The Situations Of Online Learning: Collaborative Communication Tool

Ouariach Fatima Zahra[1*], Nejjari Amel [2], Khaldi Mohamed[3]

[1] Educational science, language didactics, human and social sciences, Higher Normal School of Tetouan, Abdelmalek Essaadi University, Morocco.

[2] Humanities, National School of Applied Sciences, Abdelmalek Essaadi University, Morocco

[3] Computer Science and University Pedagogical Engineering (S2IPU), Higher Normal School of Tetouan, Abdelmalek Essaadi University, Morocco.

Corresponding author (*) : fatimazahra.ouariach@etu.uae.ac.ma

Abstract. The use of Web 2.0 communication tools greatly enhances the potential for collaborative learning. This article examines how the collaborative communication tool differentiates itself at each stage of the learning situation, offering specific functionalities to facilitate interactions between learners, enabling them to engage, exchange ideas and collaborate on shared projects using a learning management platform (LMS), while taking into account the four stages of the learning process (situation, conceptualization, objectivation, transfer) and highlights, at each phase, the functionalities that promote successful interaction. By detailing the use of the collaborative communication tool in each phase, this discussion provides stakeholders with a framework for effectively optimizing the role of technology in dynamic educational contexts, highlighting the many benefits as well as the strategic and effective integration at each stage of the educational process.

Keywords: E-learning, Collaborative communication tool, Learning situation, LMS.

1 Introduction

The e-learning landscape has indeed been greatly influenced by the rise of information and communication technologies (ICT). Within this realm, collaborative communication tools hold immense significance as they contribute to the creation of vibrant and captivating e-learning environments. By enabling ongoing interaction between educators and learners, these tools have transformed the way information is shared, absorbed, and deliberated upon.

The importance of e-learning cannot be overstated in our modern, fast-paced society. It plays a vital role in the continuous growth and enhancement of skills. Individuals now have the opportunity to expand their knowledge and proficiency in various areas, such as technology, language, and their respective professions, by enrolling in specialized

M. Khaldi et al. (eds.), Proceedings of the E-Learning and Smart Engineering Systems (ELSES 2024), Atlantis Highlights in Social Sciences, Education and Humanities 36,
https://doi.org/10.2991/978-2-38476-408-2_58

online courses. This revolutionary approach eliminates the limitations of time and place, granting learners the freedom to seamlessly integrate learning into their busy lives, both personally and professionally. The rise in popularity of online learning has been fueled by the emergence of learning management systems (LMS). An integral component of e-learning is a collaborative communication tool that enables interaction between learners, instructors, and peers. The LMS serves as a platform for facilitating online communication and providing access to diverse learning resources. E-learning has become a standard practice in university courses, prompting a reevaluation of the most effective methods and tools for online education (Yücel and Uslue, 2016). Asynchronous communication tools are applications or platform that allows users to communicate at different times no simultaneous connections are required (Zahra et al.,2023) .

In the situation of a learning management system (LMS), various collaborative communication tools can be used, such as wikis (Zahra et al., 2024), discussion forums, chat rooms and video conferencing (Ouariach et al., 2023). These tools enable learners to interact with each other in a virtual environment, which proves advantageous for those unable to physically attend traditional face-to-face courses due to geographical or scheduling limitations. This article will focus on the development and implementation of the wiki as a collaborative communication tool in online learning environments. In addition, we will explore how this tool can be adapted and differentiated to meet the specific needs of each learning situation. In this way, the wiki transcends its simple information-sharing function to become a dynamic, interactive space. It becomes an essential place where the co-creation of knowledge, collaboration and the collective construction of knowledge take center stage in the online educational experience. Using the wiki as a collaborative communication tool in e-learning environments offers additional benefits. The adaptable and customizable nature of wikis enables learners to actively contribute to content creation and ongoing development (Soufiane et al., 2023). This fosters learner autonomy and involvement, transforming them into active participants in their own educational journey. As a result, the wiki as a collaborative communication tool gives learners the opportunity to cultivate crucial skills such as critical thinking, creativity, effective communication and collaboration (Ouariach et al., 2023), all of which are of immense value in today's professional landscape.

