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Evaluating AI-integrated educational content creation versus ChatGPT-assisted methods

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Abstract

This study investigates the comparative effectiveness of two content creation methods in educational settings: the Manual Method, using ChatGPT to generate and upload content to Moodle, and the MoodleSense Method, an AI-powered extension of Moodle for content creation and management. The research evaluated four critical aspects: educator performance, time and resource efficiency, content quality and alignment with curriculum standards, and the impact on educator workload. The results demonstrated that MoodleSense outperformed the Manual Method across all four aspects, offering enhanced time efficiency, better content quality, and stronger alignment with curriculum standards. Furthermore, MoodleSense reduced the educators' workload by automating key processes, enabling more effective content management. The findings contribute to a deeper understanding of AI's role in education and offer insights into how educators can effectively integrate such technologies to enhance teaching practices.

Keywords: Artificial Intelligence; Learning Management System; Embedded AI; AI-Assisted LMS; Moodle; MoodleSense; ChatGPT; Distance Learning; e-learning

1. Introduction

Fifty years ago, Computer-Assisted Instruction (CAI) was introduced, signaling the start of creating educational materials. CAI's goal was to imitate or support individualized instruction that has been typically delivered by human educators. With the increase in adoption of adaptive educational technologies, there was a rise in the development of personalized educational content. This type of technology commonly acts as smart tutoring systems, utilizing a thorough knowledge of instruction and psychology to customize resources for each student. Lately, there has been a notable increase in interest in AI-driven systems, specifically for generating educational content through text-to-text methods. GPT-4 has been highlighted for its exceptional abilities in automating educational evaluations.

Currently, AI-LMSs are extensively utilized to provide students with customized and smart learning interactions. These platforms create teaching materials to improve student involvement and academic results. Excluding AI from educational content creation would limit the opportunity to incorporate AI in the entire LMS process. It is a fact that AI is quickly changing the field of education by offering innovative tools that improve both the teaching and learning process. Tools like MoodleSense and ChatGPT provide educators with effective ways to develop educational materials. This research compares two methods of generating content: 1) utilizing the AI capabilities of MoodleSense for automatic content generation (MoodleSense Method), and 2) manually generating content using ChatGPT and incorporating it into Moodle (Manual Method).

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The increasing adoption of AI in education makes it necessary to analyze these methods. With institutions around the globe transitioning to digital platforms, it is crucial to identify the most efficient methods. Analyzing automated content creation with AI assistance as opposed to manual methods can determine the most effective approaches, make resource allocation more efficient, and improve the overall quality of educational content. This assessment is especially relevant because of the increasing use of AI technology in providing customized and expandable education. In addition, comparing AI-powered systems like MoodleSense could bring societal advantages by lessening the burden on teachers, allowing them to prioritize student engagement. The automation of creating content could enhance access to education, particularly in areas with limited resources, leading to increased fairness.

This research aims to add to the scientific knowledge of AI in the field of education by offering empirical evidence on the efficiency of various AI-based content creation techniques. Although there has been a lot of research on technical aspects, the educational influence and user experience of these tools have not been thoroughly investigated. This study aims to assess the effectiveness and impact on content quality of integrated LMS AI tools compared to standalone options such as ChatGPT. The results may provide new insights into how AI can assist teachers, match content with educational guidelines, and change digital learning settings, ultimately influencing the direction of education.

2. Literature Review

AI integration in education has advanced quickly in recent years, with a focus on automating content creation processes to meet the rising complexity and scalability demands of educational systems. AI technologies, especially those integrated into Learning Management Systems (LMS), have demonstrated great promise in developing customized learning experiences. These systems create educational materials for each student's requirements, providing a more focused method of learning. Mavrikis and colleagues [16] emphasized the potential of AI to enhance educational results through personalizing content to cater to different learner profiles, ultimately boosting student participation and retention rates.

As educational institutions around the globe adopt digital platforms, AI-driven LMS platforms such as MoodleSense have made significant progress. These platforms use advanced algorithms to not just create course content, but also examine student data to make sure instructional materials match particular learning goals. Zhang and Liu [18] suggest that AI-driven LMS platforms can effectively scale personalized education to a large audience by dynamically adjusting content to meet the changing needs of modern students. This enhances accessibility and adaptability in education.

Although fully automated systems are efficient, AI-powered tools such as ChatGPT give educators greater control and flexibility in creating content. This combination of methods enables teachers to keep control over their teaching methods while also leveraging the quick and efficient capabilities of AI in producing top-notch content.

Recent findings from Johnson and Patel [14] confirm that although ChatGPT efficiently generates educational content, a manual review process is necessary to ensure both the accuracy and educational quality of the material. Finding the right mix of automation and human involvement results in content that is both streamlined to create and customized to meet educational objectives.

Moreover, studies like the one conducted by Davis et al. [13] have examined how effective automated content generation in AI-driven LMS platforms is compared to manual content creation with AI tools. The results indicate that automated tools such as MoodleSense are beneficial for large-scale situations, but manual approaches with AI support are more suitable for settings needing extensive customization and contextual relevance.

Even though AI usage is increasing, McCarthy and Nguyen [17] contend that there is still a lack of long-term understanding in current research about how AI-generated content impacts educational results in the long run. Furthermore, the ethical concerns, such as potential bias in content or the reduced involvement of human teachers, have not been thoroughly examined.

According to Lee and Wang [15], upcoming studies should concentrate on comprehending the wider effects of AI in education, especially on finding a balance between automation and the crucial human aspects of teaching and learning, in order to guarantee that AI advancements improve rather than hinder the educational system.

