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The Influence of Spada Learning Management System (LMS) on Algorithm Learning and Programming of First Grade Students at Universitas Pendidikan Indonesia

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ABSTRACTS

This study discusses the effect of using a Learning Management System (LMS) on learning Algorithms and Programming. This study aims to determine the effectiveness of the LMS Spada in the Algorithm and Programming learning process, to determine the positive and negative impacts of using LMS, and to find out how to improve the learning process to make it more effective. The method in this study is a survey method with 32 participants. The data was obtained from distributing questionnaires through WhatsApps social media. The results of this study, it is known that LMS is very effective in learning Algorithms and Programming. Then in this study it was also stated that the use of LMS in the learning process had a positive impact and a negative impact. In addition to knowing the effectiveness, positive and negative impacts, in this study we can find ways to improve the learning process to be more effective, including: Continue to practice and read, be brave, take advantage of existing learning media, complete facilities and infrastructure and others.

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1. INTRODUCTION

The very rapid progress of science and technology has brought changes in various fields of life, especially education. One of the information technologies that can support the learning process is internet-based technology (e-learning). Through e-learning students can share information and can access learning materials at any time. In addition, educators can conduct evaluations to measure students' conceptual understanding using e-learning. With conditions like this, students are expected to be able to solidify their understanding of the concept of each learning material provided by educators. One of the causes of the increasing use of e-learning is the availability of various kinds of Learning Management System (LMS) software (Bariah & Sidik, 2019).

One of the universities that have used e-learning as a learning medium is the Open University (UT). UT implements a distance and open learning system. The distance learning system means that learning is not done face-to-face, but uses media, both print and non-print media. UT provides teaching materials that are designed to be studied independently. Students who have learning difficulties can request study assistance from the local Open University Distance Learning Program Unit (UPBJJ-UT).

Technology that develops in the world of education is referred to as educational technology (tekped). According to the Association for Educational Communication and Technology (1972) educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, utilizing, and managing appropriate technological processes and resources. According to Richey (2008), educational technology is the study and practice to assist the learning process and improve performance by creating, using, and managing appropriate technological processes and resources.

Based on field data, the theory of educational technology according to the Association for Educational Communication and Technology (AECT) and according to Richey is in accordance with current conditions. This is because educational technology today is very helpful in the learning process. With educational technology, teaching materials are easy to obtain, even though the learning process is carried out online.

Several researchers have conducted research related to LMS educational technology. One of them is the research conducted by Hidayat *et al.,* (2017) on the development of an LMS for the Hypertext Preprocessor (PHP) programming language. In his research, it is stated that LMS for learning PHP is needed by students. This can be seen from the total results of 75% of respondents supporting LMS which has a discussion forum feature, video material in the form of screenshots and provides downloadable materials. In addition, from research conducted by Hidayat *et al.,* (2017) it can be seen that the use of educational technology in the learning process can be well received by students. In his research, it was stated that LMS was ready to be used as a learning medium and was effective in increasing students' mastery of concepts. It can be seen from the results of expert test data analysis which shows the overall average is 89.81% with a very good category.

The difference between previous studies and this research lies in the objectives and problems studied. Whereas previous research examined the development of LMS for the PHP programming language and to measure students' understanding of concepts and characters, this study examines the effect of LMS on the learning process of Algorithms and Programming.

This study aims to determine the effectiveness of the LMS Spada in the Algorithm and Programming learning process for first grade students at Universitas Pendidikan Indonesia, to find out the positive and negative impacts of using LMS, and to find out how to improve the

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learning process to make it more effective. The importance of this study is to determine the effect of LMS on Algorithm and Programming learning for first grade students at Universitas Pendidikan Indonesia. By knowing the effect of LMS on learning algorithms and education, it can help educators in the learning process.

Learning is essentially a process, namely the process of regulating, organizing the environment around students so that it can grow and encourage students to carry out the learning process (Pane & Dasopang, 2017). According to the Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System, that learning is a process of interaction between educators and students and learning resources that take place in a learning environment. Many factors must be prepared in the learning process, one of which is the selection of applications that will be used in the implementation of the learning process (Indiani, 2020).

