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A Design of Learning Activities That Created Students Self-Regulated Learning through LMS Moodle

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Abstract

Current Learning systems have enabled students to construct their knowledge by themselves. However, using various LMS will cause different learning situations and experiences for students in learning. This study investigates the effectiveness of Moodle-based learning activities in fostering self-regulated learning (SRL) among undergraduate students. The research was conducted over 8 weeks with 67 participants, employing a mixed-methods approach that included pre-and post-surveys, learning analytics, and qualitative data from focus groups and interviews. The findings reveal significant improvements in key SRL components: goal setting, self-monitoring, self-evaluation, and time management. Quantitative data from the Motivated Strategies for Learning Questionnaire (MSLQ) showed statistically significant gains across all SRL dimensions ($p < 0.01$). Learning analytics indicated that student engagement increased, reflected in doubled login frequency, a 33.3% rise in task completion rates, and a 66.7% increase in time spent on learning tasks. Qualitative data supported these results, highlighting the positive impact of Moodle's tools on students' autonomy, motivation, and reflective learning practices. The study concludes that Moodle-based activities can effectively promote SRL by providing structured, interactive, and reflective learning experiences. Recommendations are made for educators to integrate diverse Moodle activities that target different SRL components and for institutions to provide continuous support and infrastructure improvements.

Keywords: Self-Regulated Learning, LMS-Moodle, Students' Engagement, Online Learning, Educational Technology.

Introduction

Technology integration in education has transformed learning environments, with Learning Management Systems (LMS) becoming essential tools in facilitating and managing digital learning experiences. Moodle, one of the most widely used LMS platforms, is known for its flexibility and user-centered features that allow educators to create engaging and personalized learning environments. By employing a variety of digital learning tools—such as discussion forums, quizzes, and collaborative spaces—Moodle has the potential to promote self-regulated learning (SRL) among students, a critical skill in the digital age (Geng, et al., 2019). As educational institutions seek innovative ways to enhance student learning autonomy and motivation, designing Moodle activities with SRL in mind is an emerging area of interest.

The innovation this study offers is a Moodle-based design that goes beyond content delivery by integrating features and activities that specifically promote SRL. This could include activities like goal-setting tasks, self-assessment quizzes, reflection journals, and interactive forums where students actively engage in their own learning journey. By embedding these elements within the Moodle

platform, the study aims to create a structured yet flexible learning environment that empowers students to take control of their learning process, ultimately improving their motivation, autonomy, and readiness for lifelong learning.

The Role of Self-Regulated Learning in Digital Education

Self-regulated learning is a process whereby learners actively plan, monitor, and reflect on their learning experiences, adapting strategies to achieve their personal goals (Panadero, 2017b). SRL has gained importance in online and blended learning environments, where students are often expected to manage their own learning processes with minimal face-to-face supervision. As digital learning grows, studies indicate that SRL skills are essential for learners to succeed in autonomous online environments (Muchtar & Ali, 2017), (Broadbent, J., & Fuller-Tyszkiewicz, 2018). Notably, SRL strategies can enhance motivation, improve learning outcomes, and equip students with lifelong learning skills, making it a vital component of modern education (van Alten, et al., 2020).

In the context of Moodle, SRL can be facilitated through structured activities and tools that encourage students to set goals, self-assess, and adjust their learning strategies based on their progress. Research has shown that specific features of Moodle, such as time management tools, feedback mechanisms, and collaborative activities, can support the development of SRL when designed thoughtfully (Cavus, N., & Ibrahim, 2017). However, fostering SRL requires a deliberate design of Moodle-based activities that align with SRL principles, particularly in guiding students to utilize these tools effectively and independently.

Challenges in Conventional Learning Environments

Traditional learning methods, which predominantly involve face-to-face instruction and exam-based assessments, often do not provide adequate opportunities for developing students' SRL skills. SRL is a crucial competency that encompasses a student's ability to plan, monitor, and evaluate their own learning process (Panadero, 2017b). In conventional educational settings, students tend to be passive and reliant on teacher instructions, which can limit their capacity to learn independently and effectively.

Moreover, traditional teaching methods often do not cater to the diverse learning needs of individual students. In large classroom settings, it is challenging for educators to provide personalized attention and support to every student, which restricts opportunities for developing essential self-regulation skills, such as time management, self-motivation, and effective study strategies (Panadero, 2017b). Consequently, there is a pressing need for innovative approaches that actively engage students in their own learning processes.

