Development of a Blended Learning System Using the Flipped Classroom Model to Enhance Students' Learning Achievement in a Developmeny Communication Course

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บทคัดย่อ

การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อการพัฒนารูปแบบการเรียนรู้แบบผสมผสานโดยใช้แนวคิดห้องเรียนกลับด้าน (Flipped Classroom) เพื่อเพิ่มผลสัมฤทธิ์ทางการเรียนของผู้เรียนในหลักสูตรพัฒนาการสื่อสาร กระบวนการวิจัยประกอบด้วย 3 ขั้นตอนคือ 1) การสังเคราะห์ของวรรณกรรมต่างๆเกี่ยวกับทฤษฎีการเรียนรู้การออกแบบการเรียนการสอนและการเรียนรู้แบบผสมผสาน 2) การพัฒนาการเรียนการสอนบนเว็บโดยใช้ระบบการจัดการเรียนรู้เอ็ดโมโด (Edmodo) และ 3) การวิเคราะห์ผลสัมฤทธิ์ทางการเรียนของผู้เรียนในการเรียนรู้แบบผสมผสานโดยใช้แนวคิดรูปแบบห้องเรียนกลับด้าน โดยการวิจัยดังนี้ใช้นักเรียนที่ลงทะเบียนในรายวิชา DEVC40 (การพัฒนาการสื่อสาร) จำนวน 162 คน ในภาคการศึกษาที่ 1 ปีการศึกษา 2557-2558 โดยการสุ่มตัวอย่างได้กลุ่มควบคุมที่ใช้การเรียนการสอนแบบปกติและกลุ่มทดลองที่ใช้การเรียนการสอนแบบผสมผสานกับการใช้แนวคิดห้องเรียนกลับด้าน วิเคราะห์ข้อมูลโดยใช้การวิเคราะห์เชิงปริมาณและคุณภาพ

ผลการวิจัยพบว่ารูปแบบการออกแบบห้องเรียนกลับด้านเป็นการออกแบบที่มีประสิทธิภาพของระบบการเรียนการสอนที่มุ่งเน้นการเรียนรู้แบบผสมผสาน ซึ่งรูปแบบประกอบด้วย 5 ขั้นตอนคือ 1) การประเมินสภาพแวดล้อมการเรียนรู้ที่มุ่งเน้นความต้องการของผู้เรียนลักษณะเฉพาะของผู้เรียน แหล่งทรัพยากรการเรียนรู้บทบาทและความรับผิดชอบของทั้งผู้สอนและผู้เรียน และความท้าทายขององค์กรการเรียนรู้ 2) การวางแผนและออกแบบห้องเรียนกลับด้านซึ่งเกี่ยวข้องกับวัตถุประสงค์การเรียนการสอนแผนการสอนกลยุทธ์การสอนในชั้นเรียนเครื่องมือและเทคโนโลยีและเครื่องมือที่ใช้ในการประเมินผลการเรียนรู้ 3) สร้างและทดสอบ 4) ดำเนินการจัดการห้องเรียนกลับด้าน และ 5) การประเมินและปรับปรุงการเรียนการสอนต่อไปของ โดยการประเมินรูปแบบจากผู้เชี่ยวชาญนั้นมีคะแนนเฉลี่ยสูงที่สุดในด้านของการยอมรับ ($\overline{x}$ = 4.8) ประโยชน์ ($\overline{x}$ = 4.6) ความสัมพันธ์กัน ($\overline{x}$ = 4.6) ความพึงพอใจ ($\overline{x}$ = 4.48) ความคมชัด ($\overline{x}$ = 4.44) ความน่าดึงดูดใจ ($\overline{x}$ = 4.4) และความสะดวกในการดำเนินงาน ($\overline{x}$ = 4.32) การศึกษาครั้งนี้สรุปได้ว่าผลสัมฤทธิ์ทางการเรียนของผู้เรียนตามที่ระบุโดยคะแนนหลังเรียนสูงขึ้นอย่างมีนัยสำคัญในกลุ่มทดลองกว่าในกลุ่มควบคุมที่ระดับ 0.05 อย่างมีนัยสำคัญ ระดับความพึงพอใจของผู้เรียนมีความสัมพันธ์อย่างมีนัยสำคัญกับผลสัมฤทธิ์ทางการเรียนของผู้เรียนที่เรียนรู้แบบผสมผสานโดยใช้แนวคิดห้องเรียนกลับด้าน

