




THE IMPACTS OF CLOUD TEACHING ON THE EDUCATIONAL PROCESS: A LITERATURE REVIEW

 <https://doi.org/10.56238/levv16n45-017>

Submitted on: 10/01/2025

Publication date: 10/02/2025

Sergio da Silva Pessoa¹, Robson Silva Cavalcanti², Karina do Valle Marques³, Mikel Eduardo de Mello⁴, Francisca Edilma Monteiro Pinto⁵, Walaci Magnago⁶, Alexandra de Andrade Guedes Martins Mantovani⁷, Grasielly Monteiro Pereira⁸ and Raimundo Raelisthon do Nascimento Brasil⁹

ABSTRACT

This research aimed to analyze the impacts of cloud teaching on the educational process, considering its advantages, challenges and the transformations that this technology has promoted in education. The methodology adopted was bibliographic research, with a survey of articles in academic databases such as SciELO and Google Scholar, to gather and analyze studies on the subject. The results indicated that cloud teaching offers flexibility in access to content, personalization of learning, facilitation of collaboration between students and teachers, and constant updating of teaching materials, but it also presents challenges, such as inequality in access to technology, the need for digital training, and security and privacy issues. The conclusion pointed out that, although cloud teaching has great potential for educational transformation, its success depends on careful implementation, which

¹ Doctorate student in Education
UNR - National University of Rosario
Santa Fe – Rosario – Argentina
E-mail: spessoa@uea.edu.br

² Master in Development and Environment, area of concentration: Human Habitat and Environment PRODEMA-UFPB/UEPB.

Professor at ECIT
Nobel Vita Lawyer, Coremas-PB
E-mail: robsonsilvacavalcanti@yahoo.com.br

³ Federal University of Uberlândia
Uberlândia, Brazil

⁴ Federal University of Mato Grosso do Sul
Mato Grosso do Sul, Brazil

⁵ Ecumenical
São José-São Bento Paraíba, Brazil

⁶ Master in New Digital Technologies in Education
University: Centro Universitário Carioca - UNICARIOCA
E-mail: walacimagnago@hotmail.com

⁷ Specialist in Educational Supervision and Guidance
UNIVERSITY - UNIFIP CENTER

⁸ Business Administration Student
University of the State of Amazonas
Novo Aripuanã-AM Pole

E-mail: gmp.adm19@uea.edu.br
⁹ Business Administration Student
University of the State of Amazonas
Novo Aripuanã-AM Pole
E-mail: rrdnb.adm19@uea.edu.br



considers technical, pedagogical and human aspects, and it is essential to integrate this technology with face-to-face and hybrid approaches to meet the diverse needs of students.

Keywords: Education. Cloud teaching. Apprenticeship.

INTRODUCTION

In recent years, education has been profoundly impacted by technological innovations that have transformed the way teaching is delivered and how students learn. One of the most significant changes was the implementation of solutions based on cloud technology, which enabled new ways of accessing and managing educational content. Cloud teaching platforms offer a wide range of features, such as remote storage, collaboration tools, and virtual learning environments, which make the educational process more flexible, accessible, and dynamic (Costa Júnior et al., 2023).

The concept of cloud teaching can be defined as the use of technologies based on remote servers to make educational content available, facilitate access to learning tools, and promote collaboration between students and teachers, regardless of their physical location. As a result, both educational institutions and students began to have new means of interaction and learning, providing a more connected and interactive environment (Cardoso; Almeida; Silveira, 2021; (Baldissarelli; Gomes; Hahn, 2024).

One of the main benefits of cloud learning is accessibility, which allows students to access educational materials at any time and from anywhere. This has been especially relevant in distance learning contexts, where flexible schedules and student autonomy are key to the success of the learning process. In addition, cloud platforms enable educators to personalize content, promote more efficient communication with their students, and adapt their teaching methodologies according to the needs and particularities of each group (Oliveira; Souza, 2020).

Another relevant point is collaboration. Cloud tools, such as discussion forums, virtual classrooms, and shared documents, favor group work and the exchange of knowledge among participants. This collaborative environment encourages the development of social skills, such as communication and teamwork, which are essential for today's job market. For teachers, cloud learning provides the means to monitor the progress of each student in more detail, adjusting the pace and strategies according to the performance of each one (Rodrigues et al., 2023).

