ORIGINAL ARTICLE

Implementation of Moodle as a Teacher Support Tool in Municipal Public Education: Contributions to Distance Education in Ibiá-Mg

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ABSTRACT

Distance Education (EaD) has played a crucial role in the democratization of education in locations with structural challenges, such as Ibiá-MG, especially during the COVID-19 pandemic, which highlighted the need for technological and hybrid solutions. Municipal teachers reported difficulties in using digital tools, highlighting the urgency for technical and pedagogical support. To address these challenges, Moodle was implemented as the official Virtual Learning Environment (VLE) in the municipality, combined with a practical workshop for teacher training. The methodology included a literature review, diagnosis of the school's technological infrastructure, and the offering of a model course, promoting the pedagogical use of Moodle. The results indicate advances in the modernization of education, with greater teacher confidence in the use of technologies and the adoption of active methodologies, despite connectivity limitations and the demand for continuing education. This work highlights Moodle as a viable tool for distance education in municipal contexts, promoting digital inclusion and pedagogical innovation.

Keywords: Teacher Training. Digital Inclusion. Active Methodologies. Virtual Learning Environments. Technological Innovation.

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Implementação do Moodle como Ferramenta de Apoio ao Docente no Ensino Público Municipal: Contribuições para a Educação a Distância em Ibiá-Mg

RESUMO

A Educação a Distância (EaD) tem desempenhado papel crucial na democratização do ensino em localidades com desafios estruturais, como Ibiá-MG, especialmente durante a pandemia de COVID-19, que evidenciou a necessidade de soluções tecnológicas e híbridas. Professores municipais relataram dificuldades no uso de ferramentas digitais, destacando a urgência por suporte técnico e pedagógico. Para enfrentar esses desafios, foi implementado o Moodle como Ambiente Virtual de Aprendizagem (AVA) oficial no município, aliado a uma oficina prática para capacitação docente. A metodologia incluiu revisão da literatura, diagnóstico da infraestrutura tecnológica escolar e a oferta de um curso modelo, promovendo o uso pedagógico do Moodle. Os resultados apontam avanços na modernização do ensino, com maior confiança docente no uso de tecnologias e adoção de metodologias ativas, apesar de limitações de conectividade e demanda por formação continuada. Este trabalho destaca o Moodle como ferramenta viável para EaD em contextos municipais, promovendo inclusão digital e inovação pedagógica.

Palavras-chave: Formação Docente. Inclusão Digital. Metodologias Ativas. Ambientes Virtuais de Aprendizagem. Inovação Tecnológica.

Implementación de Moodle como herramienta de apoyo docente en la educación pública municipal: aportes a la educación a distancia en Ibiá-Mg

RESUMEN

La Educación a Distancia (EaD) jugó un papel crucial en la democratización de la enseñanza en localidades con desafíos estructurales, como Ibiá-MG, especialmente durante la pandemia de COVID-19, que destacó la necesidad de soluciones tecnológicas e híbridas. Los docentes municipales reportaron dificultades en el uso de herramientas digitales, destacando la urgencia de apoyo técnico y pedagógico. Para enfrentar estos desafíos, se implementó Moodle como el Entorno Virtual de Aprendizaje (AVA) oficial en el municipio, combinado con un taller práctico para la formación docente. La metodología incluyó una revisión de la literatura, diagnóstico de la infraestructura tecnológica escolar y la oferta de un curso modelo, promoviendo el uso pedagógico de Moodle.

Los resultados apuntan a avances en la modernización de la enseñanza, con mayor confianza de los docentes en el uso de tecnologías y la adopción de metodologías activas, a pesar de las limitaciones de conectividad y la demanda de formación continua. Este trabajo destaca a Moodle como una herramienta viable para la educación a distancia en contextos municipales, promoviendo la inclusión digital y la innovación pedagógica.

Palabras clave: Formación de Profesores. Inclusión Digital. Metodologías Activas. Entornos Virtuales de Aprendizaje. Innovación Tecnológica.

1. INTRODUCTION

According to the Brazilian Association for Distance Education, a census conducted between 2020 and 2021 revealed an increase in the demand from educational institutions for the distance learning modality, particularly following the experience of the COVID-19 pandemic, as documented in the census data from that period across all regions of the country.