คำสำคัญ: การเรียนรู้แบบผสมผสาน ห้องเรียนกลับด้าน ผลสัมฤทธิ์ทางการเรียน การมีส่วนร่วม ความพึงพอใจ

Abstract

This study primarily aimed to construct a development model for blended learning using the flipped classroom to enhance students' learning achievement in a development communication course. The research process consisted of three phases: 1) synthesis of various literature on learning theories, instructional design, and blended learning; 2) development of web-based instruction using the Edmodolearning management system; 3) analysis of students' learning achievement in blended learning using the flipped classroom model. Overall, 162 students enrolled in DEVC 40 (Development Communication 40) during the First Semester, Academic Year 2014-2015 were randomly assigned in the control group with traditional instruction, and the experimental group with blended learning using the flipped classroom. Data were analyzed by using quantitative and qualitative analyses.

Findings revealed that the Flipped Classroom Design Modelwas an effective system-oriented instructional design model for blended learning. This model consisted of five phases: 1) assess the learning environment which focuses on learning needs, learner characteristics, resources, roles and responsibilities of both teacher and students, and organizational challenges; 2) plan and design the flipped classroom which deals with instructional objectives, lesson plan, flipped classroom strategies, learning tools and technologies, and assessment instrument; 3) construct and test the blend; 4) implement and manage the flipped classroom; and 5) evaluate and revise which refers to formative and summative evaluations,and gathering of feedback for further improvement of instruction. The model had a very high mean ratingfrom experts in terms of acceptability ($\overline{x}$ = 4.8), usefulness ($\overline{x}$ = 4.6), relevance ($\overline{x}$ = 4.6), satisfaction ($\overline{x}$ = 4.48), clarity ($\overline{x}$ = 4.44), attractiveness ($\overline{x}$ = 4.4), and ease of implementation ($\overline{x}$ = 4.32). This study concluded that students' learning achievement as indicated by the posttest scoreswas significantly higher in the experimental group than in the control group at 0.05 level of significance. Students' level of satisfaction had a significant relationship with their learning achievement in blended learning using the flipped classroom.

Keywords: blended learning, flipped classroom, learning achievement, participation, satisfaction

Introduction

With the recent developments and innovations in educational communications and technology, new paradigms that offer diverse learning opportunities have continuously gained popularity in higher education. Many teachers implement learning activities using blended learning systems because this design takes advantage of the benefits of both face-to-face instruction and online learning. While online learning provides flexibility in the access of learning contents, face-to-face instruction motivates and engages the students in the learning process through personal interaction with their teachers and co-learners.

Blended learning has been defined in various ways. Graham (2006) explained that this pedagogical

approach refers to the convergence of face-to-face settings (characterized by synchronous and human interaction) and ICT-based settings (which are asynchronous, text-based, and where learners operate independently). Thorne (2003) emphasized that blended learning integrates the learning innovations and technologies offered by online learning with the interaction and participation offered by traditional instruction. The goal of blended learning is to give the most efficient and effective learning experience to students by combining different learning environments or by providing more than one delivery mode to optimize the achievement of learning objectives and cost of program delivery (Singh and Reed, 2001). Educators and trainers who would like to implement a blended learning system must carefully select the most appropriate learning tools and technologies for a specific learning intervention in order to effectively achieve the learning objectives (Holden and Westfall, 2010).

A current trend in delivering blended instruction in higher education institutions changes the role of students from being passive receivers of information to active learners. This approach is often referred to as the flipped classroom. Staker and Horn (2012) categorized the flipped classroom as one of the four rotation models of blended learning. Unlike in traditional instruction where students attend classes and learn inside the classroom as the teacher gives the lectures, in a flipped classroom, the teacher uses interactive, teacher-created learning technologies to deliver the lessons to the students outside regular class hours, thus reducing lecture hours inside the classroom. Through these learning technologies and instructional methods, the students can have greater control over their own learning. They can learn at their own pace, individually or with co-learners – anytime and anywhere as long as they have access to the media. Meanwhile, instructional activities such as homework, exercises, and projects are conducted during regular class hours to assess what students have learned. These allow the teachers to spend more time working with the students at the individual or group level. In-class activities are designed to develop students' higher order thinking skills, encourage active learning, and enhance social interaction and collaboration among students. In simple terms, flipping the class means that class hours are allotted for hands-on activities while actual lessons are given as homework for students (Shimamoto, 2012; Staker and Horn, 2012; Li, et al., 2013).

