

## Learning Management System Acceptance Rate Among Vocational School Physics' Student

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### Abstrak

*Learning management systems (LMS) telah menjadi komponen kunci dari pengajaran dan pembelajaran di sekolah. Namun, evaluasi tingkat penerimaan siswa terhadap pelaksanaannya selama ini masih belum banyak dilaporkan. Oleh karena itu, penelitian ini bertujuan untuk mengevaluasi tingkat penerimaan LMS di kalangan siswa ditinjau dari Gender dan tingkat kelas. Tingkat penerimaan siswa terhadap LMS di administrasi melalui survei online menggunakan Google form. Sebanyak 141 orang siswa yang mengambil mata pelajaran fisika berasal dari kelas XI dan XII salah satu sekolah menengah kejuruan negeri telah dilibatkan. Penerimaan terhadap LMS menggunakan 21 item LMSAS (Learning Management System Acceptability Scale) yang dikembangkan oleh Sezer dan Yilmaz pada tahun 2019. LMSAS menggunakan skala likert 5-point, dari 1 (Sangat Tidak Setuju) hingga 5 (Sangat Setuju). Komponen penerimaan LMS meliputi Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Condition (FC), dan Social Influence (SI). Wright map dan Logit Value of Person (LVP) digunakan untuk menilai penerimaan LMS di kalangan siswa. Hasil analisis menunjukkan bahwa penerimaan siswa terhadap LMS sebagian besar terdistribusi pada tingkat penerimaan yang baik. Sebanyak 84% siswa menerima LMS. Berdasarkan gender, 65% siswa laki-laki cukup menerima LMS. Berdasarkan kelas, siswa kelas XII lebih dominan (35.5%) menerima LMS. Jadi, sebagian besar siswa di sekolah menengah kejuruan negeri menerima LMS dengan baik.*

**Kata kunci:** Learning management systems, LMSAS, Model Rasch, Penerimaan LMS.

### Abstract

*Learning management systems (LMS) have become a key component of teaching and learning in schools. However, the evaluation of student acceptance rates on its implementation so far has not been widely reported. Therefore, this study aims to evaluate the acceptance rate of LMS among students in terms of gender and grade level. The level of student acceptance of the LMS in administration through an online survey using Google forms. A total of 141 students who took physics subjects from class XI and XII, one of the vocational high schools were involved. Acceptance of the LMS uses a 21-item LMSAS (Learning Management System Acceptability Scale) developed by Sezer and Yilmaz in 2019. The LMSAS uses a 5-point Likert scale, from 1 (Strongly Disagree) to 5 (Strongly Agree). LMS acceptance components include Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Condition (FC), and Social Influence (SI). Wright map and Logit Value of Person (LVP) were used to assess LMS acceptance among students. The analysis results show that student acceptance of the LMS is distributed chiefly at a good level of acceptance. As many as 84% of students received the LMS. Based on gender, 65% of male students are quite accepting of the LMS. Based on class, class XII students are more dominant (35.5%) receiving LMS. Thus, most students in public vocational high schools welcome the LMS well.*

**Keywords:** Learning management systems, LMSAS, Rasch Mode, Acceptance of LMS.

## INTRODUCTION

Due to the global spread of the coronavirus (COVID-19), most schools in Indonesia have switched to online and electronic-based learning. As a precautionary measure to prevent the spread of the virus, the government announced that learning was conducted online by utilizing various appropriate platforms, such as Learning Management Systems (LMS). Learning Management System is a software application used to manage educational courses, training programs, or learning and development programs by tracking, reporting, automating, and delivering them (Husain, 2022). In online learning, instructional design and materials delivery have been identified as the two most important aspects affecting student satisfaction and perceived learning (Barbera et al., 2013).

LMS is one of the electronic learning tools that has been widely used to improve students' learning experiences and construct students' understanding of specific topics. Various LMS models have been developed, including Moodle, Google Classroom, Edmodo, Atutor, Blackboard, and Success Factors (Kasim & Khalid, 2016). LMS in online learning is a new learning experience for teachers and students in most schools in Indonesia. Teacher-student interactions that usually occur in the classroom are replaced with virtual meeting rooms and various features available in the LMS.

