LE STUDIUM
Loire Valley
Institute for Advanced Studies

LE STUDIUM Multidisciplinary Journal
ISSN 2669-7807

www.lestudium-ias.com

FELLOWSHIP FINAL REPORT

Learning ecologies based on content curation

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REPORT INFO

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Period of residence in region Centre-Val de Loire: September-December 2023

Keywords :
Education, ICT, Learning ecologies, Content curation

ABSTRACT

The accelerated digital development characterizing today's society multiplies and blurs educational contexts. In this regard, it becomes necessary to create learning spaces supported by ICT (Information and Communication Technology) that integrate formal and informal contexts, where each person decides what, how, and when to learn. From this perspective, the proposal is to create learning ecologies with learning resources based on a content curation process that retrieves, develops, and shares educational digital content according to the interests and informational needs of the professors. This study aims to analyze the learning resources that make up the learning ecologies available to professors at the University of Orléans. The presentation includes the theoretical foundations underpinning the research and its main results from the qualitative perspective of educational research.

1- Introduction

The United Nations Educational, Scientific and Cultural Organization (UNESCO) emphasizes how virtual environments have evolved education and the way students interact with teachers [1]. Furthermore, the United Nations through Sustainable Development Goal (SDG) 4 Quality Education, there is a highlighted need to implement innovative and suitable solutions to offer better education by leveraging different technologies [2].

On another front, the Open Education Movement initiated in the late 1990s also emphasizes the use of digital technologies for greater access to education, information, and knowledge through open learning resources. The aim is to create virtual teaching-learning spaces that enable autonomous learning and individual development in any temporal space.

Both perspectives underscore the importance of innovating with technologies in the educational field to ensure everyone possesses the necessary technical and professional competencies to access employment, decent work, and entrepreneurship. Higher education as a pathway to acquire relevant technical and professional competencies requires the use of technologies that adapt teaching to new forms of interaction. Generating virtual teaching-learning spaces as proposals for technological innovation provides opportunities for improvements in content assimilation levels and greater access to education. Hilli, Nørgård, and Aaen (2019) state, "the reconceptualizing learning spaces through the notion of hybridity to consider ways of creating new classroom experiences that cut across countries, courses, roles, contexts, as well as communication and media platforms" (p.68) [3].

However, education and the learning process take place in both formal and informal, school-based, or non-school-based contexts. It is relevant to create teaching-learning spaces supported by ICT (Information and Communication Technology) that integrate

T. Hernández Campillo, N. Pino, P. Bourdier, M. Schneewele. Learning ecologies based on content curation, *LE STUDIUM Multidisciplinary Journal,* **2023**, *7*, 88-98
https://doi.org/10.34846/le-studium.329.05.fr.11-2023

training contexts, where each person decides how and when to learn. From this perspective emerges the ecological theory of learning as a driving force for educational innovation that enables the creation of flexible, expanded, and diverse spaces favoring informal learning strategies. Likewise, it strengthens knowledge acquisition in a variety of environments beyond formal ones.

The term “learning ecologies” emerges in line with the concept of ecology used in the field of Biology, referring to the interactions among organisms and the environment surrounding them (Richerson, Mulder, & Vila, 1996) [4]. Building upon these ideas, Bronfenbrenner (1993) developed an ecological theory that explicates how the influence of different contexts affects the learning processes within individuals. Subsequently, with the integration of technology into various spaces where people develop, and the emergence of the Information Society, information ecologies arise as the relationships and interactions with technologies performed by individuals in their practices (Nardi & O’Day, 1999) [5]. The primary limitations of information ecologies stem from directing attention toward the corporate world rather than prioritizing learning as the primary focus of the activities.

The learning ecologies we know today emerged in response to the previous limitations found within information ecologies. The actual learning ecologies demonstrate a wide range of freedom, diffuse components, and involve autonomous learning within virtual communities, fostering acts of creation, development, and dissemination of knowledge. In this sense, Barron (2006) presents progress concerning previous conceptualizations and defines learning ecologies as “the set of contexts found in physical or virtual spaces that provide opportunities for learning. Each context is comprised of a unique configuration of activities, material resources, relationships, and the interactions that emerge from them” (p. 195) [6]. Furthermore, several studies specify that learning ecologies are those that foster free access to information and knowledge (Siemens, 2007; Grabowska, 2022) [7, 8], as well as the array of contexts and interactions that offer opportunities or resources for individual learning and development (Jackson & Barnett, 2020; Santos-Camaño, Vázquez-Cancelo, & Rodríguez-Machado, 2021) [9,10].

