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The Effectiveness of Blended and Printed Learning Resources in Improving Science Learning Outcomes of Student Teachers at a Distance University

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ABSTRACT

Learning resources are an essential factor that determines learning outcomes, especially elementary school teacher education program students in distance education. This study aims to compare the effectiveness of blended learning and printed learning resources in improving science learning outcomes for distance education students. This study is a true experiment conducted at the Universitas Terbuka (UT) regional office of Jember, as a representation of the East Java region. Respondents of the study were 56 students using blended learning resources and 60 students using printed learning resources. The data were collected using a test of student learning outcomes and analyzed using t-test and N-gain. The results show that both blended learning and printed learning resources significantly improved learning outcomes at α = 5%, each with an average N-gain having relatively the same products at moderate levels. This study also raises information that blended learning resources are more effective than printed learning resources. This study implies that blended learning resources can be used as an innovative solution to improve student learning outcomes in distance education systems.

Keywords: distance education, learning outcomes, blended learning, printed learning resources

INTRODUCTION

Student adaptation in the learning process in higher education is still a challenge. Students must be able to carry out a new social role, namely developing new behaviors and looking for opportunities to build themselves into a new status. The process of achieving a position in a new environment is not easy, which can cause students to be anxious and stressed. As a result, students can tend to be lazy and fail to adopt new behaviors and carry out activities that they can generally do (Kuznetsov, 2013). The adaptation process includes a biological, social, and psychological level. The natural story is related to the genotype and selection of potential traits such as long-distance runners and sprinters. The social status is associated with the socialization and interiorization of new group norms. Meanwhile, the level of psychological adaptation is manifested through decision making, activity manifestation, and goals (Delen, Aktuğ, & Helvacı, 2020).

Learning is a complex process. Several parameters have an essential role in the learning process, including perception and operation of knowledge, general skills, development potential, and

environmental factors (Passwords, 2012). Besides, in the learning process, the tutor must be able to read the dominant characters in students. A characteristic that needs to be considered is the difference in student learning styles. Students' learning styles have differences from one another (Özyurt & Özyurt, 2015). Learning outcomes are the abilities that students have after receiving their learning experiences. These abilities include cognitive, affective, and psychomotor aspects. Learning outcomes can be seen through evaluation activities that aim to obtain evidentiary data that will show the level of student ability in achieving learning objectives.

One of the elements of the 21st century is information literacy and information technology (ICT). Information literacy and information technology can be achieved by integrating ICT in learning. An effective way to implement it is by integrating ICT, including the internet, as a tool in the learning process (Lam, 2014). Learning technology is theory and practice in designing, developing, utilizing, managing, and assessing strategies and resources for learning. Operationally educational technology can be considered as a process that is applicable to help solve learning problems in humans. Its activities can be either systemic or irregular on the concept of a system. Regularity is an activity to meet demands made by assessing one's own needs first, and then formulating goals, identifying the achievement of objectives taken by taking into account existing constraints, determining criteria for the selection of the best possible, and developing and testing the possibilities to be selected (Gusmaneli, 2012).

One of the characteristics of distance higher education is the separation between educators and students. This separation has enormous implications for the learning process, namely that most learning takes place remotely (Budiastra, Erlina, & Wicaksono, 2019). The portion of face-to-face is very minimal, especially with advances in information technology; face-to-face seems to be the last alternative. The facilitation provided by distance higher education plays a significant role. The quality and quantity of facilitation must be able to make students interact with various learning sources (Herodotou, et al., 2020). The Universitas Terbuka (UT) applies a distance education system. The reason for the establishment of UT is the education process with a large number of students. It can be implemented nationally, and relatively students do not need considerable funds to complete their studies at UT.

Education kit can make use of the resources available at existing universities and other government agencies without disrupting their main activities. One of UT's goals is to complement the existing higher education system. UT recruits students who choose distance education because the students are already employed in a location far from the university, and they must have flexibility and freedom from tight schedules in classroom-based learning (Zuhairi, Adnan, & Thaib, 2007).

