

From Viewing to Doing: Engaging Undergraduates with AI and Wikis, in Moodle – LMS to Scaffold “Teaching and Learning Team-Working in Research Proposal Writing”

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ABSTRACT

The Learning Management System (LMS) a popular one being Moodle, has many features that can be adopted to the task requirements. The Wiki feature is a user- friendly feature. This paper explores the utility of this feature from a sociological perspective as well as the technology affordance perspective that has evolved from there. The context of Research Proposal writing as a collaborative, team-working assignment for undergraduate learners is explored here in the learning of Scientific Research Methods as a course and how peer-scaffold is enabled.

Keywords: Moodle, LMS, Research Proposal Writing, Team Working, Technology Affordance, Technology, Peer-Scaffold.

INRODUCTION

The learning management systems' (LMS) design is predominantly focused on leveraging the technology and not necessarily addressing the challenges of the user or in an academic environment, the learner. This paper outlines an exploratory study that highlights the challenges of implementing a tool the “wiki” on the common LMS- Moodle, in the context of undergraduate learners, studying Scientific Research Method, and writing a Research Proposal as a collaborative work.

The user-perception of the LMS system is considered here in the context of affordance and the presence of the functionality scaffold fulfillment in the context of the learner- is explored.

Objectives of the Study

1. To explore the implementation challenges for an LMS tool for a collaborative student project with specific reference to teaching the research methodology course
2. To assess the scaffolding possibilities of an LMS tool as a collaborative student project
3. To evaluate the concept of affordances and user perception of an LMS tool
4. To assess the possibilities and scope of an AI framework in a technology, affordance and social affordance perspective.

REVIEW OF LITERATURE

A lot of research has been done on how to improve learning outcomes and student engagement by integrating

AI and Wikis into the Moodle learning management system. In a recent study, it was also revealed that by processing vast volumes of data to build adaptive learning environments, integrating AI into LMS platform can drastically adapt and enhance the environment of learning. In order to address the changing demands of individualized education, this study investigates the incorporation of Artificial Intelligence (AI) into Learning Management Systems (LMS). This study suggested that in order to improve the operation of an e-Learning or LMS platform and update it in line with contemporary training approaches and learner expectations, artificial intelligence (AI) and machine learning (ML) can help us process these data. Additionally, it can assist us in gaining comprehensive, precise, and perceptive information about how individuals are interacting with an LMS at the micro level, which will help us enhance the system's efficacy and provide more individualized programs that will increase participation and retention rates. In this work, a framework has been outlined along with the process for safely and successfully incorporating artificial intelligence into an LMS platform. (Sougleridi et al., 2024). In light of student performance, this study seeks to assess the Moodle Wiki tool. An investigation was carried out involving learners who were utilizing the online learning platform to work together to create a collaborative text that illustrated the significance and outcomes of communication and information technology use in small and medium-sized businesses in the Sant'Ana do Livramento vicinity. The use of Wikis in Moodle for collaborative learning has been proven to foster student interaction and knowledge construction, as highlighted by studies that emphasize the importance of social learning design. The study concludes that the Wiki tool effectively supports collaborative learning, leading to better student engagement and interaction. The collaborative process facilitated by Wiki enhances the overall learning experience by promoting dialogue and content co-creation. (Sonego et al., 2014)

This study investigates the communication dynamics between students and educators in a smart e-learning system utilizing Moodle LMS. This research work tried to analyze the effectiveness of communication in Moodle-based e-learning environments and its impact on the students' perception and information retention. The study concludes that while smart e-learning systems like Moodle improve communication efficiency, they may also lead to a decline in the quality of personal interactions. The authors suggest strategies to mitigate these issues to maintain effective communication in digital learning environments. (Khoroshko et al., 2019)

The present study give insights to improve the teaching -learning process in field of science and maths especially through use of many interesting tools and the students also re-enforce their abilities and knowledge in a user-friendly and modern E-learning environment through the use of proper pedagogies. The environments have been created in collaboration with educators to supplement in-person instruction for both academic and extracurricular purposes. Teachers can add to, modify, or use the environments exactly as they see fit, making them equal partners in their growth. This is one of the environments' key benefits. The environments include interactive activities combining simulations, short videos, virtual experiments, games and more, in order to enhance interactive learning based on constructivism theory, and allow for students and teachers to learn skills for intelligent use of information and technological communication. In this study it was evaluated that Students' opinions of web-based homework assessments were generally highly favorable. It was intended to introduce Moodle courses in other topics, like biology and chemistry curriculum, to enhance and standardize the students' foundational understanding. (Kotzer & Elran, 2012)