Learning Management System (LMS) is a platform or software application for online learning activities, or commonly referred to as virtual classroom learning. Some of the free and popular LMS platforms include: Quipper School, Edmodo, Schoology, GeSchool, Moodle and Spada. Some of the LMS platforms above are considered very good and in demand among students to university students. The features are quite complete, starting from chatting, uploading ms files. word, pictures, excel, power point (ppt), videos, also make questions and give scores (Subiyantoro & Ismail, 2017).

2. METHODS

The method used in this study is a survey method. Survey research method is a method in which information is obtained by distributing several questions to a number of samples in the form of people. The purpose of choosing this method is to facilitate data collection, which later the data will be compared with one another. **Figure 1** shows an illustration of a cross-sectional survey design.

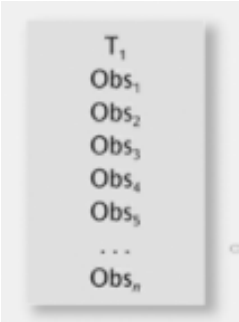

Figure 1. Illustration of a cross-sectional survey design.

Information:
T_1 : Research time.
Obs : Observation.

Based on the illustration above, it appears that the researcher only conducted one study on each research subject. There is no follow-up in the next data collection time.

The data collection instrument used in this study was a questionnaire with google form media. Questionnaires were distributed through WhatApps social media accounts. The questionnaire contains several questions as shown in **Table 1**. The questionnaire containing these questions will then be distributed to several first-grade students of the Universitas Pendidikan Indonesia. After completion, the answers from the questionnaire will be processed and then compared between the answers with one another, and finally conclusions

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are made to determine the effect of LMS on Algorithm and Programming learning for first grade students at Universitas Pendidikan Indonesia.

Table 1. Questions in the questionnaire.

No.	Question
1.	In your opinion, is the use of Spada LMS for learning Algorithms and Programming effective?
2.	Does using LMS Spada make it easier for you to understand Algorithm and Programming learning materials?
3.	Does using LMS Spada make it easier for you in the process of learning Algorithms and Programming?
4.	Did you have difficulty learning to use the Spada LMS?
5.	In your opinion, what is the negative impact of using a learning management system (LMS) on the learning process?
6.	In your opinion, what is the positive impact of using a learning management system (LMS) on the learning process?
7.	In your opinion, how can you improve the learning process to make it more effective?

Respondents in this study were first grade students of the Universitas Pendidikan Indonesia. Respondents were 32 people consisting of first grade students majoring in Computer Science Education and first grade students majoring in Computer Science. The age range of the respondents is between 18-20 years. The selection of first grade students majoring in Computer Science Education and Computer Science with an age range of 18-20 years as respondents in this study because the title of this study was the effect of LMS Spada on first grade students at the Universitas Pendidikan Indonesia. In addition, Algorithm and Programming courses are only studied in the first grade.

3. RESULTS AND DISCUSSION

3.1. The Effect of LMS Spada on Learning Algorithms and Programming

In **Figure 2**, it can be seen that most respondents choose or think that the Spada LMS is very helpful in the Algorithm and Programming learning process, the number of respondents who choose that the Spada LMS is very helpful in the Algorithm and Programming learning process is 84% of the total number of respondents, namely 32 people. For the rest, 16% or 5 respondents chose that LMS Spada does not help in the Algorithm and Programming learning process.

In **Figure 3**, it can be seen that there are still students who have difficulties when learning Algorithms and Programming using LMS Spada, the number of respondents who are still having difficulties in using LMS Spada for learning Algorithms and Programming is 25% of the total number of respondents, namely 32 people. For the rest, 75% of the total respondents did not experience difficulties when learning Algorithms and Programming using LMS Spada. The reasons of the respondents who have difficulty when learning Algorithms and Programming using LMS Spada are as follows:

(i) An error often occurs when accessing the Spada LMS.
(ii) Difficult to understand the material given.
(iii) On LMS Spada cannot upload links directly.
(iv) Have to do the login process repeatedly.

