

# A Classification Of Mediatization Tools In Online Learning Environment: Exploring The Types Of LMS' Mediatization Tools

Nisrine EL MRANI<sup>1</sup>  and Mohamed KHALDI<sup>2</sup> 

<sup>1,2</sup> *Research team in Computer Science and University Pedagogical Engineering, Abdelmalek Essaâdi University, Normal Superior School of Tetouan, Morocco*

<sup>1</sup> [nisrine.elmrani@etu.uae.ac.ma](mailto:nisrine.elmrani@etu.uae.ac.ma)

**Abstract.** Throughout the evolutionary course of distance education, mediatization forms have undergone significant changes. The rise of various educational trends and emerging technologies has also highlighted the challenges of mediatization. Therefore, complicating the choice of mediatization tools, which requires careful and in-depth examination. This paper reviews the history of distance education and addresses the evolution of mediatization forms alongside the technological advances. The essence of this article is to present a classification of the types of LMS mediatization tools. This paper concludes by categorizing Moodle's various resources and activities according to this classification, assigning them to their respective types of LMS mediatization tools.

**Keywords:** Mediatization, Mediatization tools, LMS, Distance learning, E-Learning, Classification, Online learning environment, Moodle

## 1 Introduction

Mediatization practices have undergone significant changes in recent years, due to technological advancements. Particularly, following the Covid-19 pandemic and the fourth industrial revolution, that has witnessed the proliferation of emerging technologies, alongside changes in teaching modalities [1].

Mediatization is a process involving setting the content in media, as well as the result of this process, which is mediatized learning materials. It includes the design, production, and implementation of learning environments, where selecting the most appropriate media and scripting hold significant importance [2].

Virtual learning environments (LMS) mediatize 8 generic functions of teaching [2] which can increase with the complexification of these environments. Moreover, as learning systems evolve alongside advancements in distance education technologies, new forms of mediatization emerge.

A broad overview of the history of Distance Education (DE) is given in this paper. In addition, it highlights the evolution of mediatization forms alongside the generation of DE. The authors also define mediatization tools based on two identified categories:

digital learning materials and resources, and learning environment and resource development tools.

With an ever-growing number of emerging technologies, and the rise of new mediatization forms, the choice of mediatization tools requires an examination of effective criteria for the selection of these tools and taking into account their alignment with pedagogical principles. Therefore, emphasizing the need to justify their choice [1].

The authors introduce a classification of mediatization tools, which will serve as a foundation for future work aimed at developing a typology, including criteria for selecting suitable tools. In summary, this work primarily focuses on classifying the various types of LMS tools. Then, in a table, Moodle's various resources and activities will be assigned to their corresponding types of LMS' mediatization tools.

## **2 Literature review**

### **2.1 Evolution of distance education**

According to Garrison (1993) and Bates (1995), distance learning has undergone a process of increasing mediatization from its very beginning [3]. Besides, Nipper's classification of Distance Education (DE), as noted by Peraya [4], clearly illustrates the impact of technological development on forms of mediatization. In this regard, highlighting the historical evolution of DE technologies and learning environments is essential for understanding changes in mediatization practices.

This section will present a thorough overview of the historical evolution of Distance Education. Additionally, it will highlight the different generations that have emerged over time alongside technological advancements, while shedding light on the significant development of mediatization forms throughout this evolution.

This review was primarily inspired by the five-generation model of Distance Education proposed by Heydenrych and Prinsloo [5] and other models found in the literature, including those by Taylor (1995, 2001) and Moore and Kearsley (2005).

#### **Generation 1 (Correspondence)**

The first generation of distance courses was marked by the start of correspondence-based teaching. The first correspondence course was the stenography course proposed by Sir Isaac Pitman in 1840, which used written and printed texts delivered through the postal system [6,7].

#### **Generation 2 (Mass media and teaching machines)**

The second generation has witnessed the use of mass media technologies (radio and television) as complementary instructional medias to print materials [7].