This study looked into how students were engaged with the Moodle-based platform (MBP) based on how many tasks they uploaded and saw, as well as how that affected their learning objectives. In total of 33 undergraduate students who enrolled in an online course called "The Psychology of Teaching and Learning in Mathematics Education" served as the study's participants. According to this study's descriptive statistic, students are more engaged when there are more views than posts in MBP. The number of views is correlated with the exam score of the students, according to the results of the chi square test of independence. Next, comparing the quantity of posts made by students on MBP to the number of views, the Spearman correlation coefficient analysis reveals a positive association between the two variables. These results may therefore have consequences for higher education educators who are managing several MBP activities to enhance students' learning, especially in mathematics. The study concludes that higher engagement levels, particularly in terms of task views, correlate positively with better academic outcomes. The findings suggest that educators should

focus on increasing student interaction with the platform to improve learning results. (Vellu & Maat, 2021)

This research explores the use of contextual applications within Moodle's Wiki to enhance student engagement and readiness for real-world tasks. The objective of the present study is to evaluate how the Wiki tool in Moodle can be used to create contextual learning experiences that are relevant to students' future professional environments. The study concludes that contextual applications within the Moodle Wiki can significantly boost student engagement and preparedness for practical work. However, the study notes the need for more awareness and usage of these tools to maximize their potential benefits. According to this study, users of the e-learning system are not using it to its full potential, particularly when it comes to the Wiki tool. One explanation for this is because users are unaware of wikis' ability to facilitate collaborative learning environments. This article focuses on the Moodle 2.3 initiative for contextual application on the Wiki platform. In addition, this article investigates how wikis are used by looking at the data log of student activities in the Computational Intelligence course at Universiti Teknologi Malaysia's Faculty of Computing. We can ascertain the students' active and passive dispositions through this investigation. These results should help teachers enhance their teaching practices, particularly with regard to the wiki contextual application method. It has the power to boost involvement among students and better prepare them for fieldwork in the future. (binti Mohamad, 2013)

This study investigates the use of Moodle, specifically its Wiki module, in the context of teaching English as a foreign language. This paper reviews pertinent literature to highlight the value of utilizing Moodle in foreign language learning and instruction, and it introduces a Moodle-based environment designed to support independent English practice for English language learners. The study concludes that Moodle, particularly its Wiki module, effectively supports language learning by fostering interactive and collaborative environments. The findings suggest that Moodle's tools can enhance both the acquisition of language skills and overall academic performance. (Coskun & Arslan, 2014)

This paper examines the perspectives of students and teachers on the use of Wikis in Moodle within a chemistry course at the University of the Republic. The effectiveness of Wikis in supporting teaching and learning processes and to gather feedback from both students and educators on their experiences was analysed. The study concludes that Wikis are a valuable tool in enhancing collaborative learning and teaching when appropriately integrated into Moodle. Both students and teachers found the tool beneficial, although the study emphasizes the need for better implementation strategies to fully realize its potential. (Núñez et al., 2016)

The present research of comparative study investigates the diverse construct of student involvement as it involves emotional, behavioral, and intellectual aspects. Students in this experiment included 135 undergraduate and graduate students in very similar blended and online learning environments conducted in the virtual world of Second Life. Quantitative analysis was done and a positive result was seen for the online courses delivery approach among the post-graduate students. The research work discusses the education consequences and gives suggestions for further study. This study take into account the post-graduate student and give scope for research among the under-graduate students. Unquestionably, surroundings supplemented by 3D technology have provided enormous benefits and advantages to modern e-learning. (Pellas & Kazanidis, 2014)

Analysis of learning have always been interested in researching the connection between students' online actions in Learning Management Systems (LMS) and their academic achievement. The present study analyzes existing research, establishes a new classification scheme for interactions in LMS, and explores the correlations between clickstream data of students' activity and course success, as evaluated by final grades, with the goal of obtaining high understanding and universality. Multiple regression analysis of Moodle log data was conducted on three diverse courses and as per the investigation, the models predictive power vary depending on the manner of delivery, improving the delivery methods shift from face-to-face learning to online learning. The conclusions drawn from this research study shows insights into co-relation between LMS interaction, course delivery method, instructional design and academic performance. The emphasis in this

research was given to the exploration of white-box and black-box modeling approaches. (Hernández-García et al., 2024). This research work focuses on the integration of AI chat-bot within the Moodle LMS for facilitating communication in between the educators and the students and decrease the manual workload of educators. To enhance the communication between the two AI -driven chat-bot was developed and used. For instantly answering students queries. The study reveals that that implementation of AI chat-bot significantly improves interaction of students, increasing the efficiency and effectiveness of the teaching and learning process within Moodle. (Shilowaras & Jusoh,2022)