Various researchers have reported on LMS development and the impact of its use during the pandemic in physics and science education. Bakri and Mulyati (Bakri & Mulyati, 2017) developed an e-learning tool for the Basic Physics II course using the Chamilo learning management system (LMS). By using the Dick and Carey development model, media experts, learning experts, and material experts stated that the e-learning tool as a whole was feasible as a learning tool for Basic Physics II. At the implementation stage, the device shows good functionality and is attractive to be used as independent teaching material. Rakhmawati et al. (Rakhmawati et al., 2021) developing an LMS for PAUD using the ADDIE development model. The SIKUMBANG website as a

developed LMS has been tested on three teachers and 26 students at the Unnesa Lab School Kindergarten. The test results show an increase in the number of users who can use it independently. On the other hand, Maryam (Maryam, 2021) and Nupura et al. (Nupura et al., 2021) examined using LMS on student learning outcomes. Maryam (Maryam, 2021) uses google classroom to improve student learning outcomes taking physics courses at Bina Insan University. The results showed that student learning outcomes increased in the moderate criteria by using the research design method of one group pretest-posttest design. With the same learning design as Maryam (Maryam, 2021), Nupura et al. (Nupura et al., 2021) obtained a significant positive effect on implementing WhatsApp based on Google Classroom on students of SMA Negeri 1 Suwata on the learning outcomes of rotational dynamics material. The N-Gain and Effect size values obtained are in the medium category and have a strong influence.

On another aspect, Mthethwa-Kunene and Maphosa (Mthethwa-Kunene & Maphosa, 2020) analyzed the institutional and personal factors that influence the use of Moodle LMS at Eswatini University. They found that perceived usefulness and ease of use, trust, and student satisfaction influenced Moodle use, although there was a weak to moderate positive relationship. In addition, they also found institutional factors such as inadequate technology infrastructure and inadequate student training and support in its implementation.

Today, LMS is an essential part of teaching practice (Sezer & Yilmaz, 2019). LMS affects the learning experience and overall student satisfaction (Kite et al., 2020; Lee & Lee, 2014). As part of the integration of technology-based approaches into education and as a new teaching approach, the emergence of LMS is not only studied in terms of developing and implementing to improve student learning outcomes. However, further, we need to see how the level of acceptance of the use of LMS so far. This is important as an evaluation material and to identify any variables that may affect the acceptance of the LMS so

far.

An important factor in accepting LMS among users is belief and positive intention in using it (Sezer & Yilmaz, 2019). These positive beliefs and intentions are identified through four basic elements: performance expectancy, effort expectancy, facilitating conditions, and social influence (Venkatesh et al., 2003). Performance Expectancy (PE) refers to the belief that performance in the field of physics learning will increase with the use of technology, Effort Expectancy (EE) refers to the belief that technology will be easy to use during the implementation of physics learning, Social Influence (SI) refers to the beliefs held by students in the social environment that the technology should be used in physics learning, and Facilitating Conditions (FC) refers to the belief that various elements that support the use of technology exist. Therefore, this study aims to examine the level of acceptance of vocational students towards LMS use so far in students who take physics subjects.

## METHOD

This research is included in the type of survey research. The subjects of this study involved 141 students of class XI and XII who took physics subjects from one of the State Vocational High Schools in Yogyakarta. There were 87 (61.7 %) females and 54 (38.3 %) males among the pupils. Students range in age from 15 to 19 years. Table 1 describes the demographics of students in detail.

Table 1. Demographic statistics

Demographic	Number	Percentage (%)
Gender		
Female	87	61.7
Male	54	38.3
Class		
XI	93	66.0
XII	48	34.0
Age (Year)	15 – 19	

The LMSAS (Learning Management System Acceptability Scale) instrument developed by Sezer and Yilmaz was used to assess students' LMS acceptance rates (Sezer

& Yilmaz, 2019). The LMSAS instrument consists of 21 items divided into four factors, namely Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Condition (FC), and Social Influence (SI). The Performance Expectancy factor consists of 8 items, Effort Expectancy consists of 5 items, Facilitating Condition consists of 5 items, and Social Influence consists of 3 items. The LMSAS instrument uses a 5-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Before using the LMSAS instrument, an expert was involved in assessing the translation results. Google forms are used to format items that have been translated. WhatsApp groups are used to spread the instrument. Student participation is completely anonymous.