Despite the various ecological theories and current conceptualizations, this inquiry adopts Barron's criterion (2006). Her conception of ecology enables an understanding of learning with a global vision, integrating diverse contexts (formal and informal) converging within a virtual environment as a means of accessing knowledge. She explains that a learning ecology consists of contexts, activities, resources, personal relationships, and the interactions that arise within those relationships due to an individual's acquisition of learning. However, learning resources drive activities and experiences that the learner applies in their interactions and relationships within the socio-economic, institutional, and regulatory environment.

Vargas (2017) states that learning resources are means that intervene and facilitate the teaching-learning process, thereby reinforcing the teacher's performance and optimizing said process [11]. Concerning the technological dimension of learning ecologies, this research assumes learning resources as digital content (texts, images, audios, and videos) serving to generate knowledge in individuals and aligning with the learning objectives of a subject.

Given the significance of learning resources in learning ecologies, there is a recognized need for developing a content curation process for the production of such resources. Content curation in the realm of higher education is addressed by various authors, who describe it as an activity aimed at finding, gathering, and organizing digital content on a specific topic (Meneses-Chagas, Nunes-Linhares & Fontes-Mota, 2019; Godoi, Costa & Parron, 2022) [12,13]. According to Hernández-Campillo (2022), content curation in digital education is more than an activity; it is a process involving the retrieval, development, and dissemination of digital information aligned with the learning objectives, interests, and informational needs of

professors or students [14]. In this regard, it comprises three sub processes: retrieving digital content, developing educational digital content with added value, and sharing the created educational content. Each sub process outlines procedures and digital tools for its implementation.

Since the impetus behind the hybridization of higher education following COVID-19, MOOCs (Massive Open Online Courses) have evolved into a learning ecology distinct from other online instructional models. Due to their characteristics, they make education more accessible and promote autonomous learning. The intentionality of these massive courses determines their typology as cMOOCs (based on connectivism), xMOOCs (extensive and constructivism-based), or hMOOCs (hybrid models combining the best of cMOOCs and xMOOCs). Academic literature acknowledges that, in line with the extensive possibilities MOOCs offer for a broader, deeper, and more engaging education, they should be adopted in Higher Education (Barzman, Gerphagnon, & Mora, 2020; López-Calvo, 2021; Massou, 2022; Montes, 2019; Villiot-Leclercq, 2020) [15,16,17,18,19].

Creating MOOCs with curated learning resources could transform teaching and learning practices, both formal and informal. It could also support learning mechanisms among professors, enabling them to develop their learning strategies outside formal education and acquire the necessary skills for employment. Moreover, it would contribute to the professional development of educators through self-training and the enhancement of their professional skills, thereby enhancing the quality of the teaching-learning process.

In line with the theoretical foundations outlined in this section, the overarching aim of this study is to design a proposal for the curation of educational digital content in MOOCs as learning ecologies for professors at the University of Orléans, France.

2- Experimental details

This study utilized a qualitative methodology thoroughly comprehend how MOOCs were created and how learning resources were utilized within the University of Orléans setting. It utilized specific techniques, including focus group discussions and content analysis, to gather detailed and contextualized information on these processes. The focus group, as a qualitative research technique, enables the gathering of individuals sharing similar characteristics, experiences, or roles to discuss and explore a specific topic under the guidance of a moderator or facilitator. The aim in a focus group is to obtain detailed and rich information regarding participants' perceptions, opinions, attitudes, and experiences concerning a particular subject.

As an integral part of the data collection process for this research, we also conducted informal interviews. These unstructured conversations provided a conducive space to gain deep and contextualized perspectives on the subject in question. Through a flexible and open approach, informal interviews allowed for the exploration of diverse viewpoints, enriching the understanding of the studied phenomenon. The relaxed nature of these interactions facilitated an authentic and spontaneous exchange, leading to the revelation of significant aspects that might not have emerged in a more formal context. These interviews became an essential component in capturing the richness and complexity of the participants' experiences and opinions, thereby contributing to the deepening and contextualization of the findings in this research.