Objectives of the study

This study aimed to: 1) construct an instructional design model that could serve as a framework for the development of a blended learning system using the flipped classroom to enhancestudents' learning achievement in a development communication course; 2) develop web-based instruction using the EdmodoLMSto facilitate the online learning component of the flipped classroom; 3) compare the students' learning achievement in traditional instruction and in blended learning using the flipped classroom.

Methods

This study consisted of three phases.

Phase 1: Seven ID models authored by Gerlach and Ely (1980); Hannafin and Peck (1988); Seels

and Glasgow (1997); Smith and Ragan (2005); Smaldino, Lowther, and Russell (2012); Morrison, Ross, Kalman and Kemp (2013); Dick, Carey, and Carey (2014) were synthesized in developing the Flipped Classroom Design Model. In evaluating the model, in-depth interviews were conducted with six experts in the fields of educational communication, educational technology, and instructional design based in Thailand and the Philippines. After revising the model, five experts were surveyed and interviewed to assess the model using the following evaluation criteria: attractiveness, clarity, relevance and appropriateness, usefulness, ease of implementation, acceptability, and level of satisfaction. The results of the survey were analyzed using frequencies, means, and standard deviation. Data were analyzed using descriptive statistics such as frequencies, means, and standard deviation.

Phase 2: Web-based instruction for the online learning component of the flipped classroom was developed using the EdmodoLMS. The survey research design was used in evaluating the online learning platform. Overall, 15 Bachelor of Science in Development Communication (BSDC) students at the College of Development Communication (CDC), University of the Philippines Los Baños (UPLB), Laguna, Philippines were purposively selected to participate in pretesting the EdmodoLMS. Data were analyzed using descriptive statistics such as frequencies, means, and standard deviation.

Phase 3: The pretest-posttest control group design was used to investigate the effect of the flipped classroom approach on students' learning achievement. This was implemented in one chapter of DEVC 40 (Fundamentals of Educational Communication and Technology) over a period of five weeks at CDC, UPLB. This unit dealt with basic design and production techniques of educational communication media and consisted of four modules. The population of the study included 162 students enrolled during the First Semester, Academic Year 2014-2015. They were randomly assigned into the control groupwith 79 students and experimental group with 83 students.

For the control group, traditional instruction was implemented. This used a teacher-centered approach which involved 100 percent face-to-face discussion. Instructional materials such as PowerPoint presentations, handouts, and a textbook were used. All instructional activities such as lectures, learning games, group discussions, and synthesis of the unit were conducted inside the classroom. Learning assessment such as assignments and quizzes were also administered. As for the experimental group, blended learning using the flipped classroom was employed. This treatment had 80-90 percent of learning content delivered online. The teacher used asynchronous online learning tools such as vodcasts and links to useful online resources in discussing the lessons. All learning materials such as course syllabus, handouts, and instructions to all learning activities were posted in Edmodo so that students could access the content outside class. Students were expected to access and learn the lessons before coming to class. They were encouraged to actively engage in online discussions, post questions relevant to the lesson, and share other learning materials with their teacher and co-learners. These included learning games, group discussions, workshops, projects, and exercises on visual design were conducted to apply and practice what they have learned.

Quizzes and assignments were also given both online and offline. Communication tools such as email, and discussion boards were made available for students touse for sharing and collaboration.

Both quantitative and qualitative data collection procedures were employed in this phase. A pretest was conducted prior to instruction. After administering the treatment, students were given the posttest. A survey was also conducted to determine the level of satisfaction and level of participation in each group. Selected students from both groups were interviewed to provide relevant information. Data were analyzed using descriptive statistics such as frequencies, means, and standard deviation. In addition, statistical tests such as paired t-test, independent t-test, and chi-square test of independence were employed to determine the relationship among variables.