However, despite the numerous advantages, the implementation of cloud teaching also presents challenges. One of the main ones is unequal access to technology, which can generate a digital divide, especially in regions with limited infrastructure or among students who do not have adequate devices to take advantage of cloud platforms. In addition, dependence on a good quality internet connection can be an obstacle for many students, compromising the effectiveness of the classes and activities proposed (Ramos; Rosary; Rosário, 2023).

In this context, it is important to analyze the impacts of cloud teaching on the educational process more broadly. The adaptation of teachers and the technological training of educational institutions are key points for the success of this transition. The role of the teacher also changes, requiring new skills, such as the use of digital tools, the development of skills to mediate online learning, and the ability to engage students in virtual environments (Santos; Cruz, 2023).

The objective of this research was to analyze the impacts of cloud teaching on the educational process, exploring its advantages, challenges and the transformations that this technology has promoted in the educational scenario. For this, a critical analysis of the effects of this technology on teaching and learning was carried out, considering aspects such as accessibility, collaboration and adaptation of pedagogical methodologies. It is a bibliographic research, which was carried out through the survey of articles in databases such as SciELO, Google Scholar, among others, to gather and analyze studies and academic contributions related to the theme. The literature review allowed us to identify both the benefits and challenges of cloud teaching, providing a comprehensive overview of the effects of this technology on the educational process.

DEVELOPMENT

ADVANTAGES OF CLOUD TEACHING IN THE EDUCATIONAL PROCESS

Cloud teaching has brought a great advance in access to educational materials and in the way content is shared between teachers and students. The main advantage of this model is the flexibility it offers. Students can access their lessons, activities, and study materials anytime and anywhere as long as they have an internet connection. This means that education does not need to be restricted to fixed schedules or a specific location, which allows students with different routines or personal situations to adapt learning to their needs (Oliveira; Souza, 2020).

In addition, the ability to store data on remote servers eliminates the need to keep large volumes of information on local devices, which can be costly and limited in many educational institutions. Cloud storage allows teaching materials, handouts, and even educational videos to be made available in an unlimited and accessible way to all students, regardless of the amount of data or the type of device used. This accessibility can be seen as a democratization of education, since there is no longer a need for physical resources, such as high-cost computers or local servers (Borges, 2016).

Another significant benefit of cloud learning is the personalization of learning. Platforms that operate in the cloud offer a range of tools that allow teachers to adapt

content to the individual needs of their students. This can include creating specific learning paths, personalized assessments, and even real-time tracking capabilities. With this personalized approach, it is possible to quickly identify a student's learning difficulties and propose effective solutions, optimizing teaching time and improving educational outcomes (Silveira; Fabri, 2020).

Collaboration between students and teachers has also become more efficient thanks to cloud learning. Tools such as discussion forums, chats, and collaborative work environments allow all participants in the educational process to share ideas, ask questions, and build knowledge collectively. This collaborative environment promotes not only learning, but also the development of social and professional skills, such as effective communication, teamwork, and group problem-solving, skills that are highly valued in the labor market (Cardoso; Almeida; Silveira, 2021).

In addition, cloud teaching platforms make it possible to integrate different media into the educational process. Unlike traditional teaching, where the content is mostly textual and visual, the cloud allows the insertion of videos, audios, interactive images and simulations. This contributes to the enrichment of learning and offers students more dynamic ways to understand the content. This diversification of resources is also important to meet different learning styles, such as visual, auditory or kinesthetic learners (Santos; Cruz, 2023).

In terms of educational management, the use of cloud platforms facilitates the organization and monitoring of the entire pedagogical process. The analysis and reporting tools provide teachers with valuable data on each student's performance, allowing for quick and assertive adjustments in lesson planning. This also facilitates the planning of group activities and projects, ensuring that all students can participate in a balanced way and contribute their specific competencies (Santos, 2022).

The cloud also allows educational institutions to integrate content and resources from different external sources, such as virtual libraries, academic databases, and teaching platforms from other countries. This integration broadens the horizon of learning, offering students the possibility of exploring a wider range of educational materials and learning from other cultures and educational systems, contributing to the formation of more globalized and informed citizens (Ramos; Rosary; Rosário, 2023).