Even though there are advantages to the application of e-learning in distance learning, students still need feedback from the teacher and vice versa; then, they will get more effective and on target learning outcomes. For this reason, the concept of blended learning or what is often called hybrid learning emerged, which is a learning approach that combines face-to-face learning and distance education using online learning resources. Hybrid learning provides a variety of communication options that can be used by teachers and students (Halverson & Graham, 2019).

Knowledge carried out with this model uses online learning resources and is also carried out face-to-face. Blended learning theory can be synchronized that SPADA (online learning system) learning

is a form of a learning system that combines synchronous and asynchronous learning strategies to support learning experiences in achieving optimally determined competencies (Belawati, 2005).

Face-to-face learning is an instructional method in which learning content and learning materials are taught privately to a group of students. Thus, teachers can interact and talk directly with students. Students also benefit from more significant interaction with fellow students. In face-to-face learning, students are considered responsible for their progress on specific meeting dates and times in class (Reich, Subrahmanyam, & Espinoza, 2012). Face-to-face learning ensures better understanding and memory of lesson content and provides class members with opportunities to bond with one another. Direct knowledge is primarily a teacher-centered method of education and tends to vary widely between cultures.

Many modern education systems have shifted away from traditional forms of explicit education teaching to meet the needs of every student. Independent learning is learning carried out by the teacher by giving independent assignments to students. The separate tasks assigned can be in the form of student worksheets, textbooks, multimedia, or other learning resources. The purpose of independent learning is none other than so that students can learn with their respective abilities or learning speeds because, of course, each student has different intelligence characteristics (Tytler, 2003). Of course, in this independent learning, the teacher must be prepared with learning resources that can be obtained or accessed by students as a means of carrying out independent learning.

In the globalization era, the education sector has many innovations to improve the quality of learning, as with the learning resources used in the learning process. Learning resources can be in the form of tools or anything from the simplest to the most sophisticated and modern. Students can use several types of learning resources as tools for self-development, including books, resource persons such as teachers, health experts, environments such as markets, parks, and so on (Walter, 2016). Learning resources are supporting materials that serve as a compliment, e.g., modules, reading books, magazines, video programs, leaflets, posters, and teaching comics.

These learning resources are generally arranged outside the scope of curriculum materials but are closely related to the main objective, namely, to provide deepening and enrichment for students. Several benchmarks that need to be considered in choosing learning resources, namely the availability of resources (funds, human resources, and facilities), flexibility, practicality, and durability (age) of learning resources, and the effectiveness of learning resources for a long time (Vo, Zhu, & Diep, 2020).

PERSPECTIVE

Distance Education

Distance education has already been implemented in developed countries. The United States has implemented it since 1892. Britain has implemented it since 1966. Britain was the most successful country in implementing distance education. Thus, distance education has been recognized by various governments and can be applied to overcome multiple educational problems. The limitations of space and time that are owned by students can be overcome by utilizing all kinds of learning resources through various media, communication technology, information, and other media (Firat & Bozkurt, 2020). One of the learning models in distance education is e-learning, where

learning uses a network such as LAN, WAN, or the internet, which is used to interact between teachers and students online, deliver material, assign assignments, and other learning activities. The advantage of learning through e-learning is that students are free to choose the place and time to access the material provided. Students have the opportunity to independently take control of their learning success through e-learning (Harsasi, 2011). Students can manage their assignments or material provided on e-learning when it will be started, worked on, and collected.

In the world of higher education, blended learning is widely used for the implementation of open and distance education. They are starting with the Universitas Terbuka, which implements conventional distance education (without using information and communication technology), but now the Universitas Terbuka has utilized information technology in the implementation of learning, thus combining traditional learning and learning using information technology. This openness can be said to implement blended learning (Budiastra et al., 2020). The Distance education program unit is a technical implementing unit for UT in the regions. The functions and duties of distance education program units are as a place for students to carry out academic, administrative activities and educational activities for daily activities, Universitas Terbuka distance education program unit has the task of providing distance education services.