Results

Phase 1: The Flipped Classroom Design Model

Figure 1 illustrates the Flipped Classroom Design Model (FCDM) developed in this study. This model aimed to provide a specific methodology for both teachers and instructional designers in designing effective blended learning courses or programs using the flipped classroom approach.Guided by the constructivist learning perspective and blended learning principles, the phases of the model emphasized the role of studentsin meaning and knowledge construction based from their current or past experiences.Based from Piaget's theory, the cognitive constructivist learning perspective emphasized active learning where learners are provided with the appropriate learning tools and technologies so that they can access learning by themselves and construct their personal learning. Meanwhile, the social constructivist view, based from Vygotsky's theory, emphasized collaborative learning wherein learners do not only work with their teachers one-on-one but also work together with co-learners and support each other in constructing a common core of knowledge.

The model consisted of five phases (Figure 1). Phase 1, assess the learning environment, involves the analysis of the learning needs, learner characteristics, resources, roles and responsibilities of both teacher and students, and organizational challenges. Phase 2, plan and design the flipped class, focuses on formulating instructional objectives, designing lesson plans, selecting the flipped classroom strategies and the learning tools and technologies, and designing assessment instrument for both in-class and online learning components. Phase 3, construct and test, involves the development and testing of the flipped classroom strategies and learning tools and technologies. Phase 4 explains the actual implementation and management. Phase 5, evaluate and revise, conducts formative evaluation in all phases of the model to gather feedback for the further improvement of instruction, and implements summative evaluation after instruction has been delivered.

The direction of the arrows in the model from one phase to another represented the sequential steps that needed to be followed (Figure 1). Before proceeding to the next phase, each phase should undergo formative evaluation. This indicates iteration in the processes with each phase subjected to constant

evaluation and revision for continuous improvement and modification. After completing formative evaluation for a specific phase, the ID process may go back to the first step of the current phase, go back to the earlier phases of the model for further revisions, or proceed to the next phase of the model. Finally, summative evaluation should be conducted after the implementation of the flipped class.
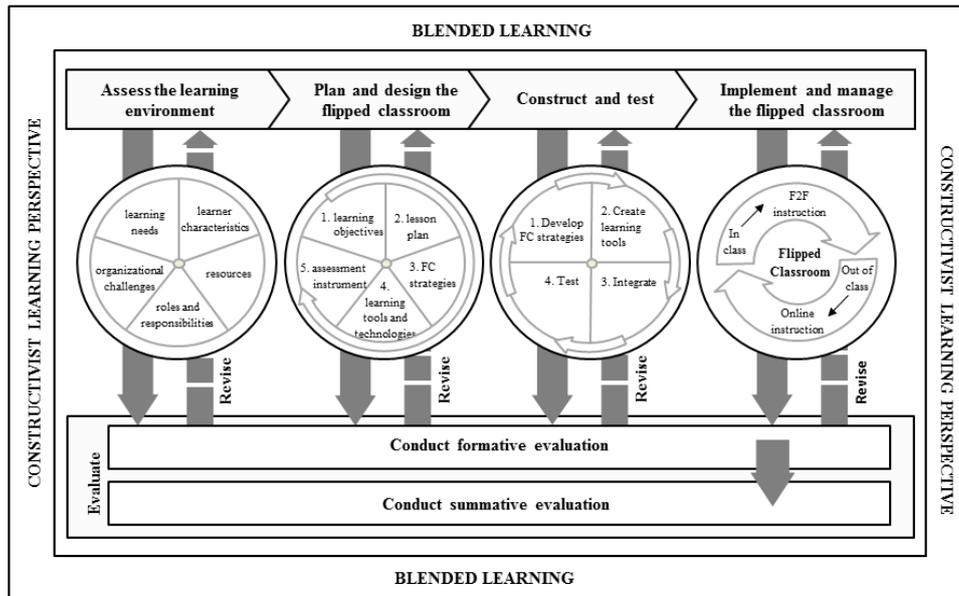

