



"School Teachers' Perception towards using LMS-MOODLE in Teaching Science to Students of Aurangabad City."

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Abstract

This paper describes the perception of school teachers of Aurangabad city towards teaching using the Open-Source Learning Management System (LMS) MOODLE in teaching science subjects. The Free and Open-Source (LMS) MOODLE has brought a dynamic pedagogical shift in Online Learning due to its nature of robust features and free availability. The outbreak of COVID-19 has forced formal and non-formal educational systems to adopt an Online teaching-learning platform for the transaction of information. In this study, teachers' perception of using LMS-MOODLE in teaching science to secondary school students of Aurangabad city is studied. The research methodology adopted is the descriptive survey method, and the sample consists of 40 female and 45 male teachers of secondary school students of Aurangabad. In this research, a self-made perception scale (*refer to appendix*) is prepared with a 5-point Likert-type scale, the reliability of the test found by Cronbach (0.71). The data analysis shows that the perception among female and male school teachers of Aurangabad city, [U = 766.5, p = .23] in teaching science using LMS-MOODLE is almost the same.

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Further, the perception between groups, i.e., *primary and secondary* school teachers of Aurangabad city, [U = 878.5, p = .898] towards using LMS-MOODLE in teaching science was also found to be identical. The study results suggest that female and male school teachers have similar perceptions towards teaching science subjects by using LMS-MOODLE. Similarly, primary and secondary school teachers have identical perceptions towards teaching science subjects by using LMS-MOODLE. The most plausible reason for the similar perceptions among male and female teachers at the primary and secondary levels is the application of the Internet and technology in learning and teaching during the pre-COVID-19 and post-COVID-19 pandemics and the social distancing implemented by the authority.

Keywords: Perception, Teachers, Learning Management System, MOODLE, Secondary School, Science.

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Introduction

The advent of information technology has transformed the entire world into a gigantic village. The advancement in science and technology has brought an enormous change in the pedagogical system. Further,

the progress in science, technology, and the computer has brought a paradigm shift in the education discourse. One such technology developed by Australian computer scientist and educator Martin Dougiamas is "MOODLE." According to (Singh, 2014) the



name "MOODLE" has two meanings; firstly, it's an acronym for the Modular Object-Oriented Dynamic Learning Environment.

Further, it is also a verb, meaning a person does the task precisely what it appears to him and develops insightful learning and creativity. The application of information and communication technology in the non-formal education system was prominent, and the educators have seldom used technology in formal education. Still, with the onset of the novel coronavirus, technology in the traditional education system has increased exponentially. (Mishra et al., 2020) advocates that COVID-19 and the subsequent lockdown has become a buzzword, and the authorities impose the state of emergency to maintain social distances among people and thus control the spread of the coronavirus. The post-corona pandemic has created a pedagogical shift (Mishra et al., 2020) from face-to-face to online instruction in the formal education system. The outbreak of a pandemic or disaster created by nature and humans is always lingering in the human civilization; thus, it becomes indispensable to design a flexible discourse in the formal education system for imparting education in such events. In recent studies, the literature review suggests that the digital divide among the marginalized people has been widened with the onslaught of novel Coronavirus.

During this disaster period, the stakeholders have implemented Online Education to maintain social distancing among the students and teachers. Educators using the LMS can create an effective personalized learning environment in online education. The LMS, available online, are paid and free and Open Source. The Free and Open Source LMS provides the facilities free of cost to the learners, teachers, and managers. Furthermore, it has been observed in recent studies that there were positive and negative perceptions among the teachers in the learning and teaching process using LMS-MOODLE. The positive perception is due to the robust features of the MOODLE platform. Some research suggests the negative perception is due to the digital divide among the marginalized learners & teachers and the

insufficient infrastructure available in the institutions. Therefore, the design and implementation of a free and open Learning Management System have become pertinent for the discourse of the curriculum in the formal education system. The study (Baig, 2017) has reviewed the literature, and the analysis of the research on MOODLE suggests that the LMS-MOODLE is an efficient platform with adequate features and plugins for the teachers and students in sharing, collaboration, and communication of information. In the MOODLE platform, data is stored in the cloud and thus easily accessible irrespective of time, place, and devices.