Learning Outcomes

The essence of learning outcomes is a change in behavior as a result of learning in a broader sense covering the cognitive, affective, and psychomotor fields. The factors that influence learning outcomes are internal factors, external factors, and learning approach factors. Internal factors that affect learning outcomes are physiological aspects (Zakirman, Lufri, & Khairani, 2019). Physical fitness and the condition of the five senses need to be maintained because there are many cases of children whose performance has decreased because they are not physically fit. Other internal factors are psychological aspects, including intelligence, attitudes, talents, interests, motivation, and personality. Intelligence can be developed, but our psychological factors very much influence attitudes, interests, inspiration, and nature.

External factors include social and non-social environments (Tseng, Yi, & Yeh, 2019). The social environment includes friends, teachers, family, and society. Meanwhile, the non-social background consists of the condition of the house, school, equipment, and nature (weather).

From the student side, learning outcomes represent the end of teaching from the top of the learning process. Learning outcomes are often used as the primary benchmark in assessing academic achievement. Learning outcomes are a reflection of the abilities possessed by students during the learning process. Learning outcomes also serve as an indicator of the triumph of learning goals (Walter, 2016). A person is said to have succeeded in learning when there has been a change in behavior in him, and this change occurs because of training and experience. This change can be in the form of a new result or an improvement to the products that have been obtained. Students have learned they can be seen from the appearance of the learning outcomes they get after participating in the learning process.

Therefore, evaluation is held at the end of the lesson to determine the level of success of students after participating in the teaching and learning process and doing assignments. Learning outcomes are measured through tests or assessment of learning outcomes (Zupanc, 2019). Assessment of

learning outcomes aims to assess various knowledge of abilities, habits, and skills as well as student attitudes during a specific time.

Learning outcomes are the result of an interaction of learning and teaching actions. The teaching teacher ends with a process of evaluating learning outcomes (Sharif, 2012). The six classifications covered in the cognitive domain of Bloom's revised taxonomy (Zorluoglu & Güven, 2020) are (1) Knowledge which emphasizes remember; (2) Comprehension which emphasizes converting information into a form that is easier to understand; (3) Applications whose learning outcomes use abstracts in certain and concrete situations; (4) Analysis (analysis) in which the learning outcomes obtained in this classification are to sort information into more detailed units so that their functions can be recognized, their relation to larger parts, and the organization of the whole section; (5) Evaluation, the results obtained are considerations about the value of something for a specific purpose; (6) Creating involves the process of arranging the elements into a coherent or functional whole.

Blended Learning

Blended learning is a combination of two different educational model instructions, namely face-to-face (traditional) and e-learning (online) education (Allen, Seaman & Garret, 2007). Blended learning presents mixed-based learning on the percentage of e-learning use in face-to-face meetings. E-learning is an increase in learning via the internet and traditional knowledge, with a rate of 80% -100%, 30-79%, 1-29%, and 0%, respectively. Various terms are used for the combination of technology-based learning activities with face-to-face activities, namely, Blended learning and hybrid learning (Lam, 2014). This blended learning can be done not only during the face-to-face learning process but also wherever students are as long as there is internet access (Dobrzański & Brom, 2008).

The learning process using blended learning can provide additional time for students to understand the material. Learning allows students to repeat learning material independently. Students can improve their mastery of knowledge by repeating some learning materials, practicing solving learning problems independently and in groups. Also, blended learning simplifies and accelerates the non-stop communication process between teachers and students (Passwords, 2012).

There are three possibilities in developing online-based learning systems related to the development of blended e-learning, namely the Web-Course, Web-Centric Course, and Web-Enhanced Course (Owston, York, & Malhotra, 2019). The Web Course is a series of instructional experiences using a digital network, namely the web for interaction, learning, and dialogue. Through the web, we do not need to hold a meeting in person at a physical location. Similar courses like web lessons are similar to online courses, but require face-to-face classes or regular meetings. Online courses are the delivery of a series of lectures on a web device or mobile device, which can be accessed anytime and anywhere.

It is designed as an online environment for comfortable learning without direct (synchronous) communication, a series of instructional experiences using digital networks for interaction, education, and dialogue. Through the internet, we do not need to hold meetings in person at a physical location. Similar courses such as web courses (also called hybrid lessons or mixed courses) are similar to online courses, but require face-to-face classes or regular meetings (Serhan, 2019).