Finally, the recent study by Datskiv et al. [20] emphasizes the drawbacks of ChatGPT in creating content, but also acknowledges its ability to streamline research efforts and aid in formatting and referencing duties. The study highlights the significance of using ChatGPT knowledgeably, urging students and educators to verify information and uphold academic integrity.

3. The Manual Method for Creating Educational Content

Figure 1 shows the typical sequence for incorporating ChatGPT into creating and sharing educational material on Moodle, a popular platform for managing learning. The process is outlined in a flowchart style, with the following steps:

- **Planning and Course Design:** This initial phase involves conceptualizing the course structure and determining the learning objectives. It includes outlining the course content, setting goals, and identifying the necessary resources and assessment strategies. Planning is crucial as it lays the foundation for the entire course development process [1,2].
- **Creating Educational Content with ChatGPT:** Once the course design is established, the next step involves generating educational materials. ChatGPT, an advanced language model, is utilized to create diverse educational content, including lectures, reading materials, quizzes, and interactive exercises. This step leverages AI to enhance the efficiency and quality of content creation [3,7,9].
- **Preparing and Organizing Content for Moodle:** After content creation, it is essential to prepare and organize the materials for upload to Moodle. This involves formatting the content to ensure compatibility with the platform, structuring it into modules or sections, and integrating multimedia elements where necessary. The organization should align with the course outline established in the planning phase [4,8].
- **Uploading Content on Moodle:** This step involves the technical process of transferring the prepared content onto the Moodle platform. It requires familiarity with Moodle's interface and functionalities, such as setting up course pages, embedding resources, and configuring assessments and activities [5,10].
- **Review and Testing:** Prior to publishing, the uploaded content undergoes a thorough review and testing process. This step ensures that all materials function as intended, are free of errors, and align with the learning objectives. Testing may involve running through the course from a student's perspective and making necessary adjustments based on feedback [6].
- **Publishing and Monitoring:** The final step is to publish the course content for student access. Post-publication, it is important to monitor the course to gather data on student engagement and performance. Continuous monitoring allows for ongoing improvements and ensures that the course remains effective and relevant [8,11].

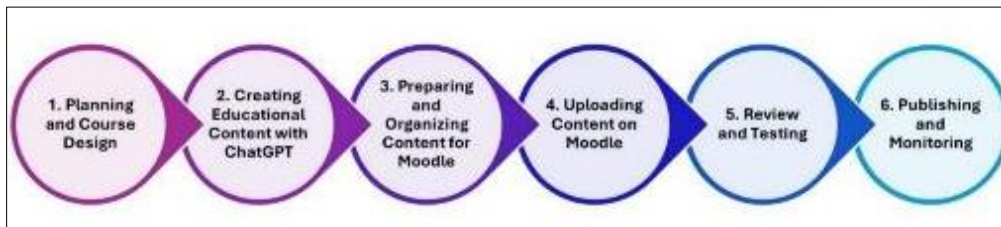


Figure 1 Manual Procedure for Creating and Uploading Educational Content to Moodle

4. Creating Educational Content using Moodle Sense

MoodleSense [12] is a Moodle learning management system extension driven by artificial intelligence. Its architecture is shown in a diagram [Fig. 2] that highlights how different components work together to perform specific tasks in the educational system. The MoodleSense hub serves as the central processing unit in this architecture, coordinating interactions among different subsystems:

- **Adaptive Learning Engine:** This engine dynamically adjusts the learning content and pathways according to individual learner performance and preferences, thereby enhancing personalized education.
- **Content Generation Engine:** This engine is in charge of automatically creating educational content by utilizing advanced AI algorithms to produce materials that are customized and fitting for the learners' requirements.
- **Language Translation Module:** The module offers assistance in multiple languages, translating educational materials to cater to a variety of linguistic backgrounds, enhancing inclusiveness and accessibility in educational settings.
- **Personalization Subsystem:** This subsystem is dedicated to customizing the user experience by considering specific learner traits, upgrading the educational interface to improve engagement and effectiveness.
- **Integration and API Management Subsystem:** This subsystem helps with integrating outside services with MoodleSense, overseeing API interactions to ensure compatibility with other educational technologies.
- **User Feedback and Sentiment Analysis Module:** This module collects and examines user feedback using sentiment analysis methods to guide enhancements in course content and user engagement tactics.



Figure 2 MoodleSense Components

5. Research Focus and Research Questions

To determine the most effective method for creating and evaluating top-notch educational resources in online learning settings, this research will examine the capabilities of both a natural language generation tool and an AI-assisted learning management system. The research is focused on examining these crucial elements:

- The educator's performance.
- The efficiency of content creation in terms of time and resources.
- The quality and alignment of generated content with curriculum standards and educational objectives.
- The impact on educators' roles and workload.

These objectives lead to the formulation of the following research questions:

- How does the content generated by MoodleSense compare to that created manually using ChatGPT in terms of quality and educational relevance?
- What are the differences in the time and resources required for content generation between the two approaches?
- How do these approaches affect the role of educators in the content creation process?
- What are the potential benefits and drawbacks of each method in supporting effective teaching and learning?

6. Research Methodology

This study aims to comprehensively compare the Manual Method and the MoodleSense Method in the creation and evaluation of high-quality educational resources within online learning environments. The Manual Method involves the use of ChatGPT for content generation, followed by publication on Moodle, while the MoodleSense Method utilizes the AI-assisted MoodleSense platform for both content creation and management. The main objective of this study is to assess these approaches based on four main aspects: effectiveness in creating content, consistency with educational standards, content quality and significance, and influence on educator's responsibilities and workload.