Purpose of the Study

The onset of the novel Corona Virus has brought a pedagogical shift in the formal education system from the perspective of the application of online technology in imparting education to the students. This sudden change in imparting education to the students and using online education in the formal education system has created a digital divide among the marginalized teachers and students. The digital divide between the students and teachers is due to economic, social, and geographical barriers. Therefore, this study aims to find Teaching Science to Secondary School Students in Aurangabad City. Teachers' perception towards using LMS-MOODLE in Teaching Science to Secondary School Students of Aurangabad City.

Literature Review

A pedagogical transition from face-to-face to online teaching and learning has occurred recently (Mishra et al., 2020). This pedagogical revolution has also altered how stakeholders perceive the application of technology in teaching and learning. This study focuses on the teachers' perception of using Open Source LMS-MOODLE in teaching science at the primary and secondary school levels. According to (Baig, 2021), the findings reveal that the Twitter platform users' sentiments have a mediocre but positive emotion of polarity of (.389) regarding the application of web technology in imparting education to students. Further, the moderate value suggests that the learners are not prepared to receive education through the



online mode. During the COVID-19 pandemic and the subsequent lockdown imposed by the authority, the task of imparting education to students face-to-face had shifted to Online mode. The qualitative study by (Sallam et al., 2014) emphasizes that teachers perceive MOODLE as a valuable LMS to augment their skills in teaching and use instructions effectively. (Jaja, n.d.) used a mixed or qualitative approach to investigate 107 students' and teachers' perceptions of using MOODLE in the learning and teaching process. The study by (Jaja, n.d.) reveals teachers' positive and fresh perceptual experience towards the challenges and opportunities created by the LMS-MOODLE.

Further, the results support the positive perceptual experiences due to adopting the novel, innovative methods and approaches to teaching and learning at Veritas University. The development of the study by (Badia et al., 2019) indicates that the perceptions of students and teachers are positive toward using MOODLE in teaching and learning due to the applications of new education methods. The study's results on the use of MOODLE for learning and teaching suggest that teachers and students perceived the activities available on the MOODLE platform, such as lessons, forums, assignments, quizzes, and external tools, to have a more significant impact on learning. A study by (Ahmad & EkoSubekti, 2021) on the perceptions of mathematics teachers on the applications of MOODLE during the COVID-19 pandemic shows that nearly 40 % of teachers perceived that the activities present in the MOODLE platform were good, and 60 % of teachers perceived that there is a positive impact on learning of mathematics subject. (Ivanović et al., 2013) analyze the effectiveness of the MOODLE platform, the results obtained by the authors emphasized that teachers and students have a positive perception regarding the benefit of the e-learning strategies. And they are ready to make changes to specific system features; they are also willing to upgrade the techniques of teaching materials.

Further, the research reflects the results of the surveys, which manifest the participants' experiences regarding the

MOODLE platform. The results also confirm the positive perceptions of the participants' opinions, expectations, and barriers towards the use due to security and privacy concerns. The study by (Prasetya, 2021) identifies that teacher presumed that Moodle's outstanding reputation is due to its simplicity, cost-effectiveness, and compatibility in integrating into the external system. The popularity of MOODLE is due to its positive perception and popularity among teachers and students. Further (Prasetya, 2021) states that pedagogical and adaptive to the learning environment during the COVID-19 pandemic has also developed a positive perception among the teachers and students. (Gamage et al., 2022) conclude that LMS-MOODLE Moodle is used in teaching science disciplines and improves the outcomes in the science outcomes disciplines. Further, there are positive perceptions among the students and teachers because of the engaging, collaborative and adaptive learning environment available in the LMS-MOODLE. According to (Nicholas Mlotshwa, 2017) the students learning experiences in studying Mathematics can be enhanced by students' interest in Information and Communication Technology (ICT). The LMS MOODEL is developed on the social constructivism theory. In LMS-MOODLE, there is an advantage of student-teacher and student-student interaction through the embedded activities in the platform.

Objectives of the Study

1. To study the difference in perception among female and male school teachers' towards the use of LMS-MOODLE in the teaching of science subjects.
2. To study the difference in perception among primary and secondary school teachers towards the use of LMS-MOODLE in the teaching of science subjects.

Hypotheses

1. There is no significant difference in perception among female and male school teachers towards using LMS-MOODLE in teaching science subjects.
2. There is no significant difference in perception among primary and secondary



school teachers towards the use of LMS-MOODLE in the teaching of science subjects.

