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THE ANALYZE OF STUDENTS' PERCEPTIONS OF BLENDED LEARNING AND PHYSICS ACHIEVEMENTS ON PHYSICS UNDERGRADUATE PROGRAM

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ABSTRACT

This study aims to determine students' perceptions of blended learning in physics in blended learning process and ease of use aspects. This study also consist the correlation with students' achievements in physics. This research type is correlation research by using online survey aided by google form. The study population was all students of Physics Department consisting of 175 students from 2019 classes. The research sample was taken by random sampling technique consisting of 92 students. This research instrument uses questionnaire contained 17 statements using likert scale 1 – 5 to measures students' perceptions based on and the students' achievements in physics get from final marks in Daftar Peserta dan Nilai AKhir (DPNA) of Basics Physics course. Analysis data technique to test the hypothesis used product moment correlation. The results of data analysis obtained that students' perceptions are high category in blended learning process aspects and very high category in ease of use aspects. Students' perceptions of blended learning in physics and students' achievements in physics have positive and moderate correlation with the coefficient of correlation is 0.413. It means that the better design and application of blended learning in physics learning, the better the students' physics learning outcomes will be.

Keywords: *blended learning, perceptions, students' achievements, physics*

INTRODUCTION

Lately, we have entered an era of digitalization known as the industrial revolution 4.0. In this era, humans are faced with competition and challenges and must be able to turn all of those into opportunities. The industrial revolution 4.0 has become a major challenge for the fields of education to be able to create graduates who have the competencies needed while in the workforce (Wiyono & Zakiyah, 2019). Education needs to provide the best facilities so that the learning process is following the teacher's process standards so that later competent graduates will be produced, who are ready to compete in global world (Widayanti, et al., 2019).

The development of technology has been widely used by most people in the educational environtment. Students of the Department of Physics Unimed that most large has device communication smartphones and laptops become a proponent of the use of the development of technology in learning. Data from a survey conducted by the Asosiasi Penyelenggara Jaringan Internet Indonesia

(APJII) in 2016 showed that students in higher education are the biggest internet users in Indonesia with 89.7%, and second-placed is students with 69.8%, but the access to the pages of education is still very lacking. An issue that needs to be addressed by educators with direct student/participant learners to more use of the internet in the realm of education (Saifuddin, 2017). One of the utilization of the development of technology in the world of education is the method of blended learning.

Blended learning is an integrated learning experience that is controlled and guided by the instructor whether in the form of face-to-face communication or his virtual presence. Technological innovation is expanding the range of possible solutions that can be brought to bear on teaching and learning. Whether we are primarily interested in creating more effective learning experiences, increasing access and flexibility, or reducing the cost of learning, our learning systems will likely provide a blend of face-to-face and computer-mediated experiences (Bryan & Volchenkova, 2016). Blended learning is about teaching students how to make decisions, how to plan and organize their activities independently, how to handle the online learning platform, and how to search for, select and analyze the information. The e-learning component of blended learning can be put into practice by all manner of tools, including the social network (Krasnova & Shurygin, 2019).

At the State University of Medan in particular the Department of Physics has been applied method of blended learning in some course. It is because learning with the scientific method becomes popular and is directed as the basis for learning in the classroom. This is aimed at the basic achievement of every graduate at the State University of Medan to have scientific competence. Blended learning can be one of the various methods that are combined in learning to optimize the use of scientific methods in learning to achieve optimal graduate outcomes (Motlan, et al., 2018).

Based on the experience of researchers during their lectures, the method of learning that still dominates is face-to-face, whereas e-learning is only held at certain times according to the agreement between students and lectures. However, recently State University of Medan implemented a blended learning process using Sistem Pembelajaran Daring (SIPDA), this was done mainly because of conditions that made it impossible to apply face-to-face learning in class during Covid-19 pandemic. Following up on these activities, of course we have to know whether a learning process is effective or not, especially blended learning is a method that has recently been applied at State University of Medan.

One of the students' successes in education is shown by their academic achievements. The effort to educate the nation to improve the quality of human beings which basically can be realized through educational activities including the teaching and learning process in schools (Motlan, et al., 2019). Other than that, the learning process will run well if students like the lesson, the environment, the way of delivering the material, and the perception of ongoing learning (Fitriana, et al., 2016). Pareek (in Fitriana, et al., 2016) suggests that perception is the process of receiving, selecting, organizing, interpreting, testing and reacting to sensory stimuli or data. Perception is closely related to the five senses because perception occurs after the object in question has seen, heard or felt something and has organized and interpreted it so that perception arises.

