

Open Education Pedagogies: Toward Ecosystem-based Theoretical Model of Learning and Communication in Educational Management

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Abstract: *This paper aims to describe the conceptual framework of developing an ecosystem-based theoretical model of learning and communication in educational management affordable in a diversity of learning environments. It is founded on the interconnection of three topics in a global ecosystem of learning and communication, named the lifelong learner, open educational resources (OER), and the metaverse. A learning unit that "connects" biotic and abiotic components in a comprehensive whole is planned, developed, and supported by the investigation using the metasystems learning design theory as its conceptual framework. The usefulness of deep learning is increased by metacognitive knowledge and experience. Hypothetical, by metacognitive experience the student(s) may be better at acting as an important stimulus, either real or virtual, and differentiating important from non-important concepts if they will be able to link ideas across multiple degrees of complexity. The results showed that learning design with metacognitive tasks cannot be achieved without cognitive and affective tasks. Metacognitive experience and active stimulus helped the students to acquire new knowledge and practical skills and reduce misconceptions in a diversity of learning environments. To increase the efficiency of the ecosystem model it is recommended to increase the number of metacognitive tasks.*

Keywords: ecosystems, Metaverse, knowledge ecology, learning, educational management, responsibility.

1. Introduction

Open pedagogy, also known as open educational practice, open education pedagogies is a term that aims to describe the use of open educational resources (OER) to support teaching, learning, and assessment, including self-directed learning and/ or autodidacticism. There are five educational methods, according to

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Relieve (2022), which are constructivist, inquiry-based, reflective, collaborative, and integrative. The problem is that open pedagogy and its practical applications cannot neglect the evolution of Internet technologies. Combining the prefix "meta," which denotes transcendence, with the word 'universe', which refers to a parallel or virtual environment connected to the real world, creates the novel concept of 'Metaverse'.

According to Fernández and Camargo (2022), a society that values human progress in learning and communication should be developed, and the ecological teacher training program should be seen as its fundamental component. We are currently in the third Internet technology wave, known as the Metaverse (Collins, 2008; Tlili et al, 2022; Inceoglu & Ciloglulil, 2022). According to Tlili et al (2022), with Facebook's statement that it was rebranding and promoting itself as Meta, Metaverse saw a surge of interest. To the best of our knowledge, no study has specifically focused on ecosystems models of learning and communication in educational management, even though many studies have conducted literature reviews to summarize the findings related to the Metaverse, in general, and systematically summarizing the findings related to the Metaverse in education, in particular.

In a metaverse, managing education entails much more than just having organizational management or leadership skills. First, since both the educational institution and the student (s) operate inside an open system, maintenance of the self-directed learning capacity is more important than learning in a formal education system. Second, the development of green skills is crucial for the development of the green industry and green jobs, which can be considered a new mission of global learning. The phrase "green skills" refers to a sustainable environment and sustainable growth of human societies, which requires the active engagement of all students in understanding how to evaluate their knowledge (e.g. metacognitive knowledge and experience). Therefore, planning, developing, and maintenance of green skills for self-regulated learning capacity in a diversity of learning environments is crucial to foster students' interest and motivation to learn.

The pedagogy of green skills relies on ecosystem-based theoretical models of learning and communication. These models are a group of models dealing with human-computer and computer-computer interactions, taking into account the impact of external factors and stimuli on the human mind, decisions, and behavior. The ecosystems' approach emphasizes awareness of the global interrelationships between human and non-human elements, including communication with agents begged by artificial intelligence elements. In our opinion, in the Era of openness and, therefore, of open educational pedagogies, educational management theory needs a novel approach based on ecosystem models of learning and communication.

To cover the gap between open pedagogy, specific features of the Metaverse, and ecosystem-based models of learning and communication, this article conducts an online survey of the significance of learning and communication ecosystems in

educational management. The questions of the survey are extracted from scientific databases to reveal the research trends, focus, and limitations of this research topic, and the answers are obtained from educational managers, who attended the teacher-training course. The obtained results highlight the study gap between open pedagogy's affordability and the characteristics of learning and communication ecosystem models in educational management, administration, and leadership, taking into consideration the variety of learning contexts.

In search of a different approach to educational management, this study seeks to understand how educational managers in schools feel about the practical application of ecosystem-based theoretical models of learning and communication in educational management. Using this novel approach, the article aims to answer two research questions:

- 1) How significant are traditional ecosystems notions in a cutting-edge management approach for education? (from the perspective of educational managers)?
- 2) How useful is the ecosystem model of learning and communication for educational management?