Methodology and sample used in the research

In this study, the researcher used a descriptive research survey method to assess teachers' perception of using LMS-MOODLE in teaching science subjects. The study is limited to primary and secondary school students of Aurangabad city. The sample consists of 40 female and 45 male teachers of primary and secondary schools in Aurangabad city. The inclusion of 85 samples in this study was due to limited funds, time, and human resources. In this study, the participants were selected through stratified random sampling from the male and female teachers from primary and secondary schools using LMS-MOODLE in teaching science subjects.

In this study, the researcher conducted a pilot study and developed a perception scale to collect quantitative data regarding teachers' perception of using LMS-MOODLE in teaching science subjects. In this research, the validity of the perception scale has been found by the opinion and evaluation of experts. Further, the reliability is found using the alpha Cronbach test (0.71), which suggests an excellent internal consistency. In this study, a 15-item Likert type of scale (refer to appendix), rated on a 5-point response format, where five is "Strongly Agree" to "Strongly Disagree." Further, there is a neutral point equal to 3, and the 15-item Likert-type items were prepared using the online application Google Form for collecting online data. This research enumerated assumptions for the *independent t-test* to analyze the data. The assumptions of normal distribution have been analyzed to ascertain if the normal distribution has produced teachers' perception of using the LMS MOODLE. The assumption for normality of the *independent t-test* has been examined with the help of the statistical test *Shapiro-Wilk test*. This study used the IBM SPSS Statistics for Macintosh, Version 25.0., to analyze the quantitative data.

Findings of the study

The analysis and Interpretation of perceptions of male and female school teachers.

The test of normality was found with the help of the Shapiro-Wilk, and the results (refer to Table 1) show that the p-value of 0.003 for male and female school teachers is less than the significant value of 0.05. Therefore, the null hypothesis (H0) for the normality, i.e., the data follows a normal distribution, is rejected. Consequently, the researcher concluded from the results of the normality analysis that the perception of female and male school teachers is unlikely to be produced by the normal distribution, thus ascertaining that the assumptions of normality have been violated. The histogram further supports this (refer to figure 1,3, & 4).

Therefore, in this study, the normality assumption for the independent t-test has been violated, and the researcher has selected a non-parametric Man Whitney U test for the data analysis. The Man Whitney U test is used in this study to analyze school teachers' perception of using the LMS-MOODLE in teaching science subjects. In this study, there are two groups, namely male and female school teachers as the independent group and the perceived level of teachers as the dependent group. The null hypothesis for the perception of the LMS-MOODLE of female and male school teachers is given below;

1. H0: There is no significant difference in perception among female and male school teachers' towards the use of LMS-MOODLE in the teaching of science subjects.

As shown in the table (Table 4), the analysis of the study indicates that there is no significant difference in perception between groups, i.e., male and female teachers of Aurangabad city, [U = 766.5, p = .23] towards the use of LMS-MOODLE in teaching science. Therefore, the researcher failed to reject the null hypothesis. The results show no significant difference in perception between groups, i.e., male and female teachers of Aurangabad city, towards using LMS-MOODLE in teaching science.

The analysis and Interpretation of perceptions of primary and secondary school teachers.

The normality test was found with the help of the Shapiro-Wilk test, and the results (refer to Table 5) show that the p-value of 0.001 for primary and secondary school teachers is less than the significant value of 0.05. Therefore, the null hypothesis (H₀) for the normality, i.e., the data follows a normal distribution, is rejected. Consequently, the researcher concluded from the results of the normality analysis that the perception of primary and secondary school teachers is unlikely to be produced by the normal distribution, thus ascertaining that the assumptions of normality have been violated. The histogram further supports this (refer to figure 2, 3, & 4).

The Man, Whitney U test is used in this study to analyze the perception of primary and secondary school teachers towards using the LMS-MOODLE in teaching science subjects. In this study, there are two groups, namely primary and secondary school teachers as the independent group and the perceived level of teachers as the dependent group. The null hypothesis for the perception of the LMS-MOODLE of primary and secondary school teachers is given below;

1. H₀: There is no significant difference in perception among primary and secondary school teachers towards using LMS-MOODLE in teaching science subjects.