During the research, members of the Learning Lab Service at the University of Orléans participated in a conducted focus group session. This session focused on in-depth discussions and analysis of MOOC creation dynamics supported by the Celene platform, as well as identifying the learning resources used in these courses. Group moderators used open-ended questions to encourage discussion and the expression of opinions or experiences.

The Learning Lab is a support pedagogical service that plays a vital role in the university

and comprises a manager, seven instructional designer, one educational counselor, and five audiovisual production technicians. The primary mission of the service lies in providing pedagogical support to teachers and researchers at the institution. This support materializes through the design and development of virtual courses tailored to the professional needs of the teaching staff. The team's experience in creating virtual courses and their contribution to pedagogical training in the institution made them key informants for this study. An educational counselor supports the team by leading specialized training focused on teaching competencies.

On the other hand, content analysis constituted a technique to examine the virtual courses proposed by the Learning Lab to the university professors. The aim of this technique was understand the structure, content, pedagogical approaches, and effectiveness of these courses. These are the determined procedures for content analysis:

-Selection of analysis aspects: It focused on the course structure, content quality, enrollment quantity, and evaluation methods.

-Identification of categories and units of analysis: Due to the interest of the research, the learning resources of the course were analyzed, such as videos, texts, images and activities, as well as analyzing pedagogical strategies.

-Coding and analysis: Examination of the content of learning resources, study materials for exercises, and the interaction of enrolled individuals with those resources.

-Classification and categorization: Grouping encoded information into broader categories or thematic patterns, determining the learning resources most used for creating virtual courses and professors' access to these resources.

-Interpretation of results: Identification of significant patterns, strengths, and weaknesses in the courses that enabled making inferences for the research.

Before conducting the observations for the content analysis, we obtained explicit consent from the instructional designers responsible for creating the virtual courses. This ethical and fundamental process involved clear and transparent communication regarding the purpose of studying the learning resources available in the courses. The instructional designers provided their consent via email, fully understanding the nature of the research and the importance of their participation. We ensured the confidentiality of information and respected internal institution policies regarding restitution and valorization in research. The main results were shared with the participants for subsequent discussion in specialized conferences or for potential publication in scientific journals involving both the participants and the research team.

The Design-Based Research (DBR) was the method used for designing the proposal for curating educational digital content in MOOCs as learning ecologies. The researchers chose this method for its innovative approach in creating learning environments and for utilizing technology to address complex challenges in the educational field. In this research, the purpose of DBR differs from other research approaches in its practical focus and emphasis on the continuous iteration of design and the necessity for implementation.

It is crucial to highlight that we designed the presented proposal with a flexible approach, acknowledging the necessity for adaptation and adjustment according to individual needs and considerations. We conceived it as an open suggestion, granting recipients the freedom and autonomy to evaluate it based on their own criteria, contexts, and limitations. We emphasize the voluntary nature of accepting or rejecting the proposal, devoid of any impositions or associated obligations. This flexibility is intended to foster an open and constructive dialogue, promoting collaboration on mutually beneficial terms and allowing for the adaptation of the proposal to meet the specific needs of those considering its implementation.

3- Results and discussion

Focus Group with instructional designers on the creation of MOOCs for teacher professional development.

Regarding the topics and objectives for creating MOOCs, the participants expressed the need to develop courses with innovative and relevant content to contribute to the professional development of University of Orléans teachers. The considerations of instructional designers address the importance of proposing emerging topics on digital technologies and their applicability in teaching and research.

Another topic addressed was the technological didactic design of the courses. The participants consider a solid and adaptable design for creating MOOCs vital for active and participatory learning. A design with a flexible structure allows adaptation to different learning styles. However, they did not confirm the existence of a model for technological didactic design that guides the creation of virtual courses. Designing any educational action in distance learning necessarily requires outlining the training project with a methodology that guides decision-making for each element of the course.

The use of technological tools was also a matter of discussion. Participants discussed the importance of continuous training for teachers in the effective use of technological tools for creating virtual courses related to the subjects they teach. There is a virtual course for training teachers in the creation of virtual courses using the Celene platform. Additionally, participants highlighted the use of intuitive and easily accessible tools for teachers.

