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Enhancing Online Learning: A Comparative Analysis of Moodle and Google Classroom in Rabat's Faculty of Education Sciences

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Abstract

This research examined student satisfaction and perceived effectiveness of two online learning platforms, Moodle and Google Classroom, among students at the Faculty of Education Sciences in Rabat. A total of 215 students participated in an online survey to evaluate their satisfaction and perception of the platforms' effectiveness as learning management systems. The findings revealed that Moodle received a higher average rating than Google Classroom, with a majority of students considering it more effective for distance learning. However, Google Classroom was favored for its ease of use and fewer technical issues. These insights can assist educators and administrators in understanding student preferences and enhancing the online learning experience.

1. Introduction

Information and communication technologies have profoundly transformed the world of education by promoting the emergence of increasingly popular online learning platforms. These platforms are used by educational institutions, training centers, and companies from all sectors interested in distance learning (Ayouni, Menzli, Hajjej, Maddeh, & Al-Otaibi, 2021; Dobashi,

Ho, Fulford, Lin, & Higa, 2022; Kaewsaiha & Chanchalor, 2021; Cristobal Romero & Ventura, 2020).

Online learning platforms, such as Moodle and Google Classroom, have revolutionized education by offering greater flexibility, cost savings, and expanded access to educational resources. These solutions offer teachers and learners features adapted to their needs and objectives and are widely adopted by educational institutions (Setiadi, Alia, Sumardi, Respati, & Nur, 2021) as well as by businesses for online training of their employees.

Despite the undeniable advantages of these platforms, it is crucial to determine if they meet students' expectations in terms of satisfaction and effectiveness. Additionally, it is important to examine the factors that influence students' preference for one platform over the other, as well as the challenges they face when using them.

In this study, we will address the following questions:

- What is the level of satisfaction of students with the use of two online learning platforms, Moodle and Google Classroom?
- How do students from the Faculty of Education Sciences in Rabat perceive the effectiveness of Google Classroom and Moodle as online learning management systems?
- What factors influence students' preference for one platform over the other?

By answering these questions, this study aims to provide valuable information to educational institutions, teachers, and online learning platform designers to improve students' learning experience and promote their academic success.

2. Literature review

The benefits of online learning platforms are numerous. They offer greater flexibility in learning, allowing learners to take courses at their own pace and from anywhere, thereby promoting savings in time and resources. They also enable teachers to track learning outcomes and use the information collected to adapt and modify their teaching practices (Aldowah, Al-Samarraie, & Fauzy, 2019; Bachhal, Ahuja, & Gargrish, 2021; Balkaya & Akkucuk, 2021; Dominguez, Bernacki, & Uesbeck, 2016; Hempel, Kiehlbaugh, & Blowers, 2020; Marticorena-Sánchez, López-Nozal, Ji, Pardo-Aguilar, & Arnaiz-González, 2022; Price et al., 2021; Sergis, Vlachopoulos, Sampson, & Pelliccione, 2017; Shurygin, Saenko, Zekiy, Klochko, & Kulapov, 2021; Zakaria, Saharudin, Yusof, & Abidin, 2019; Zheng, Xing, & Zhu, 2019).

Moreover, recent studies have shown that these platforms increase student motivation, engagement, and cooperation (Araya & Collanqui, 2021; Campbell, Heller, & Pulse, 2022; Gamage, Ayres, & Behrend, 2022; Hwang, 2020; Jones, Lotz, & Holden, 2021), retention, performance and critical thinking (Alkholy, Gendron, Dahms, & Ferreira, 2015; Ardianti, Sulisworo, Pramudya, & Raharjo, 2020; Bernacki, Vosicka, & Utz, 2020; Cadaret & Yates, 2018; Gamage et al., 2022; Hempel et al., 2020; Oguguo et al., 2021). They provide a more interactive and collaborative learning environment through features such as discussion forums, chat sessions, collaborative workspaces, and video conferencing tools.

Modular Object-Oriented Dynamic Learning Environment (Moodle) is one of the most popular online learning platforms (Chang, Li, & Huang, 2022; Ikawati, Al Rasyid, & Winarno, 2020; Rice, 2008; Cristóbal Romero, Ventura, & García, 2008). It is an open-source, free, and highly flexible solution that enables teachers and administrators to create customized online learning environments to meet their specific needs and objectives (Chang et al., 2022). With its varied features, Moodle is widely used to create, organize, and distribute learning content such as courses, assignments, quizzes, discussion forums, online chats, video conferencing, and videos (Dobashi et al., 2022; Huerta, Caballero-Hernández, & Fernández-Ruiz, 2022; Cristóbal Romero et al., 2008; Yassine, Kadry, & Sicilia, 2016). Furthermore, this platform allows tracking and analyzing learners' progress and engagement throughout the learning process (Alkholy et al., 2015).

