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Ten Years User Experience Development Of Moodle In Higher Education Context: A Systematic Literature Review

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Abstract

Currently, approximately 561 LMS have been developed worldwide to assist teaching and learning processes and other academic needs. During the ten years of Moodle's development as an LMS, to our knowledge, no prior systematic review has comprehensively examined Moodle interface design across these specific dimensions (consistency, usability, navigation, information hierarchy, visual appearance, and user testing). This review addresses several key research questions: (1) What journal platforms publish the most journals about Moodle interface design? (2) Who are the most frequently cited authors in the last ten years? (3) How has the Moodle interface design developed in the last ten years? (4) What are the concerns or gaps regarding the Moodle interface design that can be used as a reference for further LMS development research? This literature review focuses on studies conducted from 2015 to 2025 on using Moodle in academic institutions. Following the PRISMA-p protocol for systematic searching and screening, researchers used bibliometric analysis (VOSviewer) to answer RQ1, RQ2, and RQ4 and using thematic analysis to find the third research question' answer. The sustained volume of publications (67 articles) and the continued research interest across multiple journal platforms suggest Moodle's ongoing relevance as an LMS in higher education contexts during the review

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period. Emerging but underexplored themes include ethics and data safety. Moreover, Given the limited research on AI integration in Moodle interfaces within our corpus and the single article addressing data safety, future research examining these emerging concerns would strengthen the evidence base for Moodle development prioritiesand develop as the automatization world keeps moving forward.

Keywords: Moodle, interface design, systematic literature review

BACKGROUND

There are several learning management systems (LMSs) available for developing, managing, and distributing digital resources for face-to-face or online instruction. An LMS provides interaction between traditional learning and various digital sources and offers students opportunities for personalized e-learning (Bedregal-Alpaca et al., 2021; Ochoa-Orihuel et al., 2020). Research related to LMS continues to grow, especially when the pandemic hit the whole world and limited face-to-face human activities in various regions (Dias et al., 2020). Educational institutions must adapt to the restrictions imposed, including physical interaction, which precludes most of the integration of conventional learning, assessment, and research methods (Tirza, 2021). The role of LMS has become well known in various contexts, not only in science but social sciences and even the arts. Through increased access to broadband internet and advances in online learning technology, LMSs are growing. Many educational institutions have used LMS and are continuing to research the effectiveness of different types of LMS. Several recent studies have shown that several features in LMS can increase student engagement and motivation (Jones et al., 2021; Marachi & Quill, 2020; Omar, 2021), student achievement, retention as well as students' ability to think critically (Bernacki et al., 2019). In addition, LMS also allows instructors to make modifications, track student learning outcomes and also adopt some changes to the curriculum if they occur (Dewi et al., 2022; Goyal et al., 2023). The latest systematic literature review shows that learning environments including LMS will continue to develop massively in the future (Luo et al., 2017; Maslov et al., 2021).

Currently, approximately 561 LMS developed worldwide aim to assist the teaching and learning process and other academic needs. Moreover, the e-learning platforms that are most frequently used and frequently researched are Edmodo, Moodle, MOOC, and Google Classroom (Setiadi et al., 2021). Moodle is one of the most popular LMSs and an open-source choice (Fenu

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et al., 2017). Previous research suggests that lecturers and researchers use Moodle as their LMS platform (Khatser & Khatser, 2022).

During the ten years of Moodle's development as an LMS, While individual studies have examined aspects of Moodle's consistency, usability, navigation, information hierarchy, visual appearance, and user testing, no prior systematic review has synthesized these interface design dimensions across the literature (Aikina & Bolsunovskaya, 2020; Makruf et al., 2022; Marisa Rodrigues, 2020; Noorani, 2023). This review addresses that gap by systematically analyzing how these elements have been studied from 2015 to 2025. In contrast, Moodle users continue to show improvement; in 2020, there were 294 million Moodle users worldwide (Monllaó Olivé et al., 2020). Therefore, this study conducted a systematic literature review of Moodle interface design over the last ten years. The results of this study are intended for researchers and developers who plan to develop Moodle as an LMS within their institutions and as a research area. This review addresses several key research questions:

1. What journal platforms publish the most journals about Moodle interface design?
2. Who are the most frequently cited authors in the last ten years?
3. How has the Moodle interface design developed in the last ten years?
4. What are the concerns or gaps regarding the Moodle interface design that can be used as a reference for further LMS development research?

