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Student Preference for Online Learning Media in Practical Courses Flipped Learning

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ABSTRACT

Purpose – The purpose of this study is to determine students' preferences for online learning media and the features of the learning management system (LMS) used in the flipped learning practical course.

Methodology – This quantitative descriptive research involved 75 students majoring in automotive engineering education at Universitas Negeri Yogyakarta (UNY), Indonesia, as respondents. Data were collected by questionnaire and analyzed using conjoint analysis to identify student preferences.

Findings – The results of this study showed that student preferences for learning media to support practical course flipped learning are, 1) video: practical tutorial video with duration between 5-10 minutes and use Indonesian instruction; 2) documents: modules with Indonesian instruction; 3) test: multiplechoice test; 4) the submission of practical learning assignment and reports is collected through besmart, but for discussion forums students prefer to use whatsapp group.

Significance – This study contributes empirical evidence on student-centered design of flipped learning in vocational practical courses by identifying prioritized LMS media and features using conjoint analysis. The findings provide a data-driven framework for optimizing the selection of instructional media to enhance learning effectiveness and practical readiness in engineering education.

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INTRODUCTION

The COVID-19 pandemic accelerated the adoption of online learning in education, including higher education. Although online learning was initially adopted primarily as a response to restrictions on face-to-face interaction, its potential extends beyond emergency remote teaching. Online learning can also complement face-to-face instruction and provide greater flexibility in accessing learning resources (Adedoyin & Soykan, 2020). One instructional approach that leverages this potential is flipped learning, in which students access learning materials before attending face-to-face sessions, allowing classroom time to focus on more active and practical learning activities.

Online learning in universities is used not only during pandemics but also as an alternative when face-to-face meetings are not possible. However, it has also been used before the pandemic, although its use was not as much as during the pandemic (Kopp et al., 2019; Leszczyński et al., 2018). Online learning has many benefits, one of which is supporting face-to-face learning through the flipped learning method.

Learning in vocational-based study programs applies practical learning with a more dominant focus than theoretical learning (Abdurrahman & Mahmudah, 2023). It is hoped that students will have more time to hone their competencies. Practical learning in the Department of Automotive Engineering, Universitas Negeri Yogyakarta (UNY), which has been implemented so far, is still experiencing several obstacles, namely the limitations of practical tools, time, varying student abilities because of different educational backgrounds (Senior High School and Vocational High School), there is overlapping implementation of theoretical and practical learning so that students have to carry out the practice but have not yet received the theory. This causes students to spend a lot of practice time studying the training object, so practice time cannot be used optimally. Therefore, flipped learning is an alternative to overcome these problems.

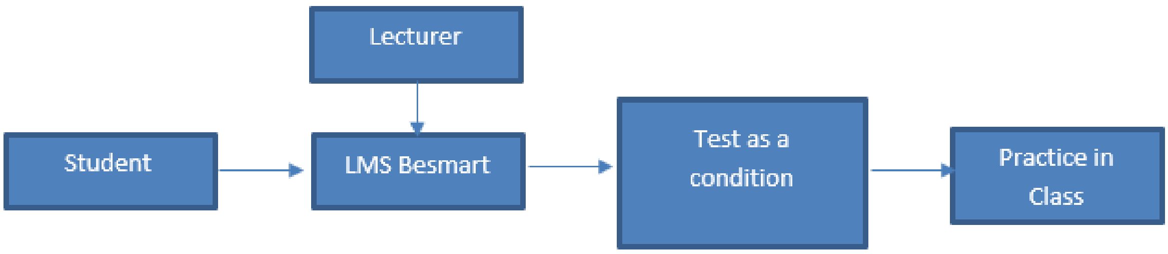

Figure 1. Practical Course Flipped Learning

Through flipped learning students can learn from various sources that lecturers at LMS have provided (Listiqowati et al., 2022; Siburian et al., 2022). Students can learn in advance what will be practiced, so when they practice, they already have sufficient understanding. The use of tests before practical learning aims to ensure students' basic abilities before carrying out practical learning activities, thereby optimizing practice time and reducing the risk of work accidents and damage to training objects. Students must take tests and achieve a certain score to be eligible to participate in practical learning. Based on these problems, it is necessary to identify student preferences regarding learning media and the criteria to be included in the LMS used at UNY, namely Besmart UNY, which has been used to support online and flipped learning. The use of learning media and appropriate features makes the LMS more meaningful in supporting students' understanding. Thus, the results of this study can serve as a basis for lecturers to include learning resources in the LMS and to use its features.