Google Classroom is another free learning management platform designed for schools and any user with a personal Google account. This online platform was launched in 2014 (Al-Maroof & Al-Emran, 2018) and used by more than 100 million teachers and students worldwide in 2020 (De Vynck & Bergen, 2020). It enables teachers to create online courses, organize discussions, encourage collaborative learning, distribute assignments, and assess student progress (Azhar & Iqbal, 2018; Latif, 2016; Pirronea, Varrasia, Plataniaa, & Castellanoa, 2021; Pratama, 2021; Rosyada & Sundari, 2021; Shaharanee, Jamil, & Rodzi, 2016). Students can access online courses, submit assignments, and communicate with their teachers (Fitri Rahmawati, Zidni, & Suhupawati, 2020; Iftakhar, 2016). Google Classroom is user-friendly and promotes time and paper savings by allowing teachers to distribute and collect assignments online (Al-Maroof & Al-Emran, 2018; Shak, Hasni, Abdul Malik, & Mohd Tahir, 2022; Zhang, 2016).

3. Methodology

To address our research questions and evaluate the satisfaction of students at the Faculty of Education Sciences in Rabat regarding the use of Moodle and Google Classroom platforms, we conducted exploratory research using an online questionnaire.

3.1. Sample

Our questionnaire was sent to a sample of 215 students from the Faculty of Education Sciences in Rabat, Morocco. Students were invited via email and the questionnaire was accessible on all devices (computers, tablets, and smartphones) to ensure maximum participation.

3.2. Data Collection: Online Questionnaire

The questionnaire (see Appendix) was designed and created online using Microsoft Forms. It consisted of 25 targeted questions, divided into six items:

- Personal information: This section collects demographic data about the respondents, such as gender, employment status, age range, and level of education. This information can help in understanding the background of the respondents and can be used to analyze the data in different demographic groups.

- Degree of ICT proficiency and availability of computer tools among students: This section assesses the respondents' self-perceived proficiency in information and communication technologies (ICT) and the types of devices and internet access they have. This information can provide insights into the technological readiness of the respondents for distance learning.

- Platform evaluation: This section asks respondents to rate and compare two distance learning platforms, Google Classroom and Moodle, on various aspects such as effectiveness, ease of use, motivation and engagement, communication, collaborative work, creativity, personalized learning, and evaluation of learning. This information can help in understanding the strengths and weaknesses of each platform from the users' perspective.

- Technical difficulties: This section asks respondents if they have experienced any difficulties in using Google Classroom and Moodle. If they answer yes, they are asked to specify the difficulties. This information can help in identifying and addressing the technical issues that users face with each platform.

- Perspectives: This section asks respondents about their preferences for future distance learning and hybrid teaching, and if they were to teach remotely. This information can

provide insights into the users' attitudes towards each platform and their potential use in different teaching and learning scenarios.

- Suggestions: The final question invites respondents to share any suggestions or comments they have. This open-ended question can provide qualitative data that may reveal insights not covered by the previous questions.

The questionnaire was pre-tested with a small group of students to ensure its clarity and comprehensibility. The final version of the questionnaire was then distributed to the sample via email.

3.3. Data analysis

To analyze the data collected from the online questionnaire, we used SPSS and Excel software. Descriptive analysis was conducted to determine the frequency, percentage, and average of the responses to each question. We also used the Chi-square test to determine the association between different variables and the students' satisfaction with the platforms. The Chi-square test was used to determine if there was a significant difference between the proportions of students who were satisfied with Moodle and Google Classroom. The level of significance was set at $p < 0.05$. The results of the Chi-square test were reported as a Chi-square value and a p-value. The Chi-square value was used to determine the strength of the association between the variables, while the p-value was used to determine the statistical significance of the association. Overall, the use of SPSS and Excel, descriptive analysis, and the Chi-square test allowed us to analyze the data and draw meaningful conclusions about the satisfaction of students with Moodle and Google Classroom.

4. Results

4.1. Personal data

Our sample consists of 215 students (64.2% female and 35.8% male), which reflects the gender distribution noted in the total student population at the Faculty of Education Sciences in Rabat. The majority of students are still young (Figure 1): 66.5% have an average age of less than 30 years and only 12.1% reported being over 40 years old.