This article discusses the possibility of transformation in the global education pedagogy and educational management brought about by open education pedagogies. The world has changed so much in the last few decades that the role of pedagogy and educational management has also changed. We need to think about how to improve pedagogy and educational management, and how we can help our students to be more adaptive and accommodative to the diversification of learning environments. There is so much for learning designers to do because the scientific principles of pedagogy and educational management established more than one hundred years ago cannot be aligned to open education pedagogies of recent global education. In sum, the results of this study present a roadmap for future research that should be considered to improve ecosystem-based models of communication and learning in educational management around the globe as well as to improve metacognitive knowledge and experience in the Metaverse.

1.1. Educational management and leadership

Educational management is a field of research and practice that focuses on how educational institutions are administered, according to Bush (2006, p. 1). The decision-making process for achieving the objectives of the educational organization is the basis of educational management. However, factors from outside the school environment have an impact on students' perceptions of learning objectives and educational outcomes as well as learning and communication in both the physical world and the Metaverse. These factors have a significant impact on the goal and mission of educational organizations, as well as on the learning and communication strategies of learners.

The problem is that while educational management was established as an area of study in the previous century using scientific management concepts, over time its theorists and practitioners started to develop models based on experience in schools and colleges. Due to the lack of a single, all-encompassing theory, there are several models of educational management, administration, and leadership. However, most of them are knowledge ecology-focused. The concept of knowledge ecology, known also as the ecology of knowledge, refers to gaining meaning and value from fruitful conversations: art and science. The knowledge ecosystem is more related to a knowledge management strategy that tries to encourage the dynamic evolution of knowledge interactions between entities to enhance critical thinking, creativity, and decision-making through better evolutionary networks of cooperation and collaboration.

This is a contradiction with the role of pedagogy and educational management in an education Metaverse. As was noted by Zhai et al. (2022), technology support, business interaction, and rule design make up the bulk of the education metaverse's scope. The foundation of the entire framework is the business interaction, and interaction is the basis for developing both the technology and the regulations. Through digital mapping, which configures the real subject's physical, cultural, psychological, and spiritual existence, teachers and students in the metaverse gain virtual identities, creating a mirror incarnation in the educational metaverse.

Educational management is frequently seen as being mostly related to practical undertakings and the experience of educational managers and leaders. What is the role of educational leadership? Connolly, James, and Fertig (2019) acknowledged that although educational management and educational leadership are crucial concepts for comprehending organizing in educational institutions, there is still disagreement about what they mean, how they differ, and how valuable they are for educational organizing and learning. In their opinion, there are conceptual discrepancies between educational management and educational leadership, and these inconsistencies could be eliminated by responsibility as a state of mind of a leader in education.

In our opinion, responsibility is not only about the identification of one of the best leadership models (i.e. distributed leadership, data-based leadership, effective leadership, normative, etc.) or/and leadership styles (i.e. contingent, participative, managerial, moral, transformational, and instructional) in educational settings, but also about the identification of the best model for learning and communication in a diversity of learning environments. Therefore, an ecosystem model of learning and communication could be the most affordable model in educational management.

1.2. The impact of ecosystem models on educational management

In the global context of data-driven educational management, organization, and leadership, priority is given to knowledge ecology and ecosystems of learning

and communication. However, the ecosystem approach in teaching, according to Cook (1970), entails gathering and coordinating information before presenting it in the context of a comprehensive system. Abiotic variables and biotic community composition should be discussed in the ecosystem structure courses. Furthermore, the ecological processes should be the main focus of the courses covering the role of ecosystems. Therefore, the ecosystem approach places a strong emphasis on highlighting the total interdependence among several systems, elements, and environments.

The term ‘learning and communication ecosystem comes together with digital technologies, open educational resources, and open pedagogy. According to Lane et al. (2021), the learning ecosystem is a fully open ecosystem that can reach learners where they are. This means that technology-enhanced learning contexts and the open landscape of the digital environment impact learning and communication. Increasingly, learning and communication take place in open and networked learning environments, which are characterized by rising complexity, dramatic changes, and unexpected impact on the mind and behavior.

One of the recent investigations of publications related to ecosystem models of learning and communication showed three tendencies: first, the predominance of the ecosystem approach in research regarding teacher professional development; second, there is more research available aims to reveal the ecosystem functions on individual style and, third, the studies focused on ecological teacher training program within the diversity of contexts, systems, and environments and, third, the ecosystem-based training methodologies for the development of in-service teachers' competencies.

Among papers dealing with issues of in-service teacher professional development, we found interesting ideas about the urgent need to provide training based on an ecosystem approach aligned with best practices and with teachers' and schools' needs in a global society. From this perspective “*an ecosystem approach operates under the coordination of a governance model, features a central hub, and conceptualizes the relationships of the organizations as a network. Ecosystems are underpinned by value co-creation, and shared logic and can be non-geographical*” (Falkner, Vivian & Williams, 2018). The core of the ecosystem is anticipated to be the network of lifelong learners learning and communicating in a diversity of physical and virtual environments.