To achieve these research goals, a systematic approach was utilized, starting with the creation of two organized surveys. The initial survey was created to evaluate educators' level of familiarity with both Moodle and ChatGPT. This initial survey sought to gauge the participants' level of experience with these tools and establish a baseline for comparison. Following this, a second, more detailed questionnaire was created to evaluate the Manual Method and the MoodleSense Method across the specified dimensions. This questionnaire was administered in two phases: the first phase focused on

the Manual Method, and the second phase targeted the MoodleSense Method after a subsequent period of interaction with the MoodleSense platform.

The study involved a sample of 64 educators who are experienced in using ChatGPT for content creation, which is then uploaded to Moodle, representing the Manual Method. Initially, these educators were asked to complete the first questionnaire to determine their level of familiarity with Moodle and ChatGPT. This was followed by their completion of the second questionnaire specifically addressing the Manual Method, covering aspects such as time and resource efficiency, educator's performance, alignment with curriculum standards, content quality, and impact on their workload.

After the initial data collection, participants were provided with access to MoodleSense for a period of three weeks, during which they utilized the platform for content creation and management. Upon the completion of the three-week period, educators were asked to fill out the second questionnaire once again, this time focusing on their experiences with the MoodleSense Method.

This approach enabled a direct comparison between the two methods based on firsthand user experience. Data collected from both phases of the questionnaire were then analyzed using SPSS software, which facilitated both qualitative and quantitative analyses. This analysis aimed to identify significant differences and similarities between the Manual Method and the MoodleSense Method, providing insights into their relative effectiveness and implications for educational practice.

The comprehensive methodology employed in this study ensures a robust analysis of both methods, offering valuable insights into their respective advantages and limitations. By examining the efficiency of content creation, alignment with educational objectives, content quality, and the impact on educators' roles, this research contributes to a deeper understanding of how AI-assisted tools can enhance or transform online education practices. The findings are anticipated to inform best practices for educators and guide future developments in educational technology.

In this study, a subset of scale rating questions from the questionnaires was utilized to focus on specific aspects of the research. Further quantitative and qualitative analysis of participants' responses, including a more comprehensive examination of trends and correlations, will be conducted in future studies. These analyses aim to provide deeper insights into the data and explore additional variables that were not addressed in the current research phase.

7. Data Analysis and Results

7.1. Assessment of Educators' Proficiency with Moodle and ChatGPT

This initial study aimed to evaluate educators' knowledge of the platforms Moodle and ChatGPT, which are important tools in current educational methods. The survey, given to 64 teachers, laid the groundwork for the subsequent primary investigation. The research used a 100-point Likert scale [19] to assess the participants' level of experience with each platform. Participants were requested to assess their level of familiarity with various factors like how often they use the platforms, how easy they are to use, and how effective they are in improving teaching methods.

After the survey was finished, the educators' scores were grouped into three levels of familiarity:

- Low familiarity (0-33),
- Medium familiarity (34-66),
- High familiarity (67-100).

These classifications provided a better grasp of the participants' skill level in using Moodle and ChatGPT for teaching purposes.

Most educators were found to be very familiar with the platforms in the survey findings. All 64 participants were classified in the high familiarity category, showing a fundamental level of understanding within the group. A moderate level of engagement was exhibited by 10 educators (15.6%) considered to have medium familiarity with the platforms, suggesting there is still potential for improvement. The 54 educators left (84.4%) showed strong knowledge, showcasing expert skills and regular use of Moodle and ChatGPT during their teaching tasks.

Table 1 Aggregated Table of Participants' Data

Moodle and ChatGPT Familiarity Level	Number of Educators	Percentage (%)
Low (0-33)	0	0.0%
Medium (34-66)	10	15.6%
High (67-100)	54	84.4%
Demographic Data	Number of Educators	Percentage (%)
Male	48	75%
Female	16	25%
Age group 26-35	24	37.5%
Age group 36-45	40	62.5%
Educational / EQF Level	Number of Educators	Percentage (%)
Bachelor's / EQF Level 6	34	53.1%
Master's / EQF Level 7	29	45.3%
PhD / EQF Level 8	1	1.6%
Years of Educational Experience	Number of Educators	Percentage (%)
1-5	15	23.4%
6-10	18	28.1%
>10	31	48.4%

The results indicate that educators have widely embraced and become skilled in using digital platforms like ChatGPT and Moodle, showing a strong preference for these tools. The lack of attendees in the bottom tier shows the growing importance of these platforms in academic environments.

7.2. The Manual Method Survey

The following table displays a subset of questions related to the Manual Method found in the questionnaire. The purpose of these questions is to identify the four fundamental elements as per the research focus.

Table 2 Rating Scale Questions regarding the use of ChatGPT

Rating Scale Questions	
How much has your interaction with students in Moodle improved through the use of ChatGPT?	Time Efficiency Questions
How fast do you find the process of creating educational material with ChatGPT and posting it on Moodle?	
How much time do you save in your educational preparation through the use of ChatGPT?	Workload Questions
How easy do you find the process of creating educational materials using ChatGPT?	
How easy do you find the integration of material generated by ChatGPT into Moodle?	

How effective do you consider ChatGPT in producing quality and interactive educational material?	Content Quality & Curriculum-Alignment Questions
To what extent do you think the material created with ChatGPT meets the educational needs of your students when posted on Moodle?	
To what extent does ChatGPT meet your needs for customizing educational material?	

7.3. The Moodle Sense Method Survey

Table 3 displays a subset of questions that are part of the MoodleSense Method questionnaire. After using MoodleSense for three weeks, the educators received and filled out the questionnaire. The questions correspond directly to those in Table 2, allowing for a comparison between the Manual Method and the MoodleSense Method.