The participants identified challenges in creating virtual courses such as time constraints, developing multimedia content tailored to teachers' needs, and achieving greater interactivity. We suggest emphasizing interactivity more in this regard. For example, they could conceive more collaborative activities that encourage interaction with other professionals. Interactivity in the online training environment occurs not only with materials but can also involve interaction between the teacher and the course creator, as well as interaction among teachers and students. The technological didactic design of the course should anticipate all of these interactions.

Evaluation was also a topic of debate. There was a discussion about the most suitable instruments to assess and provide feedback related to the fulfillment of massive virtual courses. Participants acknowledged the need to evaluate the course's development and to document its process, strengths, weaknesses, and areas for improvement. However, the feedback instruments that participants use to identify difficulties, learning resources, activities that have worked better or worse, adjust the schedule for the next edition, detected needs, and proposals for improvement are imperceptible. According to the authors, the introduction of self-assessment rubrics in virtual courses would be a useful and innovative tool. Self-assessment rubrics provide a status of individuals' training in a competence, in a field of knowledge, or in a profession.

Interdisciplinary collaboration between instructional designers, pedagogical referents, and teacher-researchers was another topic of discussion. Participants emphasized the importance of this collaboration between content experts, pedagogues, and technology professionals to enhance the quality of MOOCs. Regular meetings at the Learning Lab facilities foster more innovative, flexible, and pedagogically sound MOOCs.

The focus group's outcomes highlighted the need for innovative, flexible, and pedagogically sound MOOCs. Participants identified significant challenges regarding resources and evaluation, along with recommendations focusing on interdisciplinary collaboration and professional development to enhance the quality and effectiveness of massive online courses.

They also recognized the institutional support provided by the University of Orléans. The university offers resources for creating quality content in MOOCs, including instructional technology devices, recording studios equipped with high-quality audio and video technology, multimedia design laboratories, and specialized

technical staff to support the production and editing of educational materials.

Content Analysis of Virtual Courses Created for Teachers: Utilized Learning Resources

Given the significance of learning resources within learning ecologies, a content analysis conducted to identify didactic materials for teachers' professional development. Applying this research technique allowed for an understanding that learning resources were digital contents explicitly designed for use in teacher training contexts, supporting teaching activities or pedagogical management. It is also noted that a substantial portion of these resources originate from external sites like YouTube, which can sometimes lead to dispersion in the learning objectives.

Among the functions fulfilled by the learning resources in the virtual courses created by the Learning Lab are motivation, stimulation, and the sustained interest of the teacher, provision of information, guidance in their training, assessment of knowledge and skills, as well as providing simulations that offer environments for experimentation.

Regarding the types of resources used in virtual courses, the authors of this research observed that audiovisual resources, particularly educational videos, were the most commonly used in the analyzed virtual courses, representing 60% of the didactic material. The remaining resources consist of reading materials in PDF format or online documents, animations, online presentations, and infographics. Considering this, we could suggest including other resources like podcasts, as they allow for emphasizing and personalizing the training.

Furthermore, the integration of illustrations may benefit the course's target audience. Illustrations encompass various resources, such as graphics, photographs, and drawings. These are advisable whenever they help reinforce concepts or supplement content. Additionally, they serve as a valuable resource for creating mind and concept maps for a topic or providing complementary or visual information.

Another aspect observed in the content analysis was the use of resources encompassing a variety of hypertext, hypermedia, and multimedia. Academic literature on distance education and online learning recognizes that constructing materials with hypertexts will help address staticky, one of the most common errors in training environment configurations. In this regard, the advantages of hyperlinks and branching paths stand out, but it is advisable not to have more than three links in each information node. Excessive hypertext, hypermedia, and multimedia can lead to disorientation for the teacher and cause cognitive overload.

The analyzed virtual courses primarily feature audiovisual resources and reading materials, which are highly appreciated for their clarity and usefulness. However, many of these resources originate from external sources and some lack a pedagogical or formative character. While experts in a disciplinary field have created these resources, perhaps they did not consider the pedagogical processes involved in online learning. In this sense, instructional designers could review, expand or rework the learning resources to adapt them to the different learning styles and rhythms of teachers. We propose the implementation of a content curation process to facilitate the creation of learning resources better tailored to the formative needs of the University of Orléans teachers.