2 Exploring the evolution of the Wiki tool in different contexts

The evolution of wiki tools has been a subject of interest in various fields, including computer science, psychology, and collaborative software. Viégas highlighted the unconventional and powerful collaboration style fostered by wiki websites, where every visitor has the power to become an editor (Viégas et al., 2004). Furthermore, Jimoyiannis & Roussinos (2017) proposed a co-evolution model of the cognitive and social systems to describe collaborative knowledge construction by authors in Wikipedia (Jimoyiannis & Roussinos, 2017). This model has implications for understanding the evolution of wiki tools and their impact on knowledge construction. A wiki is a digital platform or application that grants users the ability to create and edit content collaboratively (Ouariach et al., 2024).

(2012) emphasized the use of graphical analysis of wiki contributions to assess collaborative learning experiences, generating charts, tables, and statistics for easy analysis of wiki evolution (Palomo-Duarte et al., 2012). This approach provides insights into the evolution of wiki content and the dynamics of collaborative learning. Additionally, Arazy & Gellatly (2012) discussed the effects of owners' motivation and behavior on group members' engagement in corporate wikis, shedding light on the tensions between wiki affordances and organizational realities (Arazy & Gellatly, 2012). Understanding these tensions is crucial for comprehending the evolution of wiki tools in corporate settings.

Moreover, Louridas (2006) explored the use of wikis in software development, indicating the relevance of wikis in facilitating collaborative software development processes (Louridas, 2006). This perspective contributes to understanding the evolution of wiki tools in the context of software development practices. Additionally, Huang et al. (2013) highlighted the popularity of wiki technology in collaborations due to its flexibility and easy accessibility, underscoring its relevance in collaborative environments (Huang et al., 2013).

Furthermore, Fokaefs et al. (2010) presented WikiDev 2.0, a lightweight wiki-based tool suite that enhances collaboration within software development teams, demonstrating the evolution of wiki tools to support specific domains such as software development (Fokaefs et al., 2010). This exemplifies the adaptation and evolution of wiki tools to cater to the needs of specific domains.

In summary, the evolution of wiki tools has been studied in various contexts, including collaborative learning, software development, and corporate settings. These studies provide valuable insights into the collaborative and knowledge construction aspects of wiki tools, their impact on group engagement, and their adaptation to specific domains.

3 Definition of the wiki collaborative communication tool

Wikis are considered a type of Web 2.0 technology that enables users to work together on the Web. In terms of collaborative writing, wikis enable participants to create a collective document by editing, discussing and sharing information on a topic of common interest (Chao et al., 2011). An online collaborative platform enables both learners and instructors to jointly craft, refine, and disseminate content in a shared document. A wiki presents an interactive digital environment permitting users to supplement, edit, and remove substance within a common composition. Within electronic learning, a wiki integrated into a learning management system provides students a virtual forum for teamwork, co-development of material, interchange of ideas, inquisition, and allocation of assets. Participants can collectively contribute to the formation and progression of wiki substance by implementing modifications, appending references, furnishing remarks, and interacting with one another. This inspires energetic learner involvement, cooperation, and the cultivation of collective expertise. Additionally, the wiki collaborative communication tool facilitates peer recommendations, allowing learners to offer constructive feedback on individual contributions and thereby advance their own comprehension and abilities. Wikis serve as an online platform where learners can create, edit, and share information at their own pace. This fosters active participation, allowing learners to contribute to the collective

construction of knowledge. Additionally, wikis offer an effective means of documenting and organizing information, facilitating easy search and navigation for learners.

4 The role of the wiki collaborative communication tool

The versatile applications of wiki tools have been explored across various domains, shedding light on their diverse functions. Within libraries, wiki tools, in conjunction with other Web 2.0 technologies, play a significant role in transforming service delivery. Additionally, in the fields of biology and medicine, wiki tools are recognized as innovative instruments for information production and dissemination, highlighting the evolving research practices and potential future advancements (Boudry, 2012).
In the realm of education, wiki tools have been acknowledged as effective instructional tools, engaging students in collaborative scholarship within a wiki environment (Parker & Chao, 2007). Furthermore, wiki platforms have been utilized for authentic assessment in higher education, emphasizing their role in measuring learner comprehension and fostering accountability (Eddy & Lawrence, 2012). Similarly, the integration of a wiki in biology education has revolutionized traditional instructional methods, transforming the roles of educators and students while enhancing collaborative efforts (Vargas et al., 2017).
The scholarly works cited shed light on the diverse contributions of wiki platforms across various fields, including libraries, education, knowledge cultivation, and evaluation. These works emphasize the importance of wiki tools in reforming service provision, investigative methods, pedagogy, the acquisition of understanding, and the maintenance of organizational knowledge. Furthermore, wiki instruments have been identified as relevant solutions for developing applications in rapidly evolving learning environments, highlighting their role in knowledge formation and administration (Leclercq & Savonnet, 2012). Additionally, the use of wikis has been shown to facilitate the development of study strategies and clinical reasoning in educational contexts, demonstrating their ability to foster cognitive engagement and problem-solving skills (Lachaîne et al., 2013).