Web-Centric Course is learning that combines traditional face-to-face learning with online learning. Where some class activities such as consultations, material giving, assignments, discussions are partly carried out online (Shalihah, Supramono, & Abdullah, 2019), then some discussions, readings, exercises, consultations, and exams are carried out face to face. So this web-centric course is not centered on conventional learning or online learning, but a combination of the two. Furthermore, the type of online learning possibility is the Web-Enhanced Course.

It is the use of online learning which aims only to support the face-to-face learning process in class. So the primary education is carried out in face-to-face activities in style, while online learning is used as a support only (Ashoori, Kajbaf, Manshaee, & Talebi, 2020). This online learning can take the form of enrichment, giving questions, and exercises. In addition to teaching in the classroom, teachers are also required to be able to master information techniques or online learning on the internet.

Printed Learning Resources

Learning resources take several forms (Nguyen, Duong, & Cambria, 2019), including (1) Books, which are bound sheets of paper, both written and blank, for example, textbooks; (2) Magazines, namely periodicals containing actual topics in society. According to the specialization, the contents of magazines include knowledge magazines; (3) Brochures, which are brief but complete information, in a printed form consisting of only a few pages and are folded without being bound; (4) Poster, is a placard posted in a public place in the form of an announcement; (5) Encyclopedia, namely a book or series of books containing information on various fields of science, for example, an animal encyclopedia.

Printed teaching resources are materials that contain lesson material or content to achieve learning objectives as outlined by using print technology. A printed learning resource contains material in the form of ideas, facts, concepts, principles, rules, or theories covered in subjects according to the discipline of knowledge and other information in learning, different teaching materials from textbooks. Textbooks are general and contain only subject matter. Printed teaching resources are more specific and complete (Boyd & Ash, 2018). The teaching resources are intended so that it is very suitable for potential users, and unlimited means things that are deemed necessary in the learning process.

Modules are learning tools or tools that contain material, methods, limitations, and ways of evaluating which are designed systematically and attractively to achieve the expected competencies according to the level of complexity. Several characteristics of printed teaching materials (Rahmawati, Lestari, & Umam, 2019), namely: (1) Must be able to teach students themselves (self-instructional). Printed teaching resources must have the ability to explain clearly to help students in the learning process, both in teacher guidance and independently; (2) Self-contained means that it contains things that are very necessary for the learning process.

These things are learning objectives/competencies, prerequisites, namely subject matter that supports or needs to be studied first, teaching procedures, learning resources that are systematically arranged, exercises/assignments, evaluation questions along with answer keys, and follow-up. Which must be done by students; and (3) Able to teach students (self-instructional material). Printed learning resources should be able to trigger students to be active in the learning

process and even lead students to be able to assess their learning abilities (Budiastra, Kosasih, & Wicaksono, 2019).

METHOD

Participants

The sample in this study were students of the elementary school teacher education program of the Universitas Terbuka (UT) regional office of Jember - East Java. Respondents in this study were 56 students using blended learning resources and 60 using printed learning resources. Samples were taken using a purposive sampling technique.

Case materials and discussion questions

This study is the result of a comparative study between the two treatments of student learning outcomes. Students involved in this study are accustomed to using printed learning resources in their learning process. Technological developments have begun to shift old learning resources so that the learning system also needs to adapt. This study can answer efforts to implement learning resources that are different from the routines used. Based on the background of the above problems, the research questions of the study are: (1) How is the effectiveness of the teaching process using blended learning and printed learning resources in improving student learning outcomes? (2) Which learning resources are the most effective for improving learning outcomes in distance education systems?

Data Collection Technique

Data Collection

This study is a true experiment. The characteristic of the study is that the sample selection in the experimental group or the comparison group is taken randomly from a population. The design used in this study is a pre-test and post-test control group. The experimental design in this study is shown in Table 1.