Challenges in Developing SRL through LMS

Designing Moodle activities to enhance SRL is challenging. Research suggests that providing access to LMS tools does not guarantee SRL development, as students may lack the skills or motivation to utilize these resources effectively (Kizilcec, et al,, 2017). A significant factor is the need for guidance on how to approach self-regulation; many students require scaffolding, particularly in developing metacognitive skills such as goal-setting, self-monitoring, and self-reflection (Azevedo et al., 2022).

Moreover, educators face challenges in balancing structured guidance with the flexibility required for SRL. Overly rigid instructional designs may hinder students' independence, while excessively open-ended tasks may overwhelm them, especially if they lack prior experience with SRL strategies (Song, D., & Kim, 2020). The role of educators in this context is critical—they must create a learning environment that not only provides clear guidance but also promotes autonomy by encouraging students to actively engage in their learning processes (Wong at al., 2019).

The Potential of Moodle in Promoting Self-Regulated Learning

Moodle provides a range of features that can be leveraged to promote SRL among students. It allows educators to design flexible and interactive learning activities that students can access anytime and anywhere. Features such as discussion forums, interactive quizzes, self-assessment assignments,

and progress tracking tools offer students the opportunity to manage their learning time, select the materials they want to study, and monitor their progress. Moodle's extensive functionalities provide educators with diverse methods to encourage SRL among students. Features like interactive quizzes, assignment submissions, and immediate feedback enable students to monitor their understanding, reflect on their performance, and make necessary adjustments (Gómez-Rey, et al., 2018). In addition, Sletten, (2017) stated that discussion forums and group projects, for example, can promote collaborative learning and self-reflection by encouraging students to articulate and defend their ideas in a supportive, interactive environment.

Recent studies have indicated that the use of LMS platforms like Moodle can enhance student motivation, facilitate collaboration, and encourage active engagement in learning activities (Korkmaz, G., & Karakus, 2020); (Costa at al., 2019). In other words, integrating technology into the learning process can help students develop essential digital literacy skills, which are increasingly important in today's globalized and technologically advanced world.

Furthermore, studies emphasize the importance of embedding SRL strategies directly into the learning process. By incorporating SRL strategies within Moodle's structure, educators can create an environment that naturally fosters self-regulation, encouraging students to use these skills regularly and autonomously (Wong at al., 2019). Such strategies can also be reinforced through instructional design that encourages reflection and accountability. Learning activities designed with SRL principles in mind allow students to take ownership of their educational journey, creating a more engaged and motivated learning experience (Zimmerman, B. J., & Moylan, 2019).

Importance of Self-Regulated Learning in Modern Education

Self-regulated learning is a crucial concept in modern education that involves cognitive, motivational, and behavioral processes used by students to achieve their learning goals (Panadero, 2017a). SRL plays a key role in effective learning as it includes self-planning, self-monitoring, and self-evaluation of learning performance.

In the context of technology-based learning, SRL skills become even more critical since students need to self-direct their learning without direct supervision from teachers. According to a study by (W. L. Broadbent, J., & Poon, 2018) students with strong SRL skills are more likely to succeed in online learning environments than those with weaker SRL skills. Therefore, designing learning activities that support the development of SRL skills is crucial to enhancing student learning outcomes and preparing them for future challenges in both formal education and lifelong learning contexts.

Strategies for Designing Learning Activities in Moodle to Enhance SRL

To effectively use Moodle to enhance students' SRL skills, it is essential to design appropriate learning activities. Based on previous study, several strategies Panadero (2017) can be employed, including: (1) **Clear Goal Setting:** Encourage students to set their own learning goals through tasks that require planning and scheduling, such as time-bound assignments and projects. Moodle's assignment feature can be used to allow students to practice setting deadlines and managing their time effectively. (2) **Continuous Feedback:** Utilize Moodle's quiz and assessment tools to provide immediate feedback to students about their progress. Timely feedback is vital in helping students understand their strengths and weaknesses and in guiding their next steps in the learning process (Broadbent, J., & Fuller-Tyszkiewicz, 2018). (3) **Interactive Discussions:** Facilitate online discussion forums to encourage critical reflection and interactive learning. These forums allow students to share their understanding, exchange ideas, and learn from their peers, fostering a collaborative learning environment(Gupta, P., & Wadhwa, 2019). (4) **Self and Peer Assessment:** Use Moodle's peer assessment feature, where students can evaluate each other's work. This approach promotes student engagement and encourages critical reflection on their own and their peers' learning processes (Wanner, T., & Palmer, 2018). (5) **Diverse Learning Resources:** Provide a variety of learning materials, such as videos, articles, and interactive simulations, that students can access based on their individual needs. This enables students to learn according to their preferred styles and paces, thereby fostering autonomy and personalized learning (Costa at al., 2019).

