

Comparative Analysis of Flipped Learning and Other Learning Methods

Ambrose A. Azeta, Deborah O. Fatinikun, Ige O. Oyeyemi, Mark O. Ogese and Ogunde Bisola

Department of Computer and Information Sciences, Covenant University, Ota, Nigeria

ambrose.azeta@covenantuniversity.edu.ng

fatoluwafisayo@gmail.com

funmioyeyemi2@gmail.com

markogese@gmail.com

bisola.ogunde@yahoo.com

Abstract: The modern day learning has moved from teacher-centered to learner-centered. Educational learning skills have gradually grown from cognitive skills to affective things, such as the feeling of students, the belief system and personal attitude. This evolution has infused multifaceted communication skills, self-management, non-routine problem solving, adaptability and systems thinking as vital skills in the educational sector. Technology-enhanced learning has continued to reform different learning methods for the 21st century world, where a universal perspective and cooperative skills are vital. The interest in modern day learning has led to so many learning methods. Educational learning skills have drastically moved from cognitive skills to affective things, such as the feeling of students, the belief system and personal attitude for able-bodied and visually impaired learners. In recent years, there has been an increasing interest in applying the modern day learning methods in the educational system. The focus of this study is to compare flipped learning and other learning methods such as inquiry-based learning, project-based learning and problem-based learning and. A Random sampling technique was used to select the articles that were used for analysis. The attributes engaged for comparative analysis includes case studies 1 and 2. For case study 1, the following attributes were considered: Discussions, Accountability, Facilitation, Apprenticeship, Tutorial, Attendance, Engagement, Performance and Learning attitude. Case study 2 used Efficiency, Portability, Effectiveness, Interoperability and Flexibility. After a detailed review of the various research papers on learning methods, it was found that each learning method differs from each other based on their efficiency; effectiveness and perfect learning support tools for students, although some were similar. However, the results of findings show that the flipped learning model performs better among the four learning methods investigated. The project-based learning model nearly matches the flipped learning model. Flipped learning model as described in this paper will move educational system from instructor-centered to learner-centered system, which will help student to be an independent learner, accountable and responsible for their learning.

Keywords: Flipped learning, Inquiry-based learning, Industry, Applications, Visually Impaired

1. Introduction

The modern day learning has moved from teacher-centered to learner-centered. Educational learning skills have gradually grown from cognitive skills to affective things, such as the feeling of students, the belief system and personal attitude (Alvarez, 2011). This evolution has infused multifaceted communication skills, self-management, non-routine problem solving, adaptability and systems thinking as vital skills in the educational sector. Technology-enhanced learning has continued to reform different learning methods for the 21st century world, where a universal perspective and cooperative skills are vital (Kay and LeSage, 2009). The interest in modern day learning has led to so many advances in learning methods. Modern day learning applications have been extended to both the able-bodied and visually impaired learners in the educational institutions and industry. Learning for the able-bodied and visually impaired through the use of technology such as speech was reported in several studies in different industry applications (Azeta, Ayo, Atayero and Ikhu-Omoregbe, 2009; Azeta, Ayo and Ikhu-Omoregbe, 2013). This speech technology is an area that is yet to experience flipped education. The aim of this study is to present a comparative analysis of Flipped learning and other learning methods such as Inquiry learning, Problem-based learning and Project-based learning. The study also highlighted the benefits and shortcomings of Flipped learning. This paper is organized as follows: Section two contains the review of learning methods. Section three highlights analysis of flipped learning and other learning methods and section four concludes the paper.

2. Review of Learning Methods

1. *Traditional learning method:* Traditional learning method is an approach that involves learning by captivating and informative, and is presented by humans who are known to be educated in specific subject areas (Sarita and Ravi, 2012). The instructor only gets 15-20 minutes of their students. Student get bored easily and they are hardly engaged.
2. *Inquiry-based learning method:* Inquiry-based learning method is a process of ascertaining new fundamental associations, with the learner deriving hypotheses and testing them by carrying out experiments and/or making observations. It is about doing an in-depth analysis in a scientific problem-case that involves investigation, observation, and analysis, exploration, experimentation and data interpretation (Pedaste et al., 2012). The different learning methods are contained in Figure 1.