Table 1: Pre-test – Post-test Control Group Design

Group	Pre-test	Treatment (X)	Post-test
E	O_1	X_1	O_2
C	O_1	X_2	O_2

Description: E: Experiment group; C: Control group; O1: pre-test (for the experimental group); O1: post-test (for the experimental group); O2: pre-test (control group); O2: post-test (control group); X1: Blended learning resources; X2: Print learning resources

This design applies two types of classes that are selected directly. Furthermore, every kind of class is given a pre-test to determine the initial state so that the similarities and differences between the experimental class and the control class can be seen (Sugiyono, 2016). The experimental class was treated using blended learning resources, while the control class continued to use printed teaching resources. After completing the treatment, the two types of classes were given a post-test. The test of student cognitive learning outcomes was used twice in this study. The first test aims to determine the cognitive abilities of the two groups.

This initial cognitive ability is needed to be used in the experimental class and the control class. The second test aims to measure student learning outcomes in the cognitive domain.

Data Analysis

The data were analyzed quantitatively. Student learning outcomes can be said improving according to the N-gain (post-test score - pre-test score) / (100 - pre-test score) (Hake, 1998). Therefore, the criteria were set as follows: (1) if N-gain ≥ .7 (high), (2) if N-gain is> .3 and <.7 (moderate), and (3) if N-gain is ≤ .3 (low). To test whether the improvements in student learning outcomes existed or not with the blended and printed learning resources, Paired t-test against the pre-test score and post-test by using IBM SPSS Statistic 22 software was done. Meanwhile, to get more effective learning sources in improving student learning outcomes after being given lessons, researchers compared the effectiveness of the two learning sources by using the independent t-test.

Instruments

This study applies the results of the model development, namely the blended learning of the new generation of science learning materials. The design of the blended learning used in science learning tutorials combines online, offline, and printed learning resources in the tutorial process. The effectiveness of blended learning of the new generation science learning resources is supported by learning outcomes that are evaluated after the implementation of learning resources. Natural science learning resources in elementary school student teachers' study include topic 1 (Learning Theory), topic 2 (Strategy and Media), and topic 3 (Evaluation of Processes and Results). Student learning outcomes, after following the tutorial, are known by using Bloom's revised taxonomy consisting of analyzing, evaluating, and creating (Wicaksono, Matlazim, & Wasis, 2017; Williams, 2017).

RESULTS AND DISCUSSION

This study shows data about the learning outcomes of undergraduate students of an elementary school teacher education program. The results of this study provide the pre-test, post-test, N-gain, and comparison of learning outcomes using blended learning and printed learning resources.

The Average Pre-Test and Post-Test Results

Figure 1 shows the learning outcomes using two learning resources, namely, blended and printed learning resources. The average pre-test result shows that the students' initial ability is homogeneous. Blended learning resources are a solution for individuals who want to keep learning on the sidelines of busy work (Brunyé et al., 2013). Students can learn the resources in the form of tutor presentations, quizzes, videos, and interact online through the Learning Management System (LMS), which can be accessed via computers, tablets to smartphones. Then on certain days, usually on weekends, students still have to be present in class to discuss the material offline or face to face with tutors and other students. The ease of learning with blended learning resources provides many benefits for students.

Student learning outcomes increase because the use of blended learning resources can be adjusted in terms of time and cost. The results of this study are supported by relevant research on the comparison of blended learning and printed learning resources to self-regulate learning (Broadbent, 2017).