Flipped Learning for Practical Courses

Conventional practical learning still faces problems, especially regarding students' readiness to carry out practice. Practical learning through flipped learning is one breakthrough that can help overcome these problems. According to Zhang et al. (2024)Flipped learning is one of the pedagogical innovations that has attracted considerable attention and interest. Therefore, since 2013, flipped learning has begun to appear more and more interesting among technical education researchers, as indicated by the number of publications related to it (Karabulut-Ilgu et al., 2018). Flipped learning, or inverted learning, extends face-to-face learning beyond the classroom by using online platforms. In flipped learning, part or all of the direct teaching is delivered through video and other media, and classroom time is used to engage students in collaborative, hands-on activities.

Learning in vocational higher education emphasizes the strength of competence in practice, preparing graduates to be ready to work. Technical vocational education has distinctive characteristics. Engineering educators agree that students learn better when they are involved in complex problems and projects (Maria Sofa et al., 2020). However, students are reluctant to set aside lectures on the theoretical background needed to solve problems. Based on this, the flipped learning model is well-suited to supporting practical learning. Many colleges and universities have adopted the flipped learning model because it provides opportunities to increase peer interaction and deeper involvement with the material being studied, as explained (Ashraf et al., 2021). Students have more learning opportunities due to material support for the learning management system (LMS), which facilitates flipped learning. Based on the results of the study, it was also found that students in the flipped classroom learned more than those in the ordinary class (Vieyra & González, 2023).

Students' readiness to engage in practical learning is an important component in achieving learning objectives. Students with an educational background outside the automotive vocational high school field have limited knowledge, especially when practical learning precedes theoretical instruction. This needs to be known to lecturers so they can address existing problems, and flipped learning is one solution. Some researchers have found that students come to class more prepared (Alharthi, 2026; Mazlan et al., 2025) and students spend more time studying, thus forming good study habits compared to conventional classroom approaches (Songsiengchai & Damnil, 2025).

Besmart UNY as a Learning Management System

Flipped learning requires support, such as a learning management system (LMS), to provide learning materials or resources, conduct tests, facilitate discussion forums, and collect assignments. At UNY, the LMS used to support online learning is Besmart UNY, which is based on Moodle. Moodle is the most widely used platform for online learning. This platform is a software package specifically designed to assist lecturers or educators at an educational or training institution in carrying out online learning (Dewi et al., 2025). Unlike social media sites, Moodle tends to focus on learning and lacks the personal touch and networking capabilities that social networking sites offer. Moodle is more about building online communities and expanding learning outside the classroom (Esi, 2021; Kaleci, 2025; Natalia et al., 2021)

As usual, university education is at the forefront of using technology compared to other levels of education. The impact of LMS is significant for the study of science and engineering, as it encompasses software tools that support these fields. In general, LMS provides a web-based interface that supports various activities, including learning resources, forums, chats, questionnaires, and assignments. LMS can also integrate other tools that are very interesting when teaching.

Moodle is accessed through a dedicated learning web page. With this application, lecturers can set learning times for topics or meetings. Lecturers can arrange activities that students must carry out, such as watching videos, reading reference books or modules, participating in discussions, completing tests or assignments, and other activities. Access rights for each person can be regulated, whether as a teacher, student, or administrator (Kaleci, 2025). In other words, LMS is currently used to deliver online materials to complement traditional face-to-face classes.

Conjoint Analysis to Determine Student Preferences

Conjoint analysis is an analytical technique used to examine the simultaneous impact of an object or service's attributes on a person's preferences for that object or service (Gudono, 2017). According to Dengiz (2020), conjoint analysis has interesting features. First, the task of determining choices and trade-offs from conjoint analysis is more similar to real choice situations than evaluating attributes separately. In addition, the results have high predictive validity. Second, conjoint analysis can reduce the influence of social desirability bias because it is conducted in a combined manner. Each alternative consists of several attributes; respondents can rate it or choose from the provided options. Third, conjoint analysis can determine which attributes respondents consider most important. As Sharma et al. (2024) support, this will make it easier for researchers to prioritize respondents' preferences and identify the most efficient alternatives. Fourth, conjoint analysis has higher rating- or range-sensitivity because the parameters being compared are known to the researcher. In addition, the repetition or isolation of an attribute can be minimized compared with Likert-scale measurement analysis (Kulshreshtha & Sharma, 2021). However, conjoint analysis is not appropriate for analyzing a large number of attributes, as it can saturate respondents and fail to yield useful information (Pelzer, 2019). The basic model of the conjoint equation analysis is as follows:

$$\underset{\text{(nonmetric, metric)}}{Y_1} = \underset{\text{(nonmetric)}}{X_1 + X_2 + X_3 + \cdots + X_n} \quad (1)$$