Figure 1 The Flipped Classroom Design Model

Results of experts' evaluation revealed that this model received a very high overall satisfaction rating of 4.52 (Table 1). The experts pointed out that this model was able to clearly describe and explain the important factors (e.g. pedagogical approaches, learning technologies and instructional materials, and methods of assessment) that should be considered in designing F2F and online learning components of blended learning using the flipped classroom. Although rated high in terms of clarity, ease of implementation, usefulness, relevance, acceptability, and overall satisfaction, this model, according to experts, is not a simple instructional design model to implement. Unlike other instructional design models which can be implemented by one person, as a system-oriented model of instructional design (Gustafson and Branch, 2002), this model requires team effort in implementation. It is suited for the design of a unit, a course or an entire curriculum and not for just for one topic or one lesson. Therefore, in adopting FCDM, the roles of instructional designer, teacher, and other important key persons who might be involved in the whole design process (e.g., graphic artist, web developer, and students themesleves) should be itemized and properly delineated in each phase of the model.

Table 1 Summary of experts' evaluation of FCDM

Criteria	$\bar{x}$	SD	Interpretation
1. Usefulness of the model	4.6	1.73	Very High
2. Relevance of the model	4.6	1.41	Very High
3. Level of satisfaction for each phase	4.48	1.94	High
4. Clarity of each phase of the model	4.44	1.20	High
5. Attractiveness of the overall layout or design	4.4	1.41	High
6. Ease of Implementation	4.32	1.19	High
Overall	**4.52**	**1.89**	**Very High**

* 1.0-1.5 – Very Low; 1.51-2.5 – Low; 2.51-3.5 – Moderate; 3.51-4.5 – High; 4.51-5.0 – Very High

Phase 2: Development and Evaluation of Web-based Instruction

Table 2 shows that the web-based instruction via the EdmodoLMS received positive feedback and high mean satisfaction rating ($\bar{x}$ =4.12) in terms of instructional design (teaching and learning activities employed in the delivery of instruction), EdmodoLMS design (attractiveness and organization of the design elements such as text, color, images, and layout), navigation and access (ease of access and use), and use of instructional materials (organization of the instructional materials such as video lessons, handouts, and links to other useful online learning references). These results helped the teacher and the instructional designer in pinpointing the specific components of the web-based instruction that needed further improvement.

Table 2 Summary of students' evaluation of the EdmodoLMS

Criteria	$\bar{x}$	SD	Interpretation
1. Edmodo LMS Design	4.46	0.72	Very High
2. Instructional Design	4.23	0.82	High
3. Use of Instructional Materials	4.10	1.14	High
4. Navigation and Access	3.63	0.89	High
Overall	**4.12**	**1.01**	**High**

* 1.0-1.5 – Very Low; 1.51-2.5 – Low; 2.51-3.5 – Moderate; 3.51-4.5 – High; 4.51-5.0 – Very High

Phase 3: Results of the Adoption of the Flipped Classroom Design Model

a. Comparison of Students' Learning Achievement Between Groups

Table 3 shows that there is a significant difference between the post-test scores of students in the control and the experimental groups. The computed p-value of 0.0001 indicates that students' learning achievement were significantly higher in the experimental group than in the control group (p<0.05). This finding implies that blended learning using the flipped classroom is an effective pedagogical approach in improving the academic performance of students. In this approach, the teacher combined learning

technologies and instructional materials, and implemented instructional methods that addressed the different learning style preferences of students and motivated them to interact and collaborate with co-learners in creating their own knowledge. Students actively engaged in the learning process and gained control over their own learning.

Table 3 Comparison of pre-test and post-test scores between groups

Test Type	Mean Score		t-value	p-value
	Control Group	Experimental Group		
Pre-test	15.34	15.71	0.87	0.3589 (ns)
Post test	20.65	22.68	4.48	0.01 *

*significant at 0.05 level, ns-not significant

b. Comparison of Students' Level of Participation Between Groups

Table 4 revealsthat the mean participation rating of students in the control group had a higher level of participation than in the experimental group since the computed p-value of 0.0002 is less than 0.05 alpha. While participation in in-class activities was observed higher in the experimental group than in the control group, the overall mean rating for participation was somehow influenced by the relatively low participation of students in the online learning component of the flipped classroom. This finding was affected by lack of physical presence of teacher and co-learners, time allotted for studying, reliability of internet connection, availability of resources and computer facilities, and online distractions such as checking of social media accounts, playing online games, downloading music, and watching movies. It was also observed that students tend to participate more on in-class and online learning activities if they were rewarded or given reinforcements in the form of grades, bonus points, or prizes. They felt shy to recite in front of the class especially in a room with a large lecture class size or engage in online discussion where everyone can see or read their posts. They also preferred to have activities in small groups and have assessment activities that focused more on experiential rather than rote learning.