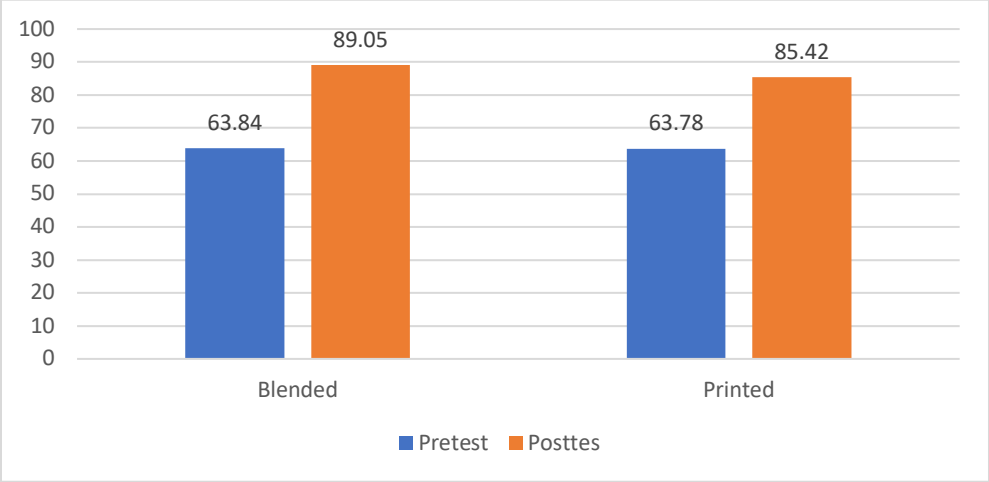


Figure 1: The Average Pre-Test and Post-Test Results on The Two Learning Sources

Figure 1 shows that learning that uses blended learning resources shows a higher average learning outcome than learning using printed learning resources. Higher learning outcomes are caused by student satisfaction with blended learning resources (Johnson, Aragon, & Shaik, 2000). The level of student satisfaction with blended learning is essential. Therefore, the focus of the research is only on the factors that affect learners' pleasure in a mixed learning environment.

There are six dimensions: (1) students, (2) instructors, (3) organization, (4) technology, (5) design, and (6) environment. Some of these dimensions are supported by research results (Chen, Yong, and Yao, 2016), concluding that students prioritize design dimensions to be the most crucial factor for them, satisfaction with the e-learning component in the process of using blended learning resources. Emphasis on design dimensions is more strategic in their e-learning implementation in the use of blended learning resources, especially for students (Sutisna, 2016).

N-Gain in Application Components

Figure 2 shows the N-gain of learning outcomes in the application component. Students who use blended learning and printed learning resources have relatively the same results in the application component. The visible emotional dimension is related to attitudes and values so that they can see a person's character in terms of learning activities (Donald, 2002). The implementation of the application of the blended learning with a review from the affective aspect can see the readiness of the teacher to teach, the ability to understand the material, the timeliness of doing assignments, the activeness of asking questions, cooperation in solving problems, having independence in learning, and assessing attitudes in learning activities (Ghadirian, Salehi, & Ayub, 2018).

The affective domain uses blended learning, and there are significant learning outcomes from students with high learning motivation more than students with a low basis in the ICT-based learning process. Students are actively involved in asking questions and participating in discussions on student online activities while focusing on reviews in completing assignments in discussion forums (Sharif, 2012).

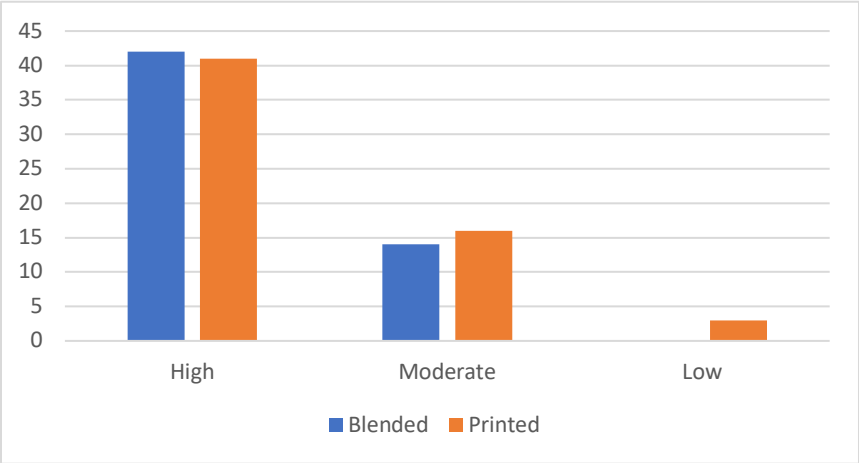


Figure 2: N-Gain Application Component on Two Learning Resources

This blended learning can be done not only during the face-to-face learning process but also wherever students are as long as there is internet access (Dobrzański & Brom, 2008). The learning process using blended learning can provide additional time for students to understand the material. Blended learning allows students to repeat learning resources independently. Students can improve their mastery of knowledge by repeating some learning resources, practicing solving learning problems independently and in groups.

