

A COMPARATIVE ANALYSIS FOR ADOPTING AN INNOVATIVE PEDAGOGICAL APPROACH OF FLIPPED TEACHING FOR ACTIVE CLASSROOM LEARNING

Husam Jasim Mohammed¹

Ebtehal Abdulmohsin AL-dahneem²

Abdulmunaam K. Hamadi³

Abstract

Active learning strategies can help guide students toward professional practice and encourage higher order thinking reflected in graduate attributes. Previous studies show that active learning or flipped learning improves learner's understanding and can be very useful in developing cognitive skills such as critical thinking and problem-solving and also helps retention of information. This approach allows having the most personalized interaction of the teacher with students. Despite the growing number of flipped courses, however, quantitative information on their effectiveness remains sparse because of very less number of researchers on it. This paper investigates the various major aspects of flipped technology to explore the efficiency of a flipped classroom model on student's performance and ease of use. An experiment conducted in a secondary school in Iraq to presents a research of comparing traditional class that engages students in some learning to a flipped classroom that creates more time for active learning using PAPRIKA technique of multi-criteria decision-making (MCDM). The overall results show that students and teachers preferred flipped classroom more than traditional cognitive learning. This suggests that the teachers in Iraq schools should be ready to do more planning in order to implement a flipped classroom model in the educational process.

Keyword: flipped classroom, PAPRIKA method, comparative analysis.

2016 GBSE Journal

Introduction

Active learning is a way of education that imparts the responsibility of learning on learners. Active learning pedagogies ranging from simple lectures to structured pedagogies can be applied to online or face-to-face environments or in a combination of both. Multiple studies have shown that active learning can be done by flipped teaching which improves students understanding and retention of information. The flipped classroom approach, with its prime focus on active learning, attempts to address the concerns of academic staff and helps to meet the expectations of students for practical exposure. Flipping the class is a prospect of thinking about an innovative pedagogical

way to engage students, encourage ownership of learning, and promote deeper learning and to equip students for professional practice. The method of the flipped classroom learning is to shift from passive to active learning where the learning process is more visible, reflexive, collaborative and engages students in critical thinking.

Quantitative and precise qualitative data on Flipped Learning is limited, but lots of research supports the core elements of the model with respect to directive strategies for engaging students in their learning. All the research on Flipped classroom available commonly consists of teacher reports on student achievement after adopting the model (based on course and/or state test scores), descriptions of flipped classrooms, course completion rates, disciplinary actions, and surveys measuring an array of outcomes, such as teacher, student and parent mindset changes

A major problem for Iraqi society is the effect of modernization. Everything is changing, and so the teacher and the method of teaching must change too, to keep pace with the development. This kind of technological advancements leads to a phase which needs some revolution in the field of education. All this calls for a need to introduce new teaching methods based on different approaches to be evaluated and identified for more efficient education.

This paper first addresses the flipped learning concept and its comparison with other conventional approaches to teaching on a sample of secondary school's boys of Iraqi schools which selected randomly. It then explores the results of our research using PAPRIKA "Potentially All Pairwise Rankings of All Possible Alternatives" method under MCDM to determine how its effectiveness has been proven at a graduate and undergraduate level for active learning. All this will allow the teachers to conclude if it is a concept worth implementing in their classroom as well as how to apply it correctly.

Traditional V/S Flipped teaching

A flipped class is one that inverts the typical cycle of content acquisition and application. Flipped classroom is a form of intermingling learning in which students learn valuable content first by themselves either by reading or watching video lectures, usually at home, and the assignments and homework are performed in the classroom with teachers and also students discussing and solving questions (Kelly E. Snowden, 2012). Teacher communication with students is more personalized guidance rather than lecturing.

In other words, this means that students gain first exposure to new material outside of class, generally via reading or video lectures, and after that use class time to do the tougher work of assimilating that knowledge, probably through discussion, problem-solving, or debates in front of their teachers and instructor. Thus the students are doing the lower levels of cognitive work (acquiring knowledge and understanding) beyond class and concentrating on the higher forms of cognitive work (analysis, application, synthesis, and assessment) in class (Bergmann & Sams, 2012).

This model contrasts with the traditional model of classroom teaching and E-learning where "initial exposure" happens through a lecture in the classroom, with students assimilating knowledge via homework and utilizing E-learning materials; thus the term "flipped classroom" (Brunsell & Horejsi, 2013). Like the most practical classes have always done, this strategy supports teachers playing their most essential role in guiding their students to further thinking and developed levels of application (McManus, Subramaniam, & James, 2012).

