Comparative Study of the Application of Blended Learning Method Versus Face-to-Face Learning Method in Student Learning AchievementCase Study: Computer Graphic Courses at Widyatama University

[1]Iwa Ovyawan Herlistiono, [2]Sriyani Violina

Abstract---The e-learning learning method does not require face-to-face between teachers and students, all teaching and learning activities are bridged by the e-learning system. At the time of implementation there were several obstacles to the implementation of e-learning, including inadequate infrastructure and an independent learning culture that students did not yet have that still required face-to-face activities with the instructor. Blended Learning is a learning method that combines e-learning systems with face-to-face methods. In 1 (one) semester, it is determined when learning is done by e-learning system and when face to face. This study compares student learning outcomes using face-to-face and blended learning methods for Computer Graphic courses at Widyatama University

Keywords---Blended Learning, Computer Graphic

I. INTRODUCTION

Today the development of educational technology has shifted from the media (aids / support) of learning to become a reference for learning resources which is one of the main components of the educational process. This development and / or change is greatly influenced by the development of educational technology, especially the development of computer technology and its use in learning resource media.

The development of Information Technology is very influential on the development of learning methods. One of them is the e-learning method which is currently being developed in both formal and non-formal educational institutions.

Dr. Sukirno, M.Pd said that the education process is influenced by three main components namely, students, teachers, and learning resources. The integration of the three main components in this process is the center of educational and / or learning activities.

The e-learning learning method does not require face-to-face between teachers and students, all teaching and learning activities are bridged by the e-learning system. At the time of implementation there were several obstacles to the implementation of e-learning, including inadequate infrastructure and an independent learning culture that students did not yet have that still required face-to-face activities with the instructor.

[1]*Informatics Department, Engineering Faculty, Widyatama University Jalan Cikutra No 204A Bandung*

ovyawan.herlistiono@widyatama.ac.id

[2]*Informatics Department, Engineering Faculty, Widyatama University Jalan Cikutra No 204A Bandung*

sriyani.violina@widyatama.ac.id

Blended Learning is a learning method that combines e-learning systems with face-to-face methods. In 1 (one) semester, it is determined when learning is done by e-learning system and when face to face.

In this study learning outcomes will be compared using face-to-face learning methods and blended learning for Computer Graphic courses at Widyatama University.

II. DATA ANALYSIS

II.I. Data Sample

The data used in this study were students of Informatics Department at Widyatama University, semester 5 who took Computer Graphic lectures with a total of 88 (eighty eight) students and were divided into 4 classes A, B, C and D with the division as shown in table 1

Tabel 1:*Division of Classes*

Class	Number of Students	Learning Method
A	21	Face To Face Learning
B	23	
C	23	Blended Learning
D	21	

Lecture activities in 1 semester are divided into 14 meetings, One meeting for Midterm Examination (UTS) and One for Final Examination (UAS). Lectures using the blended learning method are divided into three face-to-face meetings which are held in weeks 1.7, and 15, 11 other meetings will be held in the form of e-learning.

Evaluation of learning is carried out in the form of Midterm Examinations (UTS), Final Exams (UAS) and Quizzes. In this study the results of the evaluation of learning analyzed are the results of the midterm and final exam.

Computer Graphic Course material

Computer Graphic Courses are subjects that study graphical systems, formation algorithms and manipulation of graphic objects from points, lines, circles, ellipses, curves and characters both 2D and 3D graphics, Computer Graphic material in 1 (one) semester can be seen in table 2.

