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E-Assessment and Moodle's assistance in inhibiting plagiarism among learners

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Abstract

This present comprehensive quasi-experimental study seeks to determine the efficacy of Moodle in decreasing plagiarism among learners in E-assessment. The in-hand study employs a quasi-experimental design where Moodle's bank of questions is implemented as the suggested treatment. The study was conducted among a randomly selected sample of 114 second-year undergraduate learners from the Department of Media and Communication and Library Science. The obtained results were collected, coded, treated, and analyzed depending on the statistical analysis. The major finding indicates that the implementation of the Question of Bank of Moodle in designing E-assessments significantly lessened the level of plagiarism among learners. Besides, the findings denote that this tool assists learners to become more independent learners.

Keywords: Bank of questions; e-assessment; learners' autonomy; Moodle; plagiarism.

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1. INTRODUCTION

Dishonesty practices cause various problems, damage, and harden the work of individuals, societies, and organizations. The educational field is not immune from such phenomenon as it faces many forms of academic dishonesty namely plagiarism. This critical problem could inhibit academic life's process and progress at many levels.

Plagiarism is spreading among learners, namely after the implementation of the online mode of teaching. The E-assessment that accompanied this new teaching context displays a wide range of plagiarism. The rising availability of internet materials and recourses, and the simplicity of copying and pasting, have made identifying and resolving plagiarism more difficult (Miranda-Rodríguez et al., 2024). Educational institutions are always looking for new ways to tackle this problem and encourage ethical academic practices and academic integrity.

The open-source Learning Management System (LMS) provides a variety of features, resources, and activities to support teaching and learning in online and blended contexts. Moodle's vast assortment of modules enables instructors to build dynamic and engaging learning experiences for learners. Moodle shows potential in tackling the problem of plagiarism among students.

While previous studies investigated the technology-based interventions' role in promoting academic integrity, there is still a gap in the literature regarding Moodle's unique influence on reducing plagiarism when designing E-assessments. Hence, the purpose of this study is to fill that gap by performing a comprehensive quasi-experimental design study to assess the usefulness of Moodle as an assistive tool in reducing the degree of plagiarism among learners in e-assessments.

This research intends to give insights into how this educational platform can be used to foster ethical academic practices by exploring the possible benefits, and obstacles connected to this use. The study will add to the corpus of knowledge by providing practical advice, valuable insights, and guidance for educators and institutions on how can creating e-assessments using Moodle prevent plagiarism and promote the culture of academic integrity among learners in online settings.

1.1. Background of study

The new learning and teaching circumstances namely after the COVID-19 pandemic imposed the use of online teaching and blended modes of learning (Menshawey et al., 2023). Therefore, the implementation of e-assessment is regarded as a necessity. However, the widespread practice of plagiarism among learners presents a substantial challenge to the concepts of academic integrity and ethical academic practices (Ghanbari & Nowroozi 2021; Hill et al., 2021). Learners should be trained, more, to respect the pillars of academic honesty principles during the first stages of their learning in general and their university online learning in particular (Taylor, 2024).

Educational institutions are always looking for new ways, measures, methods, or strategies to prevent plagiarism and promote originality in student work whether in in-person, online, or blended contexts. In Algeria, a subject entitled Ethics and Deontology is included in all the different branches and specialists but in different phases. This integration of such subjects is carried out to ensure that learners' final dissertations are not plagiarized. However, teachers at many Algerian institutions and universities noticed a large-scale spread of plagiarism among learners in the online setting, notably in the different e-assessments.

On the other hand, the adoption of the educational platform Moodle seems to be promising in assisting teachers in boosting learning respect of different academic honesty principles (Foltýnek et al., 2020). This can be achieved through the exploitation of its different resources and activities. Consequently, the study's research question is: To what extent can the Moodle Bank of Questions assist teachers in creating appropriate e-assessments that reduce the spread of plagiarism among

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second-year undergraduate learners at the Department of Media and Communication and Library Science, Faculty of Human and Social Sciences, at Batna-1 University, Algeria.

In this spectrum, the following hypothesis is formulated: The implementation of Moodle Bank of Questions assists teachers in creating appropriate e-assessments that reduce the spread of plagiarism among second-year undergraduate learners at the Department of Media and Communication and Library Science, Faculty of Human and Social Sciences, at Batna-1 University, Algeria.