In 1969, the British Open University (OU) collaborated with the BBC to develop open university programs that combined printed materials, developed by OU staff, with television and radio broadcasts produced by the BBC but integrated with the courses [8]. In the 1970s and 1980s, as new technologies like audio-cassettes and video-cassettes were introduced, there was a shift from broadcast media to the use of these cassettes as audio-visual aids [6, 9].

This generation of distance education was also marked by the rise of teaching machines which are considered predecessors of Computer-Assisted Learning (CAL) systems.

In 1954 at the University of Pittsburgh, the psychologist Skinner proposed a teaching machine (GLIDER) for reinforcing spelling and arithmetic. The glider was used to facilitate programmed learning. This mechanical machine presented students with individual questions, one at a time. Learners wrote down their responses on a paper, and the machine only allowed them to advance or proceed if the answer was correct [10, 11]. Teaching machines and programmed learning established the core principles of CAL and laid the groundwork for it.

### **Generation 3 (Computer Assisted Learning)**

The third generation has known the start of Computer-Assisted Learning (CAL). Online learning or e-learning took its roots in the 1960s with the appearance of the first generalized computer assisted learning system, that was inspired by Skinner's GLIDER. In 1960, PLATO (Programmed Logic for Automated Teaching Operations) was developed at the university of Illinois by Daniel Alpert and Don Bitzer. It is a multiple sharing system that allowed multiple users to interact with it through high-resolution graphics display terminals which are connected to a central mainframe computer [5, 10, 12].

Before the invention of transistors and microprocessors, the early CAI programs were mainly implemented on mainframe computers. Even if those computers moved from vacuum tubes to transistorized computers, their instructional use was restricted to private corporations, military offices, and large universities and institutions. They were also used for administrative purposes by large schools and universities, as they were expensive and only few large projects, like PLATO, received extensive funding for mainframes [13]. The advancements of microprocessors, coupled with the development of operating systems, laid the foundation for the personal computer revolution.

### **Generation 4 (Internet, PC, telematics and web-based courses)**

The fourth generation was characterized by the widespread use of personal computers, the rise of internet and web-based courses.

With the appearance of microcomputers in the late 1970s, CAL became affordable for small educational institutions and accessible for individual use. Microcomputers became later known as personal computers [14].

Established in 1961, the ARPANET, a forerunner of the internet, opened the door for the potential use of personal computers in delivering internet-based courses [5]. The invention of the TCP protocol around 1973 has led to the birth of Internet and the introduction of TCP/IP in 1983, enabled its globalization [15].

In 1976, the UK's The Open University launched the CICERO program, offering internet-based courses that allowed students to earn academic credit. Additionally, it developed the Cyclops whiteboard system, which enabled a limited form of teleconferencing [6]. It can be seen as a precursor to modern platforms like Skype or Zoom (Keegan, 2020) [10].

In this context, the telematic teaching approach gained popularity in education during the 1980s as computers became increasingly available in homes and universities (Mahnegar, 2012) [16].

Before the emergence of Learning Management Systems (LMS), early forms of e-learning were delivered through various tools, such as bulletin boards for communication, content management systems, and home-created web pages. Bulletin Board Systems (BBS), served as the primary online community for discussion and content sharing, acting as predecessors to LMS [17]. One of the earliest BBS and online conferencing systems was FirstClass, developed by SoftArc in 1990 [18].

This generation also witnessed the rise of the World Wide Web (WWW) [5] and the first web-based LMS. The emergence of Web 1.0 increased the accessible of educational resources, creating a for LMSs to manage online learning effectively.

The 1990s saw the introduction of the first web-based LMS platforms. Norwegian Knowledge Institute (NKI) introduced the first fully-featured LMS, EKKO, which was soon followed by GeoMetrix Data Systems' Training Partner LMS [18, 19]. Shortly after, WebCT was developed at the University of British Columbia. In 2004, Blackboard Inc. launched the Blackboard LMS. Later on, WebCT was acquired by Blackboard in 2006, leading to the combination of their platforms [8].

