that the distribution of grades A,B,C,D,E and U were 2,4,1,3,3 and 1 respectively in the term exam. In the Mock 1 exam the distribution of grades A,B,C,D,E and U were 1,3,6,4,0 and 0 respectively. These results are in line with the self report data which shows that the brighter students were not really benefitted with this strategy. In fact there is a drop seen in the grades A and B in the mock 1 exam compared to the term 1. However this strategy is seen to be effective with students who are average or below average in studies as there is an increase the number of Cs and Ds. Es and Us were completely eliminated in the mock 1 exams and all the students who were part of this strategy cleared the examination.

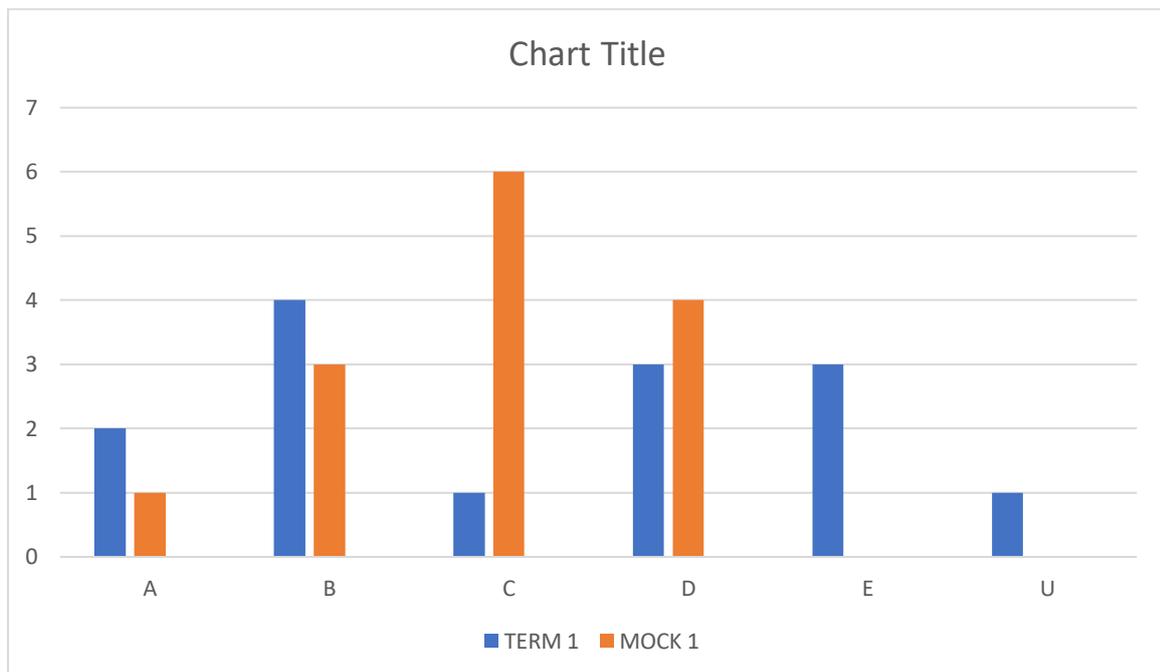


Figure 1: Comparison of grades of AS and AL students in the term 1 and mock 1 exams

Conclusion/Suggestion

Thus, from the above action research we can see that flipped classroom is an effective strategy in the long run. The results are in line with the previous studies conducted on flipped classroom and did increase the engagement of students in the class. The overall performance of the class did improve and all the students could clear the examination. The process of revision also became very interactive and engaging. Most of the students favoured the method. However, this action research also highlighted some disadvantages of this method. The top scorers were dissatisfied with the method as they felt they knew better. The strategy did not help them score better as well. All peers were unable to teach equally well affecting the overall effectiveness of this strategy. Some of the peers led to confusion as they made errors or were unable to communicate effectively. This suggests the need for further research on methods that can be used as an innovation in teaching but can cater to all the students with varied levels of ability.

Some of the suggestions for the use of flipped classroom based on this action research are:-

- We need to ensure that the students come well prepared for the class
- A demo of the student who is going to perform the role of a teacher needs to be done before the actual session to avoid errors and unnecessary confusions.
- Teacher summing up the topic taught at the end of the chapter would help as this would cater to the high scorers as they consider teacher to be a better medium to take instructions and learnings from compared to their peers.
- Review of the materials to be used by the student for conducting their class also needs to be done before the actual session.

This action research also leaves some questions for further research like

- What is the minimum age of students with whom we can start this strategy of flipped classroom?
- Will Flipped Classroom be equally effective in a class with a greater number of students?
- Can flipped classroom be conducted in a way that also benefits the top scorers in the class?

This is a relatively new strategy and needs to be explored and experimented with as it has clear cut benefits and can prove to be very effective as a strategy for promoting differential learning.

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