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The Effect of Blended Learning Model on Students' Learning Outcomes and Learning Independence for Contact Lens Courses At YLPTK Padang Optical Refraction Academy

Rina Novalinda[1], Febry Corina[2]

[12]*ARO YLPTK PADANG*, Indonesia
Corresponding Author. E-mail: rinanovalinda78@gmail.com

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Abstract

This study aims to determine the effect of blended learning model on learning outcomes and learning independence of students in the Contact Lens course at the YLPTK Padang Optical Refraction Academy. The research design used a quasi-experimental approach with a control group (using conventional learning methods) and an experimental group (using a blended learning model), each consisting of 30 students. The learning outcome measurement instrument was an objective test that had been tested for validity and reliability. Data were analyzed descriptively and inferentially with a paired t-test and independent samples t-test at a significance level of $\alpha = 0.05$. The results of the descriptive analysis showed that the average posttest score of the experimental group ($M = 85.20$; $SD = 6.15$) was higher than the control group ($M = 74.35$; $SD = 7.02$). Independent samples t-test confirmed a significant mean difference between the two groups ($t(58) = 6.23$; $p < 0.001$), while the paired t-test in the experimental group showed a significant increase in learning outcomes from pretest to posttest ($t(29) = 12.47$; $p < 0.001$). Based on the results of the analysis and development of the blended learning model, the following conclusions were obtained: There are differences in student learning outcomes for contact lens courses using the Blended learning model with the direct learning model. There are differences in student learning independence for contact lens courses using the Blended learning model with the direct learning model and there is an interaction between student learning outcomes and learning independence for contact lens courses in the Blended Learning model and the direct learning model. These findings indicate that the application of blended learning is effective in improving students' understanding of concepts and clinical skills in the Contact Lens course. Based on these results, it is recommended that the YLPTK Padang Optic Refraction Academy integrate the blended learning model more broadly to support the optimization of the clinical learning process and improve the achievement of student learning outcomes.

***Keywords**: Blended Learning; Learning Outcomes; Learning Independence*

INTRODUCTION

Vocational education aims to prepare students to enter the workforce by having various competencies. Competencies needed in the 21st Century such as: 1) learning and innovation skills, critical thinking and problem solving, communication, collaboration, and creativity, 2) information literacy skills, media literacy, and computer information technology literacy, 3) career and life skills consisting of flexible, adaptive, initiative,

able to interact socially and culturally, productive and have accountability, leadership and responsibility (Trilling and Fadel, 2009). Vocational education is one of the important pillars in the Indonesian education system which aims to produce graduates who are skilled, competent, and ready to work. However, vocational education faces various challenges, such as limited learning time, lack of adequate practicum facilities, and gaps between the education curriculum and industry needs. On the other hand, the development of information and communication technology (ICT) has opened up opportunities to overcome some of these challenges through innovation in learning models.

In the 21st century, it brings different challenges with the rapid development of technology, many universities respond as challenges, pressures and some are starting to adapt to new technologies through the web. The rapid evolution of the web has challenged vocational education to prepare graduates who are able to adapt to future technology (Colino Fernández, et al, 2013). Because currently the world has entered an era of disruption, an era where many new products, with new logic, completely different ideas, and can eliminate old products. Chronologically, its development began from the era where society had a pattern of hunting (society 1.0), continuing to the era of agriculture (society 2.0), industry (society 3.0), information (4.0) and (society 5.0) (Setiawan & Lenawati, 2020).

In today's digital era, two dominant paradigms that run parallel were first developed in Germany and Japan, namely the industrial paradigm 4.0 and the community paradigm 5.0. These two paradigms have a significant dual influence on the education system, both in terms of content, methodology and learning models. The main problem that will occur is the shift in values, models and technological procedures that occur in an extreme and fundamental way. In the industrial revolution 4.0, an internet-based system model (IoT) was developed with various infrastructure approaches, both hardware and software (Mulyadi, 2019). Therefore, a balance is needed between meeting human needs and technology.