1.2. Literature review

The technological influence on many people's lives, attitudes, and activities grew significantly in the 1980s and 1990s. However, the spread of globalization fosters this impact and imposes it on different levels and sectors of life. History shows that globalization and education are closely intertwined. At the most fundamental level, historical developments that occurred during the late modern colonial and imperialist eras had an impact on the establishment of mass education. Many consider these historical developments to be necessary antecedents of political-economic globalization.

The use of technology and the Internet has led to substantial changes in educational systems today, including new ideas and methods about how to teach and learn. One of the important instructional design elements is the assessment of learning as it represents an opportunity to offer constructive feedback that highly assists in the betterment of the learning-teaching process (Haladyna, 2002). With the switch toward the online context, e-assessment emerged to fit the new situation. Different researchers such as De Villiers et al., (2016) prove the efficacy of the e-assessment in the teaching and learning contexts as it offers more accessible, flexible, efficient, and convenient assessment experiences.

One of the most popular and current teaching strategies involves the use of virtual environments that are accessible in a variety of formats. For instance, online teaching-learning platforms are one illustration of these new changes. Kabassi et al., (2015) note that Learning Management Systems (LMS) are adaptable tools used by universities throughout the world in the learning and teaching environment.

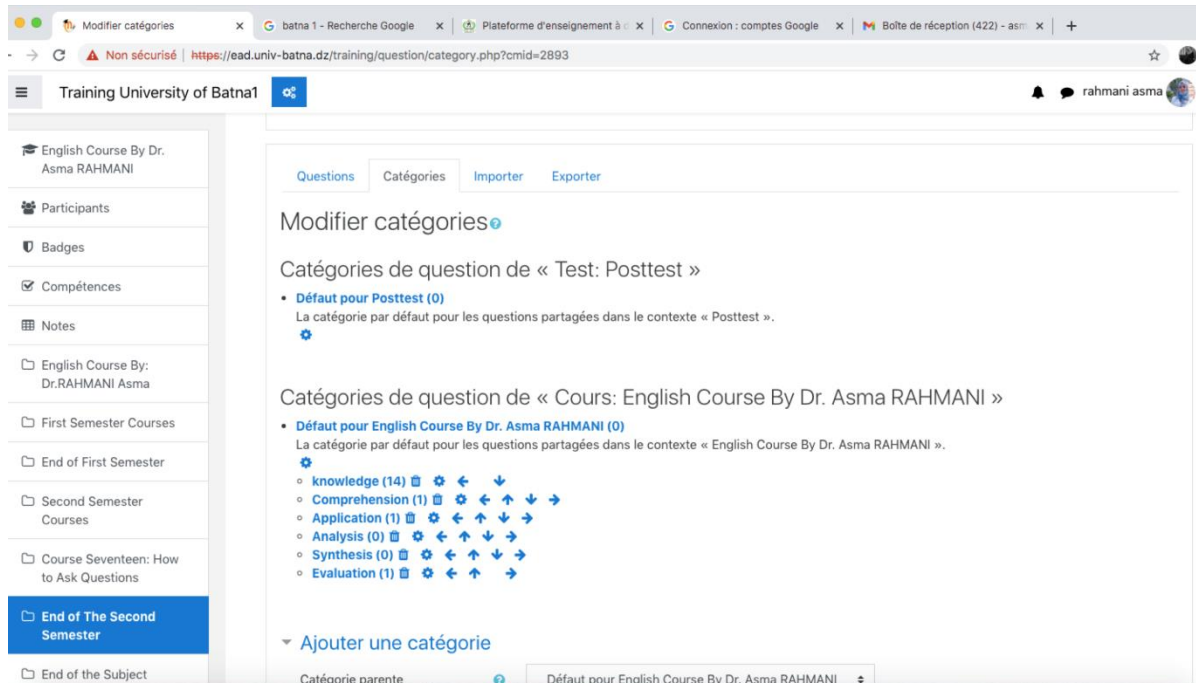
For both online and on-campus students and instructors, Munoz et al., (2015) argue that LMS is a productive environment that encourages the effective management of material and academic processes. Also, Parathnandh et al., (2014) note that adopting an LMS makes it simpler to track how learning resources are used, conduct online evaluations and tests, and improve communication between students and teachers. LMS is considered a working environment that plays a supportive role in the management of content and academic processes for online and on-campus students and lecturers. According to Parathnandh et al., (2014), LMS simplifies the monitoring of tools of material usage, to perform evaluation and testing online, and facilitates communication between learners and teachers. Patel and Patel (2017), LMS is seen as the most fundamental and trustworthy tool for implementing blended learning and is the starting point of web-based programs.