Moreover, leveraging AI for evaluating student interactions on Wikis has demonstrated effectiveness for recognizing engagement patterns and boosting cooperative learning settings. In order to analyze participant interactions, this study recommends a visualization application in Moodle's Wiki that utilizes the application to social learning metrics and graph theory. As per the findings of the study, the suggested tool effectively analyses the engagement patterns and provides insightful information on how students interact with one another. The educators could boost students engagement by recognizing and addressing the needs of students who are disengaged by picturing these conversations. (Zampieri & Oliveira, 2017).

This study conducted in 2016 also demonstrate comparison between two LMS platform i.e. Wiki and Moodle when effectively used can enhance students engagement in their studies in Romanian undergraduate economic course. This study was conducted to know how these AI tools affect the learning styles of students. The study concluded that both the platforms help student involvement with effective social learning design being critical to maximizing their benefits. The analytical part of this research work evolves the importance of including social learning environments to fully leverage these web 2.0 tools but on the contrary the success depends largely on the pedagogical strategies employed. (Stanca & Felea,2016)

Affordance and the Learning Environment

Affordance is a relation between an object or an environment and an organism that, through a collection of stimuli, affords the opportunity for that organism to perform an action (Webster, 2018).

For example, a knob affords twisting, and perhaps pushing, while a cord affords pulling. In a learning environment the “purpose-perception” of the tool hence will also define the success of the incidence of learning.

A Learning Management System’s purpose will be to deliver a specific function that is perceived by the user. This perception has become very fluid and dynamic due to the very nature of the improvisation on many factors that also includes:

More digital literacy of the learners but the technology did not keep pace with their usage habits.

Loss of focus on the purpose- using technology for the sake of using it and not really a contribution to the objective of the task defined.

- Loss of the affordance of technology itself, due to various pressures for not letting the phenomenon of obsolescence take-over and let the new technology take-over.
- The question of the functionalities of the AI tool that are available for the Moodle users, do they afford scaffolding of the learners is a key discussion point.

Social affordance Vs Affordances of Technology

Affordances traditionally have been in the context of social action and sociology. More specifically, social affordance is something that is of greater relevance with the advent of more dominance of social technologies like Facebook and wikis for instance.

A Conceptual Model for the Technology Affordances Dr. Ralph Putnam's "Affordances of Technology" (Hollingshead) model that highlights the four aspects of technology-affordances can help us reflect on the usage patterns of the LMS.

The model that has the four affordances highlighted viz., Providing Access to Information Automating, Simplifying, and Transforming Task represent ideas in new and different ways Communicating and Collaborating with Peers and Experts

Providing Access to Information:

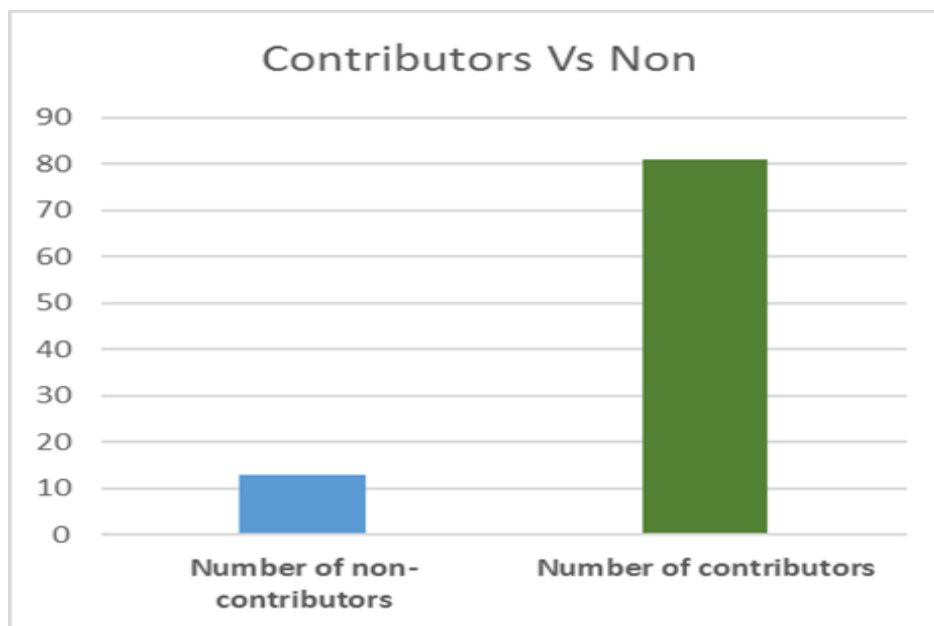
- In the context of the collaborative project the "Wiki" was required to enable the availability of the preliminary information about the project. This was done in the context of the teacher as well as learner contributing to the initial document that was available online for the users to reflect on, similar to a bulletin board function of any LMS.