> The EAD.BR 2020 Census indicates that the recent authorization of distance education (EaD) for stricto sensu graduate programs and secondary education was very well received by educational institutions. An analysis of how these institutions are organizing course expansion reveals a growing interest in stricto sensu graduate programs: 21% of institutions intend to offer distance education programs, and 25% are exploring course options. A similar trend is observed in the expansion of basic education, with 5% of institutions indicating plans to offer courses in this modality and 20% currently evaluating possibilities—representing a significant increase compared to the previous census. It is important to emphasize that these data were collected during the pandemic; therefore, when compared to the EAD.BR 2019 Census, the interest of institutions in expanding across various educational levels has grown considerably (Abed, 2022, p. 53).

A expansão da Educação a Distância (EaD) tem se consolidado como uma resposta significativa aos The expansion of Distance Education (EaD) has increasingly established itself as a significant response to the challenges faced by the contemporary educational system. As noted by Moore and Kearsley (2011), distance education is not merely an alternative to traditional in-person instruction, but rather an educational modality that demands careful planning, robust technological infrastructure, and, most importantly, an active role from faculty members.

In fact, the global health crisis not only necessitated an abrupt shift to remote teaching but also placed on educators the responsibility of acting as instructional designers—planning and structuring fully virtual learning environments, often without adequate preparation for this new and complex role (Teixeira Junior; Cordeiro; Silva, 2024).

The integration of technological tools such as Moodle into municipal public education requires not only adaptation to local infrastructure but also the development of innovative pedagogical practices. Moran (2015) emphasizes that distance education, beyond the mere provision of content, must foster interactive and collaborative experiences that engage students and support the development of critical competencies.

Recent experience has shown that the effective use of Virtual Learning Environments (VLEs) goes beyond their role as content repositories; their true potential lies in transforming them into spaces of pedagogical interaction that promote meaningful exchanges between teachers and students (Burci et al., 2020).

Thus, teacher training must go beyond the technical use of tools to encompass the development of a new pedagogical mindset—one that integrates technology and active methodologies into the teaching and learning process.

Another critical factor for the success of distance education is overcoming connectivity barriers, especially in regions located far from major urban centers. According to Pretto and Bonilla (2011), the democratization of access to high-quality internet is an essential element for ensuring digital inclusion in educational environments. Without this resource, the implementation of platforms such as Moodle may be constrained, limiting both the reach and effectiveness of the modality. In this regard, the study conducted in the municipality of Ibiá also aims to understand how these barriers impact the use of technology and how local strategies can be developed to mitigate such challenges.

Despite the advancement of digital technologies, their effective implementation also depends on comprehensive teacher training. According to Kenski (2012), the teacher is not merely a mediator but also a transformative agent whose preparation directly influences the quality of pedagogical practices within virtual learning environments.

For distance education to be truly effective and inclusive, it is essential to adopt an approach that integrates three interdependent pillars: continuous teacher training, the incorporation of technological innovations, and the development of educational policies that promote equity and quality in teaching (Oliveira, 2023).

From this perspective, the experience of municipal schools in Ibiá, Minas Gerais, illustrates a context in which limited infrastructure and a lack of familiarity with technology pose significant challenges. Accordingly, the present study aims to explore the contributions of implementing Moodle as the official distance education platform in the municipality of Ibiá, with a focus on its effectiveness as a support tool for teachers and its adoption through a model training course. The study also seeks to understand the limitations related to connectivity, the need for ongoing professional development, and the impact of these variables on the adoption of this technology within the local public education system.

The research problem guiding this study is: what are the challenges and contributions of implementing Moodle as a support tool for teachers in the municipal public education system of Ibiá, Minas Gerais, in promoting Distance Education, considering technological infrastructure limitations, teacher training, and accessibility within local educational contexts? By addressing these questions, the aim is not only to propose practical solutions but also to provide a foundation for future initiatives in similar educational settings.

2. METHODOLOGY

This study employed a mixed-methods approach to investigate the impact of Moodle use on the continuing professional development of teachers in the municipal school system of Ibiá, Minas Gerais. The methodological procedures included a literature review, field research, and controlled experimentation, aiming to ensure a comprehensive and context-sensitive analysis of the collected data.

2.1 Approach and Methods

According to Mazucato et al. (2018), the experimental method employed in this research involves the manipulation of variables under controlled conditions to observe their effects. This method was combined with a literature review, which, according to the same authors, constitutes a planned process of reading, analyzing, and interpreting various sources such as books, articles, and theses, serving as the theoretical foundation for the scientific work. Furthermore, field research was essential for understanding pedagogical practices within the specific context of Ibiá, enabling a detailed analysis of local needs.

