

(REVIEW ARTICLE)



## Place of forums in online communication through an LMS platform

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### Abstract

Web 2.0 communication tools have great potential to support collaborative learning. However, it is essential to conduct research into how learners and teachers have experienced the use of new communication tools, such as discussion forums. In this contribution, our aim is to evaluate the effectiveness of a collaborative learning environment linked to a discussion forum in the context of e-learning. We examine the use of forums as a communication tool in learning contexts across four stages of the learning process via a Learning Management System (LMS) platform. We will focus on the specific integration and management of the forum at each stage, and how forums can be strategically and effectively integrated into each stage of the educational process, fostering constructive interaction and collaborative learning throughout.

**Keywords:** E-learning; Online communication; Forum tool; Learning situation; LMS

### 1. Introduction

In recent years, there has been considerable interest in the possibilities offered by "Web 2.0" technologies in education [1; 2; 3]. These technologies are also known as "social software" or "social media" and include online communication tools such as forums, wikis, blogs, and different types of social networks. Many teachers are enthusiastic about the potential of these tools to make learning more collaborative, active, and enjoyable. Some also believe that, since these tools are widely used by young people and are freely available, they should be adopted in education [4]. Various types of discussion forums have long been used in education, particularly in distance learning contexts [5; 6].

Online communication tools include instant messaging, forums, chat rooms, email, blogs, wikis, webinars, and course management systems [7]. These online communication tools offer a variety of possibilities for fostering dialogue and collaboration between teachers, learners, and other stakeholders [8]. In this article, we discuss the integration of the forum as an asynchronous communication tool and its adaptive management in various learning situations. In the rapidly evolving landscape of online education, the integration of forums within Learning Management System (LMS) platforms has become increasingly pivotal. Forums serve as dynamic spaces where learners, instructors, and facilitators can engage in meaningful online communication, fostering a collaborative and interactive learning environment. This integration not only provides a venue for discussions but also plays a key role in shaping the overall online learning experience. This exploration delves into the significant role that forums occupy in the realm of online communication through LMS platforms, highlighting their multifaceted contributions to learning, collaboration, and the establishment of vibrant virtual communities.

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The effective integration of discussion forums into learning management systems (LMS) is crucial for optimizing the educational process. In this study, we explore the vast potential of discussion forums in various educational contexts offered by LMS platforms. These forums are not limited to simple communication tools; they are dynamic spaces that foster interaction, critical reflection, and collaboration among learners, teachers, and peers. We delve into the key role of forums as important communication tools in delivering a four-step learning process via a Learning Management System (LMS) platform. Our focus is on the specific integration and management of the forum at each stage, highlighting its functionality and added value in each educational environment. We emphasize the strategic and effective integration of forums at every stage of the educational process, promoting constructive interaction and continuous collaborative learning throughout.

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## 2. The evolution of online forums

Over the years, online discussion forums have undergone various trends and changes, demonstrating their evolution. Let's take a closer look at the progression of these forums:

- The emergence of online discussion forums dates back to the 1980s and 1990s, coinciding with the rise of the Internet. These early forums were primarily focused on text-based communication, offering users the opportunity to participate in discussions centered on a variety of topics.
- Forums underwent a transformation, expanding to encompass a wide range of specific topics and fostering the development of online communities centered on common interests. These thematic forums not only fostered a higher degree of specialization, but also attracted like-minded individuals.
- As technology continues to evolve, forums have embraced the integration of advanced features, including enhanced search functionality, personalized user profiles, rating mechanisms and multimedia capabilities.
- The emergence of social networking in the early 2000s had a profound impact on the development of online forums. Social networking platforms absorbed some forums, while others experienced a decline in popularity due to the rise of social networking.
- The accessibility of online forums has been enhanced by the development of mobile-friendly forums, which have emerged thanks to advances in mobile technology. These forums enable users to participate in discussions with greater flexibility.
- The evolution of online community management has led to the implementation of advanced models incorporating moderators, strict codes of conduct and conflict resolution mechanisms, all aimed at fostering a positive and thriving online environment.
- Forums have become an integral part of online learning environments (LMS) in online education, enabling effective communication between learners, teachers and instructors.
- In the modern era, online forums have become a valuable tool for professional collaboration, enabling remote teams to solve problems and share knowledge within organizations.