Proposal for a Content Curation Process for Creating Learning Resources in Learning Ecologies

The curation of educational digital content stands out as an integration process that enables the search, selection, creation, and sharing of digital content on a specific subject to facilitate the learning process of the individual being trained. We believe that engaging with diverse digital content can enhance the teacher's disciplinary expertise in their field of knowledge and lead to pedagogical and didactic reflections that foster their education on a specific topic or conceptual aspect.

To develop a content curation process, generic competencies relevant to any profession are necessary, such as informational and digital competencies, considered key skills in today's society. The authors conceptualize content curation as a cyclical system that can sustain for an indefinite or specific period, where each stage represents a higher level of understanding. They design the process considering the characteristics of learning ecologies, aiming to promote teacher self-training through physical or virtual contexts. The sub-processes of educational digital content curation are as follows, each representing a higher level in knowledge management.

Subprocess 1: Retrieval of Digital Content

This integrates the search and selection of relevant and updated information using available digital tools for retrieving digital information on a specific subject of the course. The instructional designer identifies the topic to curate and devises a search strategy enabling the retrieval of relevant and updated digital information from various informational sources. Essential elements within the strategy include defining keywords, both in Spanish and English, related to the search topic for accessing more information, and creating search equations using logical or Boolean operators when necessary. The digital tools utilized consist of specialized education databases, academic search engines, web alert services, educational video sites, as well as websites for image downloads.

Subsequently, instructional designer able chosen digital contents using specific digital tools stored and tagged in the designated devices established by the employed digital tools. Selection criteria may include educational relevance, alignment with course objectives, scientific novelty, currency, and format.

Tasks involved in Subprocess 1:

-Designing strategies for appropriate digital information search aligned with the defined course objectives.

-Utilizing available digital tools and options for sourcing digital content (texts, images, and videos) while considering the devised strategy.

-Selecting the most relevant digital content based on previously defined selection criteria.

-Employing available digital tools for storing and organizing the chosen digital content, incorporating labeling for efficient retrieval.

Subprocess 2: Develops educational digital content with added value.

This involves giving meaning to retrieved content from a personal standpoint to meet the informational needs of educators. It relies on the instructional designer's creativity to offer filtered, organized content with added assessments and present it in an engaging manner to educators undergoing the course. It requires characterization techniques demonstrating depth in handling information.

The objective of this subprocess is to create educational digital content, derived from retrieved content, tailored to match the course objectives and information needs. Among the digital content that can create are digital or online lessons, textual materials, audios, videos, infographics, newsletters with annotated links, and thematic boards (a space that consolidates text, audio, videos, and images from various digital sources). The authors considered necessary to integrate the bibliography using to elaborate this digital content into of the structure of the course.

Similar to the previous subprocess, employing specialized software applications and online services for digital content creation is pertinent for developing new content, along with digital tools for lesson preparation.

Tasks involved in Subprocess 2:

-Reworking retrieved content coherently and systematically, employing content curation techniques such as extracting, commenting, citing, and appraising.

-Introducing personal assessments that enrich the reworked content.

-Presenting the developed content in diverse formats, considering content curation techniques.

-Using web services and specialized software applications for creating digital content.

Subprocess 3: Sharing the created educational content.

This deals with publishing curated educational content in virtual learning environments, professional social networks, and through online content curation services. Other dissemination channels may include email, instant messaging services, and digital clouds. The authors believe that this subprocess is well known and developed by instructional designers. The novelty in this subprocess lies in promoting feedback through interaction with educators to determine if the curated content is suitable for their professional development and meets their educational needs.

Required tasks:

-Publish the created content in virtual learning environments, social networks, academic networks, and other digital dissemination spaces, considering various options based on the technological availability of educators for access.

-Request feedback on the created educational content through the functionalities of the tools used for its dissemination.

-Select the most suitable interaction mechanisms to gather student evaluations on the created educational content.

-Utilize metrics to assess the impact of the created educational content on students and other educators.

-Analyze the strengths and weaknesses identified in creating and disseminating the educational content.

-Establish new goals to enhance the created and disseminated content.

4- Conclusion

This study underscores the fundamental relevance of content curation in current learning ecosystems. The appropriate search, selection, creation, and adequate dissemination of educational resources directly influence the quality and effectiveness of teachers' professional development. Effective learning ecosystems should integrate a wide range of resources, from traditional materials to multimedia content, to adapt to different learning styles and student needs.