Table 3 Rating Scale Questions regarding the use of MoodleSense

Rating Scale Questions	
How much does using MoodleSense contribute to improving your performance as an educator?	Performance Questions
How much has your interaction with students in Moodle improved through the use of MoodleSense?	
How fast do you find the process of creating educational material with the AI platform and posting it on Moodle?	Time Efficiency Questions
How much time do you save in your educational preparation through the use of MoodleSense?	
How easy do you find the process of creating educational materials using MoodleSense?	Workload Questions
How easy do you find the integration of material generated by MoodleSense into Moodle?	
How much does using MoodleSense contribute to improving your performance as an educator?	Content Quality & Curriculum-Alignment Questions
How effective do you consider MoodleSense in producing quality and interactive educational material?	
To what extent do you think the material created with MoodleSense meets the educational needs of your students when posted on Moodle?	
To what extent does MoodleSense meet your needs for customizing educational material?	

7.4. Responses from Participants of the Surveys

Table 4 offers a detailed summary of the feedback obtained from the Manual Method Survey, which aimed to assess participants' opinions and experiences using ChatGPT for creating content. The survey gathered different perspectives on how well this method works, in terms of effectiveness, efficiency, and ease of use. Furthermore, it investigated the participants' views on how well the content aligned with curriculum standards and the general quality of the produced material. The information outlined in this table showcases important trends and patterns that will be examined in future sections to gain a deeper insight into the effects of ChatGPT on educational practices.

Table 4 Responses from the Survey on the ChatGPT-Assisted (Manual) Method

Question / Answers	1 (very low)	2 (low)	3 (medium)	4 (high)	5 (very high)
How much does using ChatGPT contribute to improving your performance as an educator?	2	3	26	19	14
How much has your interaction with students in Moodle improved through the use of ChatGPT?	10	18	21	10	5
How fast do you find the process of creating educational material with ChatGPT and posting it on Moodle?	3	7	15	22	17
How much time do you save in your educational preparation through the use of ChatGPT?	1	5	28	18	12
How easy do you find the process of creating educational materials using ChatGPT?	10	16	22	11	5
How easy do you find the integration of material generated by ChatGPT into Moodle?	3	5	18	28	10
How effective do you consider ChatGPT in producing quality and interactive educational material?	8	17	28	9	2
To what extent do you think the material created with ChatGPT meets the educational needs of your students when posted on Moodle?	9	18	29	6	2
To what extent does ChatGPT meet your needs for customizing educational material?	4	12	26	16	6

Similarly, Table 5 shows the feedback given by educators who took part in the survey about the MoodleSense Method. This table provides a thorough analysis of their opinions on different aspects of the approach, such as how user-friendly it is, how effective it is, and how it influences their teaching methods. The broader implications of MoodleSense in educational settings will be evaluated by analyzing these results.

Table 5 Responses from the Survey on the MoodleSense Method

Question /Answers	1 (very low)	2 (low)	3 (medium)	4 (high)	5 (very high)
How much does using MoodleSense contribute to improving your performance as an educator?	1	1	8	21	33
How much has your interaction with students in Moodle improved through the use of MoodleSense?	1	3	11	21	28
How fast do you find the process of creating educational material with the AI platform and posting it on Moodle?	0	4	11	28	21
How much time do you save in your educational preparation through the use of MoodleSense?	0	1	12	23	28
How easy do you find the process of creating educational materials using MoodleSense?	0	5	12	22	25
How easy do you find the integration of material generated by MoodleSense into Moodle?	0	6	12	24	22
How much does using MoodleSense contribute to improving your performance as an educator?	1	1	8	21	33

How effective do you consider MoodleSense in producing quality and interactive educational material?	0	3	10	30	21
To what extent do you think the material created with MoodleSense meets the educational needs of your students when posted on Moodle?	0	2	9	22	31
To what extent does MoodleSense meet your needs for customizing educational material?	0	0	9	20	35

8. Results and discussion

In the following section, the research findings are presented in the form of comparative graphs, offering a clear visual representation of the differences between the two methods under study. These charts allow for a detailed analysis of the educators' responses, highlighting the effectiveness of both the Manual Method and the MoodleSense Method. The comparative format facilitates an in-depth understanding of how each method impacts key factors such as content creation efficiency, alignment with educational standards, and the workload of educators. Through these visual comparisons, the data becomes more accessible and interpretable, helping to draw meaningful conclusions regarding the strengths and limitations of each approach. The charts also underscore trends and patterns that may not be immediately evident from numerical data alone, providing a comprehensive view of the research outcomes.

Fig. 3 compares the improvement in educator performance between the Manual Method and the MoodleSense Method. The results indicate a substantial difference in favor of the MoodleSense Method, where 51.56% of educators rated it as "very high" compared to only 21.88% for the Manual Method. This suggests that the integration of AI through MoodleSense significantly enhances educators' performance, likely due to the platform's tailored features that streamline their tasks and provide more effective support in creating educational materials. The performance increase reflects the capacity of AI tools to reduce the manual workload and offer more precise solutions.