As for the educational levels of the sample, the undergraduate and graduate programs are represented by 28.8% and 71.2%, respectively. Regarding their employment status, approximately 52.1% of the respondents reported being employed.
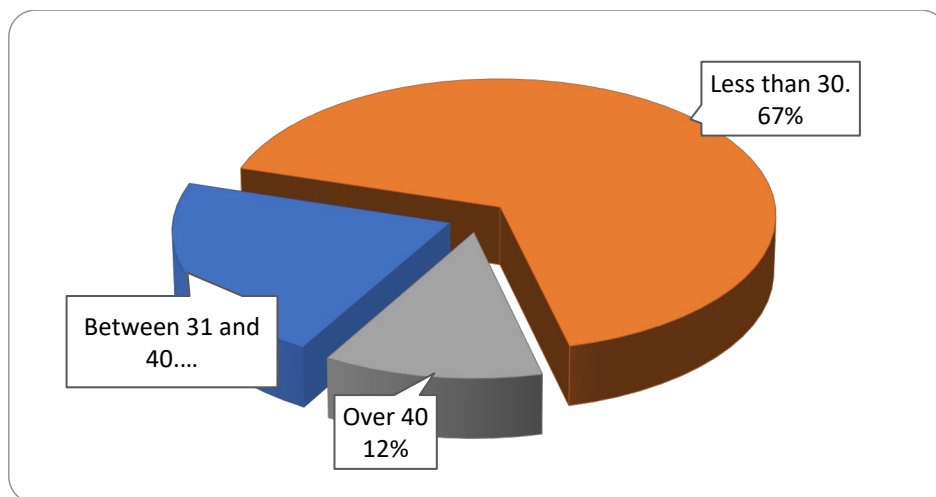
Figure 1. Distribution of respondents according to age.

4.2.   Mastery of ICT and availability of computer tools

The level of mastery of ICT by students is generally satisfactory (56.7% have a good level). It should be noted that our sample does not include any students declaring a low level of ICT mastery. This result is explained by the fact that the respondents belong to educational technology fields.

The results obtained show that 98.13% have a personal computer and almost 72% have a smartphone (figure 2). Furthermore, two thirds have a permanent internet connection (ADSL and fiber optic), which indicates a satisfactory availability of computer tools among students to benefit from distance learning.
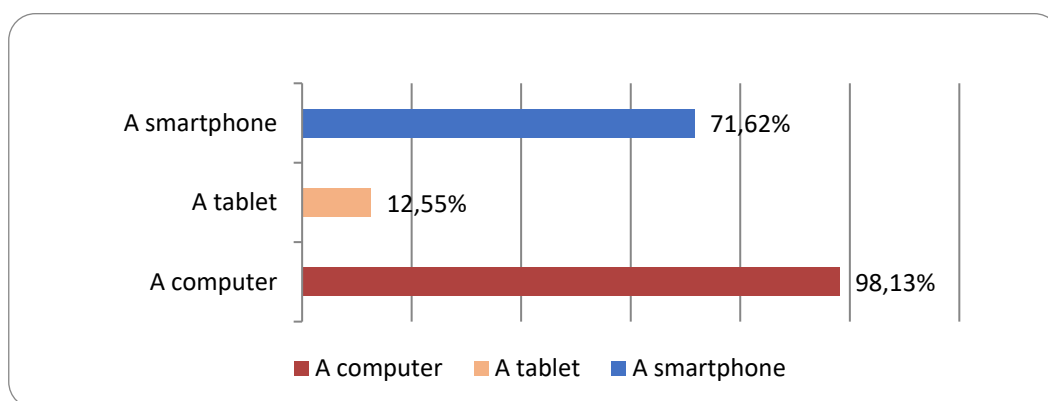

Figure 2. Availability of computer tools

4.3.   The degree of satisfaction of students with respect to the use of two online learning platforms: Google Classroom and Moodle

The two online learning platforms were evaluated by our sample, with ratings ranging from 1 to 5. The average rating given to the Moodle platform is 4.18, while that given to the Google Classroom platform is 3.97.

These results indicate that, on average, the respondents gave a higher rating to the Moodle platform than to the Google Classroom platform. Moreover, Figure 3 shows that the surveyed students gave a more positive evaluation for Moodle than for Google Classroom. Eighty-one percent gave a rating in the "4-5" range for Moodle, while only 68% of respondents gave a rating in the same range for Google Classroom.
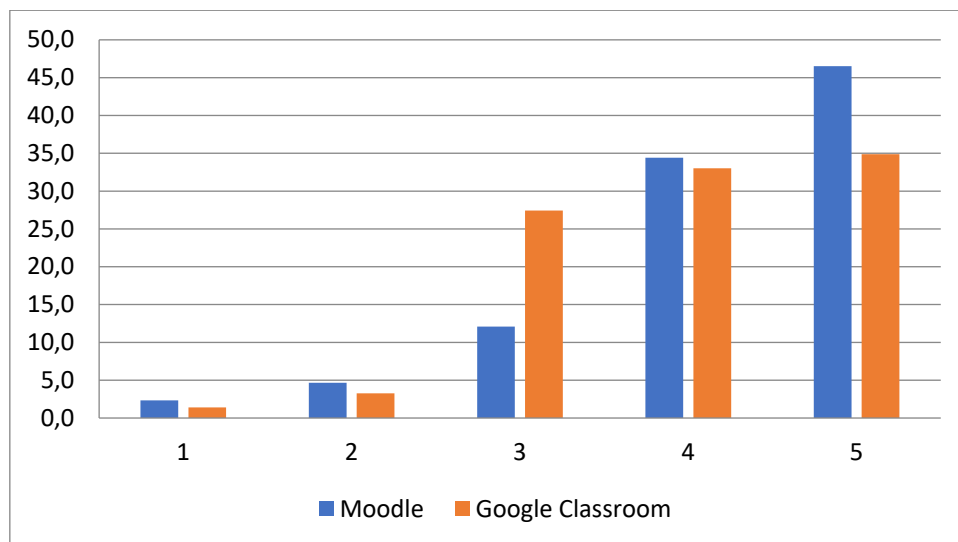