Based on **Figure 4**, it can be seen that LMS Spada can help students to understand Algorithm and Programming learning materials. This is evidenced by the number of respondents who chose "yes" as many as 76% or 25 people from a total of 32 respondents. Even so, there are still those who choose "no". It's just that the number is less, which is 24% or 8 people out of a total of 32 respondents.

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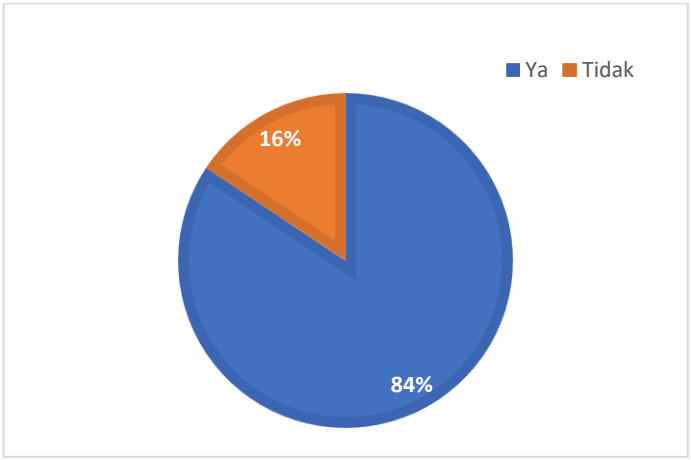

Figure 2. LMS percentage chart helps in Algorithm and Programming learning process.

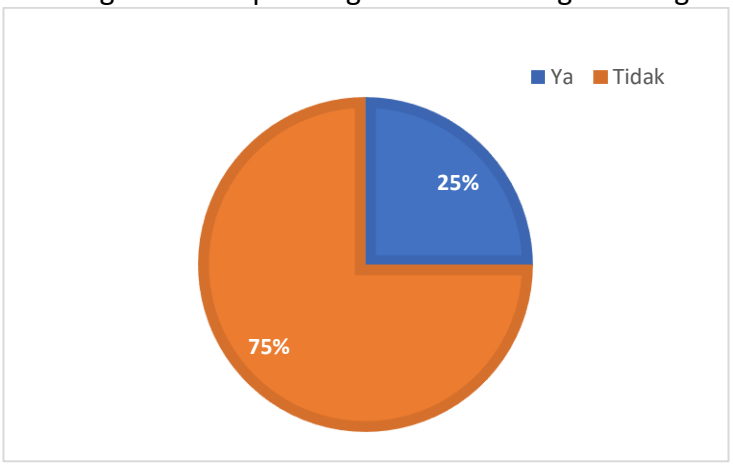

Figure 3. LMS percentage diagram makes it difficult for students in the Algorithm and Programming learning process.

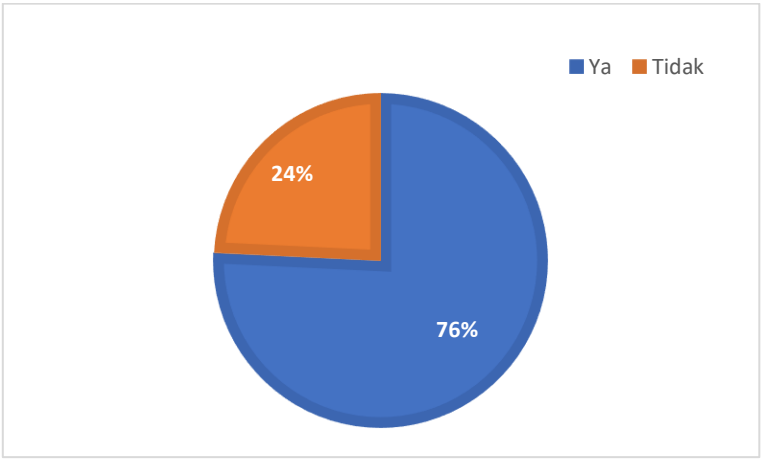

Figure 4. LMS percentage diagram helps students in understanding Algorithm and Programming material.