On the contrary to this, in flipped teaching, the students first study the topic by themselves, usually using video lessons prepared by the instructor or third parties. Using video and other pre-recorded media places lectures under the control of the students: they can watch, rewind, and fast-forward as needed. This capability may be of particular value to students with ease of access concerns, particularly when captions are provided for those with hearing disabilities. Lectures that can be watched more than once may also assist those for whom English is not their first language.

The traditional pattern of teaching has been to give students the task of reading textbooks and work on problem sets outside the school while listening to lectures and taking tests in class. In such cases, many times the classroom a lecture has been criticized despised and even made fun of. The teacher keeps on asking if “Anyone” can answer or raise a query, and gets a negligible response because of one-way interaction. Students often try to capture what is being said at the instant the teacher says it. Various times the problem with face-to-face teaching is often a matter of pacing. Therefore, some students may have trouble understanding their lecture and get the information rapidly or they may lack the previous information they need to understand the concepts presented. After the lecture, teachers often assign homework, which leads to confusing for many students. (Hamre & Pianta, 2005; Greenberg, Medlock, & Stephens, 2011).

Flipping allows the teacher to target those who need the most help rather than the most confidence. In addition to that, devoting class time to discussing and application of concepts might give teachers a better opportunity to detect errors in thinking, and allows them to work with individuals or groups of students throughout the session. At the same time, students learn by doing and asking questions. Students can also help each other, a process that benefits both the advanced and less advanced learners. (Bergmann & Sams, 2012)

Literature review

Since the presence of polytechnics, the education and learning system had actually been growing rapidly. Although using modern technology is a demand for students to complete tasks by utilizing laptop computers or computer systems (Rassiah, Chidambaram, & Sihombing, 2011). The lecturer as well as use PowerPoint slides in class (Osman, Jamaludin, & Mokhtar, 2014), it might not yet reveal students to making use of ICT in their learning and also teaching (McMahon & Pospisil, 2005). With the presence of student ICT knowledge exercised in the traditional setting, ICT literacy might be improved with using learning guidelines that involve students in collaboration, interactivity, authority, ownerships, and malleability of texts (Clark, 2010).

Nevertheless, Mason et al. (2013) stated that there is no distinction in perception in between the traditional classroom and flipped classroom. A research study by Wilson & Sipe (2014) discovered that live lectures are more effective compared with video direction alone. A study by Rassiah et al. (2011) found that lack of facilities, instructional development skills, and poor network, indicated that the traditional environment still requires being practiced, although students need modifications in the learning environment. Research studies carried out by Johnson & Renner (2012), and Mason et al. (2013) likewise found that there is no considerable difference in student accomplishment in either learning environment. According to Ramlogan, Raman, & Sweet (2014), the lecturers argue that traditional approaches still have to be adopted, due to the fact that not all topics could be practiced in the flipped classroom environment.

However, McManus, Subramaniam, & James (2012) found from their results that those instructed via the online module have greater ethical judgments compared to students who were taught with the

traditional class. Brunsell & Horejsi (2013) findings reveal that student perceptions on pre-classroom learning material that rank highest possible are the video lecture. The research additionally finds that the pre-classroom learning experience provides motivation for students' learning interest as well as improves their understanding of learning context. Educators who are flipping their class report higher student achievement boosted student engagement and better attitudes toward learning and school. Several surveys indicated that the teachers using this technique are feeling more contentment and re-energized by their increased interaction with students. In one study of 453 instructors who flipped their classrooms, 67 percent reported enhanced test scores, with definite advantages for students in sophisticated placement classes and students with special requirements; 80 percent reported increased student attitudes; and 99 percent stated they would flip their class again next year (Flipped Learning Network, 2012).

Benefits of flipped classroom

It was reported in many articles and research papers that in a flipped classroom can provide the many advantages. Some of them, in a nutshell, are as follows:

- 1) **Self-Paced Learning.** Putting video lectures online enables students to pace their learning according to their needs.
- 2) **Students learn more deeply.** When a student knows what is going to be taught, they can interact meaningfully with their instructors allowing them to acquire a deeper understanding of the content.
- 3) **Students are more active participants in learning.** The student role changes from passive recipient to the active constructor of knowledge, providing them chances to practice utilizing the intellectual tools of the discipline.
- 4) **Student–Teacher Interaction increases and students learn from one another.** A learning community will be formed that encourages them to build knowledge together inside and outside the classroom.
- 5) **Opportunities for Real-Time Feedback.** With deep understandings to apply their knowledge, gaps in their learning become visible to both themselves and the instructor.
- 6) **More Meaningful Homework.** In current practice, homework often appears to be burden and ineffective in promoting learning. Instead of writing boring assignments, watching a video lecture or reading useful notes is more please worthy.