Figure 3. Global evaluation of Moodle and Google Classroom platforms using a rating scale from 1 to 5 stars.

The results, as shown in Figure 4, indicate that most of the respondents (72.1%) consider Moodle to be more effective for their distance learning, while Google Classroom only gets a score of 27.9%.
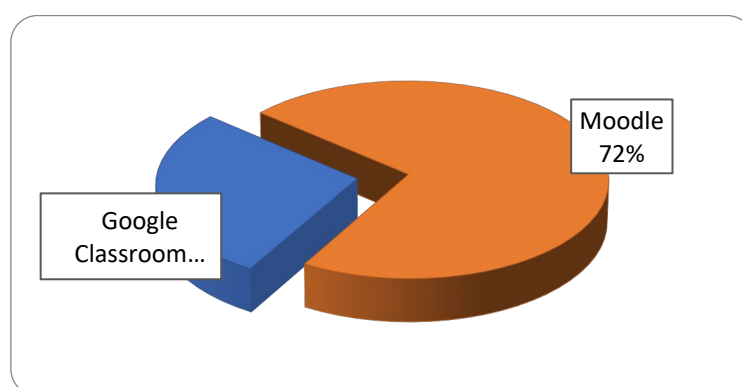

Figure 4. Selection by students of the most suitable platform for distance learning

4.4.   Comparison of the use of Google Classroom and Moodle in online teaching

Figure 5 below reveals that 69.8% of respondents believe that Google Classroom is easier to use, while 30.2% believe that Moodle is easier to use. Therefore, according to this survey, the majority of students in our sample prefer Google Classroom in terms of ease of use.
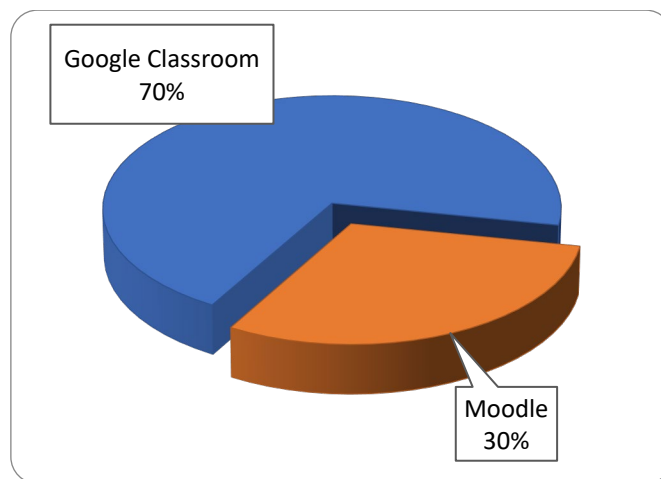
Figure 5. Comparison of Moodle and Google Classroom in terms of ease of use.

It also emerges that the vast majority of students (95.3%) did not encounter any particular difficulties when using Google Classroom (Figure 6).
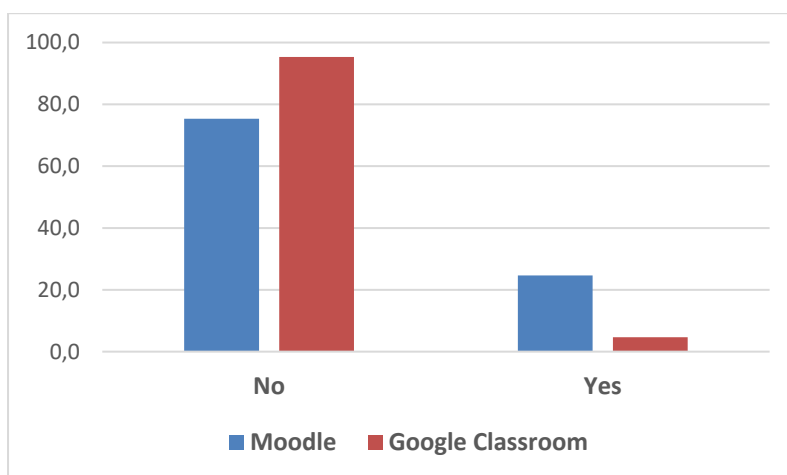

Figure 6. Technical difficulties encountered when using Google Classroom and Moodle.