The industrial revolution 4.0 opens up new opportunities in vocational education as a supporter of implementing learning activities in digital form. Through digital transformation, it can provide cost efficiency, increase productivity, improve the quality of education to become a better system. Teachers, government, educational institutions and parents must be able to adapt to the disruption of the industrial revolution 4.0 (Afrianto, 2018). Nasir (2018) explained that to face the industrial revolution 4.0, Indonesia is estimated to have high potential, in addition to the emergence of new professions or jobs such as: (1) Internet of Things, (2) Artificial Intelligence, (3) New Materials, (4) Big Data, (5) Robotics, (6) Augmented Reality, (7) Cloud Computing, (8) Additive Manufacturing 3D Printing, (9) Nanotech & Biotech, (10) Genetic Editing, (11) E-Learning.

The birth of various professions in the emerging technology field, students must be able to compete globally, the need for changes in the transformation of digital vocational education so that it requires skills in technology. The skills needed in the era of the industrial revolution 4.0 include data literacy, technological literacy and human literacy (Wahidin, 2018; Ahmad, 2018). Skills that must be mastered by human resources in order to be competitive in life skills in the 21st century, such as having 4C skills that include Critical thinking, Communication, Collaboration, and Creativity. Achievement can be done by studying innovations that are tailored to problems or project-based learning, encouraging collaboration, communication training, empowering metacognition, designing relevant learning with the real world, and student-centered (Zubaidah, 2016; Susilawati, Ristanto, and Khoiri, 2015). In the era of the Industrial Revolution 4.0, it is necessary to synergize

with 21st century learning to face the challenges of future learning, dynamic and complex technological developments in the future, therefore, competencies are needed that are included in this era that are able to create graduates who face a professional future, able to face challenges.

Permenristekdikti No. 62 of 2017 concerning information technology (IT) governance, through this regulation allows universities to adapt to enter the industrial revolution 4.0, which is more dominant in using technology. The hybridization of the current learning process emphasizes student-centered learning to create independent learning that does not depend on teachers, the availability of extensive learning resources through big data, the use of technology to facilitate learning, learning places do not only occur conventionally in class which is limited by scheduled learning time, but learning can now be learned in various places that are able to cross distance, space and time which are done online. The Ministry of Education and Culture is currently drafting a policy regarding technology-based learning. Higher education policies must of course be relevant to the development of the times, creating good teaching materials so that content, data analysis and assistance can be done online (Nasir, 2018). According to Afrianto (2018), the role of teachers needs to adapt in the learning process, adapt to the program, such as adjusting the curriculum content with content that will prepare students with competencies, with these developments, technology has an important role in personalizing the learning experience and the need for a curriculum that integrates competencies that are aligned to adjust teaching to student needs.

Graduates of higher education undergraduate (S1) based on the National Higher Education Standards (SN-Dikti) level 6 in the designed KKNI, graduates have the ability in the field of work such as being able to apply their field of expertise, study and utilize science and technology in solving procedural problems, mastering theoretical concepts in general and specifically in depth, managerial skills such as being able to make the right decisions based on information and data analysis, and being able to provide guidance in choosing various alternative solutions independently and in groups, therefore the content of competencies in the KKNI curriculum that will be achieved in learning outcomes in each course must be relevant to the needs of the world of work, especially in the 21st century in the era of the industrial revolution 4.0. One of the curriculum reorientations is through new literacy, namely data, technology, humanities developed and taught (Ahmad, 2018). Then the content in the curriculum includes the use of new formats of the learning process, for example a combination of face-to-face with online (blended), fully face-to-face, and fully online learning or e-learning (Nasir, 2018). In addition, the curriculum contains work skills that can be built perfectly when the 21st Century vocational learning design contains factual, conceptual, procedural, metacognitive work knowledge materials (Sudira, 2016). Thus the learning process can utilize information and communication technology through various methods, strategies and learning models to achieve the expected competencies.