5 Using the wiki collaborative communication tool

The utilization of a wiki as a pedagogical tool has been extensively examined in various educational contexts. Research has revealed that wikis can serve as effective platforms for group assignments, facilitating continuous feedback and fostering mutual comprehension among students (Elgort et al., 2008). Moreover, students generally hold a positive perception of wikis as a learning tool, with many considering it to be an enriching experience (Gallagher, 2017). Wikis have been identified as knowledge-sharing platforms for collaborative learning, particularly in the realm of ESL reading, and have been implemented in collaborative learning models for assisted instruction (Wiseman & Belknap, 2013; "Application of WIKI Platform and Collaborative Learning Model in Assisted Instruction for CET-4", 2018). Additionally, wikis have been acknowledged for their potential in teaching and learning, serving as supportive

tools for collaborative learning and cultivating communities of practice (Mindel & Verma, 2006; Chang et al., 2011; Shriki & Movshovitz-Hadar, 2011).
Collectively, these findings suggest that wikis possess significant value as teaching tools, fostering collaboration, knowledge sharing, and interactive learning experiences. Integrating wikis into teaching practices can enhance group work, provide a platform for collaborative learning, and contribute to the cultivation of a community of practice. Overall, the research indicates that wikis have the potential to be highly effective in facilitating collaborative learning, supporting group-based courses, and nurturing communities of practice within educational settings. To develop an e-learning tool that is truly effective, it is crucial to consider the evolving landscape of e-learning platforms and recent changes in researcher practices. The tool should aim to address the challenges faced by students who may feel frustrated or discouraged by their limited technological skills in an e-learning environment (Chouinard et al., 2022).
Furthermore, the e-learning tool should aim to provide a comprehensive educational experience that transcends spatial and temporal limitations, offering a fully online or hybrid learning environment (Meyer et al., 2020). Additionally, it should recognize the significance of motivation in the e-learning context, as it plays a pivotal role in achieving successful learning outcomes (Bourque & Garant, 2016).

6 The different forms of the wiki tool

The evolution of wiki tools has given rise to a multitude of forms and applications. Sabel (2007) delved into the structuring of wiki revision history, emphasizing the significance of the tree structure in accurately reflecting the progression of page content, encompassing reverts, vandalism, and edit wars. This underscores the structural evolution of wiki tools in effectively capturing and representing the historical development of page content.
Furthermore, Faqir et al. (2019) directed their attention to visualizing the evolution of collaboration and communication networks within wikis, showcasing how wiki tools have evolved to facilitate and visualize collaborative networks. This serves as a testament to the evolution of wiki tools in supporting and visualizing collaborative communication networks.
Moreover, Jimoyiannis & Roussinos (2017) explored the collaborative patterns exhibited by students in a wiki-authoring project, shedding light on the evolution of collaborative practices within wiki groups and the overall evolution of wiki content. This highlights the dynamic nature of collaborative patterns and content within wiki environments.
Additionally, Kasisopha & Wongthongtham (2009) delved into the realm of semantic wiki-based ontology evolution, signifying the evolution of wiki tools towards supporting semantic ontology evolution systems. This showcases the evolution of wiki tools in incorporating semantic capabilities for ontology evolution.

7 The four stages of the learning process

According to Khaldi et al. (2021), the learning process typically consists of four distinct stages: situation, conceptualization, objectivation, and transfer.

7.1 During the first phase of the situation, learners prepare themselves for the learning process by engaging in various activities. This includes conducting research, gathering information, and getting acquainted with the learning goals. Furthermore, learners have the opportunity to explore the activities and resources that will be utilized throughout their studies.

7.2 The conceptualization phase, also known as structuration, encompasses the delivery of knowledge and information to students. This can be achieved using a range of formats, including live lectures, recorded videos, readings, and presentations. The aim is to provide learners with the essential framework for understanding the topic at hand.