METHODS

This literature review focuses on studies conducted from 2015 to 2025 on using Moodle in academic institutions. To answer the first and second research questions, namely, what journal platforms publish the most journals about Moodle interface design? Furthermore, who are the most frequently referenced authors in the last ten years? Then bibliometric analysis is used to identify research trends related to the Moodle interface and provide a bibliometric overview of publications. Then, the researcher used thematic analysis to answer the second research question regarding research gaps and the development of the Moodle interface design. The thematics in question include design consistency, usability, navigation, information hierarchy, visual appearance, and Moodle user testing for the past ten years. This research is funded by the UPH Research Departement on number P-041-INT-FIP/VII/2025.

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BIBLIOMETRIC ANALYSIS

(This study adopted a strict systematic review protocol following the 4-step PRISMA-P process (Kamioka, 2019). This procedure consists of the following steps: (1) Identification of relevant literature relevant to this study, (2) screening using the authors' criteria, (3) methodical classification of the screened articles using the authors' codes and themes, and (4) selection of articles for inclusion in this review.

Identification. This process involves Publish or Perish (PoP) to obtain journals from a reputable journal platform, Scopus. Researchers use the word "Moodle" to find articles that contain the word "Moodle" and the keywords "higher education." The article year is limited from 2015-2025. The search yielded 190 articles, conference papers, and book chapters.