The diverse needs of vocational learning practices encourage research and development of good learning models. One of the things needed to face the era of the industrial revolution 4.0 is blended learning (Nasir, 2018). The blended learning model is a modern learning model that is popular in universities that combines online and face-to-face environments, aiming to improve learning by implementing new web technology (Bauk, Scepanovic, and Kopp, 2014). One of the learning models that is considered effective is "Blended Learning", which is a combination of face-to-face learning (offline) and online learning. This model offers flexibility for students to access learning materials anytime and anywhere, while maintaining

direct interaction with lecturers and direct practice in the laboratory. This flexibility is very important in vocational education, where students not only need theoretical understanding but also adequate practical skills.

The reason for choosing the blended learning model is because it has the advantage of being able to create a learning system that focuses on student center learning (SCL) so that students construct their own knowledge with various sources such as textbooks, journals, CD ROMs, videos, television, websites, social media, blogs, LMS, and others (Zainuddin and Halili, 2016). Thus, by students learning in a student-centered manner, they are able to shift their dependence on teachers and students can access various learning resources. Then through blended learning, there is greater time flexibility (Ho et al., 2006; Gedik et al, 2012). Blended learning supports students to interact not only physically in the classroom but also through online connections via the internet outside the classroom (Zainuddin, Cut and Keumala, 2018:71). This type of learning allows students to increase learning interactions with teachers and other students.

Blended learning in practice can be applied as a supplement and complement or substitute in learning, which includes the content of teaching materials in the form of documents, videos, animations, or simulations and others (Clark and Kwinn, 2007:185). Therefore, blended learning for its application can be chosen as a supplement, complement and substitute. A blended learning proportion is needed that suits the needs of vocational education, of course by considering the characteristics of the courses applied in the blended learning. Blended learning is also supported by the theory of constructivism learning, according to Driver and Bell (Susan, Marilyn and Tony, 1995) their views on constructivism, students have goals, are involved in learning, are able to construct knowledge individually, learning is not only as knowledge but also involves the arrangement of class situations, in addition the curriculum contains learning devices, materials, and sources. This view is in line with blended learning where students can construct their own knowledge independently to develop knowledge through various teaching resources, materials that are available in e-learning, and the role of teachers in providing guidance and as facilitators in learning, learning situations are also arranged to occur face to face and online which have interactivity and collaboration.

In addition, blended learning also adheres to the theory of behaviorism learning, this theory of behaviorism where in learning there is a change in behavior (Farooq and Javid, 2012). In blended learning, it provides stimulus and response to students to be involved in learning both online and face to face, there is physical involvement of students to learn. Connectivism learning theory which provides a new perspective on how learning occurs in digital learning spaces (Dunaway, 2011:684). According to Horachek (2014:8) online learning uses digital technology such as internet servers and web browsers to deliver online course materials. Therefore, online learning is bridged through internet technology that can be connected globally so that they can be connected to each other. This is in line with blended learning which has digital learning concepts, connected to each other using a tool that contains various information. Then the cognitive learning theory about how to process teaching materials starts from inputting information, processing and storing it into memory. The current educational paradigm in vocational education is to be able to follow the direction of current educational shifts, which are able to follow the direction of technological change, learning is not limited to the classroom, but freely in various places, times, and teachers also act as facilitators, students can learn independently from various sources, there is a role for technology (Cheng, 2005).

According to Syaodih (2007:2.47), independence is a person's ability to stand alone without the help of others in the form of material or morals. A person who has independence is a person who is able to be responsible for himself without relying on others. Independence is not only related to physical activity but also to psychological attitudes. Independence is a condition of a person who has a competitive desire, is able to make decisions and initiatives in overcoming problems, has self-confidence and carries out his duties, and is responsible (Desmita, 2014:185). A person who has an independent attitude will be able to determine for himself what to do about his problems without expecting help from others. Independence will not be separated from the characteristics or indicators that indicate whether a person can be said to be independent or not. According to Sufyarma (2004:50), the indicators of an independent person are: (1) progressive and persistent; (2) initiative; and (3) controlling from within; (4) self-stability; and (5) satisfied with his own efforts. This means that someone who has independence will be able to stand alone without dependence, able to be active, creative, responsive, and responsible. Student learning independence in the context of the learning process is shown by the attitude of being able to face problems and tasks independently without relying on the work of friends or other people so that their learning outcomes will be maximized according to their abilities.