The ecosystem functions in a teacher training program are complex, multidimensional, and dynamic. However, in many respects, the driving forces of stimulus and students' responses are not well understood. In theory, ecological functions deal with bioenergetics processes, the flow of energy, and the cycling of elements. The existence of the ecosystem itself depends upon the phenomenon of the conversion of energy. In learning design, the ecological functions deal with the electrical energy of a knowledge management system, which keeps the functionality of the system. In the ideal situation, the system's functionality depends on the *energy flows* (i.e. catalyzed by various stimulus-response actions,

learning, and communication activities), *the cycling interactions between matter, information, and energy* (i.e. materialized in a student's portfolio), *competition* and *self-development* of metacognitive knowledge and metacognitive experience.

2. Method of research

The purpose of the study was to find out how educational managers and in-service teachers perceived the cost-effectiveness of ecosystem-based models of learning and communication in their activities and classrooms. An online survey is used as the research methodology. The survey was completed by teachers taking part in a formative program at our university. The number of respondents who responded to the online survey is equal to 61. Thus, the research was done by educational managers and in-service teachers from public pre-university schools.

2.1. The affordability of ecosphere in educational management

Lamont Cole described the ecosphere as a closed ecological system of a planet in which various types of matter and energy are continuously interacting (fig. 1). Do you believe that this idea is significant for school management?

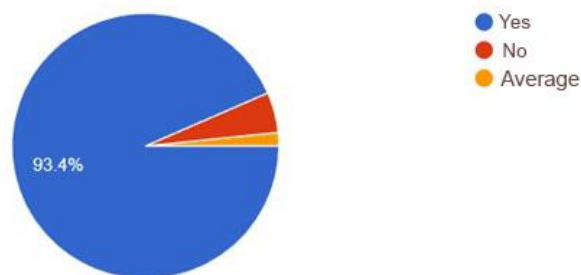


Figure 1. The importance of the ecosphere in school management

During the second question, respondents had to identify the interdependence between the ecosphere and the ecosystem of learning and communication. It was observed that educational managers and in-service teachers are interested in the topic of ecosystem-based models of learning and communication in educational management and their practical applications in daily activities.

2.2. The scope of the ecosystem from the viewpoint of in-service teachers

According to Artur Tansley's definition from 1935, an ecosystem is a unit of functioning and organization of the ecosphere made up of a biotope, which is an ever-present living environment made up of substances, factors, and relationships between those factors, and a biocenosis, which is a supra-individual level of

organization of living matter and describes all living organisms collectively (fig. 2). Do you consider the school to be an ecosystem?

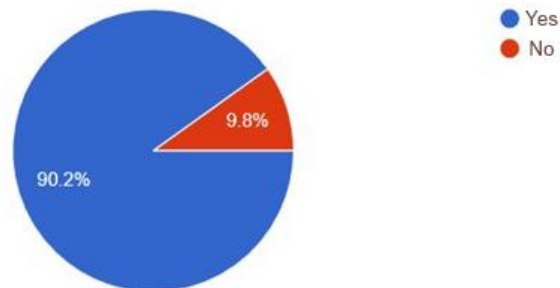


Figure 2. The school is an ecosystem

The school as an ecosystem of learning and communication means the focus on language literacy in a diversity of learning environments. However, the ecosystem relies on a group of living things that interact with one another and their physical and digital surroundings. It has significant ramifications for how we arrange schools and behave in them if we think of them as ecosystems of learning and communication. Interdependence is a cornerstone of any ecosystem. This implies that events in one area of the system have an impact on other sections of the system.

2.3. The scope of learning and communication ecosystem

The learning and communication ecosystem is made up of people, content, technology, learning culture, strategy, data, and dynamic processes (fig. 3). Do you agree with this idea?

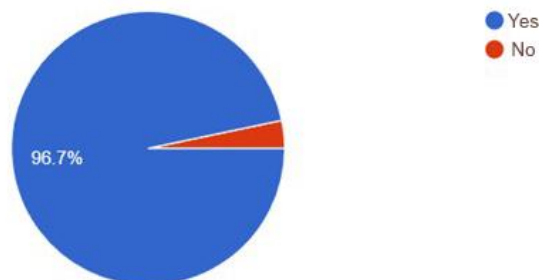


Figure 3. The complexity and dynamicity in a learning and communication ecosystem

This result relies on the second principle of the ecosystem. Another fundamental idea is that learning and communication ecosystems are designed to develop and adapt to global dimensions. As a result, when adjustments are made, such as when university ideals are destroyed, there might be highly negative results. The patterns of how people gain competencies and other results, as well as knowledge, skills, and capacities, are all affected. Professional competencies of

certain categories of learners may eventually lead to acting in an unanticipated way in the future that might be dangerous for educational sustainability.