Table 4 Comparison of students' level of participation between groups

Test Type	Mean Score		t-value	p-value
	Control Group	Experimental Group		
Participation	3.40	3.03	-3.83	0.0002*

*significant at 0.05 level, ns-not significant

c. Comparison of Students' Level of Satisfaction Between Groups

The computed p-value of 0.2271 indicates that there is no significant difference in the mean satisfaction level of students in the control and the experimental groups (p-value <0.05) (Table 5). However,

Table 6 shows thatsignificant differences were observed on specific satisfaction attributes. For instance, students in the control group were more satisfied with the facilities used by the teacher in teaching the course (p-value = 0.0001) while students in the experimental group tend to be more satisfied regarding instructor characteristics and skills (p-value = 0.0001); student-teacher and student-student interactions (p-value = 0.0001); and teaching and learning strategies employed both in-class and online (p-value = 0.0062). The instructional approach used for the experimental group focused more on active learning and collaboration using blended instruction. While it provided new learning experiences for students, its potential in effectively delivering instruction and improving the academic performance of students tend be recognized.

Table 5 Comparison of students' overall level of satisfaction between groups

Test Type	Mean Score		t-value	p-value
	Control Group	Experimental Group		
Participation	3.91	3.98	1.21	0.2271 (ns)

*significant at 0.05 level, ns-not significant

Table 6 Comparison of students' level of satisfaction for each satisfaction criterion

Test Type	Mean Score		t-value	p-value
	Control Group	Experimental Group		
1. Instructor	4.09	4.38	4.33	0.0001 *
2. Co-learners	3.78	3.94	1.58	0.1168 (ns)
3. Interaction	3.62	4.05	6.35	0.0001 *
4. Learning technology instructional material	4.16	4.33	1.92	0.0567 (ns)
5. Teaching and learning strategies	3.80	4.02	2.78	0.0062 *
6. Class Management	3.47	3.61	1.61	0.1086 (ns)
7. Facilities	3.40	3.03	-4.48	0.0001 *

*significant at 0.05 level, ns-not significant

d. Relationship Between Level of Participation and Learning Achievement of Students

At 5% level of significance, there was a sufficient evidence to say that students' level of participation is not significantly related to their learning achievement in traditional instruction and blended learning using the flipped classroom, respectively (Table 7).

Table 7 Relationship between level of participation and learning achievement of students

Level of Participation vs Learning Achievement	Chi-square value	p-value
Control group	21.8961	0.7861 (ns)
Experimental group	30.5094	0.8326 (ns)

*significant at 0.05 level, ns-not significant

e. Relationship Between Level of Satisfaction and Learning Achievement of Students

There was a sufficient evidence to say that the overall level of satisfaction of students in the experimental group has a significant relationship with their learning achievement (p-value<0.05) (Table 8). This finding infers that students' satisfaction could be considered as an important factor in determining the overall effectiveness of blended learning using the flipped classroom. This also tends to indicate the strengths of blended learning using the flipped classroom in teaching the course.

Table 8 Relationship between level of satisfaction and learning achievement of students

Level of Participation vs Learning Achievement	Chi-square value	p-value
Control group	25.9340	0.5767 (ns)
Experimental group	40.8462	0.0322 *

*significant at 0.05 level, ns-not significant

Conclusion

Based on the objectives of this study, the following conclusions were generated: 1) the adoption of Flipped Classroom Design Model enhanced students' learning achievement in a development communication course.The experts gave the model a very high mean rating in terms of clarity, ease of implementation, satisfaction, attractiveness, usefulness, relevance, and acceptability; 2) the web-based instruction via the Edmodo LMS had a high mean satisfaction rating in terms of instructional design,Edmodo LMS design, navigation and access, and use of instructional materials; 3) students' learning achievement in the experimental group was significantly higher than the learning achievement in the control group; 4) the mean level of participation of students in the control group was significantly higher than in the experimental group; and 5) students in the control group were more satisfied with regard to the facilities used in teaching the course. Meanwhile, students in the experimental group were highly satisfied regarding instructor characteristics and skills, student-teacher and student-student interaction, and teaching and learning strategies employed both in-class and online. Results also showed that students' mean level of satisfaction in the experimental group had a significant relationship with their learning achievement.