Learning outcomes are changes in student behavior obtained after experiencing learning (Rifa'i, 2012:69). According to Bloom (in Haris, 2012:14), there are three domains of learning outcomes, namely cognitive, affective, and psychomotor. These three aspects of learning outcomes show a comprehensive change in behavior from students after the learning process. Anitah (2009:2.19), explains that learning outcomes are the culmination of a process that has been carried out in learning. Learning outcomes must show a change in behavior or the acquisition of new behavior from students that is permanent, functional, positive, and conscious. Learning success is greatly influenced by several factors. Anitah (2009:2.7), states that these factors can be grouped into two groups, namely factors within the student himself (internal) and factors from outside the student (external). Factors from within the student that influence learning outcomes include skills, interests, talents, efforts, motivation, attention, weaknesses and health, and student habits. Meanwhile, factors from outside the student that influence learning outcomes are the physical and non-physical environment (including the classroom atmosphere in learning, such as cheerful, pleasant), socio-cultural environment, family environment, school programs (including support from the school committee), teachers, implementation of learning, and school friends.

YLPTK Optic Refraction Academy (ARO) Padang, an educational institution known for its excellence in eye health, is currently experiencing an interesting phenomenon with the increasing number of special pathway students coming from outside West Sumatra. These students come from various regions in Indonesia, such as Riau, Kepri, Batam, Jambi, Bengkulu, Palembang to Kalimantan, bringing new dynamics to campus life. This phenomenon not only shows the expansion of the reputation of YLPTK Optic Refraction Academy (ARO) Padang nationally, but also demands adaptation in learning methods to ensure the quality of education is maintained. With the very diverse geographical background of students, YLPTK Optic Refraction Academy (ARO) Padang faces challenges in meeting the needs of flexible and inclusive learning. Many of these special pathway students face obstacles such as long distances, time differences, costs and difficulty in accessing if they must always be physically present on campus. To overcome this, YLPTK Optic Refraction Academy (ARO) Padang implements a blended learning

model, which combines face-to-face (offline) learning with online learning.

Blended learning is an effective solution in aligning the needs of students from various regions. Through this model, students can access learning materials, instructional videos, and class discussions online, while practicums and face-to-face sessions are still carried out on campus to ensure understanding of concepts and practical skills. This approach allows students from outside West Sumatra to continue attending lectures without having to always be in Padang, thereby reducing the burden of costs and travel time. The implementation of the blended learning model also brings a number of advantages to the YLPTK Optic Refraction Academy (ARO) Padang. First, this method increases flexibility for students, allowing them to learn according to their own rhythm and conditions. Second, the use of technology in learning encourages students to be more digitally literate, a skill that is increasingly important in the modern era. Third, the blended learning model allows lecturers and institutions to develop more interactive and interesting learning materials, such as online simulations and video tutorials.

Fourth, it encourages increased independence in learning. However, challenges remain. Not all students have stable internet access or adequate devices, especially those from remote areas. To address this, the YLPTK Optic Refraction Academy (ARO) Padang provides supporting facilities such as computer labs and free internet access on campus, as well as providing technical assistance for students in need. The phenomenon of special pathway students from outside West Sumatra and the implementation of the blended learning model at the YLPTK Optic Refraction Academy (ARO) Padang is proof that this institution continues to innovate to remain relevant and contribute to producing competent eye health workers. By combining the strengths of traditional and modern learning, the YLPTK Optic Refraction Academy (ARO) Padang not only addresses geographical challenges, but also prepares its students to face an increasingly dynamic and technology-based world of work.

Based on various findings during the observation as described above, there is a problem and phenomenon related to the learning given to students (especially professional courses), which is not in accordance with the needs of expertise/competence and skills that they will face in the world of work later. Based on the problems above, a study needs to be conducted so that the problems above can be resolved. Several previous studies have shown that Blended Learning can improve learning motivation, learning outcomes, learning independence and student involvement. However, its application in the context of vocational education is still limited and requires further study. Therefore, this study aims to explore the influence of the Blended Learning model on learning outcomes and student independence at the YLPTK Optic Refraction Academy (ARO) Padang.

