Knowledge or content? The philosophical boundaries in e-learning pedagogical theories.

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The evolution of educational technologies engages dissimilar pedagogical strategies; however, the existent work in e-learning seems to neglect hitherto an important discussion: what is knowledge, and what is content in the different pedagogical approaches? To promote such discussion e-learning definition and featured technologies will be under debate given their influence over the pedagogical choice. Afterwards, the attempt is to define knowledge and content, as well as to present their possible boundaries. Finally, we approach pedagogy and its theories to frame what is knowledge or content in each of those theories.

Keywords e-learning; pedagogy; knowledge; content

1. Introduction

The new educational paradigm establishes a certain intellectual affiliation between learners and technologies. Instead of using technologies to guide learners through prearranged interactions, learners may use technologies that function as "the mindful engagement of learners". When students learn with computer technologies, instead of being restricted by them, they increase their thinking [1, 2]. [3] suggests that these different types of learning using technology exist on a dynamic continuum. It is interesting that the e-learning literature seems to pay little regard to the notions of knowledge and content, not considering the differences and similarities between the two concepts, and namely how the pedagogical strategy influences such concepts. There is some implied consideration [4, 5], which suggests that successful teachers cannot simply have an intuitive or personal understanding of a particular concept, principle, or theory. Rather, they must themselves understand ways of representing the concepts to students, which leads to the concept of pedagogical content knowledge. Against this backdrop and following [6], this paper attempts to define the keywords that allow such discussion and their possible boundaries. Finally, in order to obtain plausible answers concerning our research question we characterize various dimensions of pedagogy and its theories, allowing in that sense to frame what is knowledge or content in each of those theories.

2. E-learning

E-learning can be defined "as the use of ICT in higher education, which aims mainly the independent use of technology by students" [7]. So, e-learning review describes four general categories of e-learning technological systems:

- Learning Management Systems (LMS)- support administrative tasks [8];
- Managed Learning Environment (MLE)- includes the whole range of information systems and processes, which contribute directly or indirectly to learning and learning management [9];
- Learning Content Management Systems (LCMS)- allow developers to store, manage and provide access to pieces of content used in e-learning [10];
- Virtual Learning Environments (VLE)- the components in which learners and tutors participate in several on-line interactions, including on-line learning [11].

The key elements in an e-learning project are: lecturer, content, student, place, time and interactivity [12]. Therefore, an e-learning process comprises conceptual and physical components, and procedures that should be both standardized in terms of procedures and technologies. So, an e-learning application must engage: e-learning process design; learners' competencies definition; and, a framework for co-operation amongst teachers and students.

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3. E-learning technologies

3.1 Knowledge Management Systems: present and future

All efforts to implement e-learning will eventually move towards total automation of teaching, learning and managing processes- Learning Management Systems (LMS). For [13], LMS are often viewed as a starting point (or critical component) of any e-learning or blended learning program. This perspective is legitimate from a management and control standpoint, but antithetical considering the way most people learn today. Therefore, the evolution of LMS engages two different concepts [14]:

- Learning KM Systems (LKMS)- LMS evolution due to social interaction, which entails into Personal Learning Environments (PLEs) and Social Software (SS);
- Learning Oriented KM Systems (LOKMS)- LMS evolution at an instructional level.

PLEs are a recent feature of LKMS, as an alternative to the structured model of an LMS. PLEs are defined as: systems that help students to take control and manage their own learning [15]. SS is "a conceptual shift that acknowledges the reality of distributed learning practices and the range of learner preferences" [16]. Finally LOKMS it is an evolution concerning instructional design, including feedback loops concerning KMS underlying inquiring systems [17]. The result combines the flexibility of inquiring systems with an enhanced version of Simon's Intelligence-Design-Choice model to form a conceptual LOKMS for inquiring organizations.