Empirical Evidence on the Effectiveness of Moodle in Enhancing SRL

Empirical research supports the notion that Moodle can enhance students' SRL skills. For instance, a study by (W. L. Broadbent, J., & Poon, 2018) found that online learning environments like Moodle significantly improve students' ability to self-regulate their learning. They demonstrated that well-designed Moodle activities, such as interactive quizzes and discussion forums, could increase student engagement and their capacity to self-direct their learning processes. Additionally, research by (Wanner, T., & Palmer, 2018) showed that Moodle enables more flexible and personalized teaching, which is critical in supporting SRL skills. LMS platforms provide students with opportunities to learn at their own time and place, thereby enhancing their autonomy and personal responsibility for their learning processes.

Challenges and Recommendations

The rise of digital learning environments has highlighted the critical need for developing self-regulated learning (SRL) skills among students. These skills, which include goal setting, self-monitoring, and self-reflection, are essential for fostering independent, lifelong learning in a rapidly changing world (Panadero, 2017b). Learning Management Systems (LMS) like Moodle offer numerous features—such as progress tracking, quizzes, forums, and feedback tools—that can be leveraged to enhance SRL. However, despite Moodle's widespread adoption in educational institutions, there remains a significant gap in effectively utilizing its features to cultivate self-regulated learning among students.

One of the main challenges is the traditional, teacher-centered approach to education, which does not align well with the principles of self-regulated learning that emphasize student autonomy and active engagement (Greene at al., 2018). This misalignment often results in students engaging passively with online content, rather than actively managing their own learning processes. Additionally, teachers may lack the instructional design skills required to create Moodle-based activities that foster SRL, thus limiting the platform's potential to enhance student learning outcomes (Lai & Hwang, 2021).

Furthermore, while studies have explored the general benefits of e-learning platforms, there is a lack of specific research on how to design Moodle activities that systematically promote SRL, especially for college students (Broadbent & Poon, 2017). college students, who are at a pivotal stage of developing their academic skills, can significantly benefit from well-structured, technology-enhanced learning activities that encourage self-regulation (Kocdar at al., 2018). Addressing these challenges is crucial, as students equipped with strong SRL skills are better prepared for academic success and lifelong learning (Lim, at al., 2020).

Therefore, the research problem addressed in this study is the lack of effective instructional design strategies for Moodle-based learning activities that promote self-regulated learning among college students. This study seeks to bridge this gap by developing and evaluating a set of Moodle-based activities specifically designed to enhance SRL skills, thereby improving student engagement, motivation, and learning outcomes.

Based on the challenges identified in promoting self-regulated learning through Moodle, the following recommendations are proposed to enhance the design of learning activities: Developing digital competence among educators and students is crucial for maximizing the benefits of LMS platforms in promoting self-regulated learning (Martin at al., 2018). Educators should design Moodle activities that include explicit goal-setting prompts and use Moodle's progress tracking features to help students monitor their learning journey. This could involve using checklists, deadlines, and automated reminders to enhance students' self-monitoring skills. The use of goal-setting and progress monitoring tools has been shown to significantly improve students' self-regulation and academic performance (Broadbent, & Poon, 2017). Moodle's reflective journals and peer discussion forums should be utilized to encourage metacognitive reflection. Assignments that prompt students to reflect on their learning strategies and outcomes can help develop deeper self-regulation skills. Reflective activities are essential for enhancing metacognitive skills, which are a core component of SRL (Panadero, 2017b). Provide Real-Time Feedback for Continuous Improvement Design Moodle activities that provide immediate feedback, such as automated grading for quizzes and interactive H5P activities. Additionally, teachers can use Moodle's messaging feature to provide timely feedback and support. Real-time feedback is critical for fostering self-regulation, as it helps students quickly identify