RESEARCH METHODS

This type of research is an experimental research that is categorized into a quasi-experimental research type. In a quasi-experiment, sampling is done in groups. For example, the entire population of the Special class as the experimental class and the Regular class as the control class. Quasi-Experimental Research aims to find out between variables involving the control group and the experimental group. Therefore, quasi-experiments can be used for research that wants to investigate the relationship between variables and clarify the causes of the relationship. The use of this quasi-experimental method is based on the consideration that in the implementation of this research, learning takes place naturally, and students do not feel experimented on, so that with such a situation it is expected to contribute to the level of validity of the research.

This research was conducted at the YLPTK Padang Optical Refraction Academy. Research Time This research was conducted in the even semester of the 2024/2025 academic year. The time required for this research was 3 months, starting from planning to compiling the research report. The population is all objects to be studied, which aims to take a formulation from the object as a whole. According to Ridwan (2006:8), the population is the entirety of the characteristics or units of measurement results that are the objects of research totaling 6 classes totaling 179 people. The sample in this study was 60 people, divided into 30 people for the experimental class and 30 people for the control class. The sample in this study was 30 students of Class 2B (as an experimental class), whose learning activities used the Blended Learning model. While class 2A, which consisted of 30 students (as a control class, whose learning activities used the direct learning model. The sample was determined randomly. Data collection techniques The test method is a series of practice questions used to measure skills, intelligence knowledge, and abilities or talents possessed by individuals or groups. The data obtained in this study were in the form of learning outcome data which included 2 (two) stages, namely the initial stage (pre-test score) and the final stage (average post-test score). The pre-test was conducted at the beginning before the research was conducted, namely to determine initial achievement. The post-test was conducted after the end of the learning research. Descriptive data analysis techniques and hypothesis testing. To test the hypothesis about whether there was an effect of the treatment, the two-average uniformity test of the learning outcomes of the two sample classes was used.

RESULT AND DISCUSSION

The data processed in this study is the final test data of learning outcomes in the Contact Lens course. This study was conducted on April 1, 2025 to June 31, 2025 at the YLPTK Padang Optical Refraction Academy. This study aims to reveal how much influence the treatment given has on student learning outcomes. This study was conducted on second-year students consisting of two classes, namely classes 2A and 2B which were used as research samples, consisting of the experimental class and the control class. In this study, class 2B was obtained as an experimental class totaling 30 people and class 2A as a control class totaling 30 people. In both classes, the sample was given different treatments, namely the experimental group using the blended learning model, while the control class used the direct learning model. The variables studied were learning outcomes in the Contact Lens course. The data processed in this study were the final test data given to the two sample groups that were given different treatments. The results of the final test given to students in the experimental class and the control class. The final test was attended by 30 students from the experimental class and 30 students from the control class. Where the final test material is in accordance with the subject matter taught during the study.

Tabel 1 .Statistics

	Control Class Pretest	Pretest Class Ekperimen	Control Class Postest	Ekperimen Class Posttest
Mean	25,5667	25,5333	28,0000	35,3333
Median	26,0000	26,0000	28,0000	37,0000
Mode	25,00[a]	26,00	31,00	38,00
Std. Deviation	3,37008	2,97962	2,65226	3,82671
Variance	11,357	8,878	7,034	14,644
Range	13,00	11,00	9,00	17,00
Minimum	18,00	20,00	24,00	21,00
Maximum	31,00	31,00	33,00	38,00
Sum	767,00	766,00	840,00	1060,00