Excel and Winsteps 4.6.1 were used to analyze student responses. Wright map and Logit Value of Person (LVP) were used to assess LMS acceptance among students. Before being used, the LMSAS instrument was evaluated for the suitability of the items by referring to Table 2 (Purnami et al., 2021; Sumintono & Widhiarso, 2014).

Table 2. Item fit criteria

	Value range
Outfit MNSQ	0.5 – 1.5
Outfit ZSDT	-2.0 – 2.00
PT.Mea Corr	0.4 – 0.8

## RESULTS AND DISCUSSION

### RESULTS

#### LMSAS Statistics Summary

Before use, the LMSAS (Learning Management System Acceptability Scale) instrument was evaluated for reliability. Summary statistics are tabulated in Table 3.

Table 3. LMSAS statistics summary

	Item	Person
Measure		
Minimum	-1.52	-2.71
Mean	0.00	1.10
SD	0.58	1.37
Maximum	0.82	7.48
Strata	5.83	4.57
Reliability	0.94	0.91
Cronbach's $\alpha$		0.93

Based on Table 3, the instrument reliability value is 0.93. At the same time, the item and person reliability values are 0.94 and 0.91, respectively. The strata index of items and persons are 5.83 and 4.57, respectively. The logit item size ranges from -1.52 to 0.82. In comparison, the logit person size ranges from -2.7 to 7.48.

**Item fit in LMSAS**

After analyzing the instrument's reliability, we continued to evaluate the suitability of the items in the LMS acceptance scale. The value of MNSQ outfit, ZSTD outfit, and PT. Mea. Corr. As an indicator of item suitability, they are summarized in Table 4.

Table 4. LMSAS instrument validity summary

Item	Measure (Logit)	Outfit		PT. MEA Corr.	Criteria
		MNSQ	ZSTD		
<i>Performance Expectancy (PE)</i>					
PE1	-0.07	0.97	-0.23	0.63	Fit
PE2	0.44	0.87	-1.04	0.71	Fit
PE3	0.39	0.81	-1.66	0.67	Fit
PE4	0.73	0.71	<b>-2.65</b>	0.74	Maintained
PE5	-0.40	1.08	0.71	0.62	Fit
PE6	0.31	0.80	-1.77	0.73	Fit
PE7	-0.41	0.79	-1.87	0.71	Fit
PE8	0.17	0.67	<b>-3.02</b>	0.74	Maintained
<i>Effort Expectancy (EE)</i>					
EE1	-0.81	1.31	<b>2.38</b>	0.58	Maintained
EE2	-1.52	1.17	1.32	0.51	Fit
EE3	0.35	0.91	-0.74	0.67	Fit
EE4	-0.02	0.79	-1.87	0.69	Fit
EE5	0.65	1.05	0.43	0.70	Fit
<i>Facilitating Condition (FC)</i>					
FC1	0.07	0.85	-1.30	0.66	Fit
FC2	-0.86	<b>1.52</b>	<b>3.75</b>	0.53	Maintained
FC3	0.04	0.75	<b>-2.21</b>	0.62	Maintained
FC4	-0.50	<b>1.63</b>	<b>4.43</b>	0.48	Maintained
FC5	0.19	0.60	<b>-3.85</b>	0.71	Maintained
<i>Social Influence (SI)</i>					
SI1	-0.24	0.87	-1.12	0.63	Fit
SI2	0.68	<b>1.72</b>	<b>4.96</b>	0.50	Maintained
SI3	0.82	<b>1.60</b>	<b>4.24</b>	0.44	Maintained