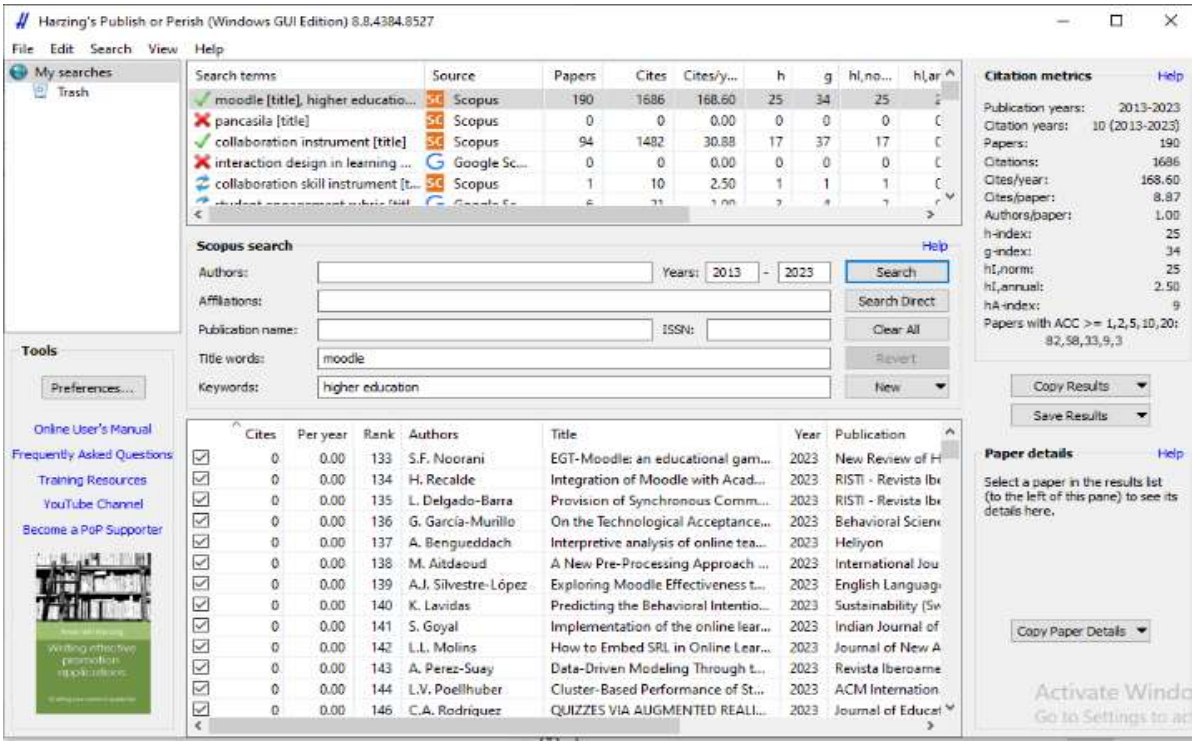

Figure. 1 The layout of PoP before screening process

Screening. In this phase, a screening phase is carried out to issue documents that: 1. Not a journal article, 2—written in a language other than English, 3. Articles that are not relevant to the purpose of this study. Irrelevant articles mean articles that, in their abstract, do not discuss aspects related to Moodle interface design.

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Classification. This study classifies research published in journal articles and non-journal articles. After classifying them, 98 papers were issued which were not included in the journal article category because these articles were included in book chapters and proceedings.

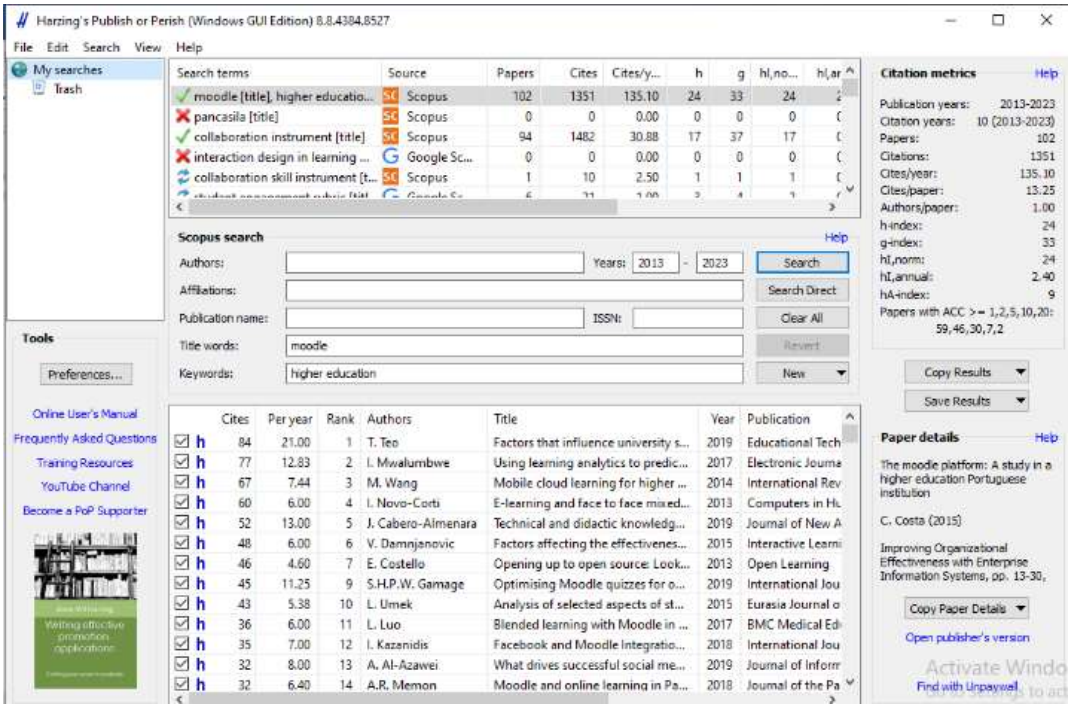

Figure.2 The screening process from PoP, chosen article from reputable journals

Included. Articles included in this study contain the word "Moodle" in the title or abstract. Limited to journal articles published in 2015-2025 and in the abstract, the elements in the interface design are illustrated. 67 articles eventually became the material for study in this article.

BIBLIOGRAPHIC ANALYSIS

The Vosviewer software, Version 1.6.19, was applied for bibliometric analysis using the Scopus database search in PoP. Vosviewer is freely available software that automates term identification and constructs bibliometric maps based on network data (van Eck & Waltman, 2013). Articles that have gone through the strict PRISMA-p stages are saved in .CSV form and then inputted into Vosviewer to display a bibliographic data map. Bibliometric analysis was performed in each article to answer the first and second and forth research questions,

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1. What journal platforms publish the most journals about Moodle interface design?
2. Who are the most frequently cited authors in the last ten years?
4. What are the concerns or gaps regarding the Moodle interface design that can be used as a reference for further LMS development research?