7.3 In the objectivation phase, learners actively apply the knowledge they have acquired. This is achieved through interactive exercises, projects and practical activities. By actively participating in practical applications, learners have the opportunity to deepen their understanding and reinforce their knowledge (Ouariach et al., 2024).

7.4 The transfer phase focuses on assessing the learner's understanding and application of what they have learned. This assessment is completed through exams, tasks and projects. The purpose of the transfer phase is to measure progress and identify areas that may require further strengthening.

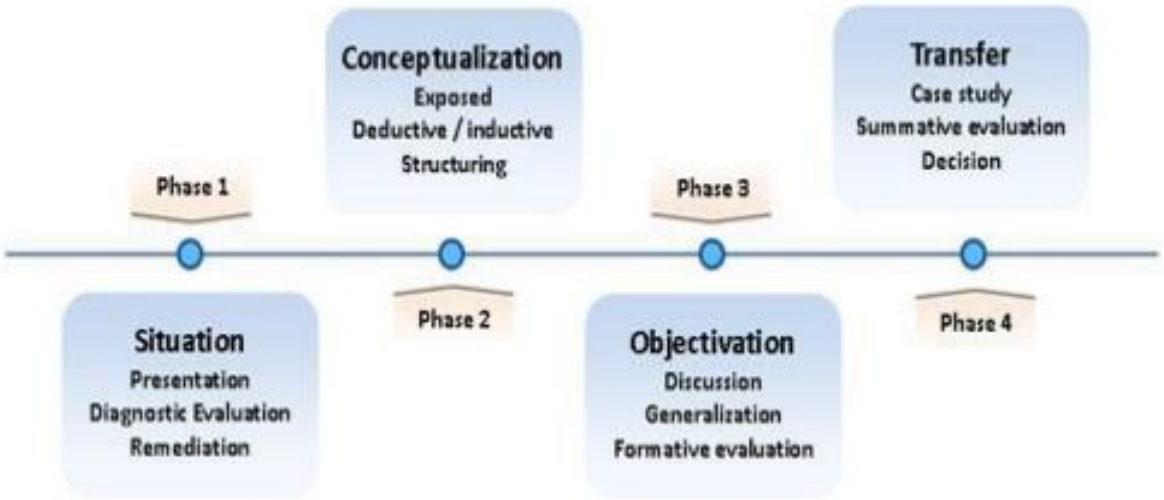

Fig. 1. Example of the life cycle of a pedagogical scenario in a learning situation (khaldi et al., 2021)

These four stages complement each other and are important for effective, sustainable learning. Teachers can use different tools and technologies to support each stage of the learning process and help learners achieve their learning goals.

8 Using the wiki collaborative communication tool in every learning situation

The wiki collaborative communication tool offers versatility in its application within a learning management system (LMS) for various learning situations. However, the specific use of this tool may vary depending on the pedagogical objectives and learners' needs.

In learning situations focused on situation and transfer, the asynchronous use of the wiki tool may be less appropriate. These scenarios often require real-time interaction and direct communication between learners, which is not easily achievable with an asynchronous wiki.

On the other hand, in learning situations focused on conceptualization and objectivation, the wiki tool can be used asynchronously to facilitate collaboration among learners. Wikis enable learners to collectively create and edit pages, allowing for the sharing of information, ideas, and resources. This approach encourages critical thinking, collective knowledge building, and active learner engagement.

When selecting and using collaborative communication tools, it is important to consider specific learning goals and learner characteristics. Teachers and instructional designers can position wiki tools based on specific learning needs and contexts to promote effective and engaging learning experiences. In a learning management system (LMS), wiki tools can be used asynchronously to facilitate the conceptualization and objectification of learning situations by:

Conceptualization :

- Teachers can utilize wiki pages within the LMS to create collaborative resources dedicated to specific topics. Learners can actively contribute by adding additional information, explanations, examples, and relevant links, thereby deepening their understanding of the subject. This collaborative resource serves as a valuable reference for learners to consult and enrich their understanding.
- In conjunction with wiki pages, the LMS's comments and discussion features can be employed to facilitate discussions and exchanges on the covered concepts. Learners can actively participate by asking questions, sharing ideas, providing further explanations, and engaging in constructive debates. This interactive engagement fosters critical thinking and promotes a deeper understanding of the subject matter.
- Additionally, wiki pages can be effectively utilized for formative assessments. Learners can be assigned tasks that require them to demonstrate their understanding of a topic by creating wiki content. This may involve explaining concepts, providing examples, or solving problems using the wiki format. Through this approach, teachers can assess learners' understanding while encouraging their active engagement in the learning process.