Asynchronous discussion forums have the potential to enhance student learning and collaboration in online courses [9]. These forums play a crucial role in online education by fostering interaction between instructors and students, thereby improving the overall effectiveness of online learning. By providing a platform for students to share their thoughts and ideas on various topics, asynchronous discussions promote critical thinking and problem-solving skills. They also offer flexibility, allowing teachers and students to engage in discussions at their own convenience, which is particularly beneficial for introverted or second-language learners. Additionally, the asynchronous nature of these discussions provides students with ample time to reflect before responding, resulting in rich and meaningful conversations.

Furthermore, asynchronous video discussions can serve as an alternative to synchronous meetings and text-based discussions, offering blended and online learning opportunities. Research indicates that the variety of media and the way in which communication technology is utilized are more significant than the inherent means and constraints, suggesting that the availability of these applications has implications for both practitioners and researchers. Overall, asynchronous discussion forums serve as the primary means for online educators to connect with and engage students, fostering peer-to-peer learning and the development of communication skills. While the level of activity in discussion forums may vary across courses, they provide students with the opportunity to learn and collaborate at their own pace and convenience [9]. It is crucial for future research to investigate how students interact within these forums in order to understand their effectiveness in enhancing student learning and collaboration. Data collected from Learning Management Systems (LMS) can be utilized to further improve online education.

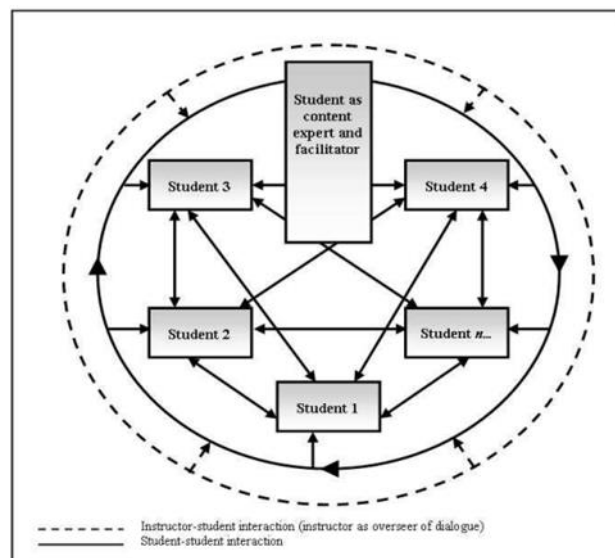
### 3. The concept of online discussion forums

Discussion forums can be defined as hybrid devices for interpersonal mass communication [10], as they enable both interpersonal and mass communication. Asynchronous online discussions have long been a common component of online courses [11]. Content analysis has revealed that the discussion forum contains social and cognitive presences, as described in the context of communities of inquiry [12]. Participation in online discussion forums has been found to predict student learning outcomes [13], and the quality of knowledge construction derived from the use of online discussion forums is a determinant of learning quality.

The quality of knowledge construction derived from online forum messages has also been linked to students' final performance [13]. Additionally, using online discussion forums offers other benefits such as increased participation, more active and collaborative learning, and greater learner satisfaction [14]. However, despite these indications of the multiple benefits of online discussion forums, our understanding of how these forums promote social interaction, knowledge sharing, and reflection remains limited. Studies such as the one conducted by Romero et al., which report a positive relationship between online forum participation and final grades, often fail to consider the different types of interaction within these forums, such as social interaction versus knowledge construction.