Table 2:*Computer Graphic Lecture Materials*

No	Course Material	Sub Material	
1	Introduction to Computer Graphics	1. Introduction to Computer Graphics 2. Differences in Computer Graphics and Image Processing 3. Application of Computer Graphics 4. Video display device 5. Raster System and Random System 6. Input Device 7. Hardcopy Device	
2	Line, Circle and Ellips	1. parameters of the formation of points, lines and circles	Explain the
		2. steps of the line drawing algorithm	Explain the
		3. DDA and Bresenham algorithms to draw lines	Distinguish
		4. and Bresenham algorithms to draw lines	Using DDA
		5. steps of the circle drawing algorithm	Explain the
		6. midpoint circle algorithm to draw a circle	Use the
		7.	Explain the

		ellipse formation parameters 8. Explain the steps of the ellips depiction algorithm 9. Use the ellips midpoint algorithm to describe ellips	
3	Curves and Characters	1. Basic Curve 2. Bezier Curve 3. Character	
4	Clipping	1. The basic concept of clipping 2. Clipping uses the DDA algorithm 3. Clipping uses the midpoint subdivision algorithm	
5	2D Transformation	1. Introduction to 2D Transformation 2. Basic Transformation 3. Translation 4. Scaling 5. Rotation	
6	Introduction to 3D Graphics	1. 3D Graphic Concepts 3D Coordinate System 3D primitives 3D Object Representation 2. Geometry Equations 3. Constructive Solid Geometry (CSG) Bezier Curves & Surfaces Lathe Object Fractal Introduction to Rendering	
7	3D Transformation	1. Introduction to 3D Transformation 2. Basic Transformation 3. Translation 4. Scaling 5. Rotation	

Learning Evaluation

Evaluation of learning is done in the form of the Midterm (UTS) and Final Exams (UAS). UTS and UAS are carried out in the form of face-to-face classes, both of which carry out face-to-face learning methods and blended learning.

Evaluation of learning result for each lecture material is distributed in the form of questions that each has its own points, each class will be calculated on average for the result of the course material.

IV. DISCUSSIONS

IV.I. Evaluation of Midterm Exam Result

Here are the results of the evaluation in the form of the Midterm Examination (UTS) both for classes with blended learning methods and face-to-face learning method.

Table 3:*Evaluation Results through Midterm Exam per Course Material*

	Face To Face Learning	Blended Learning
Line	37%	57%
Character	44%	61%
Bezier Curve	76%	55%
Circle	62%	49%
Ellips	51%	26%

Tabel 4:*Midterm Exams Result*

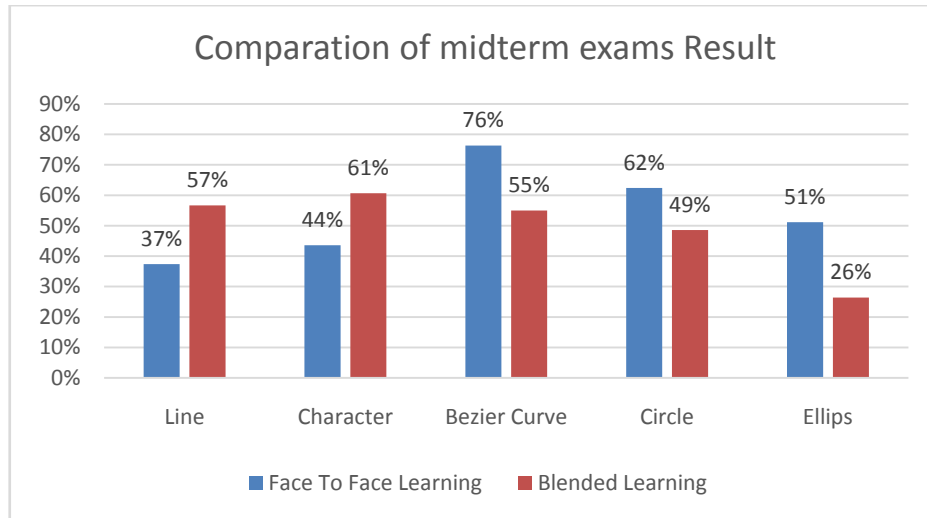|	Face To Face Learning	Blended Learning
UTS	61%	48%