In addition, the term "e-learning" was introduced by the researcher Elliott Masie, to describe online learning, during his presentation at the TechLearn Conference in 1999 [20].

### **Generation 5 (Web 2.0, Web 3.0 and emerging technologies)**

The fifth generation of distance education is currently ongoing and is characterized by the adoption of Web 2.0 and Web 3.0 technologies, along with the integration of emerging technologies into e-learning.

The Web 2.0 era, revolutionized online learning by fostering user interaction and collaboration through platforms that facilitate content creation and sharing within virtual communities [21]. Moodle, released in 2002, was a cornerstone in the history of LMSs [18]. It integrated the collaborative and interactive features of Web 2.0. Examples of Web 2.0 tools include instant messaging apps, social media platforms, video sharing platforms, blogs, wikis and web applications [22].

During this phase, Massive Online Open Courses (MOOCs), another type of web-based distance learning, were also developed. George Siemens and Stephen Downes of the University of Manitoba created the first MOOC, called "Connectivism and Connective Knowledge," in 2008. MOOCs gained popularity in 2012 when several MOOC platforms were launched by major universities and institutions. Stanford University was among the first, developing Coursera. Shortly after, Sebastian Thrun, established Udacity. Finally, the Massachusetts Institute of Technology (MIT) and Harvard University collaborated to develop Open edX, an open-source MOOC platform [8].

Besides, the history of e-learning has been influenced by the development of mobile technology, which has made learning more accessible and flexible and enabled learners to participate in learning activities without geographical constraints [23].

Another transformative milestone in LMS history was the introduction of the Shareable Content Object Reference Model (SCORM). This standard, released in the early

2000s, allowed e-learning content creation and sharing across different LMSs, promoting interoperability and content reusability. It was later succeeded by Experience API or xAPI, an e-learning specification, developed as a successor to SCORM. This specification records and tracks various types of learning experiences for learning systems. XAPI data can be used to create adaptive learning experiences by customizing content to each learner's needs, preferences, and performance [24].

Finally, this generation saw the rise of Web 3.0 tools and various emerging technologies, such as intelligent search engines, 3D visualization, serious games, artificial intelligence, immersive reality, big data, cloud computing [6, 25, 26]

## **2.2 Evolution of mediatization forms**

Over the history of distance education, modern technology advances are considered to be revolutionizing learning environments. In each phase of DE, mediatization forms has known the use of dominant mediatization tools to develop learning systems.

Initially, the system relied on and print technology, including written text and its various paratexts, such as diagrams and photographs [4].

During the second generation, technologies diversified to include sound, still images, and moving images, allowing for both real-time broadcasting using mass media technologies and delayed use, particularly with the complementary use of audiovisual aids (slides, filmstrips, audio-cassettes) [4].

The third generation was marked by the use of early CAL systems as learning environment. Furthermore, with the advent of computers and the internet, these learning environments shifted towards Learning Management Systems, which provided a more interactive learning experience by incorporating collaboration and communication tools. These systems integrate various mediatization tools to develop diverse learning resources and activities.

Finally, the implementation of Web 3.0 tools and emerging technologies in education is set to transform learning environments significantly. This will lead to the development of advanced, cloud-based learning environment, VR-based learning environments and AI-enabled adaptive learning systems. By offering individualized learning pathways and immersive learning experiences that replicate real-world situations, these innovations will enhance education.

## **3 Classification of mediatization tools**

### **3.1 Categories of mediatization tools**

A variety of tools are used for the mediatization of online learning systems or environments, they are referred to as mediatization tools. El Mrani and Khaldi [1] identify 2 categories of mediatization tools: digital learning materials and resources, and learning environment and resource development tools. These categories have multiple classes. Each class can contain various mediatization tools types. LMS' mediatization tools are identified by the authors as a class of mediatization tools which can belong to the 2 categories.