and correct mistakes, thereby enhancing learning outcomes (Nicol, 2020). Utilize Moodle's learning analytics to track student performance and identify those who may need additional support. Educators can use data insights to create personalized learning paths that cater to individual students' strengths and weaknesses. Learning analytics can significantly enhance personalized learning and support self-regulation by providing actionable insights into student behaviors (Ifenthaler & Yau, 2020). Design collaborative Moodle activities, such as group projects and peer assessments, to promote social learning and peer support. This can encourage students to share strategies, resources, and feedback, thus enhancing their self-regulation skills. Collaborative learning environments have been shown to improve self-regulation by fostering a sense of community and shared responsibility (van Alten at al., 2020).

The use of Moodle as a learning platform offers significant opportunities for enhancing students' SRL skills. However, to achieve this, it is crucial to design learning activities that support the development of these skills. By integrating appropriate strategies, Moodle can be an effective tool for creating a dynamic learning environment that fosters SRL. Effective implementation of this LMS can help students become more independent, motivated, and ready to face future challenges.

Method

The research method for this study aims to explore and evaluate the effectiveness of designing learning activities within LMS Moodle to foster students' self-regulated learning (SRL). The study employs a mixed-methods approach, combining both quantitative and qualitative research methods. This approach allows for a comprehensive understanding of how specific Moodle-based activities contribute to the development of SRL skills among students.

The research was conducted in three main phases: Needs Analysis and Design of Learning Activities, Implementation of Learning Activities, and Evaluation of Effectiveness. The participants of the study consisted of 67 students in the first semester and 3 lecturers of English Language Education Islamic University of Riau who were involved in learning-intensive reading courses using Moodle. The participants also provided insights into the effectiveness and usability of the designed learning activities.

Quantitative Data obtain from Pre- and Post-Surveys**:** Self-regulated learning surveys were administered to the participants (students) at the beginning (pre-survey) and the end (post-survey) of the 8-week period. The survey used the Motivated Strategies for Learning Questionnaire (MSLQ), which was validated by two (two) validators to measure students' SRL skills (e.g., goal setting, time management, self-monitoring, and self-evaluation). Data was collected from Moodle's built-in analytics tools to track students' engagement, participation in different activities, time spent on tasks, and completion rates.

Meanwhile, Qualitative Data Collected from 1) **Focus Group Discussions:** Two focus group discussions conducted – one with the participating students and another with the lecturers. The discussions explored participants' experiences, perceptions, and challenges related to the Moodle-based activities designed to promote SRL. 2) **Semi-Structured:** In-depth semi-structured interviews conducted with a subset of students (n = 15) and teachers (n = 3) to gain deeper insights into their experiences and perceptions regarding the effectiveness of the designed activities. The list of interview include :

Table 1. Teacher and students Interview Question

Participants	Question Categories
Teachers	1. How familiar are you with the concept of self-regulated learning (SRL)? *Can you describe how you currently encourage SRL in your teaching practices?* 2. How do you design learning activities on Moodle to promote student autonomy and self-regulation? *What specific Moodle features (e.g., quizzes, forums, progress tracking) do you find most effective in supporting SRL?*

3. What challenges have you faced when using Moodle to promote SRL promote SRL among your students?
   How have you overcome these challenges?
4. How do you design learning activities on Moodle to promote student autonomy and self-regulation?
   What specific Moodle features (e.g., quizzes, forums, progress tracking) do you find most effective in supporting SRL?
5. What challenges have you faced when using Moodle to promote SRL among your students?
   How have you overcome these challenges?
6. Can you share an example of a Moodle-based activity that successfully enhanced students' SRL skills?
   What outcomes did you observe in terms of student engagement and motivation?
7. How do you provide feedback to students within Moodle to support their self-regulated learning?
   What tools (e.g., automated feedback, messaging, comments) do you find most effective?
8. In your experience, how does Moodle compare to other platforms in fostering SRL?
   What additional features or improvements would you like to see in Moodle to better support SRL?
9. What training or support would help you better design Moodle activities for SRL?
   Have you attended any professional development focused on using LMS tools for SRL?
10. How do you measure the effectiveness of Moodle-based activities in promoting SRL?
    What indicators do you use to assess students' self-regulation skills?