The Learning Management System (LMS) is an integrated and comprehensive system that can be used as an e-learning platform (Larasati & Andayani, 2019). LMS has several other features, namely management of lesson content, management of the learning process, evaluations and online exams, as well as administration of subjects, chats and discussions (Trivedi *et al.,* 2013). One of the LMS-based e-learning used is Dokeos.

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The theory above if it is associated with the results of research on the influence of LMS Spada on Algorithm and Programming learning is not appropriate, because the theory above discusses Dokeos, which is one of the LMS-based e-learning. Meanwhile, this research examines the effect of LMS on Algorithm and Programming learning. However, for the concept of LMS it is appropriate.

3.2. Effectiveness of Spada LMS on Algorithm and Programming Learning

Figure 5 shows the results of distributing questionnaires regarding the effectiveness of the Spada LMS on learning Algorithms and Programming for first semester students at the Indonesian Education University. Based on the data in Figure 5, out of 32 respondents, 6 respondents or 19% of respondents answered that LMS is not effective when used in learning Algorithms and Programming for first grade students at Universitas Pendidikan Indonesia. Several respondents gave reasons for their answers stating that LMS is not effective if used in learning Algorithms and Programming for first grade students at the Universitas Pendidikan Indonesia. Some of the reasons given by the respondents include:

(i) Not all students are accustomed to using an open-source (searching) learning system.
(ii) The material provided through LMS SPADA is difficult to understand.
(iii) LMS has limitations that make it difficult for students to use it.
(iv) SPADA LMS still needs to be improved and developed to be more effective.

Meanwhile, 81% or the remaining 26 respondents answered effectively. Here are some reasons from respondents who answered that LMS is effective if used in learning Algorithms and Programming for first grade students at Universitas Pendidikan Indonesia.

(i) LMS SPADA provides a feature to save learning videos, making it easier for students who want to repeat material that has been delivered by previous lecturers.
(ii) Make it easier for students to get material that will be discussed by the lecturer.
(iii) Facilitate students in collecting assignments given by lecturers.
(iv) In SPADA LMS, there are features that show student learning progress. It allows the student to see how far he has learned.

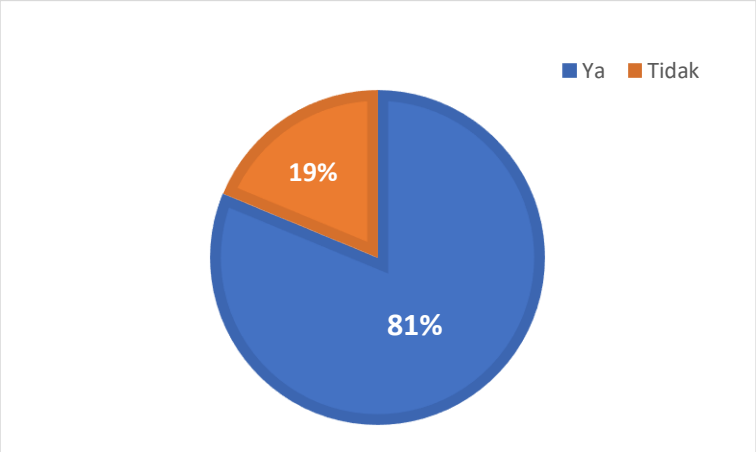

Figure 5. Diagram of the effectiveness of the Learning Management System (LMS) on learning Algorithms and Programming.

Learning is a process of regulating, organizing the environment around students so that they can grow and encourage students to carry out the learning process (Pane & Dasopang, 2017). Learning Management System (LMS) is a platform or software application for online learning activities, or commonly referred to as virtual classroom learning (Subiyantoro &

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Ismail, 2017). Some of the LMS platforms above are considered very good and in demand among students to university students (Subiyantoro & Ismail, 2017).