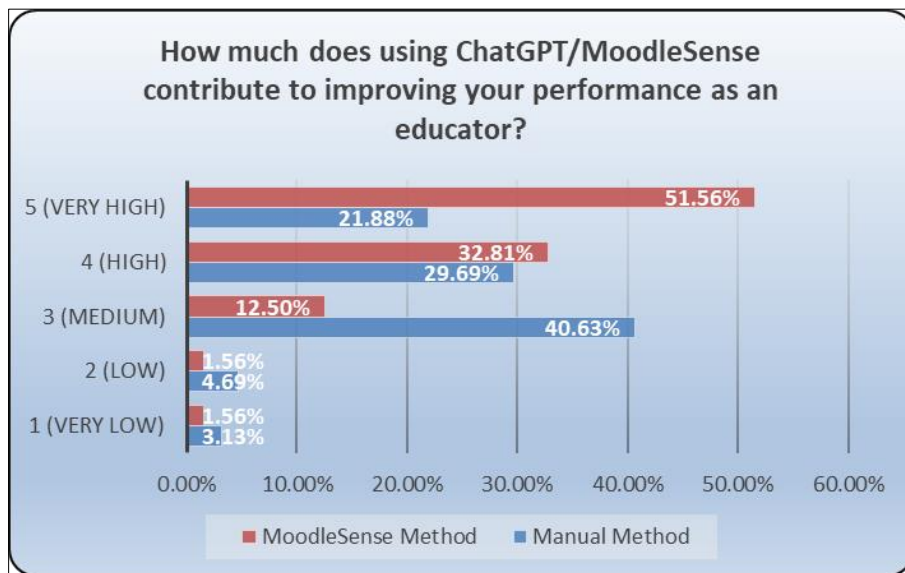


Figure 3 Educator's Performance Improvement

Fig. 4 evaluates how the two methods affect educators' interaction with students. The efficacy of the MoodleSense Method over the Manual Method is evident, as 43.75% of respondents rated it "very high" in enhancing interaction, compared to just 15.63% for the Manual Method. MoodleSense, an AI-powered tool, improves communication with students by automating simple tasks, enabling teachers to focus on personalized interaction, crucial for student engagement and academic success.

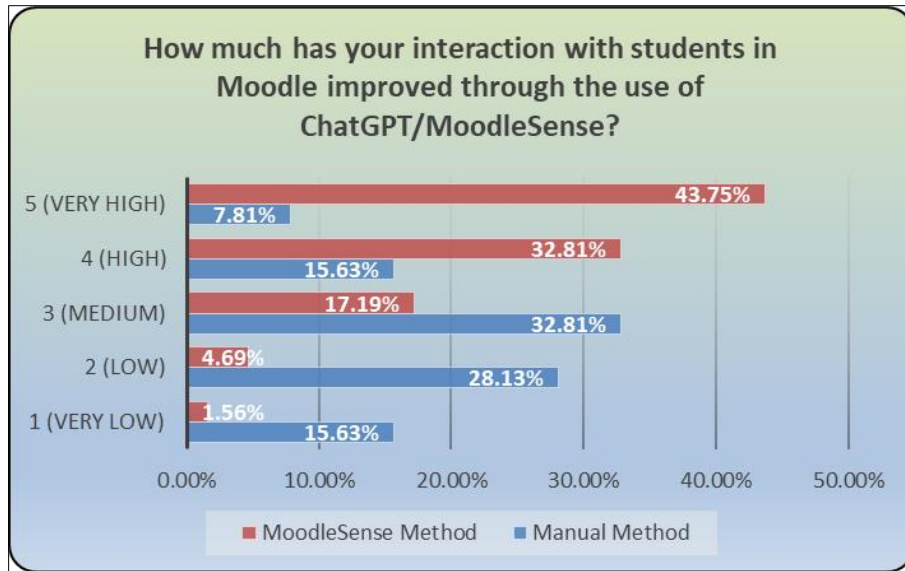


Figure 4 Improvement in Student Interaction

In terms of time efficiency, Fig. 5 demonstrates that MoodleSense significantly reduces the time required for creating and posting educational materials. While 43.75% of respondents rated MoodleSense as "very high" in terms of speed, only 26.56% gave the same rating to the Manual Method. This suggests that the automated processes offered by MoodleSense enable faster completion of tasks, allowing educators to allocate more time to other teaching activities or content refinement. The reduction in time spent on technical tasks is a clear advantage of AI integration in educational platforms.

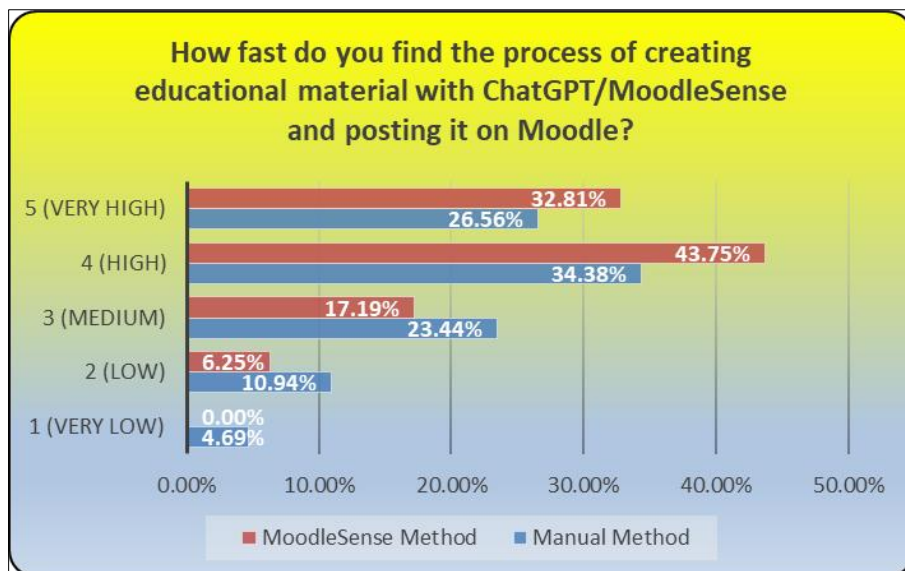


Figure 5 Efficiency of Material Creation

The time-saving aspect of preparation is covered in Fig. 6. 43.75% of educators rated MoodleSense as having great time-saving potential, compared to 18.75% for the Manual Method. This result emphasizes how MoodleSense effectively decreases the total workload linked to content preparation. The use of AI-driven processes for quick access to resources and automation of repetitive tasks is probably why participants reported saving a significant amount of time.