Difficulties/ Hurdles

Of course, with every new approach, there are challenges to be anticipated. Those educators who are attempting to flip their class may find it a little difficult at times. This can be as a result of the following reasons (Sams & Bergmann, 2013):

- 1) The class environment is not properly designed with the flipped learning pedagogy in mind. Students new to the technique may be initially resistant because it requires that they do work at home instead of be first exposed to the subject matter in school. Consequently, they may come unprepared to class to participate in the active learning phase of the course.
- 2) The homework (readings and videos) must be carefully tailored to the students to prepare them for the in-class activities. The teachers may find it difficult to get time and to make good quality videos/lecture notes.

The PAPRIKA method

Potentially all pairwise rankings of all possible alternatives (PAPRIKA) is a method for multi-criteria decision making (MCDM) or of conjoint analysis based on decision-makers' preferences as expressed using pairwise rankings alternatives. The PAPRIKA method allows the decision-maker to find the most advantageous method by answering a series of simple questions. Each issue requires us to choose between two hypothetical alternatives described according to the criteria's we set to find the optimum. The method begins by identifying all such pairs of hypothetical alternatives. Each pair is presented sequentially to us to pairwise rank, based on our expert knowledge and subjective judgment. Such simple pairwise-ranking questions are repeated with different pairs of hypothetical alternatives, all involving trade-offs among the various combinations of the criteria, two at a time, until enough information about your preferences has been collected to rank the alternatives we are considering accurately. (Hansen & Ombler, 2009).

From our answers, preference values representing the relative importance, or 'weights,' of the criteria are obtained via linear programming model. These preference values are used to rank the alternatives available. The major advantage of this method is the pairwise ranking (choosing one option from two) which is a natural type of decision activity that can be easily obtained from the subjective analysis that everyone has experience of in their daily lives. In contrast, most alternative methods of MCDM are based on 'scaling' or 'ratio' measurements of decision-makers' preferences. (Lawrance, 2013).

Our research by flipping the paradigm

To obtain a direct scientific research to establish whether flipped classrooms increase student achievement, we adopted the flipped classroom approach and inverted the entire paradigm of teaching away from a traditional model of teaching. We executed a thorough qualitative survey in different separate classes and we developed a scientific model for evaluating a set of boys schools based on Iraqi society. One classroom was a course taught with a traditional classroom model; the second classroom was a course taught with E-learning methods while another section of the same course was taught with the flipped classroom model. The same content was covered in all sections, and the same assessments were used. The analysis is done using the PAPRIKA method in '1000Minds'.

The flipped classroom students were provided with online access to a series of short video lessons that may be completed at their convenience. Each video concluded with a short online quiz, consisting of two to four questions designed to record student participation and learning knowledge. Students were supposed to answer 80% correctly before moving on to the next video. The object of the quizzes is to get immediate feedback, not grading. The class time is dedicated to active learning sessions, which allow direct interaction with the instructors as students apply their knowledge for solving graded assignments, team case studies, and exams.

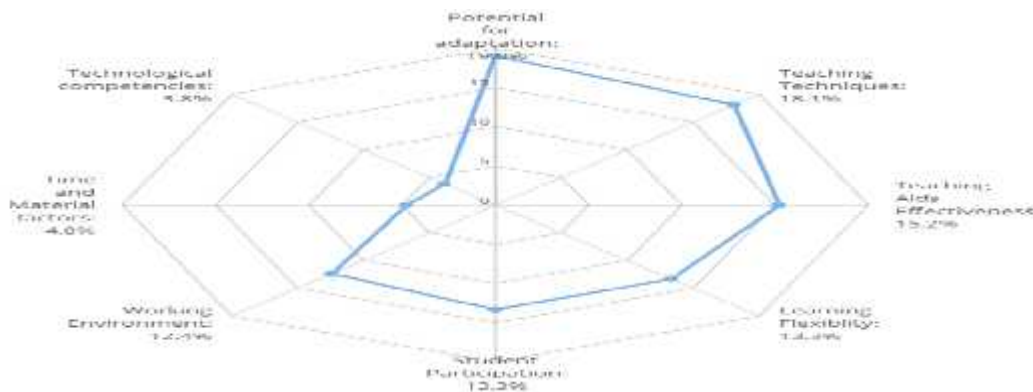
Initially, students found the format and design of the class to be somewhat uneven and were initially reluctant. In addition, students were unfamiliar with this kind of access to the instructor. However, once the students began to view the teacher as a facilitator rather than the instructor, the students eventually became comfortable with asking questions for further understanding. Table 1 illustrates the various evaluation criteria's and sub- criteria's used to rank the available teaching methodologies. For every teaching method, a normalized weight is obtained

using PAPRIKA technique for all the criteria's based on their usage and relevance in the teaching methods.