With the profile defined in the attribute, it will generate utility, after which it collects preference evaluations from respondents. This process shows why conjoint analysis is also called trade-off analysis. When making judgments about a hypothetical product, respondents must consider the product's "good" and "bad" characteristics to form preferences. Thus, respondents should consider all attributes simultaneously in making their judgments. Respondents can indicate their preferences by ranking profiles or by ranking each combination on a preference scale (e.g., 1-10).

This utility represents the total value or overall preference of an object, which can be considered the sum of the values of its parts. The general form of the conjoint model can be shown as follows:

(Total worth for product)ij . . . nij = Part worth of level i for factor 1 + Part worth of level j for factor 2 + . . .+ Part worth of level n for factor m (2)

where the product or service has m attributes, each with n levels, the product consists of level i of factor 2, level j of factor 2, and so on, up to level n of factor m.

How to estimate the section value for each level when you only have the rating value or the rating from the profile. This procedure is analogous to multiple regression with dummy variables or ANOVA, although other estimation techniques are also used, such as the multinomial logit model. This calculation is done for each respondent separately. This approach differs markedly from other techniques in that we deal with relationships across all respondents or group differences. Based on the description above, conjoint analysis is suitable for determining preferences for learning media and the features of the Besmart LMS used in flipped learning to support practical learning.

Based on the critical problems above, Suharni et al. (2024) The need for such an approach is particularly relevant in vocational higher education, where learning is strongly oriented toward developing practical competencies. In the Department of Automotive Engineering at Universitas Negeri Yogyakarta (UNY), practical learning faces several challenges, including limited practical equipment, restricted instructional time, differences in students' educational backgrounds, and the overlap between theoretical and practical instruction. Consequently, students may spend a substantial amount of practical time on basic concepts that should ideally be mastered before entering the workshop. As the previous problem, flipped learning provides an alternative by enabling students to study relevant materials, instructional videos, documents, and preliminary assessments through the Learning Management System (LMS) before practical sessions (Haloho et al., 2023; Vieyra & González, 2023). Thus, the preparation can help students enter practical activities with a stronger conceptual foundation and allow face-to-face time to be used more effectively.

Furthermore, in this context, Ahmed (2024) LMS plays an important role in supporting flipped learning because it serves as the primary environment for delivering pre-class learning resources, assessments, assignments, and communication. Therefore, at UNY, Besmart is used as an LMS to facilitate these learning activities. However, the availability of various media and LMS features does not necessarily mean that all features are equally useful or preferred by students. Students may have different preferences regarding the type, duration, and language of instructional videos; the type and language of learning documents; assessment formats; assignment submission platforms; and discussion forums. Therefore, simply providing a wide range of LMS features may not ensure that the learning environment effectively responds to students' needs. Previous studies have extensively discussed the implementation and effectiveness of flipped learning and the use of LMS in higher education. However, less attention has been given to identifying the specific combinations of learning media and LMS features that students prefer, particularly in practical vocational courses (Purwantini et al., 2025). As in Liu et al. (2024), understanding these preferences is important because the effectiveness of an LMS-supported flipped learning environment depends not only on technological availability but also on the appropriateness of the learning resources and features provided. Therefore, empirical evidence is needed to determine which attributes contribute most strongly to students' preferences. The novelty of this study lies in applying conjoint analysis to identify students' preferences for combinations of learning media and LMS features in a flipped practical learning context. Rather than examining individual LMS features in isolation, this study estimates the relative importance and utility of different attribute levels and identifies the feature combination most preferred by students. This approach provides a more detailed understanding of how students evaluate alternative configurations of digital learning resources and LMS features.

METHODOLOGY

Research Design

This study is a quantitative descriptive research. LMS Besmart UNY, which is based on Moodle, is used to support flipped learning in practical courses. In addition, this study employed a quantitative descriptive research design to describe and quantify students' preferences for learning media and LMS features in flipped learning. This design was considered appropriate as it provides a systematic approach to measuring preference patterns without examining causal relationships among variables.