The reason for identifying two categories of mediatization tools is that, as noted by Peraya [27], mediatization is the process of setting into media as well as the result of the process, which is the mediatized resources and the developed learning material.

In this work, the authors will classify the various types of LMS tools. Then, in a table, Moodle's various resources and activities will be assigned to their corresponding types of LMS mediatization tools.

This classification of mediatization tools draws inspiration from several references, including the 8 mediatized functions in a virtual learning environment [4], the digital educational media classification presented in the UNESCO MGIEP review report (Mochizuki & Bruillard, 2019) and the H5P content types classification of Monash University's Faculty of Arts (Wicaksono et al., 2021) [1].

On the basis of these classifications, the authors have categorized mediatization tools in terms of their function and use.

### 3.2 Types of LMS' mediatization tools

The LMS' resources and activities are learning objects which can be considered as mediatization tools because e-learning platforms include authoring tools that facilitate the development of materials for the course such as the H5P editor.

To classify LMS tools, the authors selected Moodle's resources and activities as mediatization tools given that it is the most widely used LMS for online learning in university contexts. The main purpose of Moodle's resources is to support learning through content delivery and information presentation. In contrast, Moodle's activities are learning activities, designed in accordance with the constructivist learning framework, promoting active learning by facilitating collaboration and interaction between students and teachers. The diverse resources and activities available on Moodle can be used to mediatize learning situations within the LMS [1].

A variety of resources and activities are supported by Moodle LMS:

#### Resources

Moodle offers 7 types of resources:

**Table 1.** Moodle's resources

| Moodle's resources  |                     |
|---------------------|---------------------|
| Page                | Text and media area |
| Folder              | URL                 |
| File                | Book                |
| IMS content package |                     |

#### Activities

Moodle provides 16 distinct activity types:

**Table 2.** Moodle's activities

| <b>Moodle's activities</b> |               |
|----------------------------|---------------|
| H5P                        | External tool |
| Database                   | Workshop      |
| Survey                     | Feedback      |
| Glossary                   | Wiki          |
| Quiz                       | Assignment    |
| Choice                     | SCORM package |
| Forum                      | Chat          |
| Lesson                     | BigBlueButton |

### LMS' Mediatization Tools Types

Taking into account the functions of LMS' resources and activities along with the 8 mediatized functions of learning environments, LMS' mediatization tools can be classified into 14 different types [1]:

- **Communication and Collaboration tools:** They allow students to collaborate, co-create content and share resources, as well as communicate and interact via audio or video-based conferencing tools.
- **Assessment tools:** Used to create tests, quizzes and assessments, in order to evaluate learners' knowledge, comprehension, performance and skills.
- **Information presentation and content delivery tools:** Designed to present and deliver information and textual content which can be accompanied by multimedia elements, added through a text editor.
- **Multimedia tools:** This type enables users to create interactive content that displays multimedia elements in visually engaging formats.
- **Data Visualization tools:** Designed to produce visual representations of data in diverse formats, including maps, charts, graphs.
- **Adaptive learning tools:** They allow each learner's experience to be tailored to their individual needs by providing individualized learning pathways.
- **Immersive learning tools:** These tools offer interactive and engaging learning experiences by immersing learners in virtual environments.
- **Game-based tools:** Used to create educational activities including aspects of game design, game elements like levels, challenges and scores.
- **Multifunctional interactive tools:** Designed to present information, deliver content, assess students and integrate various tools and interactive elements.
- **Interactive tools:** They offer engaging and interactive learning experiences for learners.
- **Information memorization tools:** They assist students in memorizing and reinforcing the concepts and information learned in a course.
- **Information retrieval and recalling tools:** These tools help students retrieving and recall information they have previously learned.