Table 1. The evaluation attributes/criteria with their utility values

| S. No | Criteria | Normalized Weights |
|-------|---|--------------------|
| 1 | Teaching Aids Effectiveness (Visual aids, Sound aids and Multimedia) | 0.152 |
| 2 | Working Environment (Lecture, Group Discussion, and Simulation) | 0.124 |
| 3 | Teaching Techniques (Lecturing, Mentoring, and Apprenticeship) | 0.181 |
| 4 | Learning Flexibility (Pacing, Possibility to select between topics and Time of study) | 0.133 |
| 5 | Student Participation (Ease of use, Problem-solving and critical thinking ability and Student Achievement, Student Achievement) | 0.133 |
| 6 | Potential for adaptation (Burden, Resource needed and Available information) | 0.191 |
| 7 | Time and Material factors (Time for preparation and Financial Resources) | 0.048 |
| 8 | Technological competencies (Infrastructure and Skilled teachers) | 0.038 |

Figure 1(a). Radar Chart of Normalized weights of all criteria



(a)

(b) Relative importance of attributes

| | Potential for adaptation | Teaching Techniques | Teaching Aids Effectiveness | Student Participation | Learning Flexibility | Working Environment | Time and Material factors | Technological competencies |
|-----------------------------|--------------------------|---------------------|-----------------------------|-----------------------|----------------------|---------------------|---------------------------|----------------------------|
| Potential for adaptation | | 1.1 | 1.3 | 1.1 | 1.4 | 1.5 | 4.0 | 1.0 |
| Teaching Techniques | 1.0 | | 1.2 | 1.1 | 1.4 | 1.5 | 3.8 | 1.0 |
| Teaching Aids Effectiveness | 0.8 | 0.6 | | 1.1 | 1.1 | 1.2 | 3.2 | 4.0 |
| Student Participation | 0.7 | 0.7 | 0.9 | | 1.0 | 1.1 | 2.8 | 1.5 |
| Learning Flexibility | 0.7 | 0.7 | 0.9 | 1.0 | | 1.1 | 2.8 | 1.5 |
| Working Environment | 0.7 | 0.7 | 0.8 | 0.9 | 0.9 | | 2.6 | 1.4 |
| Time and Material factors | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | | 1.3 |
| Technological competencies | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.8 | |

(b)

Figure 1(a) shows the normalized weights of all the criteria in the form of radar chart and figure 1(b) shows the 'Marginal rate of substitution' (ratio) of the column attribute for the row attribute. When Figure 1 is analyzed, it can be observed that in all the categories of evaluation, the factors potential for adaptation and teaching techniques played a major role. Technological competencies and time & material factors are identified as the least affecting criteria when choosing an educational methodology. After the criteria weights are determined, the ranking of the teaching methods based on PAPRIKA is obtained with total utility factor is as shown in Table 2.

Table 2. Ranking of the teaching methodology

| Concept | Rank | Total utility |
|--------------------------------|------|---------------|
| Flipped Learning | 1st | 80.95% |
| E-learning | 2nd | 58.10% |
| Traditional Classroom Learning | 3rd | 8.57% |

According to Table 2, the Flipped learning methodology is determined as the first alternative with around 80% utility factor. With E-learning method, it comes out with 58%, and the traditional classroom approach got around 8% which is the least. All our results illustrate that if a student undergone through Flipped teaching will demonstrate consistent improvements in their performance. The E-learning and traditional classroom methodologies, which impart knowledge on static and resource-restricted environments are arguably less predictive of real-world success because they do not mirror the actual requirements of the working world. In the qualitative terms, it can be observed that the lower-level dependent learners will note that the use of flipped teaching helped them in understanding the material more practically. Our analysis on a group of boys of Iraq schools has shown that making them learn in the group can substantially increase their Potential for adaptation with comparably fewer efforts of their teachers.

Conclusion

After reviewing our results, it can be concluded that the use of flipped learning imparts positive effects on the student's performance. Flipped learning can provide the students with an opportunity to learn in a more differentiated fashion rather than linear and intellectual. Flipped learning empowered students through more active learning. Students studying using flipped approach will stand higher in their achievement and have better attitudes toward learning and school. Not only this, the flipped classroom approach, with its inherent focus on active learning attempts to address the concerns of academic staff and helps meet expectations around graduates and their preparation for professional practice.