Based on Table 4, the MNSQ outfit value on the Performance Expectancy factor is between 0.67 (PE8) to 1.08 (PE5). The ZSTD outfit value is from -3.02 (PE8) to 0.71 (PE5), and the Pt. Mea. Corr. from 0.62 (PE5) to 0.74 (PE4). On the Effort Expectancy factor, the MNSQ and ZSTD outfit values range from 0.79 (EE4) to 1.31 (EE1) and from -1.87 (EE4) to 2.38 (EE1). While the value of Pt. Mea. Corr. are in the range of 0.51 (EE2) to 0.70 (EE5). The Outfit MNSQ in the Facilitating Condition factor is in the range of 0.60 (FC5) to 1.63 (FC4) and Outfit ZSTD values from -3.85 (FC5) to

4.43 (FC4). At the same factor, the value of Pt. Mea. Corr. from 0.48 (FC4) to 0.71 (FC5). The last factor, Social Influence, is the range of values of Pt. Mea. Corr. from 0.44 (SI3) to 0.63 (SI1). Meanwhile, the MNSQ outfit and ZSTD outfit values range from 0.87 (SI1) to 1.72 (SI2) and from -1.12 (SI1) to 4.96 (SI2).

**Wright map acceptance of LMS**

Figure 1 is a Wright map (item-person map) of LMS acceptance generated using the Winsteps 4.6.1 software.