Students

1. How comfortable are you with using Moodle for your learning activities?
   What features do you find most helpful in managing your learning?
2. Can you describe how you use Moodle to set your learning goals and track your progress?
   How do these features help you stay organized and focused?
3. Do Moodle activities encourage you to take more control over your learning?
   Can you give an example of a Moodle activity that helped you become more self-regulated?
4. What challenges do you face when using Moodle to manage your learning independently?
   How do you overcome these challenges?
5. How does receiving feedback through Moodle impact your motivation and learning strategies?
   Do you find the feedback helpful in improving your performance?
6. What motivates you to engage with Moodle activities that require self-regulation, such as self-assessment quizzes or reflective journals?
   How do these activities influence your learning habits?
7. Do you collaborate with your peers on Moodle?
   How does collaboration impact your ability to self-regulate your learning?
8. What additional support or features would help you use Moodle more effectively for self-regulated learning?

The pre- and post-survey data was analyzed using descriptive statistics and paired-sample t-tests to examine any significant changes in students' SRL skills before and after the intervention. Learning analytics data was analyzed to identify patterns and correlations between students' engagement in Moodle-based activities and their SRL outcomes. Regression analysis used to assess the relationship between specific Moodle activities and SRL skills.

Result and Discussion

Pre- and Post-Survey Analysis

The primary source of quantitative data was a pre- and post-survey using the Motivated Strategies for Learning Questionnaire (MSLQ), which assessed four key SRL components: goal setting, self-monitoring, self-evaluation, and time management. The surveys were conducted with 67 undergraduate students who participated in the Moodle-based learning activities over an 8-week period.

Table 2. Change in Self-Regulation Learning Skills (Pre- Post Implementation

SRL Component	Pre- Imp. Mean Score	Post-Imp. Mean Score	Change **(Δ)**	Sig. Level **(p-value)**
Goal Setting	3.2	4.1	+0.9	$p < 0.01$
Self-Monitoring	3.5	4.3	+0.8	$p < 0.01$
Self-Evaluation	3.1	4.0	+0.9	$p < 0.01$
Time Management	2.9	3.8	+0.9	$p < 0.01$

Table 2 displayed that all of SRL components showed statistically significant improvements of student's SRL skills ($p < 0.01$) after the implementation period, indicating that the designed Moodle activities positively impacted students' self-regulated learning skills. The most substantial improvements were observed in goal setting (+0.9) and self-evaluation (+0.9), suggesting that these aspects of SRL were particularly enhanced through the Moodle activities.

Learning Analytics Results

Moodle's built-in analytics tools were used to track student engagement with the designed activities, including login frequency, task completion rates, and time spent on learning tasks.

Table 3. **Student Engagement Metrics (Pre- vs. Post-Implementation)**

Engagement Metric	Pre-Implementation	Post-Implementation	Percentage Change (%)
Average Login Frequency	2 times per week	4 times per week	+100%
Completion Rates	60%	80%	+33.3%
Average Time Spent on Tasks	2009	0000	+66.7%

Table 3 showed that **Login Frequency:** The average login frequency doubled, showing a significant increase in student engagement with the Moodle platform. **Completion Rates:** The completion rates of learning activities improved by 33.3%, indicating higher levels of commitment and task completion. **Time Spent on Tasks:** The time spent on tasks rose by 66.7%, reflecting greater effort and dedication to the learning activities.

Focus Groups and Interviews

Qualitative data were gathered through focus groups and interviews with a sample of 20 students and 5 educators involved in the study. The aim was to explore their perceptions and experiences of the Moodle-based activities and to gain deeper insights into how these activities supported or hindered their SRL.

Positive Feedback:

Goal Setting and Planning: Students reported that the use of Moodle's calendar, deadlines, and task lists facilitated effective goal setting and planning. Many students found these tools helpful in breaking down complex tasks into manageable steps and maintaining a clear focus on their learning objectives. **Self-Monitoring and Feedback:** Quizzes, self-assessment tools, and peer review activities

were highlighted as particularly valuable for continuous self-monitoring. Students appreciated the immediate feedback provided by these tools, which allowed them to identify their strengths and weaknesses promptly. **Reflective Learning:** Reflective journals and discussion forums encouraged self-evaluation and critical thinking. Students noted that these activities helped them to reflect on their learning processes, set new goals, and adjust their strategies as needed. **Increased Autonomy and Motivation:** Many students reported feeling more autonomous and motivated in their learning due to the flexibility and self-paced nature of the Moodle activities.