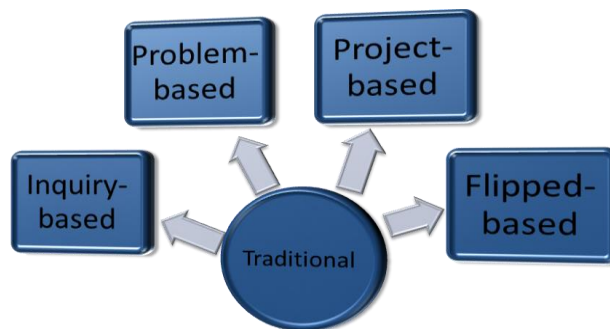


Figure 1: Learning Methods

Source: The researchers

3. *Problem-based learning:* Problem-based learning method is a student-centered method, which presents student real life problems and gives them ability to discover solution and reason by themselves. Students have the tendency to learn while in search of solutions to problems, and it encourages persistent learning and self-motivating atmosphere among learners (Vasconcelos, 2012).
4. *Project-based Learning Method:* Project-based learning is a method of instruction that promote learning by involving students as a central organizing strategy for problem-solving skills through self-direction. It is a student-centered learning method that involves project-based tasks (Ngoh, 2015).
5. *Flipped Learning Method:* Flipped learning method makes use of live video and screen cast software to record lecture materials, slide presentations and demonstrations, with annotations and is posted for the students to read and watch (Ngoh, 2015). It helps improve student learning with tutor-created videos, interactive lessons, and instruction that occurs in class which is accessed both at home and in class. In traditional classroom, learning is done in class and home work at home. With flipped classroom, learning is done at home, and home work is done in class. It is the opposite of traditional style of learning. Students participate in collaborative learning which promotes active learning (Bishop and Verleger, 2013).

The research in Strayer (2007) compares the flipped classroom and the traditional learning/ homework methods in two different college level introductory statistics class. One of the findings of survey shows that students of flipped classroom were less satisfied with how the structure of the classroom guided them in the course learning tasks. Ingram, et al. (2014) established the level of differences between students' experiences of learning mathematics in flipped classrooms and in comparison classrooms.

2.1 Benefits and Shortcomings Of Flipped Learning

The following benefits apply to flipped learning (Reeve, 2013): (i) Pre-reading resource materials (lecture/others) are available on e-learning portal ahead of flipped classroom activity; (ii) It promotes deep learning, (iii) Flipped classroom is used to enhance student engagement, and allows students more time to collaborate with other students, which brings great learning experience to build teamwork abilities (see Figure 2); (iv) there is homework ideology which makes students to practice and apply their knowledge in the

classroom, under the watchful eyes of the teacher; (v) opportunity for real-time feedback by the tutor, where by student misconceptions can immediately be corrected; and the learning activities continues at home after the classroom.

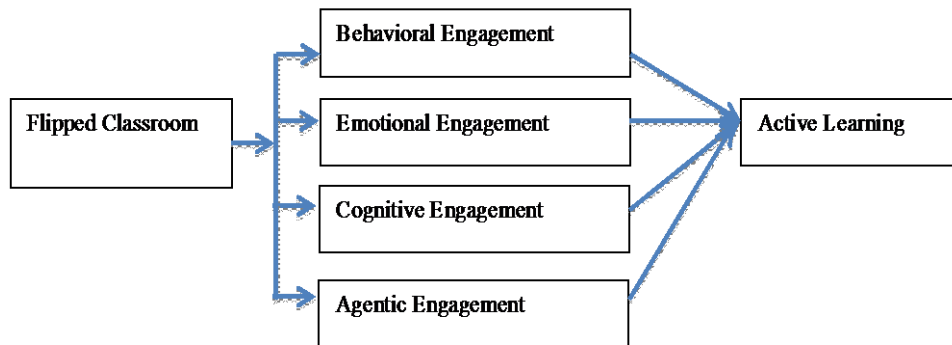


Figure 2: Theoretical framework of flipped learning method

Source: (Reeve, 2013)

Certain shortcomings have been attributed to flipped learning such as: (i) Limited Internet facilities to share online video lectures with learners; (ii) Learners have different levels of motivation; (iii) there may be cost that goes with preparing course materials, such as editing, video recording, hardware and software, (iv) the level of effectiveness of flipped learning method to all disciplines may be questionable, (v) sometimes explanations are less impactful than traditional classroom, and it requires skills and time on the part of the tutor to prepare video lecture notes.