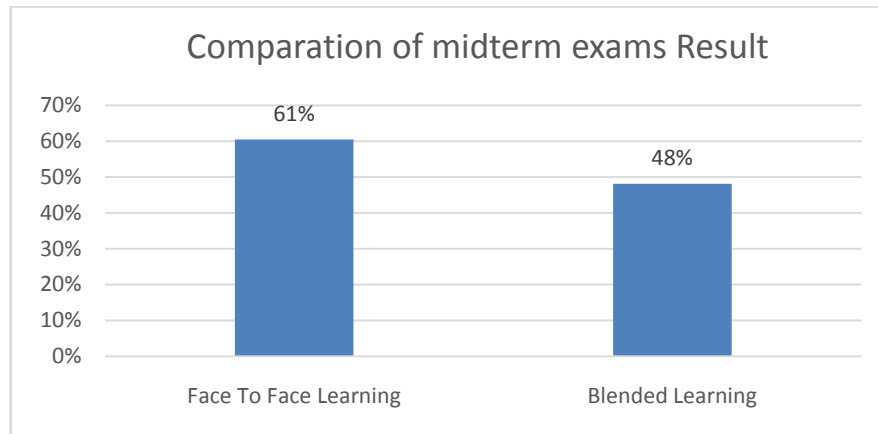**Figure 1:***Comparation of midterm exams Result (per course material)*

Figure 2*:Comparation of midterm exams Result*

Evaluation of Final Exam Result

The following are the evaluation results in the form of Final Examination Semester (UAS) both for classes with blended learning methods and face-to-face learning method.

Table 5:*Evaluation Results through Final Examsper Course Material*

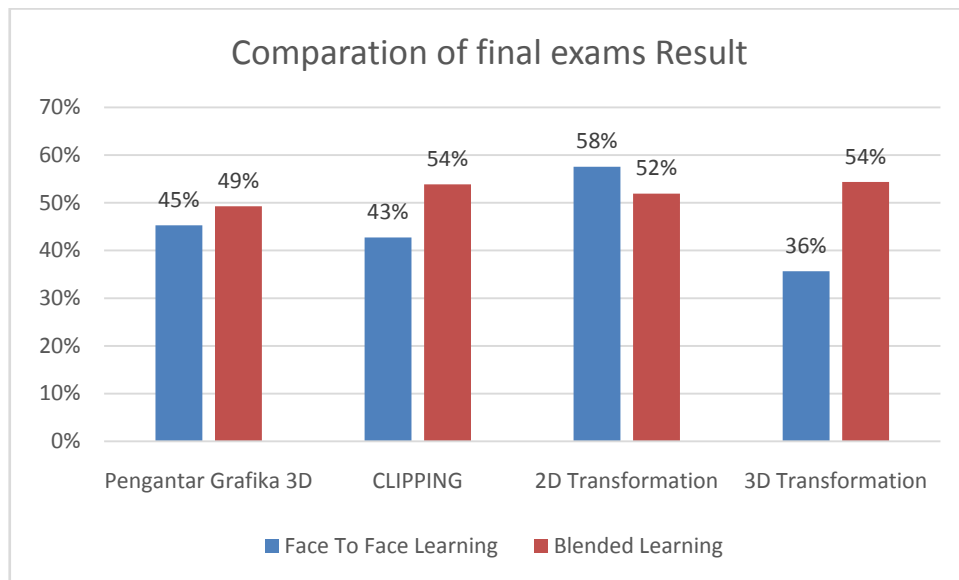|	Face To Face Learning	Blended Learning
Introduction to 3D Graphic	45%	49%
Clipping	43%	54%
2D Transformation	58%	52%
3D Transformation	36%	54%