The online discussion forum serves as an electronic platform for online learning, discussion, knowledge sharing, and information dissemination. As described by [15], it is a web application that brings together individuals with shared interests and visions. Members of these forums have the opportunity to post messages on discussion threads, interact with others, and receive feedback from fellow students and teachers, facilitating a deeper understanding of the material being discussed. The online discussion forum promotes learning through networking, providing students with the opportunity to seek, obtain, and share information, ultimately having a positive impact on the teaching and learning process [16].

According to [17], online discussion forums play a crucial role in promoting student-centered learning by enabling students to lead and coordinate discussions. The research also highlights the positive correlation between increased student participation in online forums and improved learning outcomes. In addition, the study identifies four main models of participation in these forums, including Socratic questioning, sharing opinions and personal experiences, brainstorming and responding via messages. In their model illustrated in Figure 1, Neil and Maria present an online discussion forum as a peer learning environment that prioritizes student expertise and facilitation, with the instructor acting as a supervisor overseeing the dialogue.



**Figure 1** Online discussion forum as a student centred peer e-learning environment [18]

The role and control of the teacher are transformed into that of a facilitator and mentor, rather than an intellectual guide. When students are able to serve as content or topic experts in online discussion forums, it enhances their cognitive and leadership skills. This experience allows students to think critically and deeply, both in traditional classrooms and online forums, in order to provide accurate answers to questions. By placing students in expert roles,

we foster their autonomy and self-confidence. The act of explaining and arguing can also promote a better understanding of the concepts being covered. Additionally, the asynchronous nature of communication allows everyone to carefully prepare their responses. As a result, this type of interactive and collaborative pedagogy appears to facilitate meaningful learning while empowering learners.

### 3.1. Role of the forum

Online discussion forums play a significant role in higher education [19]. They not only break down communication barriers between students and their teachers but also provide a platform for fruitful discussions among students themselves. As highlighted by [20], the use of online discussion forums has emerged as an effective tool for engaging students outside the classroom. It allows students to post messages on discussion threads, interact with their peers and receive feedback from both fellow students and the teacher, ultimately fostering a deeper understanding of the material being studied.

An online forum creates a motivating environment where students can freely express their views and ideas with greater confidence compared to a traditional classroom setting. It particularly benefits introverted learners, as they can comfortably participate in the teaching and learning process by sharing their opinions from anywhere without feeling excessive pressure. However, this can only be achieved if staff and students are encouraged to actively participate in the forum. [17] suggested that educators need to underpin student motivation by being explicit about expectations and ground rules for online discussion forums, as this sets the framework for interaction, peer collaboration and dialogue.

### 3.2. Using the forum

Forums are utilized on an ad hoc basis, either as part of a course or to discuss specific teaching-related topics [21; 22; 23], or throughout the semester. Additionally, students are among the billions of people who engage with the Facebook social network, dedicating a certain amount of time each day to this platform [24]. The forum, serving as an instrument of asynchronous and remote written collective communication, is one of the online communication tools available in the students' digital environment.

Several observations can be made regarding the current use of forums in a pedagogical context. While it is true that there are exchanges between learners on these forums, which positively impact learning conditions, research has shown that such phenomena are rare [25]. Most of the time, forums are primarily used as a means for learners to communicate with their instructor. For instance, an examination of Télé-université forums [26] revealed that vertical learner-trainer relationships are clearly dominant, while horizontal relationships between learners are infrequent. To encourage interaction between learners, one solution is to assess and reward participation in forums [27]. However, this means that learning situations are defined according to the tools available. All e-learning platforms incorporate forum tools [28]. These forums are based on the same model, i.e. question-answer or intervention-reaction. The forums used in e-learning platforms are not specific to the educational context. However, they are expected to deliver pedagogical benefits, such as stimulating active participation by learners, increasing their motivation, creating a sense of belonging to a group and enabling natural monitoring. Some features may vary from one forum to another - tree structure of messages, different rights given to learners - but the basic principle remains the same. Communication activities are detached from learning activities.