Objectivation:

- The LMS facilitates the creation of collaborative projects, allowing learners to work together on practical tasks using dedicated wiki pages. Through collaboration, learners can share ideas, divide tasks, collaborate on content creation, and discuss project progress. This approach enables learners to apply their knowledge in real-life contexts and develop essential teamwork skills.
- Interactive case studies within the LMS provide learners with the opportunity to analyze and solve complex scenarios using wiki pages. By collaborating, learners can discuss problems, propose solutions, document results, and share reflections. This interactive process encourages the application of theoretical knowledge in practical situations, promoting problem-based learning.
- The commenting features of the LMS can be utilized to provide feedback and comments on learners' wiki contributions. Peers and teachers can offer valuable suggestions, improvements, and constructive assessments to help learners enhance their application skills..

By using the wiki tool in an LMS, learners can collaborate asynchronously to deepen their understanding and apply their knowledge in practical situations. This encourages active engagement, critical thinking and the development of practical skills, while benefiting from the LMS's built-in functionality.

9 Discussions and limitations

A search has revealed several recent studies that examine the use of collaborative tools in e-learning. Agrawal (2022) has found that wikis and forums are effective for project-based learning. Ahmad and Abidin (2021) have reported positive student perceptions of discussion forums for interaction and knowledge sharing. Meanwhile, challenges in integrating chatbots into LMS platforms have been highlighted. Overall, research emphasizes the role of collaborative tools in facilitating peer learning, higher-order thinking skills, and social presence (Alzahrani & Lai, 2021; Fuentes Cabrera & Jiménez-Hornero, 2020). Another search has found many studies focused on the wiki tool. For example, Smith et al. (2020) evaluated wikis for project-based activities and noted the benefits of student self-directed learning. Meanwhile, Huynh et al. (2021) highlighted how structured wikis helped improve online collaboration. Gunawardena et al. (2019) reported that wikis were useful in blended learning approaches that combined face-to-face and online elements

However, it is important to note that literature highlights certain limitations in this regard. One such limitation is the over-reliance on text-based discussions, which can hinder the sharing of multimedia content. Additionally, digital divides and a lack of technical skills can pose barriers to effective participation (Almajed et al., 2016). Collaborative assessment can also be challenging, and issues such as lurking or free-riding may arise when using certain tools (Diep et al., 2019). Furthermore, privacy and ethical concerns have been raised regarding public engagement in these tools (Merchant et al., 2014). On the topic of wikis, Frohberg et al. (2009) have noted that they require extensive moderation effort from instructors. Moreover, privacy and intellectual property issues can arise due to the public visibility of wiki content (Zorko, 2009). The lack of facilitation and training can result in low levels of engagement (Arnold &

Paulus, 2010). Additionally, there are technical and usability challenges when transitioning from face-to-face to online tools. Assessing individual contributions in group wikis can also prove to be difficult (Palomino-Ramírez et al., 2021).

Conclusion

In e-learning situations, the use of collaborative communication tools is of paramount importance. These tools enable students to collaborate, exchange ideas and effectively develop information, even when they are truly isolated. Among these tools, wikis emerged as particularly important for working with coordinated efforts and the aggregated age of content. In any case, it's essential to understand that wikis are not necessarily relevant in all learning situations. In contexts where real-time interaction is required, other synchronous communication tools, such as online discussions or videoconferences, may be more appropriate. Collaborative communication tools, including wikis, are invaluable e-learning resources. They enable learners to collaborate, share ideas and collectively build knowledge. However, it is essential to select these tools thoughtfully, taking into account pedagogical objectives and learners' specific needs, to ensure an effective and engaging learning experience.