Our study also aimed to compare Moodle and Google Classroom in terms of six questions related to different pedagogical needs in the context of distance learning, namely student motivation and engagement, communication, collaborative work, production and creativity, creating a personalized learning path, and assessing learning outcomes. We note that the reliability analysis showed a high Cronbach's alpha of 0.813, indicating good reliability of the measures.

Indeed, Figure 7 shows that Moodle is preferred by a majority of respondents to stimulate motivation and engagement in learning (75.3% vs. 24.7% for Google Classroom), to facilitate communication (56.7% vs. 43.3% for Google Classroom), to facilitate collaborative work (77.2% vs. 22.8% for Google Classroom), to encourage production and creativity (89.8% vs.

10.2% for Google Classroom), to help create a personalized learning path (87.9% vs. 12.1% for Google Classroom), and to assess learning outcomes (87.9% vs. 12.1% for Google Classroom).
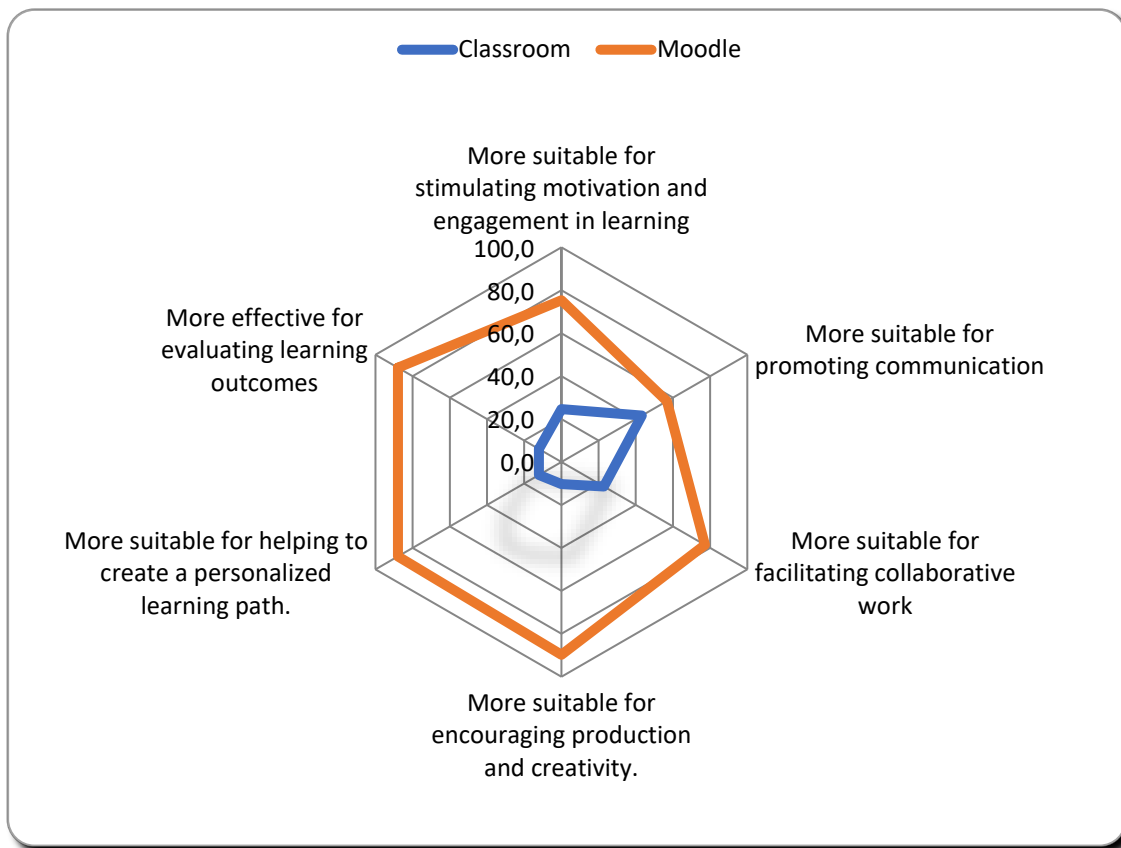

Figure 7. Comparison of the benefits of using Moodle and Google Classroom in distance education

This indicates that respondents perceived Moodle as a more complete and more flexible platform to meet their learning needs, while Google Classroom may be more limited in its functionalities.