Although the idea is straightforward, an effective flip requires careful preparation. Recording lectures require effort and time on the part of faculty, and out-of-class and in-class elements must be carefully integrated for students to understand the model and be motivated to prepare for class. As a result, introducing a flip can mean additional work and may require new skills for the instructor. Therefore, teachers should use the flipped learning method as a new teaching method in Iraqi schools, particularly when it can be shown to match student's characteristics. However, with the span of time, new tools may emerge to support the out-of-class portion of the curriculum. As of this instance, our initial research suggests that the Flipped teaching methodology has good potential and deserve further inquiry.

References

- Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. International Society for Technology in Education.
- Brunsell, E., & Horejsi, M. (2013). A Flipped Classroom in Action. *The Science Teacher*, 80, 8.
- Clark, J. E. (2010). The Digital Imperative: Making the Case for a 21st-Century Pedagogy. *Computers and Composition*, 27(1), 27–35. <http://doi.org/10.1016/j.compcom.2009.12.004>
- Greenberg, B., Medlock, L., & Stephens, D. (2011). Bend my learning: Lessons from a blended learning pilot." Oakland, CA: Envision Schools, Google, & Stanford University D. School.
- Hamre, B. K., & Pianta, R. C. (2005). Can instructional and emotional support in the first-grade classroom make a difference for children at risk of school failure? *Child Development*, 76(5), 949–967.
- Hansen, P., & Ombler, F. (2009). A new method for scoring additive multi-attribute value models using pairwise rankings of alternatives. *Journal of MultiCriteria Decision Analysis*, 15, 87–107. <http://doi.org/10.1002/mcda.428>
- Hattie, J. (2008). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.
- Johnson, L. W., & Renner, J. D. (2012). Effect of the flipped classroom model on a secondary computer applications course: Student and teacher perceptions, questions and student achievement. *Unpublished Doctoral Dissertation*. University of Louisville, Louisville, Kentucky, (March 2012), 93.

- Kelly E. Snowden. (2012). Teacher Perceptions Of The Flipped Classroom: Using Video Lectures Online To Replace Traditional. *University Of North Texas*, 70.
<http://doi.org/1522443>
- Lawrance, H. (2013). Efficient Qos Based Resource Scheduling Using PAPRIKA Method for Cloud Computing, 5(3), 638–643.
- Marzano, R. (2001). Classroom Instruction that works. *Classroom Instruction*, 22–25.
- Mason, B., Gregory, S., Rutar, T., Ieee, K. E., Strayer, B., Learning, J., ... Journal, N. A. (2013). Comparing the Effectiveness of an Inverted Classroom to a Traditional Classroom in an Upper-Division Engineering Course . How learning in an inverted classroom influences cooperation , innovation and task orientation . Case Study : Case Studies and the Fl, 56(4), 1–14. <http://doi.org/10.1109/TE.2013.2249066>.
- McMahon, M., & Pospisil, R. (2005). Laptops for a digital lifestyle : Millennial students and wireless mobile technologies. *Asciilite 2005*, (2001), 421–431.
- McManus, L., Subramaniam, N., & James, W. (2012). A Comparative Study of the Effect of Web-Based Versus In-Class Textbook Ethics Instruction on Accounting Students' Propensity to Whistle-Blow. *Journal of Education for Business*, 87(6), 333–342.
<http://doi.org/10.1080/08832323.2011.627890>
- Osman, S. Z., Jamaludin, R., & Mokhtar, N. E. (2014). Flipped Classroom and Traditional Classroom : Lecturer and Student Perceptions between Two Learning Cultures , a Case Study at Malaysian Polytechnic, 2(4), 16–25. <http://doi.org/10.12735/ier.v2i4p16>
- Ramlogan, S., Raman, V., & Sweet, J. (2014). A comparison of two forms of teaching instruction: Video vs. live lecture for education in clinical periodontology. *European Journal of Dental Education*, 18(1), 31–38. <http://doi.org/10.1111/eje.12053>
- Rassiah, K., Chidambaram, P., & Sihombing, H. (2011). The Higher Education Students ' Experiences With Technology. *Asian Transactions on Basic & Applied Sciences*, 1(3), 1–10.
- Schwerdt, G., & Wuppermann, A. C. (2010). Is Traditional Teaching Really All that Bad? A Within-Student Between-Subject Approach. Program on Education Policy and Governance Working Papers Series. PEPG 10-15. *Program on Education Policy and Governance, Harvard University*.
- Wilson, L. E., & Sipe, S. R. (2014). A Comparison of Active Learning and Traditional Pedagogical Styles in a Business Law Classroom. *Journal of Legal Studies Education*, 31(1), 89–105. <http://doi.org/10.1111/jlse.12010>