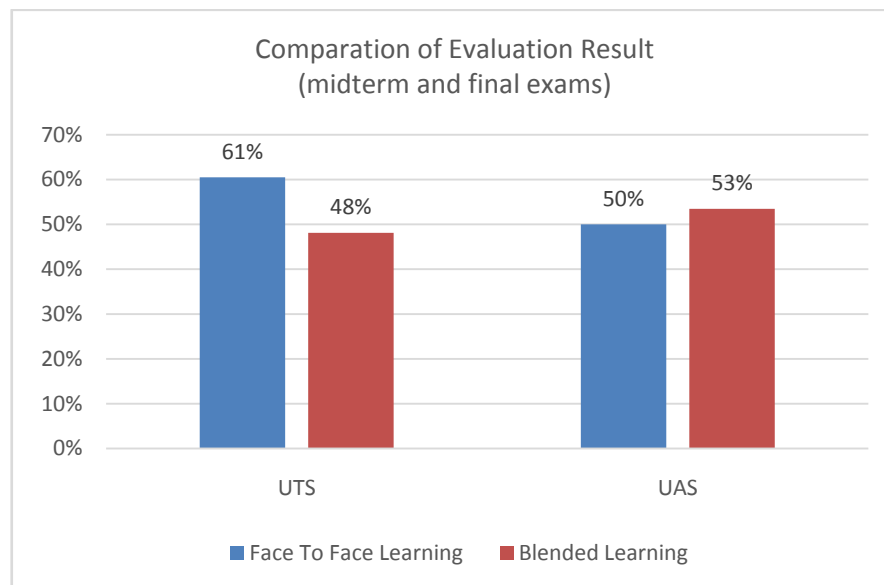**Figure 3***: Comparation of final exams Result (per course material)*

Figure 4*:Comparation of Evaluation Result (midterm and final exams)*

V. CONCLUSIONS

The conclusions of this study are [3]:

1. There are differences in the results of the evaluation of learning on the method of blended learning and face-to-face, where the results of the evaluation of learning through the Midterm Examination are better than the blended learning method [4]

2. There are differences in the results of the evaluation of learning on the method of blended learning and face to face, where the results of the evaluation of learning through the Final Examination Semester is better than the face to face method, except for the 2D transformation material [5].

REFERENCES

[1]   "Metode mengajar tatap muka dan online", UPI, tanggal akses 29 Des 2014
[2]   "Pembelajaran berbasis Blended learning"
       <http://id.wikibooks.org/wiki/Pembelajaran_Berbasis_Blended_Learning>tanggal akses 29 Des 2014
[3]   Jabarullah, N.H., & Hussain, H.I. (2019) The Effectiveness of Problem-Based Learning in Technical and Vocational Education in Malaysia, *Education + Training*, 61 (5), 552-567.

[4]   Abdul Hadi. A.R., Rehan, R., Zainudin, Z. & Hussain, H.I. (2018) Capital Structure Determinants of Shariah and Non-Shariah Companies at Bursa Malaysia, Opcion, 34 (16), 376-386.

[5]   Hussain, H. (2014). Do firms time the equity market in a non-linear manner? Empirical evidence from the UK, *International Journal of Business and Finance Research*, 8 (4), pp. 63 – 74.

[6]   Rajendran, T., Sridhar, K.P. Epileptic seizure classification using feed forward neural network based on parametric features(2018) International Journal of Pharmaceutical Research, 10 (4), pp. 189-196. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85057179816&doi=10.31838%2fijpr%2f2018.10.04.046&partnerID=40&md5=c37f3a3d94c82487374530217df894d2

[7]   Diorge jônatas marmitt, shanna bitencourt, amanda do couto e silva, márcia inês goettert, claudete rempel (2016) medicinal plants of renisus with analgesic activity. Journal of Critical Reviews, 3 (3), 1-4.

[8]   Roja Sahu, Rajesh Kumar Sahoo, Shakti Ketan Prusty, Pratap Kumar Sahu. "Urinary Tract Infection and its Management." Systematic Reviews in Pharmacy 10.1 (2019), 42-48. Print. doi:10.5530/srp.2019.1.7