4.5. Student motivation for future use of a distance-learning platform

Data from Figure 8 indicate that students prefer to use Moodle rather than Google Classroom for distance education. Indeed, 76.3% of students indicated that they appreciate using Moodle for future distance education, while only 23.7% chose Google Classroom. Similarly, if students have the opportunity to teach remotely, the majority prefer to use Moodle rather than Google Classroom, with 75.3% of students choosing Moodle and 24.7% choosing Google Classroom. Finally, regarding hybrid teaching, the majority of students (71.6%) consider Moodle to be more suitable, while 28.4% chose Google Classroom.
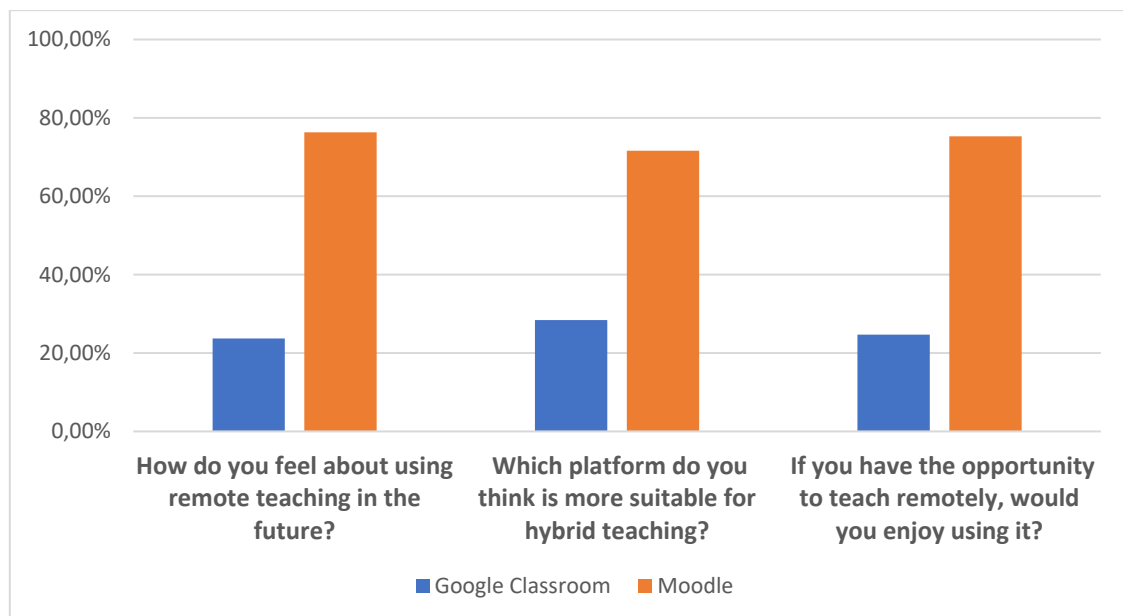
Figure 8. Students' preferences for future use of a distance-learning platform.

4.6. Respondents' Suggestions and Comments

The respondents' suggestions and comments mainly focus on the use of platforms in distance education. Here are some of the most frequent suggestions:

- Provide prior training for students and teachers to facilitate the use of the Moodle platform.

- Encourage teachers to use Moodle for hybrid teaching.

- Provide video conferencing tools to improve the efficiency of Moodle.

- Train teacher trainers for each discipline to gradually train other teachers to use Moodle

- Provide high-speed internet connection and aff66ordable hosting by the university for teachers and students.

- Offer other distance learning platforms such as Chamilo or Edmodo.

These suggestions highlight the need to train teachers and students in the use of distance learning platforms, especially Moodle, to support hybrid teaching and distance learning. The responses also emphasize the need for high-speed internet connection and affordable hosting for teachers and students. In summary, distance education has become an integral part of modern education, and platforms like Moodle can play an important role in this evolution.

5. Discussion

Our study aimed to evaluate two popular online learning platforms, Moodle and Google Classroom, through a student survey. The results have demonstrated that:

- In general, respondents gave Moodle a higher rating than Google Classroom, with an average rating of 4.18 for Moodle and 3.97 for Google Classroom.

- A higher proportion of respondents considered Moodle to be more effective for their distance learning compared to Google Classroom. Seventy-two percent of respondents selected Moodle as the most suitable platform for distance learning, while only 27.9% selected Google Classroom.

Consequently, these findings suggest that Moodle is a more popular and effective online learning platform than Google Classroom, potentially due to its more comprehensive features and greater flexibility for customization.