3. Comparative Analysis of Flipped Learning And Other Learning Methods

The comparism of flipped learning and other learning methods is based on certain criteria using case study 1 and 2. For case study 1, the following attributes were considered: Discussions, Accountability, Facilitation, Apprenticeship, Tutorial, Attendance, Engagement, Performance and Learning attitude. Case study 2 used Efficiency, Portability, Effectiveness, Interoperability and Flexibility. This analysis is similar to the study by Inam, Azeta, Daramola (2017), where several voice responses were reviewed and compared.

3.1 Methodology used for analysis

In carrying out this study, several articles were selected for comparative analysis. Random sampling technique was engaged in the selection process. The date of publication of the selected articles ranges from 2006 to 2016. After a detailed review of the various research papers on learning methods, it was found that each learning method differs from one another based on the defined criteria. The comparison shown in Tables 1 and 2 considers some of the most common parameters discussed in the literature.

The results of findings from case study 1 in Table 1 shows that between 1 and 39 belong to low, 40-69 moderate and 70 to 100 high. Table 2 contains the variables used for evaluating the learning methods in case study 1. In Table 2, the explanatory variables used for evaluating the learning methods are presented. The Inquiry-based, Problem-based and Project-based learning methods all contains mix of Low, medium (MED) and High for each of the input variables. However, flipped learning has High all through except Attendance attribute.

Table 1: Classification of Explanatory variables value

%Class	Value
1-39	Low
40-69	Moderate
70-100	High

Source: The Researchers.

Table 2: Explanatory variable used for evaluating learning methods

Inputs	IBL	PBL	PJBL	Flipped Learning
Discussions	Low	Low	High	High
Accountability	High	High	High	High
Facilitation	Low	Low	Med	High
Apprenticeship	Low	Low	High	High
Tutorials	Low	Low	High	High
Attendance	Low	Low	Med	Low
Engagement	High	High	Med	High
Performance	Mod	Low	Low	High
Learning Attitude	High	High	Med	High

Source: The Researchers.

From the results of findings in Table 3, case study 2, Flipped learning has the highest percentage of attribute on the average. These results are further represented in Figure 3 graphically with portability having 100% in flipped learning.

Table 3: Findings from Case study 2.

Attributes	IBL	PBL	PJBL	Flipped Learning
Efficiency	43%	29%	44%	90%
Portability	15%	18%	34%	100%
Effectiveness	30%	41%	50%	50%
Interoperability	75%	50%	70%	40%
Flexibility	48%	30%	25%	94%

Source: The Researchers.

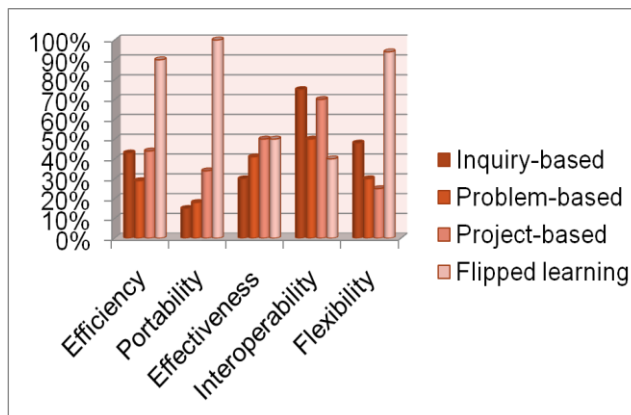


Figure 3: Analysis for measuring learning methods system

Source: The Researchers.

3.2 Summary of findings

The four learning methods investigated includes: Inquiry-based, problem-based, project-based and flipped learning. The findings from case study 1 and 2 indicates that the flipped learning model perform the best among the four learning methods in this study. The project-based learning model nearly matches the flipped learning model. There is no doubt that flipped learning became the most usable learning method in this study in terms of efficiency, portability, effectiveness, interoperability and flexibility. The findings from this study would further convince the students and instructors of the potential benefits of inverse learning as is often called. Students can utilize lecture materials at their own pace. In conventional learning, students are limited to the pace that the teacher sets for the course. Instead of the instructors telling students what, how and when to learn, and also prove what has been learned, teachers support students in becoming self-service learners.