In addition, the use of cloud technologies promotes greater independence of students in relation to the learning process. The possibility of accessing content continuously and autonomously encourages them to take a more active role in their education, developing self-management and independent learning skills. This is especially

relevant in higher education, where preparation for the job market requires skills that go beyond simple academic knowledge (Pagliarini; Sepel, 2022).

Cloud teaching also promotes the constant updating of educational content. While in the traditional model, updating books and materials requires large investments and time, the cloud allows content to be reviewed and updated in real time, ensuring that students always have access to the latest and most relevant information. This is particularly important in areas of study that are constantly evolving, such as technology and science. Finally, the implementation of cloud solutions in schools and universities can generate significant savings for educational institutions (Costa Júnior et al., 2023).

By replacing physical resources, such as books, computers, and local servers, with digital cloud solutions, schools can reduce costs with maintenance, infrastructure, and the acquisition of new materials. These saved resources can be invested in other areas, such as teacher training, improvements in the quality of teaching and accessibility for students with special needs (Silveira; Fabri, 2020).

CHALLENGES OF CLOUD TEACHING IN THE EDUCATIONAL PROCESS

While the advantages of cloud teaching are widely recognized, there are also a number of challenges that need to be addressed for this technology to be effective in the educational process. The first and most evident of these challenges is inequality in access to technology. In many regions, especially in developing countries, access to quality internet and suitable devices is still a luxury rather than a reality. This creates a significant barrier for students who, despite having an interest and potential to learn, are unable to access cloud learning platforms due to technological limitations (Bedran, 2016).

In addition, the internet infrastructure in many regions is still insufficient to support the intensive use of educational cloud platforms. Slow or intermittent connections can hinder the performance of students, who end up having difficulties following classes and carrying out online activities. This lack of connectivity also hinders real-time interaction between teachers and students, which can hinder the construction of a collaborative and dynamic learning environment (Oliveira; Souza, 2020).

Another significant challenge is the need to train both teachers and students in the use of digital tools. While cloud learning platforms are mostly intuitive and easily accessible, many teachers are still not completely familiar with these technologies and are therefore unable to exploit their full potential. In addition, the lack of digital skills among students can also pose an obstacle, as many may find it difficult to quickly adapt to new tools, hindering the pace of learning (Costa Júnior et al., 2023).

Data security and privacy are also key issues that need to be considered when talking about cloud education. Educational platforms store a large amount of sensitive data, such as personal information of students and teachers, assessment results, and pedagogical content. Protecting this data from intrusions and cyberattacks should be a priority, and educational institutions need to ensure that the platforms they use follow strict security standards and compliance with data protection laws (Santos; Sá, 2021).

In addition, cloud teaching can generate an overload of information for students. The amount of educational materials and resources available on the platforms can be overwhelming, and without proper guidance from teachers, students can feel lost and unsure of where to start. Content curation and proper pedagogical planning are essential to ensure that cloud learning is effective and that students are not overwhelmed with excessive information. Another critical point is the social isolation that can be caused by cloud learning, especially in distance learning models (Cardoso; Almeida; Silveira, 2021).

While collaboration tools can mitigate this problem, many students may miss face-to-face interaction, direct contact with peers, and teachers. Cloud learning can be a lonely experience, which can affect the development of soft skills that are important for training well-prepared professionals. In addition, the excessive use of technologies can lead to health problems, such as eye strain, back and neck pain, and even disorders related to the prolonged use of screens, such as dry eye syndrome (Santos; Sá, 2021).

Educational institutions need to be aware of these aspects and promote a balance in the use of technologies, encouraging breaks and well-being practices for students and teachers. The cost of implementation can also be an obstacle, especially for smaller schools and universities. Cloud learning platforms often require significant investments in software licenses, staff training, and IT infrastructure. This can be a challenge for institutions that are already facing financial difficulties and that sometimes do not have the necessary resources to ensure an efficient implementation of the technology (Santos; Cruz, 2023).

Adapting curricula and pedagogical methodologies to cloud teaching requires time and planning. Teachers need to rethink their teaching approaches, and this can be a time-consuming process that requires constant monitoring. Resistance to change is a factor that should also be considered, since many educators are still used to traditional methods and may have difficulties adapting to the new model (Lourengo; Cardoso Junior, 2022).