Automating, Simplifying and Transforming Tasks:

- To keep track of how many times and the how long the users were there logged in the LMS was automated in this case. There was no simplification for the user here, due to the nature of the design of the task. The straightforward rubric was on if there were contributions or not.

Table I Contributors Vs Non-Contributors

S. No	The total number of contributors and non-contributors	No.
1	Number of non-contributors	13
2	Number of contributors	81



Represent ideas in new and different ways:

- Representing the ideas and the conversation in different formats like for example in a tabular form was not possible using the LMS. This kind of collaboration is essential and very important to measure the successful technology intervention by the LMS that we can say has facilitated the same.

Communicating and Collaborating with peers and experts:

- In this context there definitely was presence of communication, but did the usage of Wiki promote a collaborative communication was questionable since the affordance of the technology was not in the context of promoting the collaborative working that is already present in the other relevant environments like MS Teams meetings etc., In the context of the collaboration with the experts it was an approval seeking- behaviour rather than active discussion that was noticed.

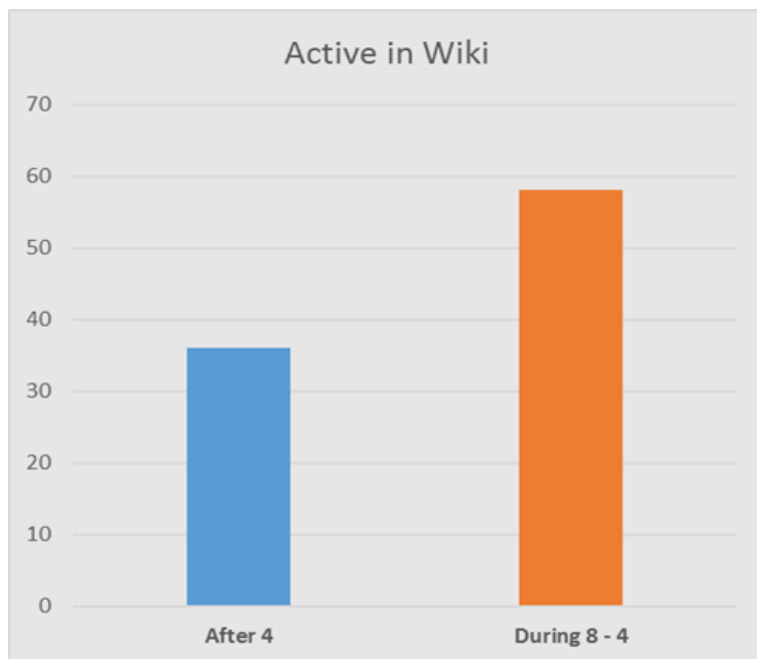
Student's Project Collaboration

The student's group of four members that were created, facilitated an efficient meeting-point of their online discussions. The thread of the off-line and online collaboration was not efficiently established as an objective of the exercise and neither was it covered in the design of the task for the students.

A seamless synchronisation of discussion points and a follow-up of the same through both off-line and the efficiency of the same in the online interaction needs to be done during the design of the task itself. The summary statistics could only provide the circumstantial evidence of an off-line or after working-hours collaborative working evidence. This non-representation of evidence gathering in the task design did not yield a clear assessment of this criteria of technology affordance. Refer Table II for the time active in Wiki.

Table II. Active Time on Wiki

S.No	Time	Total
1	After 4	36
2	During 8 - 4	58



The Moodle Environment

For the purpose of establishing collaboration as an objective or to show the usage of technology in varied number of contexts and hence assess the efficiency of the same in the task-fulfilment after the completion of an implementation cycle is the question here. Technology affordance very precisely is measurable in

this context if the task is clearly defined for specific requirements of the user. But with the current metrics this is not sufficient to clearly point in the direction of a more efficient technology affordance. The number of active hours is not a dependable metric for ascertaining the quality / efficiency of the interaction

Table III Number of Active Hours

S. No	Hour	No. of Hours
1	0	3
2	1	1
3	2	1
4	7	1
5	8	4
6	9	4
7	10	2
8	11	6
9	12	35
10	13	4
11	14	2
12	15	1
13	16	3
14	17	6
15	18	3
16	19	1
17	20	3
18	21	3
19	22	5
20	23	6

The Collaborative Project

The task

The research proposal writing is not just a collaborative writing exercise but collaborative thinking exercise. The ability of the LMS feature to either capture if there is the presence of this collaboration or effectively

measure the efficiency of the same will define the level of the its technology affordance.