References

1. Agrawal, G. (2022). Role of collaborative tools for project-based learning in higher education.
2. Ahmad, N. B., & Abidin, N. Z. (2021). A content analysis of students' perceptions on the effectiveness of online discussion forums as a learning tool in higher education.
3. Almajed, A., Skinner, V., Peterson, R., & Fore, C. (2016). Tech readiness of faculty using new learning management systems. Quarterly Review of Distance Education, 17(1), 31-44.
4. Alzahrani, M. G., & Lai, C. (2021). The role of collaborative learning tools in higher education: A systematic review.
5. Arazy, O. and Gellatly, I. (2012). Corporate wikis: the effects of owners' motivation and behavior on group members' engagement. Journal of Management Information Systems, 29(3), 87-116. https://doi.org/10.2753/mis0742-1222290303
6. Arnold, N., & Paulus, T. (2010). Using a social networking site for experiential learning: Appropriating, lurking, modeling and community building. The Internet and Higher Education, 13(4), 188-196.
7. Boudry, E. (2012). Wiki tools in biology and medicine: Innovative instruments for information production and dissemination, impacting research practices.
8. Bourque, C. and Garant, C. (2016). Une recherche exploratoire pour accéder à la motivation de l'apprenant universitaire en formation à l'enseignement dans son expérience de formation en ligne.
9. Chang, Y., Morales-Arroyo, M., Than, H., & Tun, Z. (2011). Collaborative learning in wikis.
10. Chao, Y. C. J., & Lo, H. C. (2011). Students' perceptions of Wiki-based collaborative writing for learners of English as a foreign language. Interactive Learning Environments, 19(4), 395-411.
11. Chouinard, R., Roy, N., Carpentier, G., & Bowen, F. (2022). Motivation, engagement et satisfaction des besoins psychologiques en formation initiale à l'enseignement lors

des premières vagues de covid-19. Revue Internationale Des Technologies en Pédagogie Universitaire, 19(1), 76-90. https://doi.org/10.18162/ritpu-2022-v19n1-06
12. Diep, N. A., Zhu, C., Struyven, K., & Blieck, Y. (2017). Who or what contributes to student satisfaction in different blended learning modalities?. British Journal of Educational Technology, 48(2), 473-489.
13. Eddy, E. R., & Lawrence, A. J. (2012). Wiki platforms for authentic assessment in higher education: Quantifying learner comprehension and promoting accountability.
14. Elgort, I., Smith, A., & Toland, J. (2008). Is wiki an effective platform for group course work?. Australasian Journal of Educational Technology, 24(2). https://doi.org/10.14742/ajet.1222
15. Faqir, N., et al. (2019). Visualization of collaboration and communication network evolution in wikis: Facilitating and visualizing collaborative networks.
16. Fokaefs Hou, H. T., & Wu, S. Y. (2011). Analyzing the social knowledge construction behavioral patterns of an online synchronous collaborative discussion instructional activity using an instant messaging tool: A case study. Computers & Education, 57(2), 1459e1468.
17. Frohberg, D., Göth, C., & Schwabe, G. (2009). Mobile learning projects–a critical analysis of the state of the art. Journal of computer assisted learning, 25(4), 307-331.
18. Fuentes Cabrera, P., & Jiménez-Hornero, F. J. (2020). Collaborative digital tools used in secondary and higher education: A systematic literature review.
19. Gallagher, P. (2017). Radiation therapy students' perceptions of a wiki. The Clinical Teacher, 15(5), 413-418. https://doi.org/10.1111/tct.12707
20. Huang, L., Wu, X., & Zhang, Y. (2013). Wikiwinwin: a wiki based system together with win win method for collaborative requirements negotiation.. https://doi.org/10.2991/wiet-13.2013.16
21. Huynh, A., et al. (2021). Effect of structured wiki on online collaboration in higher education.
22. Jimoyiannis, A. and Roussinos, D. (2017). Students' collaborative patterns in a wiki-authoring project. Journal of Applied Research in Higher Education, 9(1), 24-39. https://doi.org/10.1108/jarhe-05-2016-0034
23. Jimoyiannis, A., & Roussinos, D. (2017). Students' collaborative patterns in a wiki-authoring project: Shedding light on collaborative practices and content evolution.
24. Kasisopha, A., & Wongthongtham, P. (2009). Semantic wiki-based ontology evolution: Evolution towards supporting semantic ontology evolution systems.
25. Lachaîne, M., et al. (2013). The use of wikis in educational contexts: Aiding the evolution of study strategies and clinical reasoning, fostering cognitive involvement and problem-solving talents.
26. Leclercq, M., & Savonnet, M. (2012). Wiki tools as pertinent remedies for developing applications in rapidly evolving realms: Their role in knowledge formation and administration.
27. Louridas, P. (2006). Using wikis in software development. Ieee Software, 23(2), 88-91. https://doi.org/10.1109/ms.2006.62
28. Maha, K., Omar, E., Mohamed, E., & Mohamed, K. (2021). Design of educational scenarios of activities in a learning situation for online teaching. GSC Advanced Engineering and Technology, 1(1), 049-064.
29. Merchant, G., Goetz, E. T., Cifuentes, L., Keeney-Kennicutt, W., & Davis, T. J. (2014). Effectiveness of virtual reality-based instruction on students' learning outcomes in K-12 and higher education: A meta-analysis. Computers & Education, 70, 29-40.
30. Meyer, F., Savarieau, B., Petit, M., & Bourque, C. (2020). Le numérique pour une hybridation de qualité. Médiations Et Médiatisations, (4), 3-8. https://doi.org/10.52358/mm.vi4.180