Finally, it is important to highlight that cloud teaching, while offering many benefits, cannot be seen as a one-size-fits-all solution to all educational problems. Each educational context is unique, and the implementation of technologies must be done gradually and

adapted to local needs, respecting the cultural, economic, and social specificities of each community. Cloud teaching should be complemented by other forms of teaching and face-to-face interaction, creating a hybrid model that can more fully meet the needs of students (Santos, 2022).

FUTURE PROSPECTS OF CLOUD EDUCATION

The future of cloud education looks promising, with the continuous evolution of technologies and the growing adoption of educational institutions to the use of these platforms. One of the main trends that is observed is the use of artificial intelligence (AI) to further personalize the learning process. AI can analyze each student's performance and suggest specific content, activities, and even modify the learning pace according to individual needs. This can help make learning even more efficient and personalized (Lourenço; Cardoso Junior, 2022).

Additionally, augmented reality and virtual reality (AR/VR) are becoming increasingly integrated into educational cloud platforms. These technologies offer a new dimension to learning, allowing students to experience immersive and interactive experiences that would be impossible in traditional teaching. For example, students can take virtual trips to historical sites or explore the human body in a three-dimensional way, making learning more engaging and effective (Rodrigues et al., 2023).

The use of big data will also be an important part of the future of cloud education. With the vast volume of data generated by students, it is possible to analyze patterns of behavior and performance in a more detailed way, which can lead to a deeper understanding of educational needs and the creation of more efficient pedagogical methods. This can transform the way teachers monitor and evaluate their students, providing valuable insights for continuous improvement in teaching (Rueda, 2018).

Another trend is the increase in global collaboration, allowing students from different parts of the world to connect and share learning experiences. Cloud platforms already offer real-time interaction and communication capabilities, but the future must take this to a new level, promoting truly international learning. This can broaden students' worldview, allowing them to learn about different cultures and perspectives, as well as promote collaboration between schools and universities in different countries (Costa Júnior et al., 2023).

The evolution of cloud platforms will also allow for greater integration between different areas of knowledge. Emerging technologies will enable the creation of interdisciplinary courses, in which students can explore multiple disciplines in an integrated way, such as science, mathematics, history, and art. This can contribute to a more holistic

and preparatory education for the complex challenges of the modern world (Ramos; Rosary; Rosário, 2023).

In addition, issues related to accessibility and inclusion tend to be increasingly incorporated into cloud learning platforms. Machine translation tools, real-time subtitles, and accessibility features for students with disabilities are trends that are expected to grow on educational platforms, making education more inclusive and accessible for all.

Finally, it is important to highlight that cloud teaching will be increasingly integrated with other emerging technologies, such as blockchain, which can be used to ensure the authenticity and security of diplomas and academic certificates. This can increase trust in educational qualifications issued by cloud platforms and reduce the risk of academic fraud (Pagliarini; Sepel, 2022).

In summary, the future of cloud learning is full of possibilities, with the potential to transform the way education is organized, accessed, and experienced. However, for this to happen effectively, it is necessary that issues related to access to technology, teacher training and the adaptation of curricula are adequately addressed. If these conditions are met, cloud learning can become a central element in the education of the future, providing more accessible, personalized, and collaborative learning (Pagliarini; Sepel, 2022).

FINAL CONSIDERATIONS

In conclusion, research on the impacts of cloud teaching on the educational process has revealed that this technology has the potential to profoundly transform the way teaching is structured and how students interact with the content and with each other. The analysis of the benefits pointed out that the flexibility in access to teaching material, the personalization of learning, the facilitated collaboration between students and teachers and the constant updating of content are some of the main positive aspects of this model. In addition, the possibility of integrating various tools and media in the teaching process enriches the learning experience and caters to different learning styles and rhythms, allowing for a more inclusive and dynamic education.

On the other hand, challenges were also identified that need to be overcome for cloud teaching to be fully effective. Inequality in access to technology and inadequate infrastructure, especially in more remote regions or in education settings with limited resources, are important obstacles. The training of teachers and students for the proper use of the platforms, as well as issues related to data security and privacy, were also pointed out as areas that need attention. In addition, social isolation and the possible health impacts due to the excessive use of technology are aspects that deserve careful analysis.