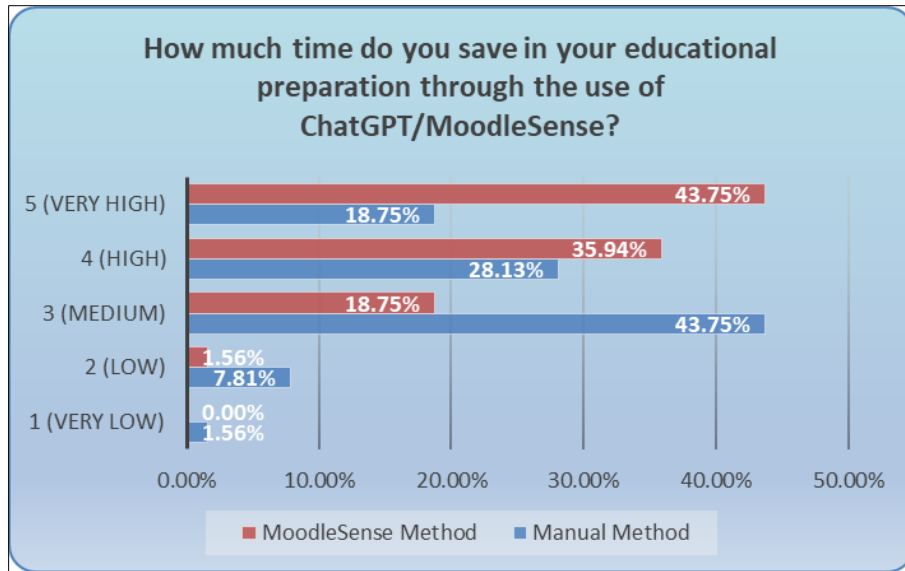


Figure 6 Time-Saving in Preparation

Fig. 7 indicates a strong preference for the MoodleSense Method over the Manual Method in terms of ease of creating educational materials, with 39.06% rating it "very high" compared to just 17.19% for the Manual Method. This distinction highlights MoodleSense's user-friendly interface and support systems that simplify content creation. Educators are finding MoodleSense less difficult to use, which allows them to concentrate on content quality, rather than creation mechanics, as indicated by the higher ratings.

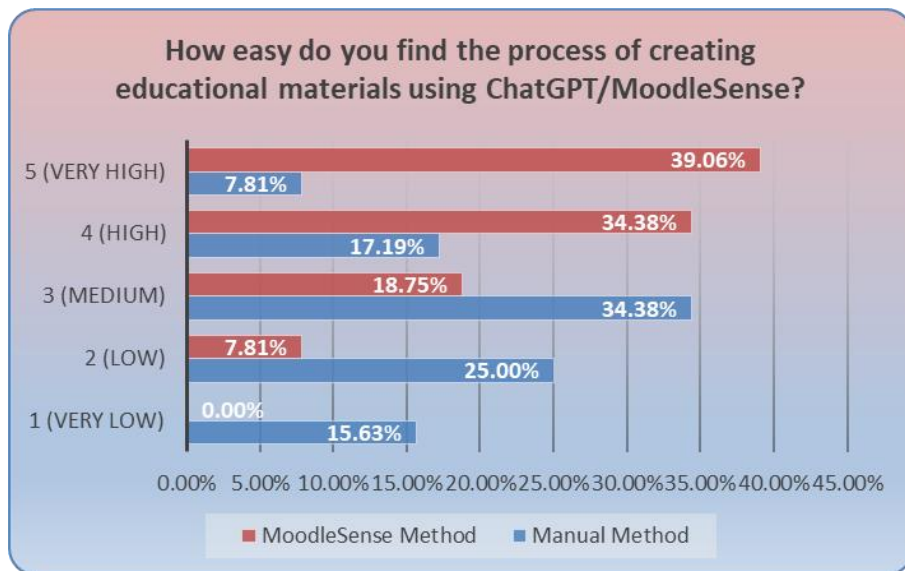


Figure 7 Ease of Creating Educational Materials

Fig. 8 focuses on the ease of integrating the generated materials into Moodle. MoodleSense once again outperforms the Manual Method, with 34.38% of respondents rating it as "very high" for integration ease, compared to 15.63% for the Manual Method. The results suggest that MoodleSense's AI-enhanced features provide a more seamless experience when incorporating educational materials into the platform. This could be due to the intuitive design and the reduced need for manual adjustments, which simplifies the process for educators.