### 3.3. Different forms of forum use

The utilization of forums encompasses a multitude of forms, contingent upon their purpose, hosting platform, and governing regulations. Here are several prevalent manifestations of online forum usage:

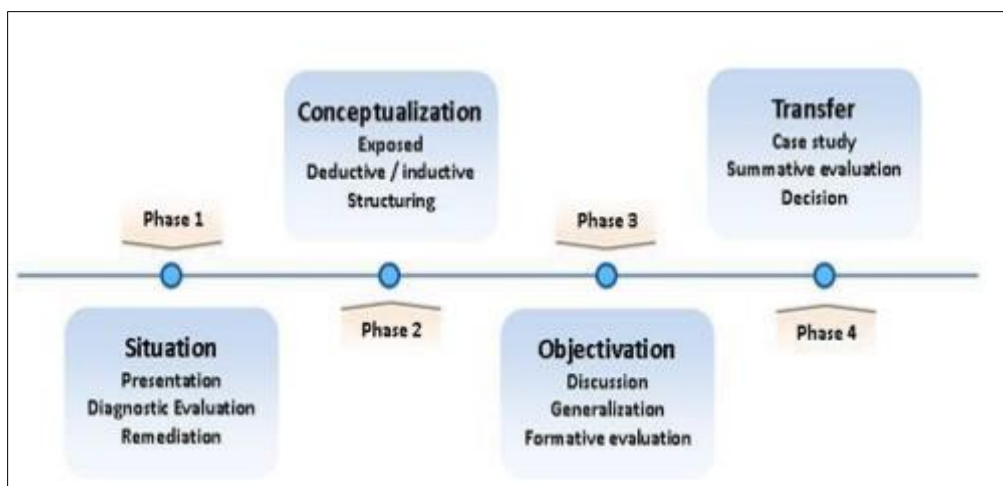
- Engaging in discussions and information sharing: Forums often serve as a hub for deliberating specific subjects. Users can pose inquiries, share personal experiences, and exchange knowledge on a wide array of topics, spanning from technology to travel, hobbies, and beyond.
- Providing support and troubleshooting: Numerous forums are dedicated to offering technical assistance and resolving issues. Users seek guidance regarding challenges they encounter, while fellow community members proffer advice and solutions.
- Cultivating online communities: Certain forums center around fostering communities based on shared interests. This can pertain to video games, hobbies, lifestyles, and more. Members share their experiences and interact, forging connections within the community.
- Facilitating debates and idea exchange: Forums can serve as a platform for civil and constructive debates on contentious subjects. Users express their viewpoints, engage in arguments, and exchange ideas while respecting divergent opinions.

- Announcements and dissemination of information: Certain forums serve as platforms for sharing announcements, news, and updates pertaining to specific topics. This encompasses event announcements, job offers, and other relevant information.
- Education and resource sharing: Some forums function as collaborative learning spaces, where members come together to share educational resources, pose questions, and provide answers to deepen their understanding of a particular subject.
- Moderation and management: Forums typically have dedicated moderators or administrators responsible for maintaining order, enforcing rules, and managing interactions. Their role is crucial in fostering a respectful and constructive environment within the forum community.
- These diverse forms of forum usage underscore the wide array of objectives and content available to users. Individuals can actively participate in forums based on their specific interests and needs.

### 3.4. The four stages of the learning process

The learning process generally comprises four stages: situation, conceptualization, objectivation and transfer [29].

- **Situation:** In this initial phase, learners engage in preparatory activities to facilitate their learning process. This involves conducting research, acquiring information, and familiarizing themselves with the learning objectives. Additionally, learners can explore the activities and resources that will be utilized throughout their studies.
- **Conceptualization (Structuring):** The conceptualization stage involves the presentation of information and knowledge to learners. This can be accomplished through various mediums such as live lectures, recorded videos, readings, and presentations. Learners are provided with the necessary foundation to comprehend the subject matter.
- **Objectivation:** During the objectivation phase, learners actively apply the knowledge they have acquired. This is achieved through interactive exercises, projects, and hands-on activities. By engaging in practical applications, learners deepen their understanding and reinforce their knowledge.
- **Transfer:** The transfer phase focuses on assessing learners' comprehension and application of the acquired knowledge. This evaluation is conducted through exams, assignments, and projects. The transfer phase serves to measure progress and identify areas that may require further reinforcement. The evaluation of learning outcomes heavily relies on comprehensive summative assessments, which play a crucial role in determining the effectiveness of the educational process. This pivotal stage, known as the Transfer Phase, provides the opportunity for students to apply their acquired knowledge and develop practical skills. [30].