REFERENCES

1. BALDISSARELLI, J. M.; GOMES, G. ; HAHN, I. S. . Local Traditions, Global Ambitions: Influence of Organizational Culture on Innovative Capability and International Growth Orientation in Brazilian Wineries. *Benchmarking*, v. AOP, p. ahead-of-print-, 2024. <https://doi.org/10.1108/BIJ-11-2023-0768>
2. BEDRAN, P. F. Letramento digital e a formação do professor de língua na contemporaneidade. *Revista EntreLinguas*, Araraquara, v. 2, n. 2, p. 225–248, 2016.
3. BORGES, F. G. B. Um olhar rizomático sobre o conceito de letramento digital. *Trab. Ling. Aplic.*, Campinas, n(55.3): 703-730, set./dez. 2016.
4. CARDOSO, M. J. C.; ALMEIDA, G. D. S.; SILVEIRA, T. C. Formação continuada de professores para uso de Tecnologias da Informação e Comunicação (TIC) no Brasil. *Revista Brasileira de Informática na Educação*, [S. l.], v. 29, p. 97–116, 2021.
5. COSTA JÚNIOR, J. F. et al. O futuro da aprendizagem com a inteligência artificial aplicada à educação 4.0. *Revista Educação, Humanidades e Ciências Sociais*, 2023.
6. LOURENÇO, C. C.; CARDOSO JUNIOR, M. M. INOVAÇÃO NA EDUCAÇÃO EM ENGENHARIA POR MEIO DO DESENVOLVIMENTO DE COMPETÊNCIAS E HABILIDADES REFERENCIADO NOS MODELOS DE EDUCAÇÃO 4.0 E 5.0. *Latin American Journal of Business Management*, [S. l.], v. 13, n. 1, 2022.
7. OLIVEIRA, K. K. S.; SOUZA, R. A. C. Habilitadores da transformação digital em direção à Educação 4.0. *Revista Novas Tecnologias na Educação*, Porto Alegre, v. 18, n. 1, 2020.
8. PAGLIARINI, D. S.; SEPEL, L. M. N. Uso de nuvem de palavras como estratégia para o ensino do Reino Fungi no Ensino Médio. *REnCiMa*, São Paulo, v. 13, n. 4, p. 1-23, jul./set. 2022
9. RAMOS, J. F.; ROSÁRIO, E. S.; ROSARIO, S. A. S. Formação continuada e o uso de ferramentas digitais no ensino: desafios e possibilidades durante a pandemia da COVID-19 em Bragança-PA. *Cuadernos de Educación y Desarrollo*, v. 15, n. 4, 2023.
10. RODRIGUES, A. M. S. et al. A leitura digital no contexto pós-pandêmico: uma revisão bibliográfica acerca dos desafios vigentes à educação digital. *Revista Ambiente: Gestão e Desenvolvimento*, 2023.
11. RUEDA, R. A. S. Uso do serviço da nuvem GeoGebra durante o processo de ensino-aprendizagem em matemática. *RIDE. Rev. Iberoam. Investig. Desarro. Educ* [online]. 2018.
12. SANTOS, G. A reexistência no pós-pandemia: considerações discursivas críticas sobre cidadania e tecnologia a partir das redes pragmáticas. *Ilha do Desterro*, v. 75, nº 3, p. 165-185, 2022.
13. SANTOS, J. A.; CRUZ, L. M. Recomposição das aprendizagens na educação básica: estratégias pós-pandemia. *Revista de estudos em educação e diversidade*, v. 4, n. 11, 2023.



14. SANTOS, T. W.; SÁ, R. A. O olhar complexo sobre a formação continuada de professores para a utilização pedagógica das tecnologias e mídias digitais. *Educar em Revista*, Curitiba, v. 37, e72722, 2021.
15. SILVEIRA, R. M. C. F.; FABRI, F. Formação continuada para professores dos anos iniciais: enfoque Ciência, tecnologia, sociedade (cts) no ensino de Ciências. *Revista de Ensino de Ciências e Matemática*, São Paulo, v. 11, n. 4, p. 169–190, 2020.