Based on the data contained in **Figure 5**, if it is associated with the theory about LMS proposed by Subiyantoro and Ismail (2017) it is appropriate, because in theory it is stated that LMS is considered very good and in demand among students to university students. This is evidenced by the data listed in **Figure 5**. The data in **Figure 5** shows that respondents tend to answer that the use of LMS in Algorithm and Programming learning is effective.

3.3. Positive and Negative Impacts of Using LMS

Based on **Figure 6**, 24% of the total respondents answered that the use of LMS in the learning process did not have a negative impact. Meanwhile, 76% of other respondents answered that the use of LMS in the learning process had a negative impact. The following are some of the negative impacts of using LMS that were conveyed by respondents when filling out the questionnaire.

(i) LMS may experience errors that cause delays in activities such as: Collecting assignments, downloading materials and viewing student learning progress.
(ii) The teaching and learning process is more passive (if the learning system only provides material without explaining it simply).
(iii) Causing a sense of laziness to record the material given.
(iv) Because this LMS is online based, which requires data usage and network stability, it is difficult for students who live in areas with poor internet connections.

Figure 7 shows some of the positive impacts of using LMS. Of the 32 positive impacts, several respondents wrote the same answers as other respondents, so that the positive impacts were grouped into seven. For more details, see **Table 2**.

From **Table 2** it can be seen that there are 14 respondents who answered the positive impact of using LMS point 1, 2 respondents answered the 2nd point, 4 respondents answered the 3rd point, 5 respondents answered the 4th point, 1 respondent answered the 4th point. 5, 5 respondents answered the 6th point and 1 respondent answered the 7th point.

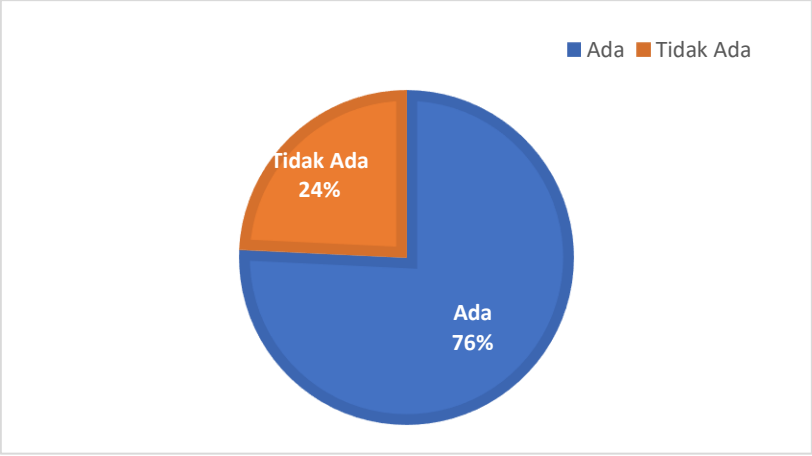

Figure 6. Percentage diagram of the negative impact of using LMS.

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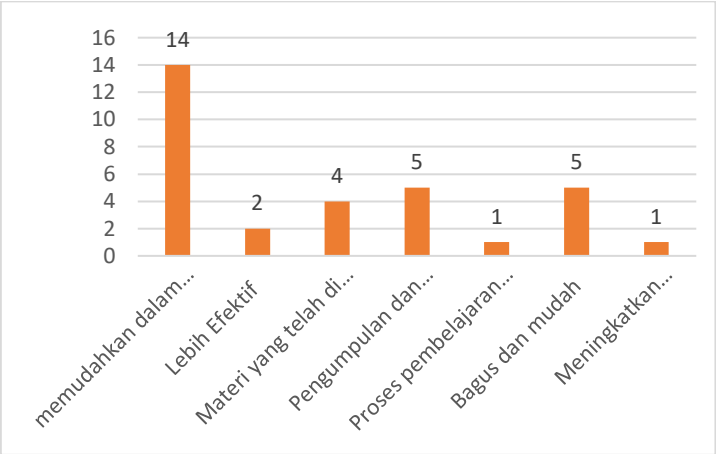

Figure 7. Diagram on the positive impact of LMS use.