2.2 Data Collection

Data were collected through questionnaires administered at different stages of the study. According to Gil (2002), questionnaires are interrogation techniques that allow researchers to capture the perspectives of respondents. However, the author notes that this technique has limitations when addressing broader social relationships, especially those involving institutional variables. The first questionnaire was administered to teachers in the municipal school system to identify needs, concerns, and difficulties related to the use of Virtual Learning Environments (VLEs), particularly Moodle.

2.3 Research Stages

Phase 1: Literature Review and Systematization

In this phase, bibliographic and documentary research was conducted on distance education and Moodle, exploring works such as those by Okada and Santos (2004), which discuss educational communication in cyberspaces, and Moore and Kearsley (2011), which address distance education. A systematic literature review on usability in Virtual Learning Environments (VLEs) was also carried out, grounded in the conception of virtual environments as interactive and collaborative spaces.

Phase 2: Questionnaire Administration and Moodle Reimplementation

During this phase, questionnaires were administered to elementary and high school teachers, as well as to staff at the IFTM campus in Patrocínio, to understand their difficulties and perceptions regarding Virtual Learning Environments (VLEs). Additionally, Moodle was reimplemented following technical improvements, including the deployment of dedicated servers, and was used as the object of study.

Phase 3: Development and Implementation of the Online Course

An online course, structured as an extension workshop by IFTM, was developed based on the needs identified in previous phases. This course, conducted in October 2024, involved 55 teachers and aimed to assess the assimilation of Moodle as a pedagogical tool. As a didactic strategy for professional development, other distance learning systems such as Canvas, Blackboard, and OpenEDX were presented to participants. The objective was to provide an overview of the Virtual Learning Environment (VLE) ecosystem, allowing for the contextualization of Moodle's features and potential relative to other educational technologies available in the market, rather than conducting a formal comparative data analysis.

2.4 Ethical Procedures

The methods and instruments used in this research, including the questionnaires, were submitted to the Research Ethics Committee for validation and approval (Approval No. 6,830,679). Following approval, the questionnaires were made available online via the LimeSurvey platform, ensuring accessibility and broad participation among teachers.

2.5 Data Analysis

The collected data were analyzed to identify challenges and opportunities related to the use of Moodle as a pedagogical tool. The study considered both complete and partial responses, including official data provided by the Ibiá Department of Education. The results were presented with an emphasis on the benefits of Moodle and the challenges encountered, culminating in the proposal of a technological solution tailored to local needs.
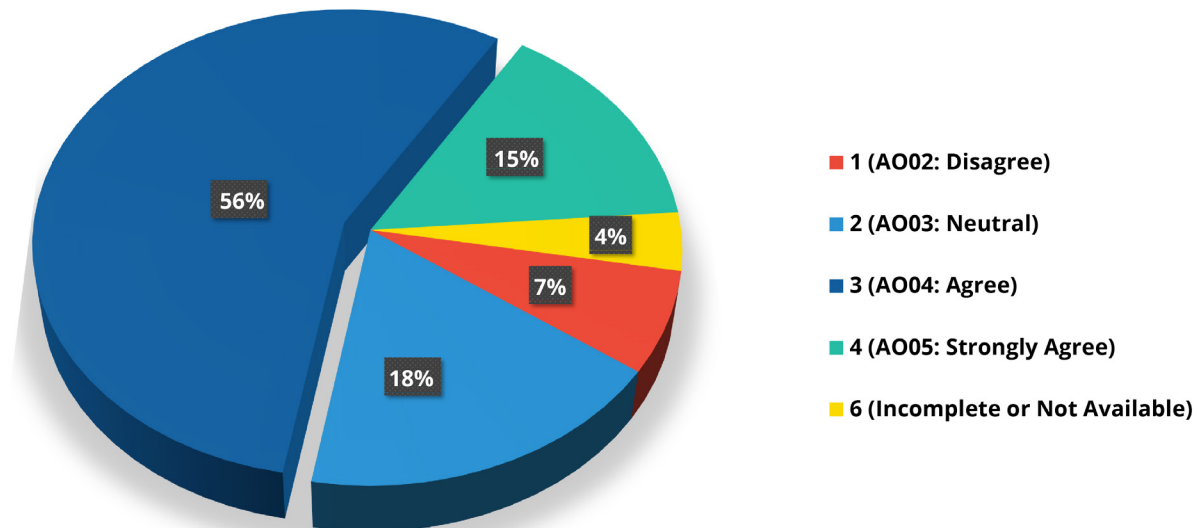
3. RESULTS AND DISCUSSION

The study employed a systematic literature review (SLR) and the Unified Theory of Acceptance and Use of Technology (UTAUT) to assess teachers' perceptions of Moodle use in distance learning environments. Issues related to usability, user experience (UX), and technology acceptance were analyzed, providing a comprehensive understanding of the challenges and benefits associated with the platform's use.