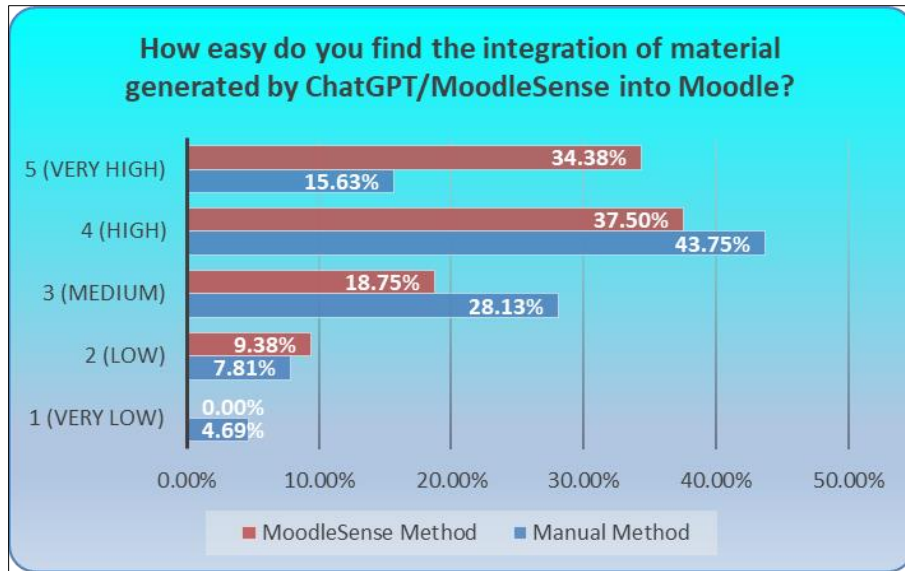


Figure 8 Integration into Moodle

Fig. 9 examines the effectiveness of both methods in producing high-quality and interactive content. MoodleSense is rated significantly higher, with 46.88% of participants giving it a "high" or "very high" rating, whereas the Manual Method received similar ratings from only 21.88% of respondents. This finding indicates that AI-supported tools like MoodleSense not only improve efficiency but also enhance the quality and interactivity of educational materials, leading to more engaging learning experiences for students.

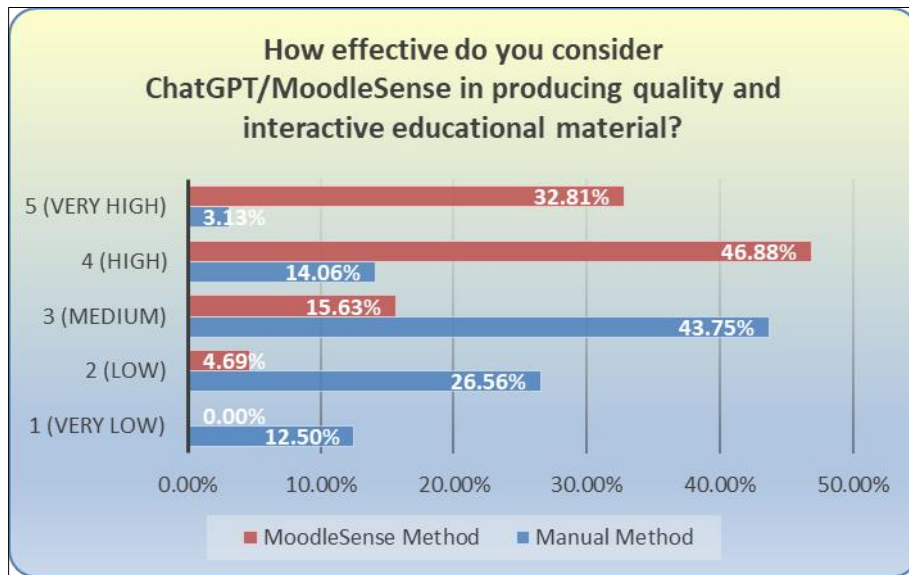


Figure 9 Effectiveness in Producing Quality and Interactive Content

In terms of meeting educational needs, Fig. 10 shows that MoodleSense is rated "very high" by 48.44% of respondents, compared to only 9.38% for the Manual Method. This stark contrast highlights MoodleSense's ability to address the specific educational needs of students more effectively. By providing tools for the customization of materials and offering interactive options, MoodleSense appears to be better suited to delivering content that meets the diverse requirements of modern education.

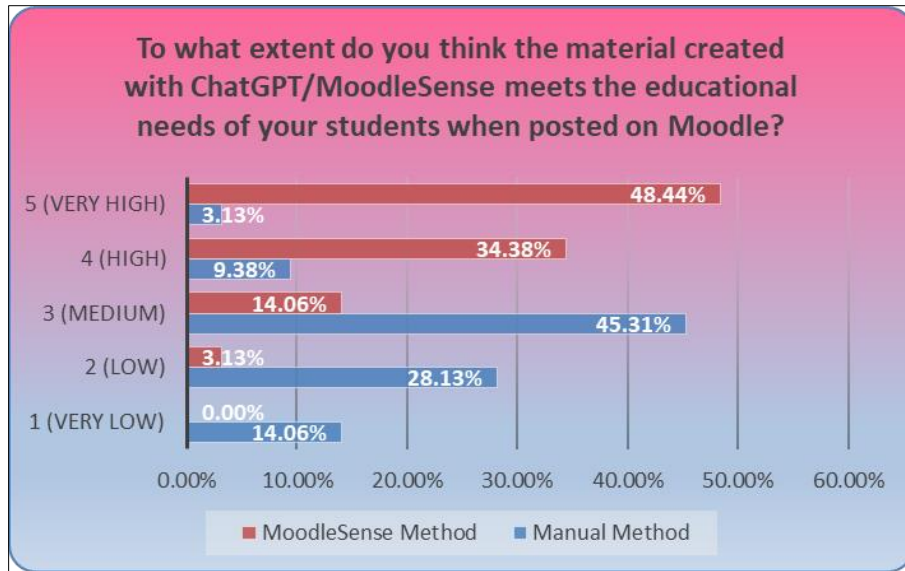


Figure 10 Meeting Educational Needs

Finally, Fig. 11 compares the two methods in terms of their ability to meet educators' customization needs. Once again, MoodleSense leads with 54.69% of respondents rating it as "very high," while only 9.38% gave the same rating to the Manual Method. This suggests that MoodleSense provides greater flexibility and adaptability, enabling educators to tailor educational materials more precisely to their teaching objectives and the specific needs of their students. The high level of customization available through MoodleSense likely enhances the overall teaching and learning experience.