2.4. The importance of humanization the educational management

Many academics stressed the value of humanizing educational management (Trkman & Cerne, 2022; Chappell et al., 2016). If we consider a school to be an ecosystem, we understand that we need to be concerned with every part of the institution and its management. Regardless of whether a component is visible or not, the school as a whole is the result of all of its interactions and interdependencies. Additionally, educational management is a derivative of the much larger ecosystem that is as much determined by its worst schools as by its greatest. The following is our query regarding this concept:

The most important role in the ecosystem of learning and communication belongs to people (fig. 4). Do you agree with this idea?

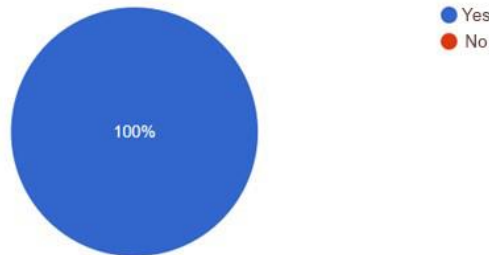


Figure 4. The importance of humanization the educational management

2.5. The affordability of learning and communication ecosystem in educational management

In sum, the learning and communication ecosystem in the post-COVID period is affordable in educational management and leadership. For instance, Arar et al. (2022) noted altered leadership and instructional approaches at their institutions in the post-COVID period. Chandler et al. (2022) report on the variability and dynamics of ecosystems. The query we're putting to our responders is, as follows: Is the learning and communication ecosystem model helpful for managing education? (fig. 5).

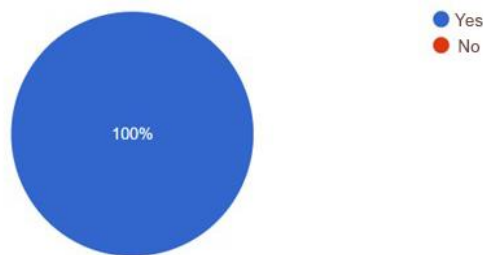


Figure 5. Total agree regarding the affordability of learning and communication ecosystem in educational management

3. Conclusion

Nowadays the idea of ecosystem models of learning and communication should be ‘connected’ with the metaverse. The metaverse is the sign of the third wave of the Internet revolution. In general, as was noted by Mystakidis (2022), the post-reality universe, a permanent and persistent multiuser environment fusing physical reality with digital virtuality, is the foundation of the metaverse idea. It is built on the convergence of technologies, such as virtual reality (VR) and augmented reality, that allow for multimodal interactions with digital items, virtual surroundings, and people (AR). The metaverse introduces new levels of social interaction and teamwork because of interconnected online 3D virtual environments (3DVE).

The metaverse describes the variety of technological developments as well as a significant change in how humans relate to technology. The Metaverse may be explored via the use of immersive technologies like Virtual Reality (VR), Augmented Reality (AR), Mixed Reality (MR), and 3D data (such as point clouds, 360° photos, and movies). The implications of the Metaverse on pedagogy and educational management of learning and communication are already being investigated by academics worldwide. As a result, the terms ‘Education Metaverse’ (Mystakidis, 2022), ‘Edu-Metaverse’, and ‘Metaverse for Learning’ have emerged as significant terms and concepts to research in this field.

The Metaverse is built on diverse technologies that allow for multimodal interactions with people, learning objects, and real-virtual settings. However, for the creation of successful learning experiences that make use of the affordances of this medium, understanding how to properly design, manage and use the Metaverse in teaching, learning and communication are still essential. On the one hand, the Metaverse raises ethical challenges, such as security, digital hygiene, privacy, equity, accessibility, and intellectual property. On the other hand, Metaverse is a sign of openness and of open pedagogy, management, and leadership, which are more dynamic and flexible. Therefore, “open textbooks play an important role in skills development. They provide open access to global knowledge and offer a collaborative way for problem-solving, critical thinking, and development of on-demand skills” (Railean, 2019).

A new educational metaverse gap, related to the importance of focusing on metacognitive knowledge and experience, is starting to take shape. To understand this global challenge, it is important to answer several questions regarding educational management theory and practice. Thus, how important is it to explore the ecosphere in school management; is this a school an ecosystem or not; what is the scope of the learning and communication ecosystem; how important it is to humanize the learning and communication ecosystem, and if learning and communication ecosystem models are helpful for managing education.

Analyzing answers of 61 respondents to an online survey it was observed that educational managers and in-service teachers are concerned about ecosystem-

based models of learning and communication and their importance in school management. Respondents agree that educational management should be humanized and that the learning and communication ecosystem is an affordable model of educational management. From this perspective, open educational pedagogies should be focused on the unique role of a life-long learner in an ecosystem of learning and communication.

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