Modular Object-Oriented Dynamic Learning Environment (MOODLE) is an open-course management system. In August 2002, the initial version of MOODLE was published to let lecturers create online courses that emphasize interaction and cooperation (Patel & Patel, 2017). Moodle offers several activities and recourses that boost learners learning and enhance their understanding such as Forums, Chats, URL links to web pages, Pages, Wikis, Glossaries, Workshops, and quizzes.

One of the tools that can be used by teachers when they want to create assignments is the bank of questions provided in Moodle. It is a storage of a set of questions that teachers may create along the creation of the course. It can be organized depending on levels.

The following Figure 1 demonstrates how this bank can be.

Figure 1
Illustration of MOODLE bank of question



Moodle Bank of Questions is a useful tool that offers teachers access to a database of pre-existing questions and even answers, allowing them to construct exams that prevent or decrease copying and require innovation and creativity. Besides, this tool can promote the design of tests that encourage and foster critical thinking, analysis, and synthesis rather than mere memorization of facts by providing a varied selection of question formats, including multiple-choice, short answer, essay questions, and many other forms.

The impact of Moodle Bank of Questions in reducing plagiarism has been highlighted by a few researchers. For instance, Johnson and Brown (2019) reported that educators who utilized the Moodle Bank of Questions witnessed a decrease in instances of plagiarism compared to those who used traditional assessment methods. The ability to customize questions and create unique assessments using the Moodle Bank of Questions discouraged students from relying on pre-existing plagiarized materials. Also, many researchers found that Moodle's question bank highly encourages critical thinking, learners' autonomy, and academic integrity (Mishra & Haldar, 2020; McSweeney & Higgins, 2018).

1.2.1. E-assessment

The term e-assessment can be referred to using different terminologies like computer-based assessment, computer-assisted assessment, e-assessment, and online assessment (Attia, 2014; JISC, 2007). However, all the terms refer to the use of information communication technologies (ICTs) in assessing learners. The Joint Information Systems Committee (JISC) reported that the term is the widely used term. It holds that e-assessment is "the end-to-end electronic assessment processes, where ICT is used for the presentation of assessment activity and the recording of responses" (JISC, 2007).

Learners' reactions toward e-assessment differ. However, Dermo (2009) and Sorensen (2013) noted that some learners are not satisfied with the use of e-assessments for several reasons such as the high level of studies, or previous experiences with this type of assessment. In their survey, Lee-Post and Hapke (2017) found that 45% of learners considered cheating to be easier in e-assessments and 30% reported that would cheat if they were given a chance to do so.

1.2.2. Plagiarism

In an instructional setting, plagiarism can happen when a writer deliberately uses someone else's language, ideas, or other original and not knowledge) material without acknowledging its source. (CWPA, 2003). The same definition is held by Bartley (2005) "reproduction and presentation of others' work, without acknowledgment, or the attempt to receive credit for the idea or words of others". In the same respect, CWPA (2003) reported that "a student who attempts (even if clumsily) to identify and credit his or her sources...has not plagiarized". Besides, intellectual Property refers to expressing an original idea that is protected by copyright laws. Violating this property is regarded as a form of plagiarism. Park (2003) reports that plagiarism is any type of "theft of words or ideas, beyond what would normally be regarded as general knowledge". The findings of a meta-analysis research conducted by Li and Jin (2017) noted that technology-enhanced implementations, have a positive effect on reducing plagiarism, and Moodle can serve as an example.

1.3. Purpose of Study

The preset study's main aim is a causal description of the impact of designing e-assessments using Moodle bank of questions on decreasing plagiarism levels among undergraduate learners at Batna1 University, Algeria. Importantly, this study focuses on describing can this tool support teachers in designing e-assessments that discourage any form of plagiarism and promote originality. By investigating the research question of the study, this study seeks to attain the following objectives:

- Providing valuable insights into the potential impact of this tool on the spread of plagiarism among learners in e-assessment.
- Exploring the different features and uses of Moodle bank of questions.
- Unveiling the importance of updating the Question bank constantly when designing e-assessments.
- Inviting teachers to rely on particular taxonomies to ensure a fair e-assessment.