**Figure 2** Example of the life cycle of a pedagogical scenario in a learning situation [29]

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.

#### 4. Integration of the Forum in Online Communication through an LMS Platform

**Table 1** Integration of the Forum in Online Communication through an LMS Platform

| The four stages of the learning process | Place of the forum in an LMS platform  | The role of online communication   |
|---|--|--|
| Situation                               | <p>-The forum serves as a virtual meeting point, providing a platform for learners to introduce themselves, share their motivations, and express their expectations.</p> <p>Utilizing the forum contributes to the formation of an online community, fostering interaction and establishing connections among participants. This cultivates a sense of commitment right from the outset of the training course.</p> <p>-The collective brainstorming method employed on the forum is an excellent means of encouraging collaborative thinking among learners. It facilitates the generation of ideas, hypotheses, and potential approaches to solving problem situations.</p> <p>-By leveraging online communication tools, learners can be motivated to actively participate in discussions and share their valuable ideas.</p> <p>-This approach enhances learner engagement with the scenario, enabling a more profound involvement and fostering a more immersive learning experience.</p> | <p>Online communication creates a collaborative atmosphere and fosters engagement by linking learners to course content, collaboration, critical feedback and active learning.</p>   |
| Conceptualization (Structuring)         | <p>- The forum becomes a dynamic space for sharing additional resources, relevant articles and videos.</p> <p>- By creating discussion threads dedicated to each module, learners are encouraged to actively participate by asking questions, expressing their opinions, and engaging in in-depth discussions about the concepts presented.</p> <p>- In this way, the forum plays an essential role in creating an interactive environment, encouraging the exchange of ideas between learners.</p>  | <p>Online communication enables learners to exchange ideas, ask questions and clarify points that may need further explanation. This creates an interactive learning community.</p>  |
| Objectivation                           | <p>-The integration of the forum also enhances the application of knowledge through exercises or projects.</p> <p>-Dedicated discussion threads for practical activities provide a platform for learners to share their work, discuss challenges they encounter, and seek feedback.</p> <p>-The forum becomes a collaborative space where participants can collaborate, pose questions to their peers, and share advice, thereby reinforcing the social aspect of learning.</p>  | <p>Online communication facilitates collaboration between learners, enhancing learning through the exchange of ideas, collective problem-solving and the creation of a social learning environment.</p>  |
| Transfer                                | <p>-The forum serves as a valuable platform for collecting feedback on the learning sequence, course content, and instructional delivery.</p> <p>-By encouraging learners to share their reflections on their learning experiences and the skills they have acquired, the forum becomes an essential tool for ongoing assessment.</p> <p>-Furthermore, it provides a space for post-evaluation discussions and facilitates feedback exchanges between learners and trainers, making a significant contribution to the continuous improvement of the course.</p>  | <p>Online communication enables continuous and constructive evaluation. Exchanges within the forum provide immediate feedback and create a space where learners can share their experiences, contributing to the continuous improvement of the course.</p> |

With a view to maximizing the effectiveness of e-learning, the forum plays an essential role in online communication through a learning situation by providing an interactive platform where participants can exchange ideas, ask questions, share experiences and collaborate. The table below illustrates the integration of the forum tool in online communication.

By integrating the forum through an LMS platform at every stage of the learning process, an interactive, collaborative, and well-structured experience is created. This approach enhances online communication among learners, fosters engagement, and facilitates effective follow-up and management of training by trainers.