3.1 Performance Expectancy

The results indicate a high agreement rate (96%) among teachers regarding the positive impact of Moodle on the organization and accessibility of instructional resources. This finding underscores that Moodle is widely perceived as an effective tool for planning and structuring teaching, meeting teachers' expectations for improving pedagogical practices. Only 2% of participants expressed neutrality concerning ease of use, and none disagreed.

These data reflect Moodle's effectiveness in promoting more efficient pedagogical organization, establishing it as a viable solution for distance education. See Figure 1:

Figure 1: Effort Expectancy

- 1 (AO02: Disagree)
- 2 (AO03: Neutral)
- 3 (AO04: Agree)
- 4 (AO05: Strongly Agree)
- 6 (Incomplete or Not Available)

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Source: Prepared by the authors, 2024.

3.2 Effort Expectancy

The analysis of effort expectancy revealed that 71% of teachers agree that Moodle is easy to use, facilitating the planning and delivery of content, while 18% remained neutral and 7% disagreed. Additionally, 4% did not complete this question. Although the majority perceive the platform as user-friendly, the presence of a significant group who remained neutral or disagreed suggests the need for targeted actions to support teachers with less familiarity with digital tools. These findings highlight that continuous training and technical support are essential to ensure full user adoption of Moodle.
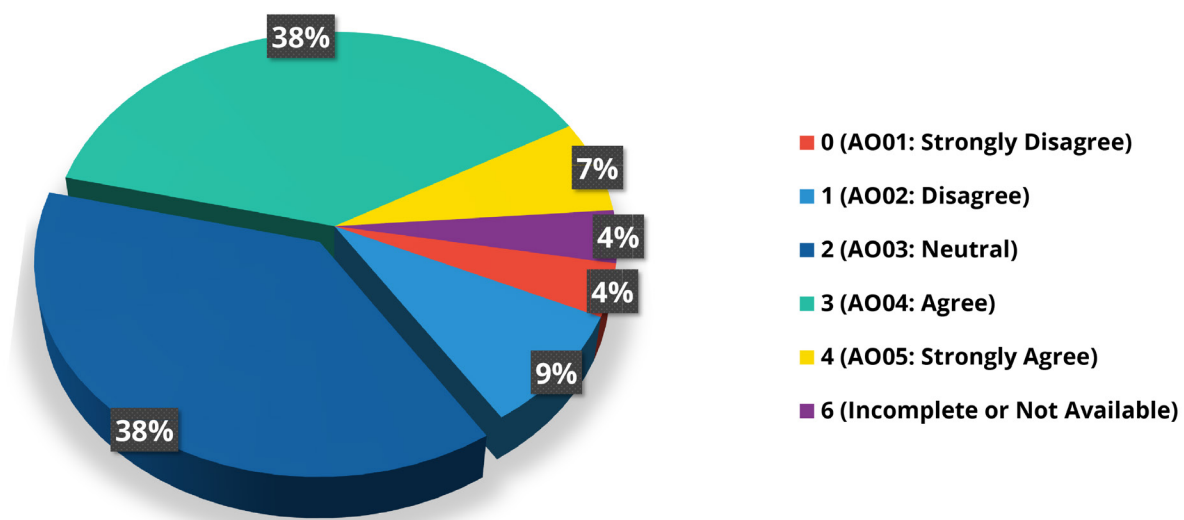
The overall results corroborate the trends identified in the systematic literature review, which highlight the importance of user-centered methodologies, such as User-Centered Design (Bueno; Silva; Oliveira, 2019). Technology acceptance is directly influenced by factors such as usability and technical support, as indicated by the UTAUT theory (Viswanath; Thong; Xu, 2003). The analysis also underscores the need for local adaptations to overcome access barriers and provide a more inclusive and effective teaching environment.

The Moodle platform demonstrates strong potential to be established as a central tool for distance education in Ibiá, Minas Gerais, provided that complementary strategies are implemented to address the needs of teachers who still face challenges in using the technology.