Moreover, these results are consistent with a recent systematic review on LMS usage trends (Altinpulluk & Kesim, 2021), which concludes that Moodle is the most popular and preferred open-source LMS. According to user experiences in 2018, Moodle was among the top 20 LMSs (Gamage et al., 2022). In addition, the number of Moodle users has been increasing significantly since 2015. According to Moodle official website statistics (https://moodle.net/sites/, accessed on 3 March 2023), the number of users has exceeded 351 million, which is a remarkable increase compared to the 78 million registered users in 2015. This growth is impressive and testifies to the increasing importance of Moodle in the field of online education and training.

Although the popularity of Moodle is undeniable, it is interesting to delve into the reasons why users prefer this platform over Google Classroom, especially in terms of features, ease of use, and the quality of the online learning experience.

Furthermore, the results also showed that the Google Classroom platform is the simplest and easiest to use. This result is consistent with other studies conducted with students (Moonma, 2021; Nafidi, Afkar, El-Ammari, & El-Batri, 2021). In contrast, only 75.3% of students reported not having any particular difficulties with the use of Moodle. These results confirm that Classroom is an easy-to-use platform, as previously reported (Abidin & Saputro, 2020; Fauzi, Wandira, Sepri, & Hafid, 2021; Iftakhar, 2016; Jordan & Duckett, 2018; LOUIZ, 2020; Moonma, 2021; Nuryatin, Rokhmansyah, Hawa, Rahmayanti, & Nugroho, 2023).

In this study, we compared Moodle and Google Classroom in terms of their ability to meet the pedagogical needs of distance learners. We found that Moodle was preferred by a majority of respondents for all six needs, including student motivation and engagement, communication, collaborative work, production and creativity, creating a personalized learning path, and

assessing learning outcomes. These findings suggest that Moodle is a more comprehensive and flexible platform than Google Classroom in the context of distance learning.

There are several possible explanations for why Moodle was preferred by a majority of respondents. First, Moodle offers a wider range of features than Google Classroom. For example, Moodle allows for more customization of the learning environment, which can help to increase student motivation and engagement (Chang et al., 2022). Second, Moodle is more flexible than Google Classroom in terms of how it can be used to support different learning styles and needs. For example, Moodle allows for more collaborative work and production of creative content, which can help students to develop their critical thinking and problem-solving skills.

However, it is important to note that some studies have found that Google Classroom is one of the most preferred platforms to help students acquire new knowledge and skills (Aleksandra, Irena, & Sladjana, 2020; Amin & Sundari, 2020; Pratama, 2021; Rosyada & Sundari, 2021; Shak et al., 2022), develop their problem-solving and self-evaluation skills (Govindarajan & Rajaragupathy, 2022).

Based on the analysis of the data collected from the online questionnaire, it was found that the majority of students prefer Moodle over Google Classroom for distance and hybrid learning. Specifically, 76.3% of students favored Moodle for future online courses. This indicates that Moodle is perceived as a more effective and efficient platform for online learning by the majority of students at the Faculty of Education Sciences in Rabat.

Furthermore, the results of a chi-square test revealed a significant relationship between respondents' level of mastery of information and communication technologies and their preferences for using Moodle or Google Classroom in future distance learning (p <0.001), hybrid learning (p = 0.009), and as a teaching tool (p = 0.001). This suggests that students who are more proficient in using ICT are more likely to prefer Moodle over Google Classroom.

Interestingly, our study found that gender, age, professional status, or academic level did not significantly influence students' preferences, at least within the sample of students included in our study. This indicates that Moodle and Google Classroom are equally accessible and effective for students from different backgrounds and levels of education.

Overall, the findings of our study suggest that Moodle is the preferred platform for online learning among students at the Faculty of Education Sciences in Rabat. The results also

highlight the importance of ICT proficiency in determining students' preferences for online learning platforms.

The feedback from respondents highlights the crucial need for adequate training and support for teachers and students in using distance learning platforms like Moodle. It also emphasizes the importance of reliable high-speed internet connections and affordable hosting options to ensure the effective implementation of hybrid teaching and remote learning experiences.

Lastly, it is important to acknowledge the limitations of our study to provide a balanced perspective and inform future research. First, our study relied on self-reported data from a student survey, which may be subject to response bias and may not accurately reflect the actual experiences of all users. Second, the sample size was limited, and the participants were drawn from a specific population, which may limit the generalizability of our findings to other contexts or user groups. Third, our study focused on comparing Moodle and Google Classroom, but there are numerous other online learning platforms available that were not considered in this research. Future studies could explore the effectiveness and user preferences for a broader range of platforms to provide a more comprehensive understanding of the online learning landscape. Fourth, our study did not investigate the specific features or aspects of each platform that contributed to user preferences, which could provide valuable insights for platform developers and educators. Future research could delve deeper into the factors that influence user preferences and satisfaction with online learning platforms, such as the role of user interface design, platform functionality, and support services. Finally, our study did not examine the long-term outcomes of using these platforms, such as student performance, retention, and satisfaction over time. Longitudinal studies could provide valuable insights into the lasting impact of different online learning platforms on student success and engagement in distance and hybrid learning contexts.