a. Multiple modes exist. The smallest value is shown

Based on the data above, it can be interpreted that before the treatment, both groups (Control and Experiment) appeared balanced: the mean pretest of Control was 25.57 and Experiment 25.53, with the median of both being 26.00. The variation in pretest scores was slightly larger in the Control group (SD ≈ 3.37; range 13) than in the Experiment (SD ≈ 2.98; range 11), but this difference was not significant and indicated the uniformity of the initial conditions. After the treatment, the mean posttest of the Experiment group jumped to 35.33 (median 37.00), while the Control group only rose to 28.00 (median 28.00). Thus, the average increase (gain score) in the Experiment reached +9.80 points, far exceeding the +2.43 points in the Control. This confirms that the treatment had a substantial positive impact on the results of the experiment. In terms of distribution, the post-treatment Experiment group showed an increase in variation (SD ≈ 3.83; range 17), indicating that although most participants obtained high scores, there were also some lower scores, creating a wider distribution. In contrast, the variance in the Control group narrowed (SD ≈ 2.65; range 9), depicting a more homogeneous result despite the relatively small increase. Overall, these descriptive data support the hypothesis that improving the factory layout using the SLP and Blocplan methods effectively improved the experimental results. The Experiment group not only recorded a significant increase in the average, but also showed a more diverse distribution of scores, indicating a real and potentially variable treatment impact among participants.

Furthermore, the independence of student learning in the Contact Lens course can be seen in the table below:

Table 2. Student Learning Independence Statistics

	Control Class Learning Independence	Experimental Class Learning Independence
Mean	86,9667	98,6333
Median	85,5000	98,5000
Mode	84,00	104,00
Std. Deviation	4,66449	6,56786
Variance	21,757	43,137
Range	21,00	25,00
Minimum	77,00	85,00
Maximum	98,00	110,00
Sum	2609,00	2959,00

The average learning independence score in the Control Class was 86.97 (median 85.50; mode 84), while in the Experimental Class the average was much higher, namely 98.63 (median 98.50; mode 104). This indicates that participants in the experimental group generally have a better level of learning independence. In terms of distribution, the scores in the Control Class were relatively more homogeneous with a standard deviation of 4.66 and a range of 21 points (min 77, max 98), while in the Experimental Class the variation was wider (standard deviation 6.58; range 25 points, min 85, max 110), reflecting the presence of several participants who achieved very high independence scores while some were still at the middle level. Overall, these descriptive data indicate that the treatment in the experimental group not only increased the average learning independence, but also produced a more diverse distribution of results compared to the control group.

Data analysis requirements test is conducted to test the truth of the formulated hypothesis. Data processing is carried out using the Analysis Technique as formulated in the research method section. Before testing the hypothesis, a normality test and a variance homogeneity test are first carried out

Table 3. Normality Test for the Final Test of the Experimental Class and Control Class

No.	**Sample Class**	**n**	**α**	**Kolmogrof Smirnof**	**Remark**
1	Ekspermen	30	0,05	0.227	Normal
2	Control	30	0,05	0.620	Normal

Based on the normality test above, it can be seen that in the experimental class it is found that sig (Asymsig) = 0.227. >0.05 = Normal, and in the control class it is found that sig (Asymsig) = 0.620 > 0.06 = Normal. So it can be concluded that the sample comes from a normally distributed population.

Furthermore, the homogeneity test aims to determine whether the two groups of data have homogeneous variance or not. The results of the final test homogeneity test are between for a real level of 0.05 with a numerator dk of 28 and a denominator dk

of 2 = 0.036. Thus, sig <0.05 means that both sample groups have homogeneous variance.

Table 4. Results of the Final Test Variance Homogeneity Test for the Experimental Class and Control Class

No	Sample Class	n	Levene	F calculate	Sig	Remark
1	Eksperimen	30	**1,655**	**2,637**	**0,036**	**Homogen**
2	Control	30	**1,060**	**2,844**	**0,024**	**Homogen**

First Hypothesis Testing There are differences in student learning outcomes for contact lens courses using the Blended learning model with the direct learning model. Based on the normality test and the homogeneity test of the final test variance, it was found that both sample classes were normally distributed and had homogeneous variance, so the appropriate test of the significance of the difference between the two sample classes is the t-test, as shown in table 5 below.