Participant

The population of this study comprised undergraduate students in the Department of Automotive Engineering Education at Universitas Negeri Yogyakarta who participated in practical courses supported by the Be-Smart Learning Management System (LMS). A total of 75 students enrolled in the Steering, Brake, and Suspension Systems course participated in this study. Participants were selected using purposive sampling, with the inclusion criteria that they had completed one semester of flipped learning and had experienced all learning media and LMS features evaluated in this study. Students from the Department of Automotive Engineering were selected because the course extensively implements flipped learning in practical instruction, allowing participants to provide informed evaluations of the learning media and LMS features based on their direct learning experiences.

Data Collection

Data were collected using a self-developed questionnaire administered after students completed one semester of flipped learning. The questionnaire measured students' preferences for eight LMS attributes, including video, learning materials, tests, assignment submission, and discussion forums. Students rated 27 card combinations on a five-point scale ranging from 1 (not needed) to 5 (urgently needed). The instrument had been tested for validity and reliability prior to data collection, indicating it was suitable for this study. Table 1 presents the card combinations evaluated by the respondents.

Table 1. Card combinations formed

CARD	Video Type	Video Length	Video Language	Document Type	Document Language	Test	Assignment	Discussion Forum
1	Practical Video Tutorials	5-10 minute	English	Job sheet	English	Multiple Choice Test	Google drive	WhatsApp

Table 1 above presents an example of the profile (card) used in the conjoint analysis. Each card represents a unique combination of eight LMS attributes, namely video type, video length, video language, document type, document language, test format, assignment submission platform, and discussion forum platform. Respondents evaluated each profile based on their preference using a five-point rating scale.

Data Analysis

The data analysis technique used was conjoint analysis to identify student preferences. The conjoint analysis is conducted using SPSS Statistics 23. The attributes and levels used in this study are as follows:

Table 2. Attribute and Level

No	Attribute	Attribute Code	Level	Regression Code
1	Video Type	JV	Practical Video Tutorials	1
			Animation Videos	2
			Graphic Videos	3
2	Video Duration	DV	1-5 minutes	1
			5-10 minutes	2
			11-15 minutes	3
3	Video Language	BV	English	1
			Indonesian	2
4	Document Type	JD	Jobsheet	1
			Reference book	2
			Module	3
			Journal	4
			Manual book	5
5	Document Language	BD	English	1
			Indonesian	2
6	Test	T	Multiple Choice	1
			Essay	2
			Multiple Choice & Essay	3
7	Assignment Submission	PT	Besmart	1
			Whatsapp	2
			Gdrive	3
8	Discussion Forum	FD	Besmart	1
			Whatsapp	2

FINDINGS

Student Preferences for Learning Media and Features in LMS

The utility estimates were generated from the conjoint analysis. Positive utility values indicate that students prefer a particular attribute level, whereas negative utility values indicate a lower preference for that level. The magnitude of the utility estimate reflects the relative desirability of each level within the same attribute—the utility estimates are presented in Table 3.

Table 3 shows that, for the video type attribute, practical video tutorials obtained the highest utility estimate (0.078), indicating that students preferred instructional videos demonstrating real practical activities. In contrast, animation videos (-0.047) and graphic videos (-0.031) received negative utility values, suggesting that these formats were less attractive for supporting practical learning. Regarding video duration, students showed the highest preference for videos lasting 5–10 minutes (0.033), followed closely by those lasting 1–5 minutes (0.029). Videos with durations of 11–15 minutes (-0.062) were the least preferred, indicating that longer instructional videos tend to reduce students' interest and perceived effectiveness.

Table 3. Utility Estimate

Attribut	Level	Utility Estimate	Std. Error
Video Type	Practical Video Tutorials	0.078	0.022
	Animation Videos	-0.047	0.022
	Graphic Videos	-0.031	0.022
Video Duration	1-5 minutes	0.029	0.022
	5-10 minutes	0.033	0.022
	11-15 minutes	-0.062	0.022
Video Language	English	-0.153	0.017
	Indonesian	0.153	0.017
Document Type	Job sheet	0.020	0.031
	Reference book	0.003	0.031
	Module	0.058	0.031
	Journal	-0.060	0.031
	Manual book	-0.021	0.040
Document Language	English	-0.130	0.017
	Indonesian	0.130	0.017
Test	Multiple Choice	0.100	0.022
	Essay	-0.066	0.022
	Multiple Choice & Essay	-0.035	0.022
Assignment Submission	Be-Smart	0.046	0.022
	WhatsApp	-0.009	0.022
	Google Drive	-0.036	0.022
Discussion Forum	Be-Smart	-0.012	0.017
	WhatsApp	0.012	0.017
(Constant)		2.874	.019