- **Study aid tools:** Materials used to support learners in studying more effectively. They aid in the organization of learning and the acquisition of knowledge.
- **Information revision tools:** They assist learners in reviewing previously learned information using active revision techniques.
- **Survey-type tools:** Design to make surveys that are used to collect data, responses opinions, and feedback from students.

Since the H5P activity incorporates more than 50 H5P content categories that are used to produce a variety of interactive learning materials, it can't be assigned to a specific type of LMS mediatization tool. The authors are not going to enumerate and classify them in this article.

Each LMS activity and resource corresponds to a particular category of these tools, although not all types are listed in the table.

### 3.3 Classification of Moodle's resources and activities by LMS mediatization tools

The following table presents a classification which affects Moodle's resources and activities to their corresponding types of LMS' mediatization tool:

**Table 3.** Classification of Moodle's Resources and Activities according to LMS Mediatization Tools Types

| <b>Content delivery and information presentation tools</b> | <b>Collaboration and communication tools</b> |
|------------------------------------------------------------|----------------------------------------------|
| Database                                                   | Forum                                        |
| Glossary                                                   | Chat                                         |
| IMS content package                                        | BigBlueButton                                |
| Lesson                                                     | <b>Collaboration tools</b>                   |
| Book                                                       | Workshop                                     |
| Folder                                                     | Wiki                                         |
| File                                                       | Database                                     |
| URL                                                        | Glossary                                     |
| Page                                                       | <b>Adaptative learning tools</b>             |
| Text and media area                                        | Lesson                                       |
| <b>Survey-type tools</b>                                   | <b>Information revision tools</b>            |
| Choice                                                     | Glossary                                     |
| Feedback                                                   | <b>Assessment tools</b>                      |
| Survey                                                     | Quiz                                         |
| <b>Multifunctional interactive tools</b>                   | Lesson                                       |
| SCORM package                                              | Assignment                                   |



|               |                            |
|---------------|----------------------------|
| External tool | Workshop (Peer assessment) |
|---------------|----------------------------|

*Justification of the table:*

Each Moodle resource and activity has unique functions and serves a specific purpose. Based on them, Moodle tools can be categorized into their corresponding types of mediatization tools.

For instance, the forum, chat, and BigBlueButton are grouped as collaboration and communication tools, facilitating synchronous and asynchronous interactions between learners and educators while offering diverse collaborative features.

Meanwhile, the workshop, wiki, database and glossary activities serve as collaboration tools, as they enable collective content creation and resource sharing between students [28].

Moreover, content delivery and information presentation tools include the IMS content package, lesson, book, folder, file, URL, page, and text and media area. The folder and file resources allow to share and manage course materials, and the URL provides direct access to external learning supports. The lesson, page and text and media area facilitate the presentation of textual and multimedia elements. The IMS content package delivers static content, incorporating various types of learning resources, while the book allows for an organized multi-page presentation. Additionally, database and glossary may be also affected to this type because they display structured information in diverse formats [29].

In contrast, the quiz and assignment are categorized as assessment tools, as they are designed to evaluate student performance and understanding through various question formats and graded tasks. The lesson activity may belong to this type, as a graded lesson includes various types of question pages. However, the workshop can also be used as peer assessment tool enabling students to review and evaluate their peers' work.

Choice, feedback, and survey are classified as survey-type tools, designed to gather student feedback. They are helpful in evaluating courses to enhance content for future use [1].

Besides, multifunctional interactive tools include the SCORM package and the external tool. In fact, SCORM packages deliver interactive e-learning content which can incorporate graded assessment activities. While external tools allow instructors to link external LTI-compliant learning materials to the course, integrating interactive activities and assessments.

Finally, the glossary can also serve as a revision tool, aiding students in reviewing definitions and preparing for evaluations. As well as that, the lesson is viewed as an adaptive learning tool because branched lessons allow instructors to create adaptive paths, guiding students to specific content pages depending on their responses.