3.2 Content Management Systems: present and future

Literature seems once again to promote a blurry or uncompleted conceptualization of CMS [see for example, 18, 19]; so, we plead our vision [6]: CMS is a tool that enables a variety of centralized technical and (de-centralized) non technical staff to create, edit, manage and finally publish a variety of contents, whilst being constrained by a set of rules, processes and workflows that ensures a coherent and validated appearance. Moreover, CMS must enable users to collaborate and interact on the creation and management of trusted content through the portal, and allow users to import or create new content and, edit existing content or properties. In conclusion, features are categorised to four content management areas; creation, management and publishing and presentation [20]. However, the social process of acquiring knowledge is rarely taken into consideration. Therefore, it is important to approach a conceptualization regarding CMS- Learning Content Management Systems (LCMS) is a term commonly used in the online publishing industry, whose objective is to simplify the creation and administration of online contents used in publications. This system enables the following characteristics [21]:

- separating content from presentation- authors need to be focused on delivering their content and, not worry about layout considerations, unless it is relevant to the article understanding;
- enforcing workflow processes- articles sent in by the authors are first approved by editors before publication. After publication, the articles are kept "live" for a particular period of time, after which they are backed up and archived.

4. The boundaries of knowledge versus content

According to Plato, knowledge is justified true belief. In "Protagoras", Plato argues that "knowledge is the food of the soul" [22]. Moreover, the [23] defines knowledge as a result or product of knowing; information or understanding acquired through experience; practical ability or skill; cognition. Knowledge is embedded- it is what we would call "just-in-context". This means that it is specific to time, place, sequence, timing, position, and relationships, within communities' contextualization. Furthermore, it follows that knowledge cannot be abstracted from context, physical or social, which includes learning environments. Contrarily, content can be etymologically defined as: "contained, satisfied, or still the contented person's desires, being bound to what he or she already has" [24]. Or, "something contained as in a receptacle, being also the meaning or significance of a literary or artistic work" [25]. Therefore, given our research question it is necessary to "draw a line" between such concepts. [26], in a modest attempt for distinguishing the different conceptual levels, through an iterative and recursive value-adding chain that: data + interpretation = information + cognitive appropriation = knowledge + collective representation and utilization = content.

Knowledge in order to be justifiable underpins an important condition: cognitive appropriation. [26] still points out that content refer any piece of information that exists within an organization! In fact, this author pleads the following four categories concerning content:

- controlled- contents and relations which are under reconsideration control. Controlled content may be structured or unstructured;
- uncontrolled- content that is not under amendment control;
- structured- usually considered as data stored in databases;
- unstructured- typically refers to documents and other electronic or physical media.

Or, [27] explores the use of a dialogue as a metaphor to evaluate a number of educational practices. Particularly, he pleads knowledge as fragments of a dialogue, "knowledgeable tellings" within an ongoing relationship. This relationship can exist between learners, between a learner and a lecturer, or between a learner and an environment experienced by the learner. [27] also describes a lecture conversation where the lecturer has already set the content, in which, the student acknowledges his arguments but do not have opinion regarding the content delivery. However, we point out some critics to [27] perception concerning content, which can be classified as reductionist, because clearly in an e-learning project learners have voice as demonstrated bellow:
- the most traditional tools such as chats or, forums allow learners to express their ideas, in spite of the existence of a set of rules;
- the evolution of E-Learning Management Systems, namely PLEs.

Plus, [27] view of content is similar to its etymological meaning of the concept content. As we have stated previously digital content encompasses four categories that challenge or abolish such classical definition. Moreover, in spite of the improved perception of [26] concerning such debate, the truth is that content is not a synonymous of collective knowledge representation and usage. Such fact is inevitably tied to content quality or evaluation, because it depends on the personal knowledge and experience of both "communicational agents": the content creator and the reader. Such assumption is still enhanced by the evolution of e-learning.