Student perceptions are an important determinant of student behavior and an understanding of these perceptions can be more useful in explaining their behavior than the well-intentioned inferences sometimes made by teachers or lectures. Students' perceptions will provide a better understanding of factors and issues to be considered when adopting blended learning (Ying & Yang, 2016). The most important factor for the success of blended learning is students' satisfaction. Insufficient student satisfaction is the impedes successful implementation of blended courses (Shantakumari & Sajith, 2015). Evaluation of the success of blended learning courses largely relies on students' attitudes, expectations, and finally their satisfaction (Akkoyunlu & Soylu, 2008). Because of it, the perception of students is very

necessary as a matter of evaluation for lecturers in the implementation of the Blended Learning method.

This study was conducted to determine students' perception of blended learning to ensure that prompt corrections can be made to the entire system. This will go a long way to enhance student's learning. Based on the conditions, researchers will assess the extent to know the knowledge of students' Department of Physics about the perception they have on the use of blended learning in physics. Because of that, researchers are encouraged to research students' perceptions of blended learning and the correlation with physics achievements on physics undergraduate program.

RESEARCH METHODS

This research was conducted in the Departement of Physics at State University of Medan and takes place in half even in the academic year 2020/2021. The population of the research is the whole students of the Department of Physics of 2019 at the Faculty of Mathematics and Science. Mechanical taking participants on a study conducted by random as many as 92 students of the Physics Department.

In this study, there are two forms of variables, namely the independent variable and the dependent variable. The independent variable in this study is the students' perceptions and the dependent variable is the students' achievements. The data of students' perceptions is obtained directly on the subject of the research via an online survey by using Google Form and also interview. The data of students' achievements is obtained from final mark in DPNA.

The researcher give questionnaire of students' perception of blended learning that was arranged in two aspects, there are Blended Learning Process and Ease of Use. Instrument that researcher used consists of 17 statements using Likert Scale 1 – 5. Before the instrument is used for the sample, the instrument should be discussed the first advance by the supervisor and two lectures as validators. Then make revisions to the instrument. The researcher also interview some students to get open opinion of their perceptions with blended learning especially in Basic Physics course. The data were analyzed using the normality test Kolmogorov Smirnov, linearity test, and correlation test Pearson. This research is a qualitative descriptive study to describe and interpret the findings.

To know the category of students' perception, the score obtained in percent with percentage descriptive analysis was consulted with the criteria in Table 1 adapted from (Riduan, 2004).

Table 1. Category of students' perceptions level

Reference	Category
$84\% \leq X \leq 100\%$	very high (vh)
$68\% \leq X < 84\%$	high (h)
$52\% \leq X < 68\%$	moderate (m)
$36\% \leq X < 52\%$	low (l)
$20\% \leq X < 36\%$	very low (vl)

RESULT AND DISCUSSION

a. Research Results

The data described in this study include data students' perception and students achievements of blended learning using SIPDA in Basic Physics course. The level of students' perceptions of blended learning can be seen in Table 2.

Table 2. Levels of student's perceptions of blended learning

No.	Aspects	Score	(%)	Category
1.	Blended Learning Process	353	77	high
2.	Ease of Use	378	82	high

Table 2 shows that the two aspects of the blended learning process and ease of use are both in the high category, but when viewed from the average score, the blended learning process aspect is still lower than the ease of use aspect.

Based on the variable data students' perceptions of blended learning in physics, the highest score was 83 and the lowest score was 50 with mean was 66.26 and standard deviation was 8.03. The frequency distribution of

students' perceptions of blended learning in Physics can be seen in Table 3.

Tabel 3. Frequency distribution of students' perceptions of blended learning

No.	Score Interval	Frequency	(%)
1.	50 – 54	9	10
2.	55 – 59	12	13
3.	60 – 64	12	13
4.	65 – 69	29	32
5.	70 – 74	16	17
6.	75 – 79	9	10
7.	80 – 84	5	5
Total		92	100

The Table 3 shows that the highest score for student perceptions is in the range 65 - 69, which is 32%, while the lowest score is in the range 80 - 84, which is 5%.

Determining the tendency of students' achievements variables, after the minimum value (X_{min}) and maximum value (X_{max}) are known, then determine the ideal mean value (M_i) with the formula $M_i = \frac{1}{2}(X_{max} + X_{min})$, determine the ideal standard deviation (SD_i) with the formula $SD_i = \frac{1}{6}(X_{max} - X_{min})$ (Azwar, 2007). Based on the norm reference above, the ideal mean of student achievement variable is 84.3. The ideal standard deviation is 3.95. Based on these calculations, the distribution table can be made as in Table 4.