Table 2. Positive impact of using LMS.

No.	Positive Impact	Number of Respondents
1.	Make it easier for students to get material that will or has been discussed.	14
2.	More effective.	2
3.	The material that has been studied can be reviewed.	4
4.	The collection and assignment of assignments is more organized.	5
5.	The learning process is more structured.	1
6.	Nice and easy.	5
7.	Improve IT skills.	1

The use of LMS is effective for managing learning because it has very complete features and is easy to access. Gunawan *et al.,* (2019) revealed that the Learning Management System (LMS) is used to distribute learning materials, give and collect assignments, and conduct research.

Based on the theory put forward by Gunawan *et al.,* (2019) if it is associated with research data on the impact of using LMS, both positive and negative, it is appropriate. This is evidenced by one of the positive impacts of using LMS from the student's perspective is that it makes it easier for students to download materials and collect assignments. The positive impact is related to the theory presented by Gunawan *et al.,* (2019).

3.4. How to Improve the Learning Process to be More Effective

Table 3 shows the results of research on how to improve the learning process to be more effective. In the table, only 10 of the 32 respondents filled in. Taking 10 answers, because some respondents expressed opinions that have the same meaning as other respondents.

Table 3. How to improve the learning process to make it more effective.

No.	Respondent	Major	Answer
1.	A	Computer Science Education	Keep practicing and reading
2.	B	Computer Science Education	Student: Need to be more courageous to ask the lecturer, Lecturer: Need to explain programming theory more simply.
3.	C	Computer Science Education	Lecturers or educators always provide an explanation of the assignments given.

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Table 3 (continue). How to improve the learning process to make it more effective.

No.	Respondent	Major	Answer
4.	D	Computer Science Education	When zooming in, the lecturer can give examples of work that are somewhat similar to the questions in the module, so students don't get confused while working on it.
5.	E	Computer Science	Using all learning media applications that can simplify the learning process.
6.	F	Computer Science	Utilize educational technology such as the Learning Management System (LMS) as well as possible.
7.	G	Computer Science Education	Doing direct practicum for courses/lessons that do require practicum.
8.	H	Computer Science Education	Provide learning videos uploaded to the Learning Management System (LMS), for example SPADA.
9.	I	Computer Science	Applying learning methods in accordance with the characteristics of student learning.
10.	J	Computer Science Education	Equip facilities and infrastructure that support the learning process.

Learning can be effective if it achieves the desired learning objectives in accordance with the achievement indicators (Fakhrurrazi, 2018). According to Fakhrurrazi (2018), effective learning can be realized by taking the following steps.

(i) Involve students actively.
(ii) Attract students' interest and attention.
(iii) Generating student motivation.
(iv) Provide individual student services.
(v) Prepare and use various media in learning.

If you link the above theory with the results of research on how to improve the learning process to make it more effective, there is a link between each other or it can be said that it is appropriate. This is evidenced by the results of research with steps to realize effective learning proposed by Fakhrrurrazi (2018) which have similarities, one of which is that in building effective learning one must pay attention to the learning media.

4. CONCLUSION

The Spada Learning Management System (LMS) greatly influences the Algorithm and Programming learning process for first grade students at Universitas Pendidikan Indonesia. In this study, it is known that LMS is very effective in learning Algorithms and Programming, this is evidenced by the results of research where 81% of respondents or 26 respondents from a total of 32 respondents chose "yes". Then in this study it was also stated that the use of LMS in the learning process had a positive impact and a negative impact. Although there are also respondents who think that the use of LMS in the learning process does not have a negative impact. Respondents who think that the use of LMS in the learning process does not have a negative impact as many as 8 people or 24% of the total number of respondents 32 people. In addition to knowing the effectiveness, positive and negative impacts, in this study we can also find out how to improve the learning process to make it more effective, including: (i)

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Continue to practice and read; (ii) Courageous; (iii) Utilizing existing learning media; (iv) Equip facilities and infrastructure; (v) Applying learning methods that are in accordance with the characteristics of students; (vi) Doing hands-on practicum.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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