## 4 Conclusion

E-learning has undergone various evolutionary phases and continues to evolve along with the rapid advancement of emerging technology. Therefore, opening insights for new mediatization practices, as numerous mediatization tools have been used over the

history of distance education, ranging from print technology and mass media, to different types of CAL systems, modern Web technologies and revolutionary technologies.

Distance teaching and learning impose significant constraints on instructional designers, particularly due to the spatio-temporal disruption of the process. Consequently, there arises the necessity to design and mediatize learning activities, alongside the mediatization of the online learning dispositif or system (Peraya & Peltier, 2020) [30]. Additionally, they have to select the most effective mediatization tool to mediatize these activities [31].

In this work, the authors presented a categorization of mediatization tools, distinguishing between digital materials and resources for learning, as well as tools for the development of learning environments and their resources. Moreover, a detailed classification of LMS' mediatization tools is presented, organized into 14 functional types. In addition, further research on the proper selection criteria for mediatization tools is suggested.

In conclusion, as each generation of distance education has leveraged various mediatization tools, understanding the impact of technological advances on the characteristics and mediatized functions of learning environments is crucial to enhance the effectiveness of future learning system's design and development.

## References

1. El Mrani, N. & Khaldi, M.: Fostering Pedagogical Innovation Through the Effective Choice of Mediatization Tools Based on TPACK Model and Technology Integration Frameworks. In Khaldi, M. (Ed.) *Fostering Pedagogical Innovation Through Effective Instructional Design*; pp. 262-286). IGI Global (2024). <https://doi.org/10.4018/979-8-3693-1206-3.ch012>
2. Peraya, D.: Médiatisation et médiation. Des médias éducatifs aux ENT. In V. Liquète (Ed.) *Médiations*, pp. 33–48. CNRS Éditions (2010).
3. Power, M.: Générations d'enseignement à distance, technologies éducatives et médiatisation de l'enseignement supérieur. *Journal of distance education* 17(2), 57-69 (2002).
4. Peraya, D.: La formation à distance: un dispositif de formation et de communication médiatisées. Une approche des processus de médiatisation et de médiation. *Calidoscópico* 4(3), 200-204 (2006).
5. Heydenrych, J. F., & Prinsloo, P.: Revisiting the five generations of distance education: Quo vadis? *Progressio* 32(1), 5-26 (2010).
6. Bates, T., & Glikman, V.: Une histoire des technologies et des médias dans la formation à distance. *Médiations Et médiatisations* (6), 12–34 (2021).
7. Aoki, K.: Generations of Distance Education: Technologies, Pedagogies, and Organizations. *Procedia - Social and Behavioral Sciences* 55, 1183-1187 (2012).
8. Bates, A. W.: *Teaching in a digital age: Guidelines for designing teaching and learning*. 2nd edn. Tony Bates Associates Ltd (2019).
9. Thomas, J.: *Audio for Distance Education and Open Learning: A Practical Guide for Planners and Producers*. Commonwealth of Learning; International Extension College, Vancouver, Canada (2001).
10. Bouchrika, I.: History of eLearning: Evolution from Stenography to Modern 2024 LMS Platforms, <https://research.com/education/history-of-elearning#3>, last accessed 2024/06/15.
11. De Bruyckere, P., Kirschner, P.A.: Computer-Assisted Learning. In: Tatnall, A. (eds) *Encyclopedia of Education and Information Technologies*. Springer, Cham (2020).