THEMATIC ANALYSIS

Thematic analysis is a qualitative research method that researchers use to organize and analyze complex data sets systematically. It is a search for themes that can capture the narratives available in the account of data sets. Thematic analysis was made to answer the third research questions:

3. How has the Moodle interface design developed in the last ten years?

In this study, researchers use the deductive approach. This is explicitly researcher-driven allowing the researchers to analyze the data in relation to their theoretical interest in the issues being investigated (Dawadi, 2020). To generate the trends of interface design in Moodle within last 10 years and the gaps about it for further research, the six-phase (Braun & Clarke, 2006) method was used as follows

(1) Familiarization with the data: Articles that are read are then marked to see concepts related to the desired topic.

(2) Coding: Codes were generated for important features relevant to Moodle interface design and gaps in those studies. This coding is not simply a method of data reduction; it is an analytic process.

(3) Searching for themes: A theme is a coherent and meaningful pattern in the reviewed articles which is relevant to the research questions. This review constructed some themes of interest relevant to interface design (RQ 3 and 4).

(4) Reviewing themes: This step involved reflecting on the themes to tell a story, defining the nature of the theme, and identifying relationships between the themes and different sub-themes within the themes.

(5) Defining and naming themes: This step involves determining the prin ciple of each theme and developing an informative name for each theme.

(6) Writing up: Writing involves creating a coherent and persuasive story about the review that includes an analysis of current and future research.

The results of the formation of themes and sub-themes can be seen in the table

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RESULT AND DISCUSSION

As explained in the method section, after going through the strict PRISMA-p stage, 67 journal articles were found that were used in this study.

Table 1 interface design themes in Moodle within last 10 years

Themes	Sub-themes	Definition of sub-themes in the articles	Articles
Expectations in interface design	Ease of use	Students' perceptions on the ease of use was significantly influenced by technology complexity and trialability	(Teo et al., 2019)
	User satisfaction	how the user feels when using each feature, teaching, and cognitive presence	(Kazanidis et al., 2018; Mwalumbwe & Mtebe, 2017; Umek et al., 2017)
	Fitur effectiveness	features in the tool show expected results	(Gamage et al., 2019)
Navigation	Finding	ease in finding the location of submit assignments	(Cabero-Almenara et al., 2019)
	Communicative	The tool manages to convey instructions to the user	(Damnjanovic et al., 2015)
	Functionalities		(Koutoumanos et al., 2014)
	Usage and awareness	user expressed highest awareness towards File, Folder, Assignment, URL and Quiz features whilst the least awareness was towards SCORM package and IMS content package features.	(Hijazi et al., 2020; Singh et al., 2019)

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		engagement with all features	
Ethics	Safety	Data safety in Moodle	(Yue & Ken, 2016)
Cognitive buildin g	Reading comprehension	Moodle e-learning platform develops a group of students' skills in the reading technique	(Baykova et al., 2020)
	Numerical skills	Mathematics and Fundamentals of Mathematical Information Processing	(Sozontova et al., 2020)

BIBLIOMETRIC ANALYSIS

From searching with PoP and going through the strict PRISMA-p stage, researchers found several journal platforms that publish many journals with the title "Moodle" and are related to their interface in college practice. As shown in the diagram below.