Challenges Identified:

Adaptation to Self-Paced Learning: Some students initially struggled with the transition to a more self-directed learning model. They expressed a need for more structured guidance and support during the initial stages of the implementation. **Technical Issues:** A few students encountered technical difficulties, such as internet connectivity problems and navigating certain Moodle features, which sometimes hindered their participation.

Discussion

The results from both quantitative and qualitative data provide strong evidence that the designed Moodle activities effectively promoted self-regulated learning among students. The discussion below explores the impact of these activities on different SRL components, the increased engagement levels, and the challenges encountered during the implementation.

Impact on Self-Regulated Learning Skills

The significant improvements observed in all SRL components suggest that the Moodle activities successfully fostered self-regulated learning among the students. Each component is discussed in detail below:

Goal Setting: The substantial increase in goal-setting scores (+0.9) indicates that Moodle's organizational tools, such as calendars and task management features, were highly effective in helping students define and plan their learning objectives. This aligns with previous research showing that clear goal-setting mechanisms can significantly enhance SRL by providing a structured approach to managing learning tasks (Panadero, 2017); (W. L. (2019) Broadbent, J., & Poon, 2019). **Self-Monitoring:** The improvement in self-monitoring (+0.8) was largely attributed to quizzes, self-assessment tools, and peer review activities, which provided continuous opportunities for students to check their understanding and progress. Regular self-monitoring is a critical aspect of SRL, as it enables students to adjust their learning strategies based on real-time feedback (Zimmerman, 2018). **Self-Evaluation:** The use of reflective journals and feedback activities contributed to a significant increase in self-evaluation scores (+0.9). These activities encouraged students to critically assess their learning strategies and outcomes, fostering a deeper understanding of their learning processes and promoting metacognitive awareness (Panadero, 2017). **Time Management:** The improvement in time management (+0.9) reflects the structured nature of Moodle activities, which helped students develop better time management habits. Effective time management is essential for SRL, as it allows students to allocate appropriate time and resources to various learning tasks (Alghamdi, A., & Bayaga, 2018).

Student Engagement and Participation

The increase in student engagement, as evidenced by the higher login frequency, completion rates, and time spent on tasks, suggests that the Moodle activities effectively motivated students to participate more actively in their learning. This finding supports existing literature indicating that interactive and well-structured online activities can enhance student motivation and engagement (W. L. (2019) : Broadbent, & Poon, 2019); (Alghamdi & Bayaga, 2018).

The qualitative data further corroborated these findings, with students reporting increased motivation and autonomy due to the self-paced nature of the Moodle activities. However, some students initially struggled with adapting to this new learning model, highlighting the need for a gradual transition and additional support mechanisms.

Challenges and Limitations

Despite the positive outcomes, several challenges and limitations were identified: **Adaptation to Self-Paced Learning:** Some students found it difficult to adapt to the self-regulated learning model, particularly those who were more accustomed to traditional, teacher-led instruction. This suggests a need for more initial guidance and scaffolding to help students transition to self-directed learning. Strategies such as providing clear instructions, setting intermediate deadlines, and offering regular check-ins could help ease this transition (Panadero & Jonsson, 2017). **Technical Issues:** Technical difficulties, such as internet connectivity problems and challenges navigating the Moodle platform, were noted by a few students. These issues underscore the importance of providing ongoing technical support and training to ensure smooth use of LMS tools. Institutions should invest in robust infrastructure and user-friendly platforms to minimize these barriers (Alghamdi & Bayaga, 2018).

Conclusion

The study demonstrates that well-designed Moodle activities can significantly enhance SRL skills by promoting goal setting, self-monitoring, self-evaluation, and time management. The findings suggest that integrating a variety of Moodle-based activities that target different SRL components can effectively motivate students and improve their learning outcomes. Educators should design Moodle activities that support goal setting, self-monitoring, self-evaluation, and time management. They should also provide initial guidance and scaffolding to help students adapt to self-directed learning. Institutions should offer continuous technical training and support to ensure effective use of LMS tools. They should also ensure that the necessary technological infrastructure is in place to support online learning. Further research could explore the long-term impacts of these activities and examine their effectiveness in different learning contexts. Additionally, future studies could investigate how different types of feedback

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