2. METHODS AND MATERIALS

2.1. Research design

This study opted for a quasi-experimental design, which is one type of observational study. This type of design can be highly effective in obtaining data for broad patterns in social science, where pre-selection and randomization of groups are typically problematic. This research seeks to determine the possible impact of designing E-assessments using a Moodle bank of questions to decrease the level of plagiarism in learners' works. Also, this research is both quantitative and qualitative.

2.2. Participants

The population in this present investigation consists of all second-year learners at the Department of Media and Communication and Library Science, Faculty of Human and Social Sciences, at Batna-1 University, Algeria. Proctor (2003) holds that "because many populations of interest are too large to work with directly, techniques of statistical sampling have been devised to obtain samples taken from larger populations". In this vein, the sample of the study comprises 114 learners. The selection of the sample was based on the probability sampling technique of simple random selection. Brown (2001) holds that through this sampling technique, "each individual in the population must have an equal chance of being selected". Also, the sample was divided into two groups, each consisting of 57(n=57) learners while the whole population is made up of ten groups. The first group was decided to be the

experimental group, the group that receives the suggested treatment, while the second group is the control group, which bears the normal procedures as in a real context. The division of the groups was already performed by the administration.

2.3. Data collection tool

The suggested treatment or intervention in this study falls into the time-intensive treatment category that will provide a long-term effect on subjects of the experimental group participants of the study's sample. The use of e-assessments developed depending on Moodle's bank of question will affect experimental learners' behaviors, and consequently grades, and will make changes that will be compared to the control group members to obtain the needed empirical data. In this respect, the members of the experimental group were invited weekly to answer two e-assignments/ e-tests developed using the Moodle bank of questions.

2.4. Procedure

As these tests were held in Moodle Platform, the teacher could adjust the different issues related to it such as the duration of the e-test, the possibility of not having the same e-assessments/ e-assignments for two students, how many times can learners take the same e-test, the duration and date of the e-tests, number of questions, the type of questions, and the category of question besides other parameters that can be adjusted.

Also, to ensure the success of the test, a test was administered to all participants before the conduction of the experiment to explain to them how to use it and assist them in overcoming any possible difficulties.

In this study, a pre-test, two progressive tests, and a post-test were performed on both groups of the sample of this study. First, the pre-test was designed to establish the baseline level of plagiarism among the participants in their work before the application of the treatment. The four progressive tests were created to stand on the gradual changes in both groups. Ultimately, the post-test was designed to check learners' plagiarism levels at the end of the experiment.

It is worth mentioning that a scoring rubric was designed to evaluate learners' performances in the different e-tests. Also, to ensure the validity of the tests, the tests' questions were evaluated by 14 teachers. All the suggested changes and remarks were taken into consideration. Moreover, to ensure the internal consistency of the tests, we administered all the tests to 34 learners from the same population who do not belong to the sample of this research. The obtained results were collected, coded, and treated using the SPSS. The obtained Psychometric test Cronbach Alpha values were: .76, .77, .81 and,78. This indicated a high consistency that allowed the use of these tests.

2.5. Data analysis

The scores of the tests: pre-test, progressive, and post-tests were based on the scoring rubrics. The grades were attributed according to the level of plagiarism detected in the answers that were analyzed by the web-based plagiarism prevention system Turnitin.

Also, all obtained results were collected, coded, and treated depending on the Statistical Package of Social Sciences SPSS.

Table one unveils the procedure followed in this study.

Table 1
Study procedures

The groups	Procedure	Duration
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Both groups	Pre-test	November, 2021
Only the Experimental Group	The treatment (E-assessments based on Moodle Question Bank)	After the pre-test
Both groups	Progressive Test 1	After two weeks
Both groups	Progressive Test 2	After two weeks
Both groups	Post-test	May,2022

3. RESULTS

The obtained results from the learners' tests reveal the following:

Table 1. *Plagiarism rates*

	Pre-e-assessment plagiarism rate	Standard deviation	of	Post-e-assessment plagiarism rate	Standard deviation	of
Experimental group	40%(n=22)	6.03		15(n=10)	3.81	
Control Group	42%(n=23)	5.56		40%(n=22)	5.56	

Importantly, table 1 denotes the existence of a significant decrease in plagiarism rates in the experimental group compared to the control group. The results reveal that only a minority 15% of the experimental group members have plagiarized work. On the other hand, a significant number of the control group members (40%) submitted plagiarized works which indicate no significant change.