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## 5. The benefits of using asynchronous discussion forums in learning situations

- Asynchronous discussion forums are an advantageous tool for learning situations, especially in the online context.
- They provide an opportunity for student interaction and reinforce peer camaraderie, fostering a sense of community within the virtual classroom [31].
- Asynchronous discussion forums are frequently used in online courses to engage students with content, assess learning and reinforce key concepts.
- The use of asynchronous discussion forums can be effective for learning and lead to more engaged learners.
- One of the advantages of using asynchronous discussion forums is that students have more time to formulate their opinions and respond thoughtfully to others, which improves their writing skills.
- In addition, all students are required to respond to prompts and reply to their peers, facilitating equitable participation and active engagement in the learning process.
- Asynchronous discussion forums incorporate many good pedagogical practices for students and teachers, regardless of current engagement levels, making them an effective environment for students to engage in learning and collaboration, which can lead to higher grades.
- Collaboration can be easier in asynchronous learning thanks to online sharing tools, allowing increased exposure to content and preparing students for future collaborative work.
- Asynchronous learning also enables collaboration despite physical separation, making it a valuable tool for distance learning situations.
- Studies have shown that asynchronous discussion forums can be more useful than face-to-face discussions and can be used with caution to empower students, even in a face-to-face classroom.

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## 6. Conclusion

When exploring in depth the rich potential of exploiting discussion forums via LMS platforms in different learning environments, it's important to note that the success of discussion forums in promoting learning depends on a number of factors, including forum design, quality of facilitation, learner participation and involvement. To ensure that discussion forums are used effectively in different learning contexts, it is essential that educators carefully consider their pedagogical objectives as well as the needs and preferences of learners. Overall, the potential of discussion forums through learning management systems in different learning situations is enormous, and educators should continue to explore innovative ways of exploiting these tools to improve learner outcomes.

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## Compliance with ethical standards

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Fatima Zahra Ouariach, Amel Nejjari, Soufiane Ouariach and Mohamed Khaldi declare that they have no conflict of interest.

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## References

- [1] Hughes, A. (2009). Higher education in a Web 2.0 world: Report of an Independent Committee of Inquiry into the impact on higher education of students' widespread use of Web 2.0 technologies