Besides, blended learning also simplifies and accelerates the non-stop communication process between teachers and students (Passwords, 2012). With this approach, the resources are delivered online. Even though the tutor is in the room providing on-site support as needed, learning is essentially self-guided, as students independently learn and practice new concepts in a digital environment.

N-Gain in The Analysis Component

Figure 3 shows the N-gain of learning outcomes in the analysis component. Students who use blended learning and printed learning resources have relatively the same results at a moderate level. In contrast, the N-gain learning outcomes in the analysis component were dominated by high and medium categories. These learning outcomes indicate the advantages of blended learning resources. The use and availability of multimedia and e-learning do not guarantee pedagogical success. Therefore, it is necessary to understand the principles of communication and learning interactions.

Individuals can study alone or in groups. Semantically, there is a distinction to be made between the terms communication and interaction: Interaction refers to the exchange of pure information (Kayser & Merz, 2020), whereas touch is understood to mean sending and receiving messages. Communication can be seen as a particular form of interaction that is very important for blended learning resources. Non-communicative actions in virtual study groups, such as uploading and downloading work resources, can affect. Held (2018) defines communicative actions between humans as interactions and interactions between humans and computers as interactivity. The two terms are collectively referred to in English as interaction.

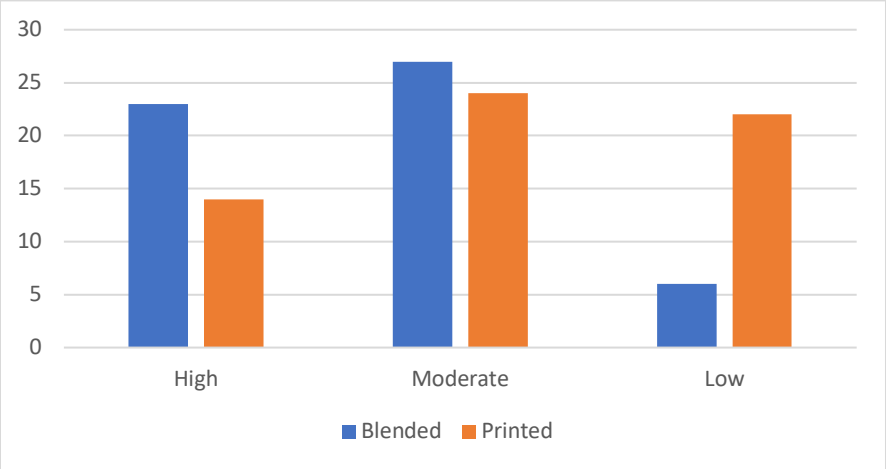


Figure 3: N-Gain Analysis Component in Two Learning Sources

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N-Gain in 'Create' Component

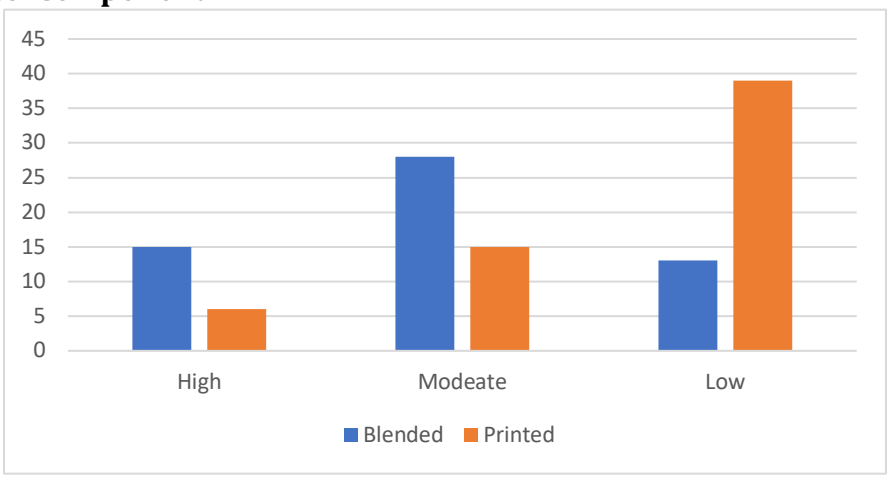


Figure 4: The N-Gain 'Create' Component in The Two Learning Sources

Figure 4 shows the N-gain learning outcomes in 'create' components. The create component shows that learning resources using blended learning produce better learning outcomes than learning resources using printed learning resources. The N-gain value at a low level shows fewer results for blended learning resources. The ability of students to create cannot be separated from the readiness of students based on application and analysis abilities (Mustapa, 2018). The practice of online learning has gained momentum as a result of the development of network technology and the increase in the capacity of current technological devices used to deliver knowledge.