Overall, this study concludes that the Flipped Classroom Design Model provided new learning experiences for the teacher and the students.To further improve the implementation of this instructional approach, students recommended that effective learning experience would take place if an equal mix of

individual and group activities depending on lesson objectives would be implemented both in face-to-face instruction and online learning. Students preferred to have learning tools and technologies that would enable rich interaction among themselves, and between the teacher and students, and those that could facilitate collaborative learning in the delivery of learning content. To facilitate effective instruction using the flipped classroom model, university administrators should be able to provide support for teachers in the form of trainings, grants, and incentives with regard to the development of appropriate instructional materials; adequate and reliable computer and internet resources; sufficient study areas or workstations for collaborative activities; and upgraded and well-maintained classroom facilities such as sound system and LCD projector.

References

Dick, W., Carey, L.M., & Carey, J.O. (2014).*The systematic design of instruction*. (8th ed.). Boston, USA: Pearson.

Gerlach, V.S. & Ely, D.P. (1980). *Teaching and media: A systematic approach* (2nd ed.). NJ, USA: Prentice Hall.

Graham, C. R. (2006). Blended learning systems: definition, current trends, and future directions. In C.J.Bonk & C.R. Graham. (Eds.), *The handbook of blended learning: global perspectives, local designs* (pp. 3-21). San Francisco, CA, USA: Pfeiffer.

Gustafson, K.L. & Branch, R.M. (2002). *Survey of instructional development models*. (4th ed.). Syracuse, NY, USA: ERIC Clearinghouse on Information Technology.

Hannafin, M.J., & Peck, K.L. (1988). *The design, development and evaluation of instructional software*. NY, USA: Macmillan.

Holden, J.T., & Westfall, P.J.L. (2010). *Aninstructional media selection guide for distance learning – implications for blended learning featuring an introduction to virtual worlds* (2nd ed.). Retrieved from http://www.ien.idaho.gov/media/Best_Practices/USDLAReport.pdf

Li, K.H., Lu, S.J., Tseng, K.H. & Huang, H.C. (2013). A preliminary study on the Facebook-based learning platform integrated with blended learning model and flip learning for online and classroom learning. In J.F. Wang & R. Lau (Eds.), *Advances in Web-Based Learning* – ICWL 2013: 12th International ConferenceProceedings (pp. 172-183). Kenting: Taiwan.

Morrison, G.R., Ross, S.M., Kalman, H.K. & Kemp, J.E. (2013). *Designing effective instruction*. (7thed.). NJ, USA: John Wiley & Sons.

Seels, B.B. & Glasgow, Z. (1997). *Making instructional design directions*. (2nd ed.). NJ, USA: Prentice-Hall.

Shimamoto, D.N. (2012, April 17). *Implementing a flipped classroom: an instructional module*. Paper presented at the Technology, Colleges, and Community Worldwide Online Conference, Hawaii, USA.

Singh, H. & Reed, C. (2001). *Achieving success with blended learning*. Retrieved from http://facilitateadultlearning.pbworks.com/f/blendedlearning.pdf

Smaldino, S. E., Lowther, D. L., & Russell, J. D. (2012). *Instructional technology and media for Learning*. (10th ed.). NJ: Prentice Hall.

Smith, P. L., & Ragan, T. J. (2005). *Instructional design*. (3rd ed.). NJ, USA: John Wiley & Sons.

Staker, H. & Horn, M.B. (2012). *Classifying K-12 blended learning*. Retrieved from http://www.innosightinstitute.org/innosight/wp-content/uploads/2012/ 05/ Classifying-K-12-blend ed-learning2.pdf

Thorne, K. (2003). *Blended learning: How to integrate online and traditional learning*. London: Kogan.