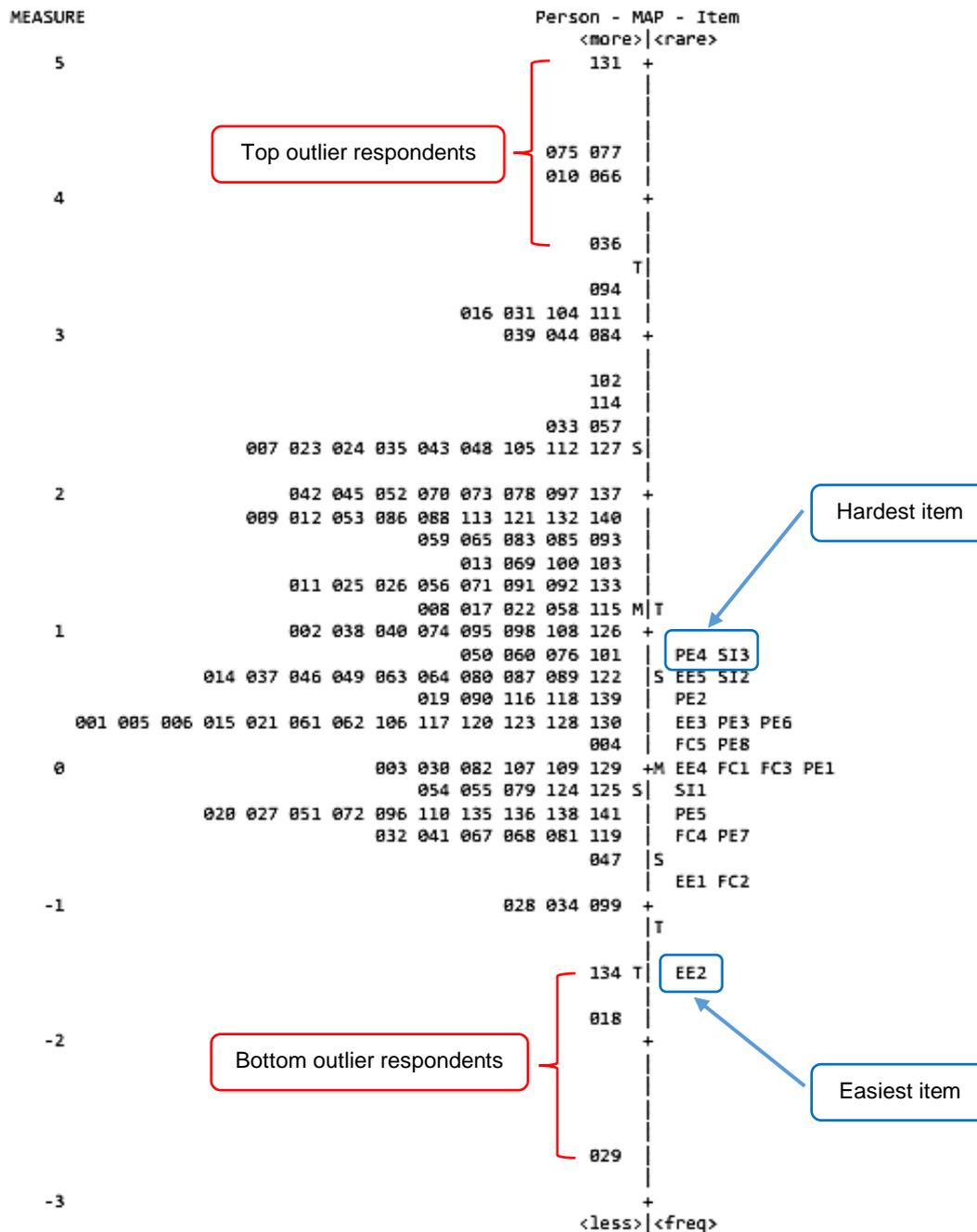


Figure 1. Wright map LMS acceptance among vocational high school students

The logit ruler in Figure 1 ranges from -3 to 5 logit. From Figure 1, it appears that most students have a good acceptance of the LMS on average. This can be seen from the person mean (1.10 logit), higher than the item mean (0.00 logit). Six people have the highest logit value (top-left side): students with codes 131, 075, 077, 010, 066, and 036. While the lowest logit value (bottom-left side) is owned by students with codes 134, 018, and 029. Items

with a low acceptance rate (most difficult to approve) belong to items PE4 and SI3 (top-right), and items with a high acceptance rate (easiest to approve) belong to items EE2.

**LMS acceptance by gender and class**

Table 7 categorizes students into four levels of LMS acceptance, ranging from Very Acceptance to Low Acceptance. Categorization of acceptance rate using student demographic profile and LVP.

Table 7. Student acceptance rate for LMS by Gender and Class

Demographics (Total)	LMS Acceptance Rate among Vocational High School students			
	Very Acceptance	Acceptance	Moderate Acceptance	Low Acceptance
Gender				
Female (87)	10	20	17	7
Male (54)	6	30	35	16
Class				
XI (93)	8	32	39	14
XII (48)	8	18	13	9
Total (141)	16	50	52	23

By gender, 118 out of 141 (84%) students' acceptance the LMS. Most of them (37%) were moderate. If we look more closely at the gender group, 35 out of 54 (65%) male students are quite receptive to the LMS than female students. While at a very high acceptance rate, female and male students have almost the same LMS acceptance rate, at 11.5% and 11.1%, respectively. In contrast to acceptance at a low level, male students were more dominant (16 out of 54 students or 29.7%) received less LMS than female students (8%). As for the class, the proportion of class XII students is more dominant (18 out of 48 students or 35.5%) receiving LMS compared to the proportion of class XI students (32 out of 93 students or 34.4%). At the same time, the opposite occurred in the moderate acceptance group. Class XI students are greater (39 out of 93 students or 42%) than class XII (27%). At low acceptance rates, the proportion of male and female students is 18.8% and 15%, respectively. Meanwhile, at a high acceptance rate, LMS acceptance from both classes has a balanced proportion.

**DISCUSSION**

This study aimed to see the level of acceptance of the LMS in students from one of the state vocational high schools. Before being used, the instrument's reliability was evaluated using three types of reliability, namely item reliability, person reliability, and instrument reliability. Item reliability shows the quality of the items. Person reliability shows the consistency of answers from respondents. While the reliability of the instrument, indicated by Cronbach's alpha value, shows the interaction between the person and the item as

a whole (Sumintono & Widhiarso, 2014). Based on the analysis results, it was found that the three reliability values were included in the "Very Good" category.

The next step is to evaluate the suitability of the 21 items to be used. The analysis results show that nine items are less fit than 21 items. The items that do not fit are caused by the outfit MNSQ and ZSTD values being outside the acceptance range. The MNSQ outfit value shows a measure of randomness in the form of distortion in the LMSAS. At the same time, the outfit ZSTD value shows a deviation from the LMSAS unit. Although nine items (PE4, PE8, EE1, FC2, FC3, FC4, FC5, SI2, and SI3) did not fit, we continued to use them because of the Pt. Mea. Corr. value is still in the acceptance range. The nine items that did not fit had an MNSQ outfit value in the range of 1.52 - 1.72. Outfit values of 1.5 - 2.0 logit can be maintained because, in this range, items will not reduce the quality of the measurement (Sumintono & Widhiarso, 2015).