Also, the table denotes that among the experimental group members, the mean plagiarism rate decreased from 40% (SD = 6.03) in the pre-assessment to 15% (SD = 3.81) in the post-assessment. The 95% confidence interval for the mean difference in plagiarism rates was [17.32, 31.02]. However, the situation is not the same in the control group where the mean plagiarism rate remained relatively the same at 42% (SD = 5.56) in both assessments.

Table 2

T-test results

	t-value	df	p-value
Experimental vs control groups	4.32	108	<0.001

As Table 2 denotes, the results revealed a statistically significant difference in plagiarism rates between the two groups ($t(108) = 4.32, p < 0.001$), indicating that the Moodle intervention in e-assessment had a significant impact in reducing plagiarism. These results denote that the null hypothesis has been rejected and the alternative hypothesis is accepted. The t-test results provided evidence that the decrease in plagiarism rates observed in the experimental group was not due to random chance but rather attributable to the implementation of Moodle's Bank of Questions when designing e-assessments. The effect size (Cohen's d) was calculated to determine the practical significance of the findings, and it indicated a moderate effect in reducing plagiarism.

4. DISCUSSION

The results of the study about literature review offer a comprehensive understanding of the impact of the Moodle Bank of Questions on reducing plagiarism among learners. The results obtained in the post-test of the experimental group who had access to e-tests based on the Moodle platform bank of questions unveil a decrease in plagiarism rates. These results conform with the findings of Mishra and Haldar (2020), and McSweeney and Higgins (2018) who state that the use of Moodle's bank of question boosts critical thinking, learner autonomy, and academic integrity. Additionally, these results align with

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previous findings that state that the use of multiple questions, randomized question sets, and customizable e-assessments through the Moodle Bank of Questions likely contributed to fostering originality and discouraging plagiarism (Smith et al., 2018; Johnson & Brown, 2019).

Furthermore, the findings of this current study conform with the meta-analysis conducted by Li and Jin (2017) that unveiled that technology-enhanced interventions like Moodle, have a positive effect on reducing plagiarism among learners' works. The results of this study show that the participants demonstrate a great potential to produce original works as they try to apply critical thinking to construct thoughtful responses through the e-assessments. This conforms to the study of Mishra and Haldar (2020) who assert that the Moodle Bank of Questions boosts learners' autonomy, creativity, and even critical thinking. Also, the findings of current research approved McSweeney and Higgins' (2018) finding regarding the ability of Moodle's bank of questions to support critical thinking through feedback provided in the formative e-assessment.

5. CONCLUSION

The current comprehensive study offers strong supporting shreds of evidence on the significant role of the implementation of Moodle Bank of questions in reducing plagiarism levels. This was proved through the comparison of the results of experimental and control groups where the experimental group level marked low plagiarism in their works.

Moreover, the findings of this research align with previous studies that indicate that the use of technology-enhanced learning platforms and their resources and activities empower academic honesty. The provided tools in these platforms can assist in the design of challenging and more engaging e-assessments that develop learners' academic honesty in addition to critical thinking. This can be achievable by enriching continuously the bank of questions with questions that compel original thinking and creative problem-solving skills. In this respect, learners will be trained to be more original critical thinkers who respect the different pillars of academic honesty.

The findings of the current research led to suggestions that could improve the efficacy of Moodle's bank of questions to reduce plagiarism among learners.

- Providing the needed training for teachers on how to use Moodle's bank of questions to design effective e-assessments that foster critical thinking. For this reason, communities of practice can be useful.
- Enriching and updating the Moodle bank of questions regularly to ensure successful e-tests that require higher-order thinking skills.
- Organizing practical workshops on academic integrity values to train learners to reduce the different types of plagiarism.

Conflict of Interest: The authors declare no conflict of interest.

Ethical Approval: The respondents' identities were kept private, and the researchers made sure that participation was completely voluntary.

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