12. Wikipedia contributors: PLATO (computer system), [https://en.wikipedia.org/wiki/PLATO\\_\(computer\\_system\)#References](https://en.wikipedia.org/wiki/PLATO_(computer_system)#References), last accessed 2024/06/15.
13. Chow, Y.-H.: A Computer-Assisted Instruction Software Package for Computer Literacy: Design and Development. Master's thesis, Oklahoma State University (1988).
14. Maddox, J.: History of Ed. Technology, <https://www.sutori.com/en/story/history-of-ed-technology--ytqFiQtYAehdVYSHfm2VNDkv>, last accessed 2024/06/16.
15. A short history of the internet, <https://www.scienceandmediamuseum.org.uk/objects-and-stories/short-history-internet>, last accessed 2024/06/16.
16. Rosário, A. T. & Dias, J. C.: Learning Management Systems in Education: Research and Challenges. In: N. Geada & G. Jamil (Eds.) *Digital Active Methodologies for Educative Learning Management*, pp. 47-77. IGI Global (2022).
17. Weller, M.: 25 Years of Ed Tech. AU Press, Athabasca University (2020).
18. What Was the First LMS Platform? <https://www.franconnect.com/the-first-lms-platform/>, last accessed 2024/06/16.
19. Wikipedia contributors: Learning management system, [https://en.wikipedia.org/wiki/Learning\\_management\\_system](https://en.wikipedia.org/wiki/Learning_management_system), last accessed 2024/06/16.
20. Lewis Keegan: Complete History Of eLearning From 1924 - Present Day, [https://skillscouter.com/history-of-elearning/#1960\\_First\\_computer-based\\_training\\_session\\_is\\_introduced](https://skillscouter.com/history-of-elearning/#1960_First_computer-based_training_session_is_introduced), last accessed 2024/06/16.
21. Boneu, J. M., Plataformas abiertas de e-learning para el soporte de contenidos educativos abiertos, *RUSC. Universities and Knowledge Society Journal* 4(1) (2007).
22. Tarade, R. S., Khan, R. A. & Singh, N.: Applications of web 2.0 technologies. *International Journal of Engineering Science and Innovative Technology* 3(2) (2014).
23. Bezhovski, Z., & Poorani, S.: The Evolution of E-Learning and New Trends. *Information and Knowledge Management* 6(3) (2016).
24. A Brief History of the LMS, <https://elearningindustry.com/brief-lms-history>, last accessed 2024/06/16.
25. Ahmad Dar, S., Ahmad Shah, R., & Zada Rayees, P.: E-Learning: Evolution to Revolution. *International Journal of Emerging Technologies and Innovative Research* 6(5) (2019).
26. Acikgul Firat, E., & Firat, S.: Web 3.0 In Learning Environments: A Systematic Review. *Turkish Online Journal of Distance Education* 22(1), 148-169 (2020).
27. Peltier, C.: Entre nomadisme et interdisciplinarité: l'exploration sans frontières des dispositifs de communication et de formation médiatisées. Rencontre avec Daniel Peraya. In: C. Peltier (Ed.) *La médiatisation de la formation et de l'apprentissage. Mélanges offerts à Daniel Peraya*, p. 31-53. De Boeck, Bruxelles, Belgique (2014).
28. Activities - MoodleDocs, <https://docs.moodle.org/402/en/Activities>, last accessed 2024/06/18.
29. Resources - MoodleDocs, <https://docs.moodle.org/402/en/Resources>, last accessed 2024/06/18.
30. El Mrani, N., Khaldi, M.: Contribution of Pedagogical Scripting-Mediatization-Mediation to the Effectiveness of Online Learning System. *International Journal of Computer Trends and Technology* 71(6), 30-34 (2023). <https://doi.org/10.14445/22312803/IJCTT-V71I6P105>
31. El Mrani, N., Bakkali, I., & Khaldi, M.: How to choose the most performant LMS in terms of mediatization? Mediatization as an essential criterion for the choice of an e-learning platform. In: *Proceedings of the E-Learning and Smart Engineering Systems (ELSES 2023)*, pp. 128-135. Atlantis Press (2024). [https://doi.org/10.2991/978-94-6463-360-3\\_15](https://doi.org/10.2991/978-94-6463-360-3_15)

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