The measurement of the result of the task—Affordances

The Wiki feature of the LMS in spite of the tailoring to the task of measuring either collaborating or scaffolding, needed more metrics to exactly define if the affordance of the same was there.

The perception and the environment

The perception of the technology environment by the users was more of task-fulfilment rather than as an enabler of the task at hand. It was more of the visibility of the first two levels of the technology affordance model of Dr. Putnam (Hollingshead).

Can Ai Enabled Wiki Serve as a n Assessment Tool for Research Methods Students' Task?

Wikis

“A wiki is a collection of web pages in which each page has its own edit button. A web site is normally edited and maintained by a specially designated person or department, wikis were designed to allow groups of people to collectively generate and edit textual information. The text can be viewed by anyone with access to the wiki. Wikis are a Web 2.0 application because they foster content creation and interaction among a group of people.” (Evans & Coyle, 2010)

Why do we need to Grade?

Among the multiple roles that grades serve as defined by Barbara Walvoord and Virginia Anderson, Viz.,

“As an evaluation of student work;

As a means of communicating progress to all stakeholders

As a source of motivation to students for continued learning and improvement

- As a means of organizing a lesson, a unit, or a semester in that grades mark transitions in a course and bring closure to it.

- Grading provides students with feedback on their own learning pointing out areas of improvements.

Grading provides feedback to instructors about their students' learning.

The Challenges of Grading:

Should reflect the quality of the student's work.

The Wiki in our case with the current metrics is not reflective of this requirement.

Scope for student appeals

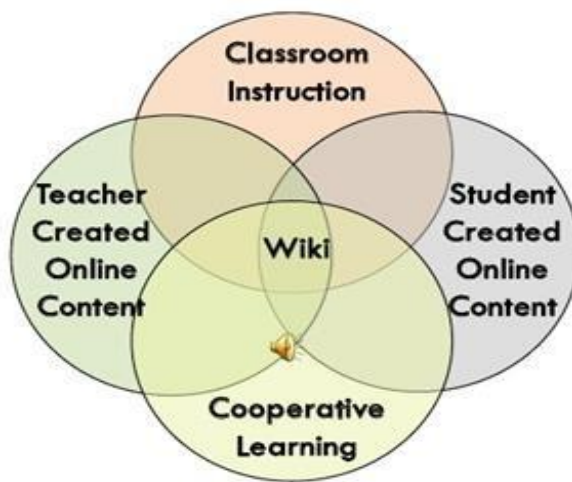
The Wiki without the right metrics on measuring specifically designed tasks is not yet a complete tool to assign numbers and look for presence of learning.

Walvoord, B. & V. Anderson in their work, Effective Grading: A Tool for Learning and Assessment, have highlighted the importance of developing the criteria for an assessment task (Walvoord, 1998).

Importance of Developing the Grading Criteria

The clarity, rigor, thoroughness, precision, or even demonstration of knowledge and a critical inquiry are all some of the most significantly weighed parameters for a grading criteria for instance. But for the task of scaffolding, these parameters are only the methods and not the end-results. Unless these characteristics are identified and transformed in to grading criteria, the scope of the Wiki serving the right affordance will not be achieved.

The following model in **Figure 1** proposed by Victoria Davis in her continuous work to upgrade teaching methodology, is useful for relating to the type of all-round support (Davis, 2006) that is required for the specific technology-affordance to be perceived in the right-level by the user.



□ Pedagogy of a Wiki-Centric Classroom

(Davis, 2006)

Figure.1 A hypothetical model of a Wiki-centric classroom proposed by V. Davis

CONCLUSIONS

The broad literature review points out that the traditional version of the most popular Wiki, the Wikispaces is shutting-down in a phased manner between July 2018 and end 2019. This study employed Wiki as a tool to assess the quality and nature of collaboration, was dependent on the Wiki feature of a learning management system- the Moodle. From a technology affordance perspective, the Wiki implementation needs more working on the task definition and defining criteria to enable the learning outcome, that might be more easy in other currently available pedagogic tools.

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