Table 4. Category of students' achievements level

Value	Frequency	Category
$X > 90.23$	32	very high
$86.27 < X \leq 90.23$	21	high
$82.32 < X \leq 86.27$	29	moderate
$78.36 < X \leq 82.32$	8	low
$X \leq 78.36$	2	very low

The Table 4 shows that most of students have very high and moderate learning achievements, with each frequency 32 and 29 students. Based on the data on the learning outcomes variable, the highest value was 96.15 and the lowest value was 72.45. The results of the analysis of the mean was 87.29 and the standard deviation was 4.41. The frequency distribution of students' achievements in Physics can be seen in Table 5.

Table 5. Frequency distribution of students' achievements in physics

No.	Value Interval	Frequency	(%)
1.	72 – 75	2	2
2.	76 – 79	0	0
3.	80 – 83	9	10
4.	84 – 87	33	36
5.	88 – 91	32	35
6.	92 – 95	15	16
7.	96 – 99	1	1
Total		92	100

The Table 5 shows that the highest value for student achievements especially in Basic Physics course is in the range 84 – 87, which is 36%, while the lowest value in the range 96-99, which is only 1%.

b. Final Product Discussion

Blended learning is the use of traditional classroom teaching methods together with the use of online learning for the same students studying the same content in the same course (Cleveland-Innes & Wilton, 2018). Conducting learning is certainly influenced by several factors, one of which is student perceptions, where this perception is useful as feedback from students to be used as an evaluation material for the learning process. The blended learning process itself contains several things, including the delivery of material, discussion, question and answer, assignment collection, and other activities carried out by means of blended learning.

Based on the Table 2, students' perceptions to learning physics using blended learning is high for both aspect. The first aspect is blended learning process with score 353 and percentage 77%. The high perceptions of students towards learning physics that is delivered blended can be seen from the response of students who state that learning physics using blended learning is interesting and fun if compared with face-to-face only. Based on the results of the interview, it was also found that the blended learning method is an effective alternative to overcome a pandemic situation

like this. This shows a positive response from students as respondents that their interest in blended learning is in the high category.

Blended learning is a learning method that can be said to be new to State University of Medan, especially the Physics Department, this is certainly a new thing for students to take part in blended learning. In addition, there are variations in learning, in this case between face to face and e-learning, which can make students more interested and feel happy to take part in learning. This is supported by (Motlan et al., 2018) which states that Blended Learning can be one of the various methods that are combined in learning to optimize the use of scientific methods in learning to achieve optimal graduate outcomes.

Students' perceptions of the effectiveness of blended learning caused by flexibility of place and time also in high category. The results of the interview as a whole also said that one of the facilities felt by students in applying the blended learning method was that it could be accessed anytime and anywhere. This is one of the advantages of the blended learning method that many students feel, especially using SIPDA.

One important assessment in the learning process is student activeness and involvement in learning. According to (Vernadakis, et al., 2011) blended course model may actually lend itself to more active learning due to students becoming more responsible for learning content on their own time, while classroom time is spent with application of newly acquired knowledge. In addition, the interaction in the Blended Learning learning model creates a motive for students to compete in learning. This is also supported by (Prilanita & Sukirno, 2017) who state that the learning method has an indirect effect on questioning skills.

Based on result of survey, students' perceptions of blended learning in increasing the frequency of asking questions to lecturers are in the high category. With the blended learning method, especially using SIPDA, which provides a discussion forum for questions and answers between students and lecturers, students ask more frequently and also the relationship created between students and lecturers becomes better. Online discussion will improve the quality of the discussion because it can be done at a different time and place and effectively to improve learning outcomes by the students are still in doubt, it has been felt by students during the learning blended. This statement supported by (Delaney, et al., 2018) that state that Student's perceptions at the outset were found to be important as was the use of the online discussion board as a learning tool even when it is not assessed.

On the SIPDA page there is also a Resource menu, which functions as a menu that contains references and other learning resources provided by lecturers. References can be in the form of e-books, journals, or links to support ongoing material. Students' perceptions of the effectiveness of blended learning in terms of easy access to learning resources were high. This is also supported by the results of interviews with several students, where one of the conveniences they get is being able to access learning resources suggested by the lecturer. In face-to-face learning, they usually look for references from libraries which take a lot of time. In addition, sometimes the resources they get are not what the lecturers expect. With the Resource menu, students can use learning resources according to the references provided by the lecturer. This also minimizes any misconceptions between students, because each student uses the same reference in learning, in this case in the Basic Physics course.

Based on the results of a survey that has been conducted, students' perceptions in terms of assignments were classified as very high, namely in terms of task collection, task improvement, and also reduced paper usage due to tasks being done and collected in files only. The results of the interview also showed that the students found it easy to collect this assignment, it's just that the difficulties experienced by students were the file size that could be uploaded was very small, namely a maximum of 2 Megabytes. In addition to providing convenience, this also changes the old way to a way that is more directed towards the use of technology, so that students think that their insight into the use of Information,

Computer and Technology also increases along with the amount of time they spend on activities through the internet network.