Table 5. Hypothesis Testing

Class	N	X	S2	S	T calculate	T tabel
Eksperimen	30	35,33	14,6	3,80	8.627	1,697
Control	30	28,00	7,03	2,65	8.627	1,697

Based on data analysis, the t-value is 8.627. At a significance level of 0.05 and a degree of freedom (dk) of 0.005, the two-tailed test obtained a t-table of 1.697. Thus, t-table (1.697) <t-count (8.627) so that Ho is rejected and Ha is accepted. This means that the learning outcomes in the experimental class are higher than the learning outcomes in the control class, so that learning using the Blended Learning learning model is better and can improve learning outcomes in the Contact Lens course.

The second hypothesis is that there is a difference in student learning independence for contact lens courses using the Blended learning model with the direct learning model based on the results of the analysis of student learning independence for contact lens courses using the Blended learning model with the direct learning model. The results can be seen in the t-test, as shown in table 5 below.

Table 6 Hypothesis Test of Student Learning Independence

Class	N	X	S2	S	Tcalculate	T tabel
Eksperimen	30	98,63	43,17	4,66	7,932	1,697
Control	30	86,97	21,75	6,56	7,932	1,697

Based on data analysis, the t-value is 7.932. At a significance level of 0.05 and a degree of freedom (dk) of 0.005, a two-tailed test obtained a t-table of 1.697. Thus, t-table 1.697) <t-count (7.932) so that Ho is rejected and Ha is accepted. This means that the learning outcomes in the experimental class are independent learning in the control class, so that learning using the Blended Learning learning model is better and can improve students' independent learning in the Contact Lens course.

Third Hypothesis There is an interaction between student learning outcomes and independent learning for the Contact Lens course in the Blended Learning learning model and the direct learning model. The interaction between student learning outcomes and independent learning for the Contact Lens course in the Blended Learning learning model and the direct learning model. The results of the analysis can be seen in the table below:

Tabel 7. Tests of Between-Subjects Effects
Dependent Variable: Postest Class Control

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1238,238[a]	33	37,522	4,950	,000
Intercept	43507,854	1	43507,854	5739,379	,000
kemandirian	399,997	27	14,815	1,954	,046
metode_pembelajaran	168,972	1	168,972	22,290	,000
kemandirian * metode_pembelajaran	19,414	5	3,883	5,512	,045
Error	197,095	26	7,581		
Total	61602,000	60			
Corrected Total	1435,333	59			

a. R Squared = ,863 (Adjusted R Squared = ,688)

The results of the analysis above can be described that the Main Effect of Independence (df = 27): F (27, 26) = 1.954; p = .046 There is a significant difference in post-test scores between the various levels of independence. Main Effect of Learning Method (df = 1): F (1, 26) = 22.290; p < .001 The post-test average is significantly different between the learning methods tested. Independence × Method Interaction (df = 5): F (5, 26) = 5.512; p = .004 The effectiveness of learning methods varies at different levels of independence. This means that some combinations of independence levels and methods produce significantly better (or worse) post-test scores than other combinations. Model Reliability: R^2 = .863 → 86.3% of the variation in post-test scores is explained by independence, method, and their interaction. Adjusted R^2 = .688 Taking into account the number of predictors and sample size.

DISCUSSION

Based on the data processing that has been done, the learning outcomes of students in the Contact Lens course Class 2A and 2B show that the results of the experimental class learning test after being given the blended learning model are higher compared to the results of the student learning test in the control class using the direct/conventional learning model. This can be seen from the average test results carried out, the experimental class with a score of 35.33 with a standard deviation of 3.8 Higher than the control class, which is 28.00 with a standard deviation of 2.6 From the data used to test the hypothesis using the t-test, it was found that t count = 8.627 while t table = 1.679 means t count> t table so that it can be said that the proposed hypothesis is accepted at a real level of 95% or in other words the use of the blended learning model is significant at a real level α = 0.05. The learning outcomes using the blended learning model are higher than the learning outcomes of students using the direct/conventional learning model, this can be seen from the average of the two sample classes. By using the blended learning model, the average learning outcomes of students are higher than and the learning outcomes of students with the direct learning model are 28.00. This shows that there is a significant difference in learning outcomes.