Conclusion

The results obtained in this study on the use of two online learning platforms, namely Moodle and Google Classroom, are interesting. The sample of the study consists of 215 students from the Faculty of Education Sciences in Rabat. The results show that the majority of students have a good level of mastery of ICT and have the necessary computer tools to benefit from distance learning.

Regarding the evaluation of the two platforms, Moodle obtained a higher average score than Google Classroom, with a majority of students evaluating Moodle as more effective for their

distance learning. However, the majority of students preferred Google Classroom in terms of ease of use, with fewer technical difficulties encountered. Google Classroom offers basic features for class management and communication with students and may be sufficient for users who are looking for a simple and user-friendly solution to offer online courses.

These findings offer valuable insights that can guide educators and educational leaders in their decision-making process when selecting an online learning platform. The results provide a comparative analysis of the effectiveness and user-friendliness of Moodle and Google Classroom, two widely used platforms in distance education.

For educators, understanding the strengths and weaknesses of each platform can help them choose the one that best aligns with their teaching style, course content, and their students' learning needs. For instance, if a teacher's priority is a platform with comprehensive features and high effectiveness in distance learning, Moodle, as indicated by the study, could be the preferred choice. On the other hand, if ease of use and simplicity are paramount, Google Classroom might be more suitable.

For educational leaders, such as school administrators or district officials, these results can inform broader decisions about which platform to adopt at an institutional level. The choice of platform can significantly impact the quality of distance education provided, affecting student engagement, learning outcomes, and overall satisfaction.

Moreover, these findings can be instrumental for developers of online learning platforms. By understanding the user experiences and preferences reflected in the study, developers can identify areas for improvement in their platform design. For instance, if students find a platform difficult to navigate, developers could focus on improving the user interface. If a platform lacks certain features that students or teachers find beneficial, developers could consider incorporating these in future updates.

In essence, these results not only inform the selection of online learning platforms but also contribute to their ongoing development and refinement, ultimately aiming to enhance the quality of distance education.

Conflict of interests

We have no conflicts of interest to declare and no financial interest to report.

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APPENDIX

QUESTIONNAIRE

This questionnaire aims to evaluate distance learning platforms used in the Faculty of Education Sciences in Rabat. We greatly appreciate your valuable collaboration, which will be of great help in accomplishing our mission.

Personal data
1. Are you?
   o Male   o Female

2. Are you?
   o Employed   o Unemployed

3. In which age range do you fall?
   o Under 30
   o Between 31 and 40
   o Over 40

4. Study cycle?
   o Bachelor's degree
   o Master's degree

Degree of ICT proficiency and availability of computer tools among students.
5. In your opinion, what is your overall level of mastery of information and communication technologies?
   o Good
   o Average
   o Poor

6. What equipment do you use during distance learning?
   o A computer
   o A tablet
   o A smartphone

7. What type of Internet access do you have?
   o ADSL
   o Fiber optic
   o 3G/4G

Platform Evaluation
8. Rate the Moodle platform?
☆☆☆☆☆

9. Rate the Google Classroom platform?
☆☆☆☆☆

10. Which platform do you find more effective for your distance learning?
   o Google Classroom
   o Moodle

11. Which platform do you find easier to use?
   o Google Classroom
   o Moodle

12. Which platform do you find more suitable for stimulating motivation and engagement in learning?
   o Google Classroom
   o Moodle

13. Which platform do you find more suitable for promoting communication?
   o Google Classroom
   o Moodle

14. Which platform do you find more suitable for facilitating collaborative work?
   o Google Classroom
   o Moodle

15. Which platform do you find more suitable for encouraging production and creativity?
   o Google Classroom
   o Moodle

16. Which platform do you find more suitable for helping you create a personalized learning path?
   o Google Classroom
   o Moodle

17. Which platform do you find more effective for evaluating learning?
   o Google Classroom
   o Moodle

Technical Difficulties

18. Do you have difficulties using Google Classroom in learning?
   o Yes
   o No

19. If yes, please specify which ones: ....

20. Do you have difficulties using Moodle in learning?
   o Yes
   o No

21. If yes, please specify which ones: ....

Perspectives

22. Regarding future distance learning, would you prefer to use?
   o Google Classroom
   o Moodle

23. Which platform do you find more suitable for a hybrid teaching?
   o Google Classroom
   o Moodle

24. If you have the opportunity to teach remotely, would you prefer to use?
   o Google Classroom
   o Moodle

Suggestions

25. If you have any suggestions or comments, please feel free to share them with us.
....
....
....