Regarding video language, students clearly preferred Indonesian-language videos (0.153), while English-language videos received a negative utility value (-0.153). A similar pattern appeared for document language, where Indonesian-language documents (0.130) were preferred over English-language documents (-0.130). These findings indicate that students considered their native language more supportive for understanding technical concepts and practical instructions. Within the document type attribute, modules achieved the highest utility estimate (0.058), followed by job sheets (0.020) and reference books (0.003). Conversely, journals (-0.060) and vehicle manuals (-0.021) were less preferred as primary learning resources. This result suggests that students favored structured instructional materials specifically designed for classroom learning. For the assessment format, multiple-choice tests had the highest utility estimate (0.100), whereas essay tests (-0.066) and combined multiple-choice and essay tests (-0.035) were less preferred. This finding indicates that students preferred assessment formats that were perceived as more straightforward and efficient.

Regarding assignment submission, students preferred using the Be-Smart LMS (0.046), while Google Drive (-0.036) and WhatsApp (-0.009) were less preferred. This result demonstrates students' preference for an integrated learning platform that combines instructional materials, assignments, and feedback in a single environment. Interestingly, for the discussion forum, students showed a slight preference for WhatsApp (0.012) over the Be-Smart discussion forum (-0.012). Although the utility difference was relatively small, this finding suggests that students perceived instant messaging applications as more convenient and responsive for academic communication. In other words, the utility estimates indicate that students tended to prefer practical learning resources, concise instructional videos, Indonesian-language materials, structured learning modules, multiple-choice assessments, integrated assignment submission through the LMS, and discussion platforms that facilitate immediate interaction. These preference patterns provide valuable guidance for designing flipped learning environments that better align with students' learning expectations and experiences.

Importance Values of Learning Media and LMS Features

Importance values indicate the contribution of each attribute to students’ decision-making when evaluating alternative learning media and LMS features. A higher importance value suggests that the attribute has a greater influence on students’ preferences. Table 4 presents the relative importance values of the eight attributes evaluated in the conjoint analysis.

Table 4. Importance Values

Importance Values	
Video Type	12.189
Video Duration	12.644
Video Language	13.082
Document Type	16.456
Document Language	13.715
Test	12.198
Assignment Submission	11.738
Discussion Forum	7.978

Table 4 presents the relative importance of each attribute in influencing students' preferences toward LMS-based flipped learning. Among the eight evaluated attributes, document type had the highest importance value (16.456%), indicating that the type of learning material was the primary consideration for students. This was followed by document language (13.715%) and video language (13.082%), suggesting that the presentation and accessibility of learning materials substantially influenced students' preferences. In contrast, the discussion forum received the lowest importance value (7.978%), indicating that communication features were considered less influential than learning resources and assessment components. Overall, these findings demonstrate that students prioritized the quality and format of instructional materials over the support LMS features provide when engaging in flipped learning.

Model Fit of the Conjoint Analysis

Table 5 presents the goodness-of-fit statistics for the conjoint model, comparing observed and estimated preferences. Pearson's R and Kendall's tau were used to evaluate the predictive accuracy of the conjoint model.

Table 5. Correlation between observed and estimated preferences

	Value	Sig.
Pearson’s R	0.973	0.000
Kendall's tau	0.874	0.000

As shown in Table 5, the conjoint model demonstrated excellent predictive performance. Pearson’s R coefficient (0.973, $p < 0.001$) indicates a very strong correlation between the observed and estimated preference scores. Likewise, Kendall's tau coefficient (0.874, $p < 0.001$) confirms a high level of agreement in the ranking of students’ preferences. These significant coefficients indicate that the conjoint model accurately represents students' preferences for learning media and LMS features in the flipped learning environment.