Within this context, a new role emerges for instructional designers as content curators, filtering, evaluating, and contextualizing information to foster a more adaptable educational environment. It is highlighted the fundamental role of technology as a facilitator in content curation. Technological tools and platforms enable efficient organization and the creation of diverse educational resources.

The study emphasizes the significance of the Learning Lab Service at the University of Orléans, particularly the active participation of instructional designers in ecosystem creation. The interaction between service members, educational researchers, and pedagogical references significantly contributes to teachers' professional development, particularly in guiding the necessary training for educators.

Key directions identified include the continual updating of content, the development of increasingly tailored virtual courses to meet educators' formative needs, and greater teacher involvement in virtual courses. These areas represent opportunities for enhancing learning ecosystems.

The research highlighted the importance of providing a variety of learning resources to accommodate different teaching styles and paces of learning. Flexibility in content presentation is crucial for optimizing the learning experience, spanning from visual materials to interactive readings,

The results underscore the importance of assessment strategies and feedback in virtual environments. There is an opportunity for continuous innovation in the selection and

presentation of educational resources in virtual courses. The ongoing search for new tools and approaches, along with regular resource updates, are key elements in maintaining the relevance and effectiveness of courses as learning ecosystems.

5- Perspectives of future collaborations with the host laboratory

These collaboration perspectives represent opportunities to advance in the understanding and enhancement of learning ecologies in MOOC environments, integrating content curation as a key component to optimize the online educational experience. The proposed thematic lines correspond to the scientific orientations established by the hosting laboratory for the period 2022-2025 (available at https://www.univ-orleans.fr/fr/ercae/le-laboratoire/thematiques-de-recherche).

1. Foster teaching and learning by integrating formal and informal contexts in virtual spaces. (Poles 3 and 4)

2. Contribute to training teachers, senior education advisors, and trainers in digital teaching skills such as creating learning resources and educational content. (Pole 1)

3. Promote interactions between educational contexts and training from the classroom or school to the social environment through pedagogical innovation. (Poles 2 and 3)

4. Provide mechanisms and teaching methods for teachers in their subjects. (Poles 1 and 2)

5. Develop educational innovation through research and international cooperation.

6- Articles published in the framework of the fellowship

Hernández-Campillo, T.R. (2023) Information Literacy on Cuban pedagogical careers. Information, culture and society, 49, 13-37. doi:10.34096/ics.i49.12665

7- Acknowledgements

I would like to express my gratitude to all individuals and institutions that significantly contributed to the development and completion of this study.

LE STUDIUM: for their invaluable support and dedication to research and scientific advancement, especially to Dr. Aurélien Montagu for providing the conducive environment for conducting this research.

Dr. Natalia Pino: for her expert guidance, dedication, and unwavering support throughout the research process. Her deep knowledge in the field and invaluable perspectives illuminated the path, enabling us to navigate obstacles and challenges with confidence. Throughout this intellectual journey, she demonstrated unparalleled generosity in sharing her experience, providing expert guidance, and fostering my academic and professional growth.

ÉRCAÉ: for their interest in the research and for facilitating the dissemination of the research, especially to Dr. Philippe Bourdier, the laboratory director, and Professor researcher Dr. Manuel Schneewele for their dedication, collaboration, and commitment during all stages of this research. Their contributions of knowledge, effort, and valuable perspectives enriched the work.

The Learning Lab Service at the University of Orléans: for their constructive feedback and valuable contributions that helped strengthen and enrich the content of this report. To the instructional designers, especially Julie Molard, who voluntarily participated in interviews, focus groups, or facilitated access to crucial data and resources for the research. Their time and contributions were fundamental to the quality of this study.

The completion of this study would not have been possible without the commitment and collaboration of all those who generously offered their time, knowledge, and support. Their contributions have been instrumental in the success of this project.