This is of course related to student attention, because it can support the continuity of learning. Attention is also one aspect of finding out how students' learning motivation is. This is supported by (Molaee & Dortaj, 2015) which states that a student's attention has to be aroused and sustained. This category also includes things that relate to curiosity and sensation seeking. Based on the research results, students agree that blended learning can increase learning motivation, although based on the Table 3, the highest score of students' perceptions is in the interval 65 – 69 which is 32%, while the lowest score is in the interval 80 – 84, which is 5%. It is because there are also many students who think that blended learning is still lacking in terms of improving understanding of the material and learning outcomes. Student satisfaction with the blended learning method towards increasing understanding of the material and learning outcomes is still in the moderate category. The similarly result shown by (Roslina, et al., 2013) that states that the students' satisfaction on blended learning indicated more negative than positive response. The quality of the learning process has an impact on student satisfaction, meaning that the better the learning process runs in higher education, the higher education student satisfaction will be (Sahyar, 2009).

The second aspect is ease of use that also showed high students' perceptions. The most significant thing is the device that they belong to were able to support the blended learning and their internet connection is quite stable to access the learning.

Student's perceptions of accessibility of SIPDA as a media of blended learning method in Basic Physics Course in high category. Based on these data, it can be concluded that SIPDA is good enough in terms of ease of access. However, based on the results of interviews with several students, at certain times they have difficulty accessing the SIPDA page, for example during exams, SIPDA becomes an error because all students access SIPDA simultaneously at the same time. This can be used as an evaluation material again in order to improve and also improve the SIPDA site for the smoothness of the Blended Learning learning process. It is undeniable that there are certainly advantages and disadvantages in every learning method applied, both in intrinsic and extrinsic terms.

Most students access e-learning by using SIPDA from both smartphones and laptops, which is indicated by the students' perceptions that are classified as very high towards this. However, based on the results of the interviews, some students still found it difficult to take part in blended learning because the internet network was unstable, especially for students who still lived in rural areas. Their internet network will be disrupted if it rains or blackouts, so it is not uncommon for them to be left behind when the lecturer explains the material that is ongoing at that time. Based on the data obtained, it is hoped that the Blended Learning learning process, especially using SIPDA, can be reviewed and improved both in terms of quality and accessibility to support the smooth learning process.

In this research, students' achievements will be associated with perceptions of one of the learning methods, namely the blended learning that they have experienced during their lectures, especially in physics. Perceptions is needed to know their attitudes and interests of something which both of them include of internal factors that effect the learning outcomes.

Based on Table 4, 32 students have very high achievement, This is shows that these students can take part in blended learning well and experience only a few obstacles. Other than that, 2 students have very low achievement. Based on the results of interviews with the two students, it is because they are not able to take part in online learning which only refers to the references provided by the lecturers, so that the understanding of the material they get is minimal. Face-to-face learning is considered more effective because the lecturer explains the material in more detail.

The results of the correlation analysis obtained the correlation coefficient value of 0.413 which lies in the range 0.40 – 0.59. Based on the correlation analysis above, it can be

concluded that students' perceptions of blended learning in physics and students' achievements in physics have positive and moderate correlation. This means that the better the design and application of blended learning in physics learning, the better the students' physics learning outcomes will be. But not only perception, there are so many factor that effect the students' achivements both of internal and external factors. This is in accordance with what was said by (Means, et al., 2013), blended learning was more effective in improving learning outcomes than online and face-to-face learning conducted separately.

CONCLUSIONS AND SUGGESTIONS

Based on the results of data analysis and discussion of research results, it can be concluded as follows :

1. UNIMED Physics Department students' perceptions of blended learning in Physics Learning as a whole are classified as good categories based on aspects of Blended Learning Process and Ease of Use.
2. The results of this study indicate that there is a moderate and positive correlation between students 'perceptions of blended learning in physics and students' achievements in physics. This means that the better the design and application of blended learning in physics learning, the better the students' physics learning outcomes will be.

Based on the results of the research and conclusions on the above, then the advice given on the research of this are :

1. Provide opportunities for students to give suggestions at the end of each lesson, either using the Blended learning method or other learning methods.Peneliti selanjutnya hendaknya pandai mengatur posisi duduk siswa dengan tepat sehingga pembelajaran dapat berjalan dengan kondusif dan lancar.
2. Expected to lecturers to design learning in blended learning to be good following the expectations of the students that we're able to improve the outcomes of learning of students.
3. Make sure that all students have good facilities before apply blended learning, so students have better satisfaction level and it will improve their perception and achievement to be very strong correlation.
4. It is expected to be used as material studies for the development of science that is associated with learning-based blended learning both at the level of college high or school.

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