DISCUSSION

The lecturer can arrange the learning media in the LMS according to the characteristics of the learning material and other important factors, accommodating students' needs and preferences in learning. Student preferences are important because, in an effort to increase student learning independence, it is necessary to support good quality material and be liked by students (Kaleci, 2025; Vieyra & González, 2023). LMS Besmart UNY can accommodate various media and features that support flipped learning, including videos and learning media in the form of documents, such as job sheets, reference books, modules, journals, and vehicle manuals. In addition, Besmart UNY can provide test features in various forms, such as multiple-choice, essay, and combined tests. In flipped learning, distance communication is very important, where the LMS Besmart UNY provides features for synchronous and asynchronous virtual face-to-face communication (Dewi et al., 2025), as well as written communication through discussion forums. Practical learning activities that usually produce projects and reports can be submitted via LMS Besmart. The assignment submission page on the LMS Besmart is very informative, with details on submission, deadlines, and other submission conditions that can be provided in more detail as needed.

The many features of Besmart UNY that accommodate a wide range of needs require the right decisions by lecturers to embed media or use features that will support learning. The tendency is due to Besmart UNY having many features that can be used and learning media that can be embedded, and lecturers use most of these features. However, this does not increase the effectiveness of learning, but, on the contrary, will confuse students regarding which material to study (Adedoyin & Soykan, 2020). Amid the many and dense class schedules, students need to be presented with the right material so they can focus more on preparing to study and on becoming prepared to participate in practical learning.

Furthermore, learning sources include practical tutorial videos, animated videos, and graphic videos. Students prefer practical tutorial videos presented at the LMS Besmart UNY. Through this type of video, important stages in practical learning material can be learned by students (Supriyadi et al., 2020), so that important points such as work procedures, work safety, and other important matters can be learned by students first before carrying out the practice. So that the potential for work accidents and damage to training objects of practice can be minimized, because students already have sufficient knowledge (Alharthi, 2026; Ashraf et al., 2021; Listiqowati et al., 2022). Students who are not from a vocational high school can be more confident practicing independently without fear of making mistakes because they already know the correct procedure from watching practical tutorial videos.

The language of instruction in learning videos can strengthen students’ understanding of the material (Chaves-yuste et al., 2026; Chen et al., 2025; Ghilay, 2025; Nugroho et al., 2025). Videos related to automotive engineering are mostly in English. LMS users, on average, only embed video links on YouTube for students to watch (Ling et al., 2024), so the videos presented are not the lecturers' own work, and the language of instruction used is also in accordance with the video's default language. Differences between the language of instruction in the video and the language students use can make it harder for students to understand the video's content as a whole. The language of instruction for the video used in flipped learning for practical learning, which is the student's preference, is Indonesian. Based on the questionnaire given to students, why do most students prefer Indonesian? They say they cannot fully understand the information conveyed in the video when English is used as the language of instruction.

References in the form of documents usually contain more complete information than information conveyed through learning media such as videos. Learning documents and media can take the form of worksheets, journals, manuals, reference books, and modules. In flipped learning for practical learning, the main points that media in the form of documents should meet are to focus on and support the material to be practiced. Based on the results of the conjoint analysis of student preferences regarding material, students prefer modules rather than documents embedded in the LMS Besmart. Therefore, media in the form of practice modules are considered more practical and focus on material in flipped learning for practical learning (Ashraf et al., 2021; Santhanasamy, 2022). In addition, as a learning medium, video, based on the conjoint analysis, indicates that students prefer Indonesian as the language of instruction. By using Indonesian, students find it easier to understand the material. Based on these results, providing material in languages other than Indonesian, the language of instruction, may make it difficult for students to understand. So it requires additional reinforcement material or an explanation from the lecturer. Thus, the use of structured language in learning media can help students understand the material.

Furthermore, tests are used before practical learning to ensure students have sufficient knowledge of the material to be practiced. At the same time, it requires students to study the material presented by the lecturer on the LMS Besmart UNY. The absence of a test can have the potential that students do not take the material seriously (Retno et al., 2019). The type of test that students are interested in is a multiple-choice test, when compared to an essay test or a combination of the two types of tests (Ajayi & Idusogie, 2020; Hamdu et al., 2020). This type of test has the advantage of being more practical when carried out online and can provide students with direct feedback in the form of grades. Lecturers do not need to correct student answers, as the Moodle system will automatically do so based on the lecturer's settings. In a Moodle-based LMS such as Besmart UNY, to ensure that the questions received by one student differ from those received by another, questions can be randomized and drawn from the lecturer's question bank. Although it looks simple, it takes a lot of time to prepare it all at the beginning of learning. Lecturers will feel the simplicity during the second and subsequent learning because they can use existing courses or develop new ones. However, when conducting online tests, it is important to consider how to prevent cheating.