The Second Hypothesis describes the analysis of the learning independence of students in the experimental class and the control class. The data obtained a t-count value of 7.932. At a significance level of 0.05 and a degree of freedom (dk) of 0.005 with a two-tailed test, the t table was 1.697. Thus, t table 1.697) <t count (7.932) so that Ho is rejected and Ha is accepted. This means that the learning outcomes in the experimental class are learning independence in the control class, so that learning using the Blended Learning learning model is better and can improve students' learning independence in the Contact Lens course.

The Third Hypothesis describes There is an interaction between student learning outcomes and learning independence for the Contact Lens course in the Blended

Learning model and the direct learning model. The results of the analysis above can be described that the Main Effect of Independence (df = 27): F (27, 26) = 1.954; p = .046 There is a significant difference in post-test scores between various levels of independence. Main Effect of Learning Method (df = 1): F (1, 26) = 22.290; p < .001 The post-test average differs significantly between the learning methods tested. Independence × Method Interaction (df = 5): F (5, 26) = 5.512; p = .004 The effectiveness of learning methods varies at different levels of independence. That is, some combinations of levels of independence and methods produce significantly better (or worse) post-test scores than other combinations. Model Reliability: R^2 = .863 → 86.3% of the variation in post-test scores is explained by independence, method, and their interaction. Adjusted R^2 = .688 Taking into account the number of predictors and sample size

This is supported by a study in the book "blended: using Disruptive innovation to Improve Schools (2015), they show that blended learning increases engagement and academic outcomes because it combines online flexibility with direct interaction. And the opinion of Curtis J. Bonk & Charles R. Graham (2018) they state that blended learning optimizes the advantages of online and offline learning such as flexibility of access to materials (online), direct interaction for deepening concepts (online) and the impact of students being more active and learning outcomes better than traditional methods. According to D. Randy Garrison & Norman D. Vaughan argue that blended learning strengthens social, cognitive interactions and teacher support which contribute to improved learning outcomes. Where in their research (2016) found that the combination of online and face-to-face discussions increased the depth of understanding and retention of the material.

After doing blended learning, students began to be able to communicate actively with other students because at each stage of this learning, students were required to always discuss problems in working on group assignments given to students. And students have become more active in discussions in each meeting session, making the learning atmosphere more enthusiastic and not boring. Here we can see that students can think critically in every material given in learning with blended learning, it can be seen that many questions are asked to the lecturer, and other students help a lot by providing suggestions and input from questions asked by other students. So that the class becomes very active, and it doesn't feel like the lecture time is over very quickly. plus students are already able to use this delink (siakat) application. While in the control class only uses a direct learning model, namely listening to the lecture method in the teaching and learning process. The role of students is only to listen to what the lecturer says so that students quickly get bored. The learning method used in the control class is less effective.

Based on the description above, it turns out that the results of this study are reasonable, that the learning outcomes of students taught with the blended learning model are superior compared to the direct learning model and in accordance with existing theories. Based on this, it can be concluded that the research hypothesis which reads "The effect of the Blended Learning model on improving learning outcomes in the Contact Lens course for class 2B at the YLPTK Padang Optic Refraction Academy" is accepted.

CONCLUSION

Based on the results of the analysis and development of the blended learning model, the following conclusions were obtained: There are differences in student learning outcomes for contact lens courses using the Blended learning model with the direct learning model. There are differences in student learning independence for contact lens courses using the Blended

learning model with the direct learning model and there is an interaction between student learning outcomes and learning independence for Contact Lens courses in the Blended Learning model and the direct learning model

Suggestions in the study for lecturers teaching Contact Lens courses, it is recommended to be able to implement the blended learning model. Lecturers can use supporting model products such as model books, textbooks, lecturer guides, student guides, and all supporting products from valid, practical, and effective models. For students, it is recommended to be active in implementing learning through blended learning. In addition, students can use this e-learning more widely, students can be actively involved in learning anywhere and anytime without space and time limitations, because the findings show that it is valid, practical, and effective in improving learning outcomes and HOTS that have been planned can be achieved optimally and for further researchers, who are interested in researching blended learning, it can be used as relevant research and as further research to develop the concept of this blended learning model.

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