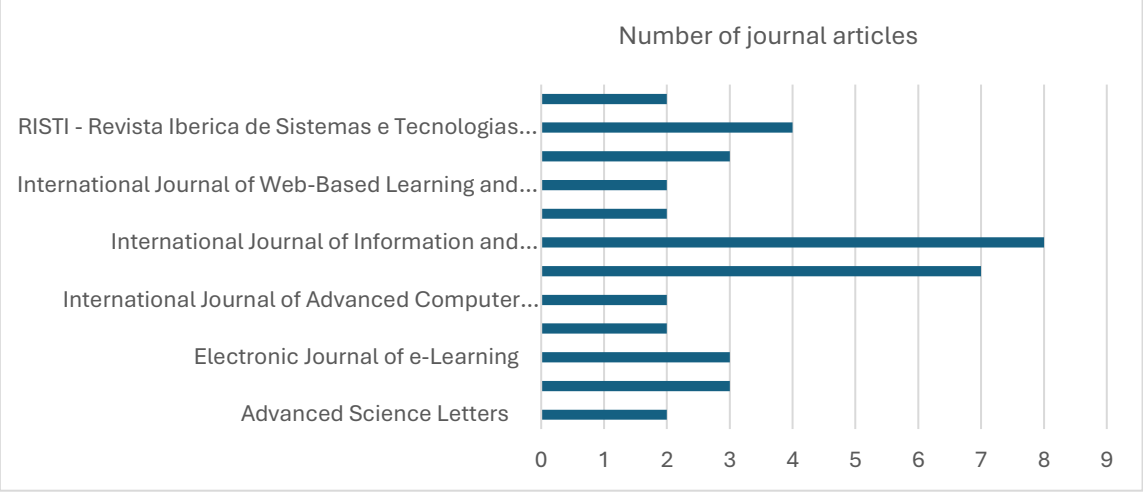

Fig. 3 The journal platform that has been widely used to publish Moodle interfaces in the last 10 years.

In order to get much information related to interfaces in Moodle, readers need to review the writings often referred to in research related to this interface. Publish, Perish, or PoP greatly

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facilitates researchers in choosing journals and journal authors that are widely referred to in research related to the Moodle interface. The results can be seen in the table 2 below.

Table 2. List of authors who discuss about Moodle interface

Rank	Cited amount	Title	Authors
1	84	Factors that influence university students' intention to use Moodle: a study in Macau	(Teo et al., 2019)
2	77	Using learning analytics to predict students' performance in moodle learning management system: A case of Mbeya University of science and technology	(Mwalumbwe & Mtebe, 2017)
3	67	Mobile cloud learning for higher education: A case study of moodle in	(Wang & Wang, 2025)

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		the cloud	
4	60	E-learning and face to face mixed methodology: Evaluating effectiveness of e-learning and perceived satisfaction for a microeconomic course using the Moodle platform	(Berestova et al., 2022)
5	52	Technical and didactic knowledge of the moodle LMS in higher education. Beyond functional use	(Cabero-Almenara et al., 2019)
6	48	Factors affecting the effectiveness and use of Moodle: students' perception	(Damnjanovic et al., 2015)
7	46	Opening up to open	(De Santo & De Meo, 2016)

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		source: Looking at how Moodle was adopted in higher education	
8	45	Optimising Moodle quizzes for online assessments	(Gamage et al., 2019)
9	43	Analysis of selected aspects of students performance and satisfaction in a moodle-based e-learning system environment	(Umek et al., 2015)
10	36	Blended learning with Moodle in medical statistics: An assessment of knowledge, attitudes and practices relating to e-learning	(Luo et al., 2017)

To answer the fourth research question, the researcher used VOS viewer. The results of the bibliometric analysis with VOS viewer show that several topics related to the Moodle interface have yet to be widely researched, and some have been frequently researched because the keywords have frequently appeared. In the picture below, what is visible is a keyword that

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has been widely researched, while what needs to be visible indicates that researchers still rarely explore the topic. Topics rarely researched related to the Moodle interface include keywords about computer self-efficacy, haproxy, developing country, collaborative environment, and logfiles.