4. Conclusion

A comparative analysis of flipped learning and other learning methods are presented in this article. The summary of findings shows that flipped learning model perform better among the four learning methods investigated. However, development of various learning technologies in the educational sector will enhance the teaching-learning process. Flipped learning method is an element of blended learning that is currently applied in most learning environments to enhance quality of teaching and learning. In a traditional classroom, learning is controlled by the instructor, while in flipped classroom learning it is controlled by the learner.

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Biographies of Contributing Authors

Dina Adinda is a Ph.D. candidate in educational sciences. Her research interests include higher education, students' autonomy and the use of technology for teaching and learning. She worked as a teacher at Institut Français Indonesia and as a teaching assistant at Rectorat de l'Académie de Strasbourg. She graduated with a Masters Designing Training and Technology at the University of Strasbourg.

Mohamed A. Ahmed MSc, Benha University, Egypt, is studying for a PGDip in Educational Technology. He has been involved in e-Learning for over 11 years, working at the e-Learning Center, Mansoura University since 2007 as a Senior Instructional Designer and leader for the Instructional Design team.

Dr Mahmoud Al Ahmad holds PhD in Electrical Engineering from Munich University of Technology in 2006. His research interests include the development of an electrical characterization method for bitec materials. He is currently associate professor at the United Arab Emirate University in AlAin.

Patricia Alexander is a Professor Emeritus previously in the Department of Informatics, University of Pretoria, South Africa and a Professor Extraordinaire at University of South Africa. She is currently a PhD and Masters candidates' supervisor at the Department of Business Informatics, Tshwane University of Technology, South Africa. Her research interests include Human-Computer Interaction and ICT4D.

Luis Alberto Álvarez-González is an Associate Professor in the Institute of Informatics in the Universidad Austral de Chile. His research interests include learning technologies, specifically learning designs and mobile learning.

Yusif Amadu is an Education Technologist with well-developed skills in online course development. He works at the University of Ghana in the Computing Systems, e-Learning Unit. He has a post graduate degree in Education Technology from the University of Cape Town and first degree from the Open University Malaysia. He is currently pursuing a second Masters in ODL at the University of Ghana.

Dr. Ambrose A. Azeta is a Lecturer in the Department of Computer and Information Sciences, Covenant University, Ota, OgunState, Nigeria. He holds B.Sc, M.Sc and Ph.D in Computer Science. His current research interests are in the areas of Artificial Intelligence in Education, e-Learning, Dialogue Systems (Voice-enabled Systems), Software Engineering, Internet Programming and Mobile Computing.

Professor Liz Bacon PhD, CEng, CSci, FBCS, CITP, PFHEA, is Deputy Pro-Vice Chancellor at the University of Greenwich, London, UK. She is President of EQANIE, British Computer Society Past President, Past Chair of the Council of Professors and Heads of Computing, and Co-Director of the eCentre research group. She has been involved in e-Learning research for more than 20 years.

Tiffany Baffour, Ph.D., M.A., M.S.S. has eighteen years experience with administrative capacity-building, and teaching in higher education to support curriculum development of face-to-face, online and hybrid courses. She is the inaugural Director of the Master of Social Work Program at The University of North Florida in the USA.

Touhid Bhuiyan is Professor of Software Engineering, Daffodil International University (DIU), Bangladesh. His research interests are in cyber security, intelligent recommendations, social network, trust management, big data analytics and e-Learning. Before joining DIU he was employed by several Universities including The University of Western Australia, Queensland University of Technology, University of Western Sydney and University of Malaysia Perlis.

Delio Ignacio Castaneda, PhD (Cum Laude) in Organizational Behavior from the Universidad Autónoma de Madrid, Spain. He also holds a Masters (with Distinction) in Education from the University of Manchester, England. He is currently a Full Professor at Pontificia Universidad Javeriana, as well as a researcher, consultant and invited Professor in the fields of Knowledge Management, Organizational Learning and Strategic Talent Management.

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