8- References

1] UNESCO 2017. Accessible Virtual Learning Environment. https://catedraunescoinclusion.org/entornos/evaac/

[2] ONU (2015). Quality Education https://www.un.org/sustainabledevelopment/es/education/

[3]. Hilli, C., Nørgård, R. T., y Aaen, J. H. (2019). Designing hybrid learning spaces in higher education. *Dansk Universitetspædagogisk Tidsskrift, 14*(27), 66-82. https://doi.org/10.7146/dut.v14i27.112644

[4] Nardi, B. y O'Day, V. (1999). Information ecologies: using technology with heart. Chapter four: information ecologies. *First Monday, 4*(5). https://doi.org/10.5210/fm.v4i5.672

[5] Richerson, P. J., Mulder, M. B., y Vila, B. (1996). *Principles of human ecology.* https://spada.uns.ac.id/pluginfile.php/148295/mod_resource/content/1/Principles%20of%20Human%20ecology.pdf

[6] Barron, B. (2006). Interest and self-sustained learning as catalysts of development: A learning ecology perspective. *Human development, 49*(4), 193-224. https://doi.org/10.1159/000094368

[7] Siemens, G. (2007). Connectivism: Creating a Learning Ecology in Distributed Environments. En T. Hug (Ed.), *Didactics of Microlearning: Concepts, Discourses and Examples* (pp. 53–68). Germany: Waxmann.

[8] Grabowska, M. (2022). L'articulation des situations d'apprentissage formel et informel des langues étrangères au niveau universitaire dans une écologie hétéroglotte. Exemple des étudiants de philologie française en Pologne. *Recherches en didactique des langues et des cultures*, 1-20. https://doi.org/10.4000/rdlc.11600

[9] Santos-Camaño, F. J., Vázquez-Cancelo, M. J., y Rodríguez-Machado, E. R. (2021). Digital technologies and learning ecologies: challenges and opportunities. *Educatio Siglo XXI, 39*(2), 19-40. https://doi.org/10.6018/educatio.466091

[10] Jackson, N., y Barnett, R. (2020). Introduction: Steps to ecologies for learning and practice. En N. Jackson & R. Barnett (Eds.), *Ecologies for Learning and Practice*, (pp. 25-46). Londres: Routledge.

[11] Vargas Murillo, G. (2017). Didactic educational resources in the teaching-learning process. *Cuadernos Hospital de Clínicas, 58*(1), 68-74. http://www.scielo.org.bo/pdf/chc/v58n1/v58n1_a11.pdf

[12] Meneses-Chagas, A., Nunes-Linhares, R. y Fontes-Mota, M. (2019). A curadoria de conteúdo digital enquanto proposta metodológica e multirreferencial. *Revista Ibérica de Sistemas e Tecnologias de Informação*, (33), 32-47. doi: 10.17013/risti.33.32–47

[13] de Godoi, K.A., Costa, A.P. y Parron, N. (2022). Análise qualitativa de modelos de curadoria de conteúdo digital: Possibilidades para o uso em CAQDAS. *Investigação Qualitativa em Educação: Avanços e Desafios*, 12, 1-9. doi: 10.36367/ntqr.12.2022.e630

[14] Hernández-Campillo, T.R. (2022). *Curation of educational digital content* (Doctoral dissertation). Ignacio Agramonte Loynaz University of Camagüey, Cuba.

[15] Barzman, M., Gerphagnon, M., & Mora, O. (2020). *La transition numérique dans la recherche et l'enseignement supérieur à l'horizon 2040.* France: Quae. https://library.oapen.org/bitstream/handle/20.500.12657/39954/9782759231539.pdf?sequence=1&isAllowed=y

[16] López-Calvo, S. (2021). *Learning Ecologies of University Teachers in the Social Sciences and Law Branch* (Doctoral dissertation). https://ruc.udc.es/dspace/handle/2183/29304

[17] Massou, L. (2022). Mutualisation des ressources pédagogiques numériques pour l'hybridation: vers l'éducation ouverte? Distances et médiations des savoirs. *Distance and Mediation of Knowledge, 38*(38).

https://doi.org/10.4000/dms.7997
https://journals.openedition.org/dms/5203

[18] Montes-Rodríguez, R. (2019). *Learning Ecologies in MOOC Courses: Expanded Education in Multiple Training Contexts* (Doctoral dissertation). https://digibug.ugr.es/handle/10481/57303

[19] Villiot-Leclercq, E. (2020). L'ingénierie pédagogique au temps de la Covid-19. Distances et médiations des savoirs. *Distance and Mediation of Knowledge*, (30). https://doi.org/10.4000/dms.5203