3.3 Social Influence

The analysis of Social Influence revealed that 45% of teachers received encouragement from colleagues and administrators to adopt Moodle, demonstrating partial support within institutions. However, 13% disagreed with this statement, and 38% remained neutral, indicating that support is not uniformly distributed among teachers. This data reflects the need to strengthen the organizational culture surrounding Moodle use by promoting greater engagement among school teams and administrators. According to Viswanath, Thong e Xu (2003), social influence is a determining factor in the acceptance of new technologies, and its absence may reduce engagement with the platform. See Figure 2:

Figure 2: Social Influence

- 0 (AO01: Strongly Disagree)
- 1 (AO02: Disagree)
- 2 (AO03: Neutral)
- 3 (AO04: Agree)
- 4 (AO05: Strongly Agree)
- 6 (Incomplete or Not Available)

Source: Prepared by the authors, 2024.

Technical support and resources available for Moodle use were considered sufficient by 40% of teachers, while 25% remained neutral and 30% disagreed. This scenario suggests that a significant portion of teachers face difficulties related to support, highlighting the importance of more robust infrastructure and ongoing technical assistance. According to Bueno, Silva e Oliveira (2019), the success of educational platforms depends not only on usability but also on institutional support to mitigate operational barriers.

Data on usage behavior showed that only 16% of teachers use Moodle frequently, while 42% use it occasionally and 18% never use it. This low frequency may be related to a lack of social encouragement and technical support, as well as challenges in adapting to the platform. To increase regular use, institutional actions are necessary to reinforce the platform's importance within the educational context and provide continuous training to facilitate its adoption.

The Moodle course was widely evaluated positively by teachers, with 69% reporting a significant improvement in their skills with the platform. Additionally, 65% of teachers stated they felt more comfortable using digital tools after the training. These results reflect the course's effectiveness in providing participants with a solid foundation for using Moodle in their pedagogical practices.

Despite advances in Moodle use, 80% of teachers still prefer in-person teaching, emphasizing direct contact with students and the perception of greater pedagogical effectiveness in the classroom. This preference reflects the local reality, where limitations in internet infrastructure and familiarity with traditional methods influence teachers' choices.

Qualitative reports highlighted the acceptance and positive impact of the course among some teachers. Examples include a teacher who noted increased interaction and enthusiasm in a colleague facing personal challenges, and another who acquired equipment to participate and is already planning to integrate Moodle into her classes. These testimonials illustrate how Moodle can engage and motivate educators, overcoming personal and professional barriers.

5. CONCLUSION

The implementation of Moodle as the official distance education system for the municipality of Ibiá, Minas Gerais, represents significant progress for local public education, establishing an accessible and functional virtual environment for teachers and students. This project, accessible at (https://ead.ibia.mg.gov.br), offers the municipal education network a robust and adaptable platform that not only facilitates the teaching-learning process but also enables more individualized pedagogical monitoring and practical, interactive content organization.

The introduction of Moodle in the municipal network of Ibiá expands the reach of pedagogical practices and promotes digital inclusion.

The platform allows teachers to organize content and activities with flexibility, utilizing resources such as synchronous and asynchronous lessons, quizzes, forums, and progress tracking tools, which contribute to a more dynamic and student-centered teaching approach.

Furthermore, the training provided to teachers, which included both initial tutorials and ongoing support, is essential to consolidate Moodle as a reliable and effective resource for remote teaching, reinforcing teachers' digital autonomy and strengthening professional development within the Ibiá education network.

Despite the positive results, some challenges still need to be overcome to optimize Moodle's use.

Among the main weaknesses identified are limitations in internet access, especially in more remote areas where a viable StarLink satellite connection solution is not yet available for acquisition through exemption from bidding processes, and variability in teachers' adaptation to digital tools, which revealed the need for continuous technical support and additional training to standardize platform use.

Teacher feedback emphasized the importance of pedagogical methodologies specific to distance education, aiming to maximize Moodle's potential and adapt content to the new demands of online teaching.

The training sessions represented an important step, but there is room to expand the training program, including in-person workshops and digital labs to help teachers feel more confident and proficient in using the platform's advanced features.

The results indicate that Moodle has a positive impact on the educational context in Ibiá, especially in content organization and teacher-student interaction. However, challenges such as limited technical support, low usage frequency, and preferences for in-person teaching highlight the need for ongoing strategies to increase acceptance and utilization of the platform. The Moodle course was essential in boosting teachers' confidence and demonstrating the platform's potential as a pedagogical tool. Improvements in technical support and the provision of hands-on training could further enhance Moodle's impact in municipal public education.

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