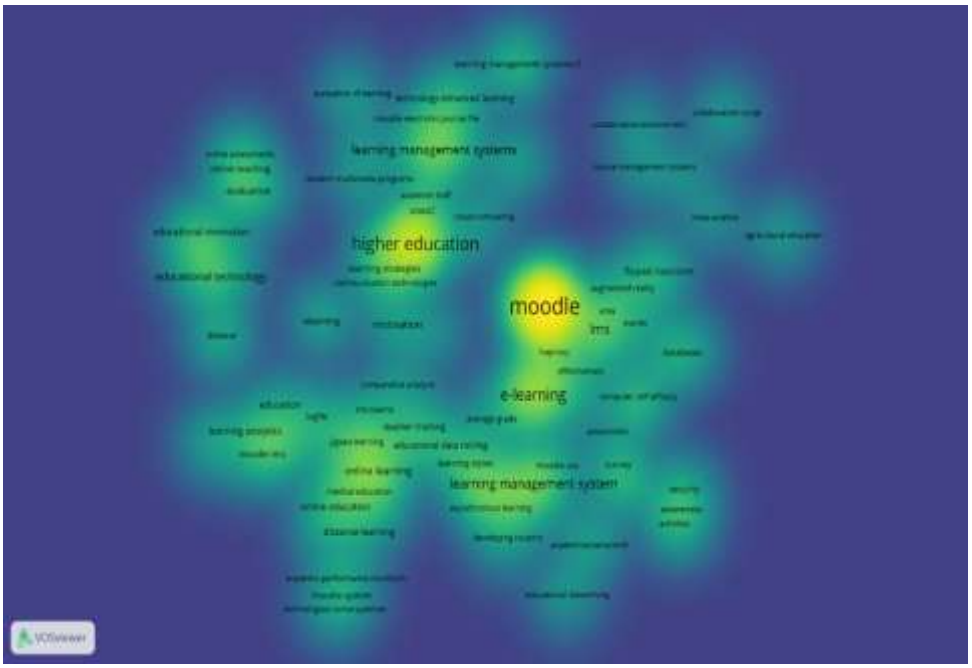

Figure 3 The layout of VOS viewer

Research gaps are also shown in the network visualization in VOSviewer so that future researchers can fill these gaps. For example, how many are in two color clusters between research topics on Moodle and asynchronous classes but are still quite close together? This means that between these two variables, it is still possible to find aspects to fill the gap between these two variables. This means that conducting research related to these two variables is still possible.

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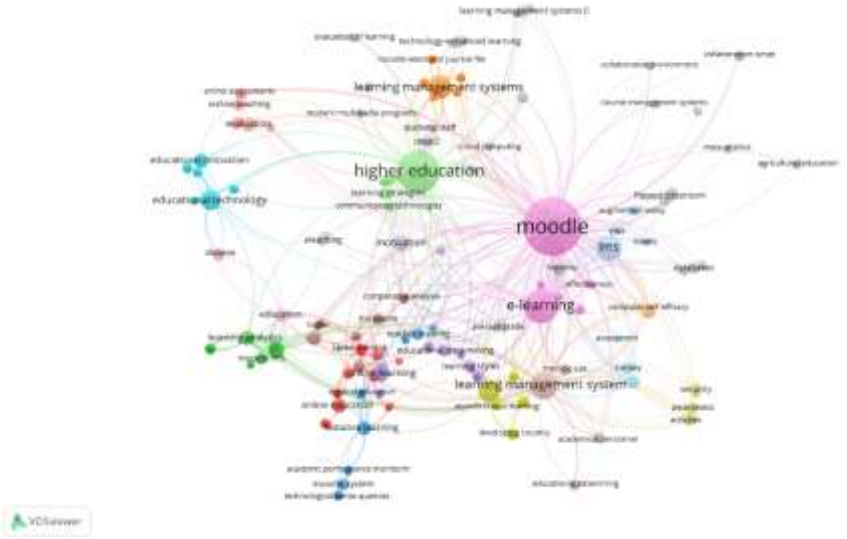

Figure 4 VoS viewer showed the Moodle reseach and other topics as potential future research

CONCLUSIONS

Within ten years, Moodle has become a stable and in-demand LMS platform. Much research has been done on Moodle and its interface design. The findings from this literature review raise several themes that can be considered for the development of further research. One of the emerging themes is ethics, an issue in the rapidly growing world of information. Student data security needs to continue to be a consideration for Moodle. Moodle also needs to consider the presence of AI, which is increasingly massive in influencing the world of education, so much research will likely link Moodle with AI interface design. Research topics related to Moodle interface design and its relationship with Asynchronous classes are also rarely observed. This topic will be very useful when many universities, especially in developing countries, develop micro-credentials for students outside the university.

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