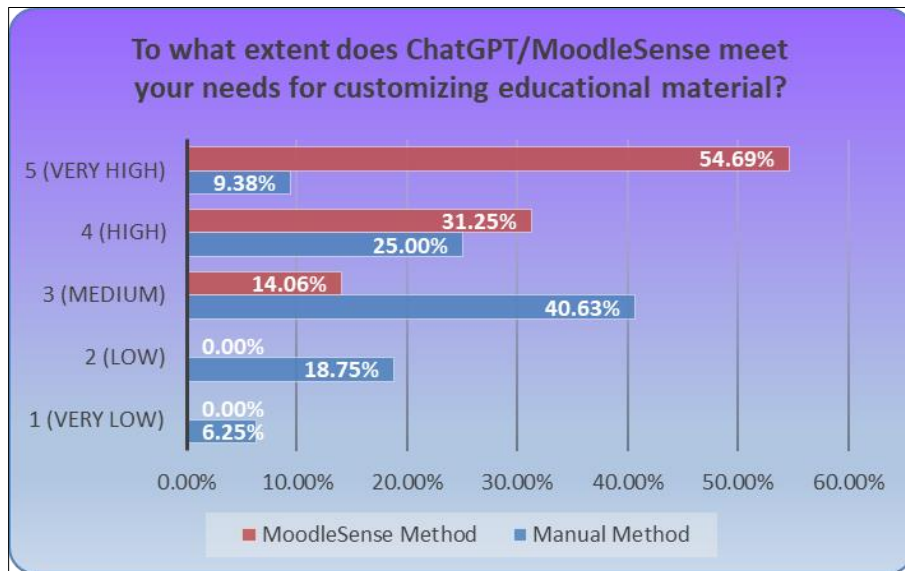


Figure 11 Customization of Educational Material

The comparison of the Manual Method and the MoodleSense Method, as shown in the charts, gives important information about the diverse strategies educators use for creating and managing content. The results highlight how AI-driven resources such as MoodleSense can improve effectiveness, excellence, and overall teacher contentment in comparison to traditional approaches. This information not only showcases important performance indicators but also indicates a change in educational methods towards automated, smart systems that closely match curriculum standards and lessen the burden on educators. These findings provide a strong base for future exploration and advancement in this important field of educational technology.

9. Conclusions

In conclusion, the findings of this research highlight critical insights into the comparison between the Manual Method, which utilizes ChatGPT, and the AI-powered MoodleSense Method for educational content creation and management. The results clearly demonstrate distinct advantages and drawbacks inherent to each approach, thereby informing both pedagogical practices and future AI-assisted educational technologies.

First, in terms of educator performance, MoodleSense appears to offer significant benefits by automating routine tasks and reducing the administrative workload for educators. This frees up time for instructors to engage more deeply with the pedagogical aspects of content delivery and student interaction. In contrast, while ChatGPT's Manual Method offers a flexible tool for content generation, it requires more manual oversight, which can detract from educator efficiency.

The efficiency of content creation, particularly in time and resource management, also reveals a marked difference. MoodleSense enables faster content production through its seamless integration into the Moodle platform, automating multiple processes such as content alignment with curriculum standards and educational objectives. In contrast, ChatGPT's method, though effective in producing high-quality material, often involves additional steps such as manual uploading and editing, resulting in longer preparation times.

Content quality and alignment with curriculum standards are crucial areas where MoodleSense excels. The AI extension facilitates the creation of content that is both pedagogically sound and aligned with educational objectives. On the other hand, ChatGPT allows for creative freedom but does not provide inherent tools to ensure that the content aligns with set standards, requiring more manual intervention from the educator to ensure quality control.

Moreover, the impact on educators' roles and workload is another essential consideration. The use of MoodleSense not only reduces the time educators spend on technical tasks but also redefines their roles, allowing them to focus more on instructional strategies and personalized student engagement. ChatGPT, while reducing content creation effort, does not alleviate the technical burdens associated with content deployment, thereby leaving educators with a higher workload overall.

This research suggests that while both methods offer valuable tools for content creation, MoodleSense demonstrates a more comprehensive solution by addressing both the technical and pedagogical needs of educators. ChatGPT, however, remains a powerful resource for flexible and dynamic content generation but may require additional support to meet institutional and curriculum-based requirements effectively. Future research should explore how the integration of AI tools like MoodleSense and ChatGPT can be further optimized to support educators in delivering high-quality, standards-aligned content with minimal resource expenditure.

Future Work

In future work, the analysis will expand to include a detailed examination of the participants' demographic data. Specifically, responses will be analyzed in combination with the gender, age, educational background, and level of teaching experience of the educators. This approach aims to identify whether and how these variables influence the perceptions and experiences of the participants regarding the content creation methods explored in this study. By considering these factors, we aim to gain a deeper understanding of the role that demographic differences play in shaping educators' interactions with AI-based tools like MoodleSense compared to traditional methods using ChatGPT.

Moreover, this extended analysis will provide insights into potential correlations between demographic characteristics and the effectiveness of content creation approaches. For instance, understanding whether more experienced educators or those with higher educational qualifications prefer one method over another could offer valuable information for tailoring future educational technologies to meet diverse user needs. Ultimately, this future research will help to ensure that AI-based content creation tools are more effectively aligned with the varying professional backgrounds and expectations of educators, thus contributing to more personalized and inclusive educational practices.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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