- [2] Mason, R., & Rennie, F. (2008). *E-learning and social networking handbook: Resources for higher education*. New York: Routledge.
- [3] Redecker, C. (2009). *Review of learning 2.0 practice: Study on the impact of Web 2.0 innovations in education and training in Europe*. Seville, Spain: European Commission Joint Research Centre Institute for Prospective Technological Studies.
- [4] Green, H., & Hannon, C. (2007). *Their space: Education for a digital generation*. Demos.
- [5] Mason, R. & Kaye, A. (Eds.). (1989). *Mindweave: Communication, computers and distance education*. Oxford: Pergamon Press.
- [6] Palloff, R. M., & Pratt, K. (1999). *Building learning communities in cyberspace: Effective strategies for the online classroom*. San Francisco: Jossey-Bass.
- [7] Ouariach, F. Z., El Abidine, M. Z., Nejari, 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.
- [8] 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*.
- [9] Lombart, E., & Fairon, C. (2020). Spécificités de communication des forums de discussion. *Corpus*, (21).
- [10] Baym N. K. (1998). « The Emergence of On-Line Community », *Cybersociety 2.0: Revisiting Computer-Mediated Communication and Community*, 35-68.
- [11] Koschmann, T., Hall, R., & Miyake, N. (2002). *CSCIL2: carrying forward the conversation*. Mahwah, NJ: Lawrence Erlbaum Associates.
- [12] Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, 15, 7–23.
- [13] Romero, C., Lopez, M.-I., Luna, J.-M., & Ventura, S. (2013). Predicting students' final performance from participation in on-line discussion forums. *Computers & Education*, 68, 458–472.
- [14] C,elik, S. (2013). Unspoken social dynamics in an online discussion group: the disconnect between attitudes and overt behavior of English language teaching graduate students. *Educational Technology Research and Development*, 61, 665–683. Retrieved from <https://doi.org/10.1007/s11423-013-9288-3>
- [15] Alabo, H.B. and Emmah, V.T. (2014). Online Discussion Forum: A Tool for Effective Student-Teacher Interaction. *Int. J. of Applied Sci.-Research and Rev.* 1 (3): 111-116.
- [16] Nor, F.M; Norizan, A.R; and Jamaluddin, A. (2010). E-learning: Analysis of online discussion forums in promoting knowledge construction through collaborative learning. *Wseas Transactions on Communications*, 9 (1): 54-62.
- [17] Xia, C., Fielder, J. & Siragusa, L. (2013). Achieving better peer interaction in online discussion forums: A reflective practitioner case study. *Issues in Educational Research*, 23(1),97-113. <http://www.iier.org.au/iier23/xia.html>.
- [18] Neil, H. and Maria, S. (2007). Developing online discussion forums as student centred peer e-learning environments. *Proceedings ascilite Singapore,2007*
- [19] Xiaoling, L. (2018). *The Effectiveness of Online Discussion Forums and Recommendations for Chinese Higher Education*. A Project Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Education, Department of Curriculum and Instruction, University of Victoria.
- [20] Balaji, M,S. and Diganta, C. (2010). Student Interactions in Online Discussion Forum: Empirical Research from „Media Richness Theory“ Perspective.*Journal of Interactive Online Learning*, 9 (1): 1- 22
- [21] Mangenot, F., 2008, "Instrumented Pedagogical Practices and Tool Properties: The Case of Forums," *Journal of Information Science and Technology*, 1–20.
- [22] Roux C. and Mayen P., 2013, "The Discussion Forum in Training: a Potential Space for Accessing Others' Relationship with Learning Objects," *Distances and Mediations of Knowledge [Online]*, 3 | 2013, published on June 26, 2013, URL: <http://dms.revues.org/316>
- [23] Charnet C., 2016, "What if Digital Technology Changed University Pedagogy: Knowledge Transmission," to be published in "Digital and Education: Devices, Games, Issues, off games coordinated by Luc Massou, Philippe Bonfils, and Philippe Dumas, *Proceedings of TICEMED 2014*."



- [24] Vishwanath, A., 2014, « Habitual Facebook use and its impact on getting deceived on social media » *Journal of Computer-Mediated Communication*, 20, n/a-n/a.
- [25] Hotte, R. (1998). "Modeling a Multi-Expert Support System for Distance Cooperative Learning." Doctoral Thesis, University of Paris 7 - Denis Diderot.
- [26] George, S. (2001). "Distance Collective Learning. SPLACH: An IT Environment Supporting Project-Based Pedagogy."
- [27] Gommer, L., Visser, G. (2001). Implementation of a digital learning environment: The real results. In W. Fowler & J. Hasebrook (Eds.), *Proceedings of the World Conference on the WWW and Internet (WebNet 2001)* (pp. 433-438). Orlando, Florida, USA: AACE.
- [28] Ecoutin, É. (2000). "Technical and Pedagogical Comparative Study of Platforms for Open and Distance Learning. Study conducted by ORAVEP for the Ministry of Research (DT/SDTETIC)."
- [29] 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.
- [30] Ouariach Soufiane, Khaldi Maha and Khaldi Mohamed, "Conceptualizing an Inductive Learning Situation in Online Learning Enabled by Software Engineering" *International Journal of Advanced Computer Science and Applications(IJACSA)*, 14(12), 2023. <http://dx.doi.org/10.14569/IJACSA.2023.0141210>
- [31] S. Ouariach, M. Khaldi, E. Mohamed, and M. Khaldi, "The Flipped Classroom: From Passive Information Absorption to Active Learning," in *Handbook of Research on Language Teacher Identity*, IGI Global, 2023, pp. 269-293. doi: 10.4018/978-1-6684-7275-0.ch015