After evaluating the quality of the items to be used, we mapped the LMS acceptance rate among students through the Wright map. In general, the Wright map is divided into two sides, the right is for the difficulty level of LMS acceptance, and the left is for the level of student acceptance of the LMS (Ling Lee et al., 2020; Sukarelawan & Gustina, 2021). The upper-left side is occupied by the students who have the best acceptance rate of the LMS. In contrast, the lower-left side is occupied by students with the lowest level of acceptance of the LMS. Based on Figure 1, the four students with the highest acceptance rate and three students at the lowest acceptance rate include the upper and lower outliers because the logit

of the acceptance rate is outside the range of 2 times the standard deviation (Adams et al., 2020; Ardiyanti, 2017; Papini et al., 2020). The level of student acceptance of LMS during a pandemic can be grouped based on the value of the standard deviation (symbol S on the map) and mean (symbol M on the map). Students who have a high acceptance rate (Logit > M + S) of 11.3% (16 of 141 students). Meanwhile, students who have a low acceptance rate (Logit < M – S) are 16.3% (23 of 141 students). However, most students had an LMS acceptance rate in the moderate group (in the -S to +S range). This shows that vocational high school students have a good acceptance of LMS use during the pandemic.

The upper-right side of the map shows items that have a low acceptance rate. In comparison, the lower-right side shows the items that students most easily accept. On the right side of the map, we can see that the SI3 item “My friend who uses LMS effectively while studying physics has higher self-confidence” is more difficult for students to accept. While at the same time, the EE2 item “I can use LMS easily when studying physics” is the easiest to accept. Furthermore, most of the statements in the map are distributed between 2 standard deviations and there are no statements that have an upper logit outlier value (more than 2 standard deviations). This shows that students have been accustomed to using LMS during the covid-19 pandemic (Khunaini & Sholikhah, 2021; Mthethwa-Kunene & Maphosa, 2020; Wiratomo & Mulyatna, 2020; Yauma et al., 2020). Students have started to get used to and adapt to learning in a virtual environment through LMS. The use of LMS in the last two years is one of the efforts to break the chain of the spread of Covid-19 (Raza et al., 2021). So, the level of acceptance of the LMS by students on the aspects of Performance Expectancy, Effort Expectancy, Facilitating Condition, and Social Influence can be said to be good.

If we look at the acceptance rate of LMS based on Gender and Class, it appears that they have accepted LMS as a new physics learning environment during the pandemic. However, there are a small number of them who still have a low level of acceptance. This finding

is in line with the report of Khairani et al. (Khairani et al., 2020). Most students have felt the various positive impacts of using LMS so far. This is supported by several studies that report how LMS can improve students' academic success (Handayani et al., 2021; Lestari et al., 2021; Nupura et al., 2021; Rusdin et al., 2020; Susilawati et al., 2019).

## CONCLUSION

This study revealed that the acceptance rate of students who took physics subjects to the LMS was good (mean person 1.10 logit). The statement of ease of use of the LMS for students has the highest acceptance rate among other statements. Meanwhile, friends' self-confidence statements are higher than their own when their friends use LMS effectively have the lowest level of acceptance. Based on gender, 65% of male students accept the LMS compared to female students. Female and male students have almost the same LMS acceptance rate, at a very high acceptance rate, around 11%. Based on grade level, the proportion of class XII students is more dominant (35.5%) receiving LMS than class XI students. Preferably, at a moderate acceptance level, the proportion of class XI students is greater (42%) than class XII (27%).

This research has contributed significantly to reporting the level of acceptance of LMS use among Vocational High School students in Yogyakarta in learning physics. However, there are identified limitations. The respondents involved came from the same school and were limited to the context of physics. This finding cannot be generalised to capture the level of acceptance of LMS in Indonesia. Therefore, further research needs to consider the heterogeneity of respondents from the aspect of the type of school and the scope of the subject so that the picture of the LMS acceptance rate among students is richer. Future researchers need to consider sampling techniques involving respondents to generalise the findings.

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