LMS Besmart UNY also has a feature for assignment submission, in which lecturers can make several arrangements for assignment submission, such as collection time, file size, and type of assignment document (Purwantini et al., 2025). This is a common setting used by lecturers. The conditions for submitting assignments can be written down, and students can read and adjust the existing provisions, under which the system will automatically reject files if the time limit has passed. The advantage of this system is that it can also tell students whether their submitted assignments have been corrected and graded by the lecturer, along with the lecturer's notes. The presence of feedback is very important for describing achievements related to the tasks collected. The results of the conjoint analysis show that students prefer to collect assignments through LMS Besmart UNY because of the advantages it offers over collecting assignments via Google Drive or WhatsApp. In other words, the other two options do not impose time restrictions or protect the privacy of submitted assignments; other students can view their friends' work files, increasing the potential for cheating.

Online discussion is needed in flipped learning (Listiqowati et al., 2022; Siburian et al., 2022). This discussion can be facilitated through various platforms, including the LMS. Besmart UNY also offers this feature. The discussion can be started with lighter questions from the lecturer or student questions, depending on the learning setting used by the lecturer. Conjoint analysis for the discussion forum feature, comparing the use of the features on Besmart with those on another platform, namely WhatsApp, showed that students preferred using WhatsApp to facilitate discussion. This is understandable because every student must have a WhatsApp account, and it is easier to access than the features at Besmart UNY. In other words, the findings indicate that students' preferences for an LMS-supported flipped learning environment are shaped more strongly by the content and accessibility of learning resources than by communication or administrative features. The high importance of document type, document language, and video language suggests that students prioritize learning materials that are clear, accessible, and appropriate for preparing them for practical activities. These findings reinforce the importance of designing flipped learning not merely by providing technological features but by carefully selecting and combining learning resources to meet students' needs. Thus, the conjoint analysis provides an empirical basis for lecturers to optimize the configuration of Besmart and develop a more student-centered flipped learning environment for practical courses in vocational higher education.

CONCLUSION

Lecturers need to consider the selection of media and features on the LMS when implementing flipped learning. Learning outside the classroom via the LMS in flipped learning allows students to study the material independently before engaging in practical learning in class. Independent student learning needs to be supported by high-quality media aligned with student preferences so students can understand the material optimally, effectively, and efficiently.

A Moodle-based LMS can present various media in different forms according to the lecturer's desired arrangement. In addition, it offers a range of features to support online or distance learning. The number of features does not mean that all of them are used in a course, but the lecturers need to be careful to identify the essential features and media that can support the learning process. Incorporating all types of learning media and using all the features will actually confuse students about which part to prioritize studying. It should also be understood that students do not study only one course but several in one semester.

The type of learning media, the language of instruction in the media, and the duration of the media (especially for video media) were factors that influenced students' attention when studying the material embedded in the LMS. The criteria derived from the conjoint analysis implicitly guide lecturers to produce their own media that align with the characteristics of the material and the students they teach. The use of existing media on the internet, such as YouTube, is permitted but cannot accommodate all the material that should be taught or align with student preferences. The test feature should be used in flipped learning as a motivator to encourage students to study the material and ensure they master it before engaging in practical learning in class, in the laboratory, or in the workshop. Communication activities between lecturers and students, or between students, can use not only the features in the LMS but also other easily accessible and effective platforms, such as creating discussion forums in WhatsApp groups.

Therefore, this study extends the discussion of flipped learning by demonstrating that the design of an LMS-supported learning environment should be informed by students' preferences rather than by the availability of technological features alone. The use of conjoint analysis makes a methodological contribution by enabling the systematic identification and comparison of the relative importance of different LMS-supported learning attributes. This perspective adds to existing research that has primarily examined the implementation or effectiveness of flipped learning without explicitly examining students' preferred combinations of learning resources and digital features. However, the findings should be interpreted in the context of the study, particularly given the involvement of students from a single automotive engineering program at a single higher education institution. Future research should therefore examine whether similar preference patterns emerge across vocational disciplines, institutions, and learning contexts, and investigate how these preferences relate to students' engagement and learning outcomes. In this regard, the present study provides a basis for further empirical investigation into student-centered LMS design for practical flipped learning.

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