As shown in the table shown (Table 4), the analysis of the study indicates that there is no significant difference in perception between groups, i.e., *primary and secondary* school teachers of Aurangabad city, [U = 878.5, p = .898] towards the use of LMS-MOODLE in teaching science. Therefore, the researcher failed to reject the null hypothesis. The results show no significant difference in perception between groups, i.e., *primary and secondary* school teachers of Aurangabad city, towards using LMS-MOODLE in teaching science.

Discussion

The analysis of the results was found contrary to the researcher's expectations. The results suggest that the perception of the

female and male school teachers does not significantly differ concerning the use of LMS-MOODLE for teaching science subjects. Likewise, the perception of the primary and secondary school teachers does not vary substantially concerning the use of LMS-MOODLE for teaching science subjects. The researcher failed to refute the null hypotheses regarding the use of LMS-MOODLE by male and female school teachers of primary & secondary school teachers in teaching science. The unexpected results might be due to providing equal opportunities for hands-on experiences and training by the institutes on the use of technology to the primary and secondary school teachers irrespective of gender. Further, there was a strict implementation of social distancing during COVID-19, and the female and male teachers were forced equally to use technology for imparting education at primary and secondary schools.

Recommendation

The activities available in the LMS-MOODLE platform and its use in teaching science subjects help teachers engage students. The interaction between the students and teachers enhances with the plugins, external tools, and activities available in the LMS-MOODLE platform; this further develops effective communication among the teachers and students and helps in the collaboration and sharing of the information among students. But the use of MOODLE does not warrant the higher order thinking abilities among the students. The effectiveness in teaching subjects solely lies in the quality of content developed and engaging activities available for the students; furthermore, a study in the field of teaching and learning can be conducted on the effectiveness of LMS by comparing the two LMS-MOODLE Vs. Google Classroom.

Conclusion

The data analysis shows that the perception among female and male school teachers of Aurangabad city, [U = 766.5, p = .23] towards using LMS-MOODLE in teaching science is almost the same. Further, the perception between groups, i.e., *primary and*



secondary school teachers of Aurangabad city, [U = 878.5, p = .898] towards using LMS-MOODLE in teaching science was also found to be the same. The study results suggest that male and female teachers perceive using LMS-MOODLE in teaching science subjects. Likewise, the primary and secondary school teachers have a similar perception of using LMS-MOODLE in teaching science subjects. In this study, the researcher failed to refute both null hypotheses regarding using LMS-MOODLE in teaching and learning. And this may be due to the regressive steps taken by the authorities to implement social distancing and the use of online technology for imparting education at primary and secondary schools.

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Appendix:

Perception Scale

A perception scale for male and female school teachers at the primary and secondary level at Aurangabad city. A 15-item Likert type of scale, rated on a 5-point response format, where 5rating is assigned for "Strongly Agree", 4rating is assigned for " Agree", 3rating is assigned for "Neutral", 2rating is assigned for "Disagree", and 1rating is assigned for "Strongly Disagree". The 15-item in the Likert type scale is given below;

- 1) I feel satisfied while teaching through LMS MOODLE.
- 2) LMS-MOODLE provides high-quality learning experiences to the students.

- 3) The assignments activity designed in the MOODLE improves communication among the students and teachers.
- 4) Accessibility of digital resources in the MOODLE platform is better.
- 5) MOODLE platform consists of better engaging activities in the form of plugins and external tools.
- 6) Activities in the MOODLE platform arouse curiosity among the students.
- 7) Activities in the MOODLE platform develop interest among the students.
- 8) Students are satisfied with the easiness and accessibility of the tools available in the MOODLE platform.
- 9) In the LMS-MOODLE various plugins, tools and features are available to the students according to their needs.
- 10) In the LMS-MOODLE, learning experiences are designed according to student's learning styles.
- 11) The LMS-MOODLE is designed according to the pedagogical principle of cooperation, sharing, and collaboration.
- 12) The activities designed in the LMS-MOODLE are based on the constructivist principle.
- 13) A personalized learning environment designed in the LMS-MOODLE is satisfactory.
- 14) The assessment tools designed and developed in the LMS-MOODLE satisfactorily measure the students' learning outcomes.
- 15) In LMS-MOODLE, tools for formative and summative assessments are available.

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