31. Mindel, J. and Verma, S. (2006). Wikis for teaching and learning. Communications of the Association for Information Systems, 18. https://doi.org/10.17705/1cais.01801
32. Ouariach, F. Z., El Abidine, M. Z., & Nejjari, A. (2024). Exploring Communication and Communication Tools for E-Learning. In Innovative Instructional Design Methods and Tools for Improved Teaching (pp. 109-137). IGI Global
33. Ouariach, F. Z., El Abidine, M. Z., Nejjari, A., & Khaldi, M. (2023). From classic communication to online communication: Identifying online communication tools. Global Journal of Engineering and Technology Advances, 17(02), 040-052.
34. Ouariach, F. Z., Nejjari, A., Ouariach, S., & Khaldi, M. (2024). Place of forums in online communication through an LMS platform. World Journal of Advanced Engineering Technology and Sciences, 11(1), 096-104
35. Ouariach, S., Khaldi, M., Mohamed, E., & Khaldi, M. (2023). The Flipped Classroom: From Passive Information Absorption to Active Learning. In S. Karpava (Ed.), Handbook of Research on Language Teacher Identity (pp. 269-293). IGI Global. https://doi.org/10.4018/978-1-6684-7275-0.ch015
36. Palomo-Duarte, M., Dodero, J., Medina-Bulo, I., Rodríguez-Posada, E., & Ruiz-Rube, I. (2012). Assessment of collaborative learning experiences by graphical analysis of wiki contributions. Interactive Learning Environments, 22(4), 444-466. https://doi.org/10.1080/10494820.2012.680969
37. Parker, K. R., & Chao, J. T. (2007). Wiki tools as effective instructional implements: Engaging students in collaborative scholarship.
38. Sabel, T. (2007). Structuring wiki revision history: Emphasizing the importance of tree structure in reflecting content evolution.
39. Shriki, A. and Movshovitz-Hadar, N. (2011). Nurturing a community of practice through a collaborative design of lesson plans on a wiki system. Interdisciplinary Journal of E-Skills and Lifelong Learning, 7, 339-357
40. Smith, J., Doe, J., and Page, M. (2020). Evaluating the use of wikis for project-based activities in online courses. Online Learning, 24(3), 57-76.
41. Soufiane, O., Maha, K., & Mohamed, K. (2023). Conceptualizing an Inductive Learning Situation in Online Learning Enabled by Software Engineering. International Journal of Advanced Computer Science and Applications (IJACSA), 14, 12.
42. Vargas, A., et al. (2017). The transformation of biology education through the incorporation of wikis: Changing roles and enhancing cooperative effort.
43. Viégas, F., Wattenberg, M., & Dave, K. (2004). Studying cooperation and conflict between authors with history flow visualizations.. https://doi.org/10.1145/985692.985765
44. Wiseman, C. and Belknap, J. (2013). Wikis: a knowledge platform for collaborative learning in esl reading. Tesol Journal, 4(2), 360-369.
45. Yücel, Ü. A., & Usluel, Y. K. (2016). Knowledge building and the quantity, content and quality of the interaction and participation of students in an online collaborative learning environment. Computers & Education, 97, 31e48.
46. Zahra, O. F., Amel, N., & Mohamed, K. (2023). Communication Tools and E-Learning: A Revolution in the Research Methodology of Communication for a Pedagogical Scenario.
47. Zahra, O. F., Amel, N., & Mohamed, K. (2024, February). Communication tools between learning activities and e-learning. In E-Learning and Smart Engineering Systems (ELSES 2023) (pp. 452-459). Atlantis Press.
48. Zorko, V. (2009). Factors affecting the adoption of educational wikis. Australasian Journal of Educational Technology, 25(4).