The recent study has examined the online learning readiness of traditional higher education students. Information about online distance education readiness at open and distance education universities is also still needed to be researched on a large scale (Kayser & Merz, 2020). Using a valid and reliable online learning readiness scale is required to reveal distance education readiness. The results showed that the demographics of open and distance education learners can be used as indicators of online learning readiness and that there is a need for adaptive and personalized online learning systems. Besides, there is a statistical significance between time spent studying online and online learning readiness. Further research reveals that there is a correlation between willingness to learn online and the technological devices that students prefer at the UT (Firat & Bozkurt, 2020).

Independent T-test

The improvement of student learning outcomes is viewed from the pre-test and post-test results. The progress of student learning outcomes is the result of the learning process using blended learning and printed teaching materials. Learning activities are essential activities in the education process. Thus, the success of educational goals depends a lot on how the learning process is experienced by students (Skocic Mihic, Blanusa Troselj & Katic, 2019). Learning refers to all activities designed to support the learning process characterized by changes in individual behavior by the learning objectives. Learning outcomes are often used as a measure to determine how far a person has mastered the material that has been taught. Learning outcomes cannot be separated from the factors that influence it (Fatawi et al., 2020).

The factors that affect learning outcomes can be classified into two parts, namely, internal factors and external factors. Internal factors are factors that come from within students that can affect learning outcomes. In contrast, external factors are factors that come from the family, tutors, campus, and society, as well as the learning environment (Callahan, 2020).

Table 2: Independent T-Test Implementation of Blended Learning and Printed Learning Resources

Independent Samples Test										
		Levene's Test: Equality of Variance		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference	
									Lower	Upper
Learning outcome	Equal variances assumed	.528	.469	2.767	114	.007	4.21400	1.52298	1.19699	7.23101
	Equal variances not assumed			2.775	113.961	.006	4.21400	1.51834	1.20617	7.22183

Based on the output in Table 2, it is known that the Sig. Levene's Test for Equality of Variances is .469> 0.05, and it means that the data variance between groups of students using blended learning and printed learning resources is homogeneous. Based on the Independent Samples Test output in the equal variances assumed section, the Sig. (2-Tailed) of .007 < 0.05, so as a basis for decision making in the independent sample t-test. Thus, it shows that there are significant differences (on average) student learning outcomes in groups of students who use blended learning and printed learning resources.

A tutor must make efforts so that the learning material presented can be easily understood by students. Students more comfortable receiving learning resources; it is necessary to make efforts so that students use as many sensory organs as they have. Research using blended learning resources allows students to be involved in various learning experiences (Han & Ellis, 2019). The progress of science and technology greatly influences the development of student thinking. Current students tend to want new things that are interesting and challenging. Likewise, when they take lessons in class, they want to have updates every day. Learning that is interesting and does not involve the active role of students will be very dull. Thus, a tutor is always required to know to make learning updates by including interesting learning resources for students (Cooper, Olsher, & Yerushalmy, 2020).

CONCLUSION

Based on the results of the research data analysis, it can be concluded that both blended learning and printed learning resources can significantly improve learning outcomes at $\alpha = 5\%$. The implementation of both blended learning and printed learning resources shows that each with an average N-gain has relatively the same results at a moderate level. This study also raises information that blended learning resources are more effective than printed learning resources. Blended learning allows teachers/tutors to provide a more comprehensive learning experience for students.

RECOMMENDATION

This research implies that blended learning resources can be an innovative solution to improve student learning outcomes in the distance education system. The implementation of blended learning resources is, of course, inseparable from the main components that synergize to produce the expected learning outcomes.

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