5. Learning pedagogy

5.1 Dimensions

Learning is an active process that aims to connect learner's new and old knowledge, creating an indulgent process. In an etymological sense learning was bounded to teaching children, however today's quest to provide learners for an independent and lifelong learning implies that learning acquires several forms: pedagogy, andragogy and heutagogy. In spite of such, [28] acknowledges some generic learning perspectives: associationist/empiricist perspective (learning as activity); cognitive perspective (learning as achieving understanding); situative perspective (learning as social practice).
Pedagogy can be characterized as teacher-focused learning and comprises teacher taking responsibility for learning content, time and place of such learning. The focus concerns teacher's perspective and experiences rather than the learner [29]. In order to obtain pedagogical practices for effective learner engagement, the learning environment should include: access and motivation; online socialization; information exchange; knowledge construction; and, development. Still, [30] describes three levels for effective pedagogy: axis 1 (as levels of guidance and depicts how learner's needs influence content and delivery); axis 2 (as experience of learning and as a level of self-management and guidance that students require); axis 3 (as supervision of online learning as a continuum process). Andragogy refers to learning processes for all ages including five elements [29]: informing learners about the importance of learning; tutorial procedures; relating the topic to their experiences; leaner's assisting to overcome their personal barriers'. Finally, heutagogy comprises self-determined learning as a process. It is seen to provide a twofold opportunity to learner's, which means they can simultaneously focus on their learning, their experiences and the process itself. Heutogogy is seen to go beyond the levels of problem-solving, extending the learning proactively and action learning, giving the learner the opportunity to develop self-efficacy and capability, using skills such as: reflection; environmental scanning; value experience; and, interact with others [31]. At this point, we should also discuss the phenomenon of capability, which in accordance to [31] is a holistic attribute that focus the ability that people have to learn, to be creative, to have a high degree of self-efficacy, to be able to apply competencies in a range of environments, as well as be a team player.

5.2 ICT pedagogical theories

Online teaching and learning philosophy is often based on traditional learning theories and theoretical perspectives on distance and adult education. In spite of a wide range of educational schools of thought, five broad approaches can be mapped: behaviourism, cognitivism, constructivism, social theory/social cultural theory and, connectivism.

Behaviourism entails a leaner's model as a solitary driver for understanding [32] and knowledge achievements as a conceptual platonic figure. Behaviourism requires subject matter to be analysed as specific associations, expressed as behavioural objectives, so Instructional Systems Design (ISD) can be categorized as a pedagogical theory derived from it. As a response to behaviourism, cognitivism appeared. Cognitivism claims that learning engages the acquisition or reorganization of cognitive structures [33]. Such theory allowed conceptual principles and procedures regarding informational structure of curricula. Cognitive science contribution for ISD is demonstrated through computers tutors. Moreover, constructivism assumes that individual knowledge is an adaptive and active process. Such reality is constantly open to change, because present structure and linkages are the foundation to which other knowledge structures are appended [34]. The growing importance of this approach is recognized throughout ICT learning practices. However, the increasing knowledge complexity, as well as the raise of educational networks gives origin to social theory/social cultural. Such approach refers that students join a knowledge-generating community in order to solve real problems as part of their study. In a social constructivist environment, the teacher will himself be a learner together with his students, as the generic skills of collaboration, problem solving and creating new knowledge are important goals. Finally, [35] proposes a new learning theory, which is characterized by the "amplification of learning, knowledge and understanding through the extension of a personal network". Such theory embraces self-efficacy concerning personal knowledge management within educational environment.

5. Conclusion

Given our research question, as well as, the ideas under debate throughout this paper, it is important to acknowledge some important claims: e-learning main stream literature disregards such discussion; the evolution of E-Learning Management Systems will enhance the need to approach such problem; the evolution of pedagogical strategies will also challenge our research question. From the above discussion concerning knowledge and content boundaries, the truth is that a clear perception of both concepts is required, because pedagogical strategies influence e-learning practices. Therefore, we plead the following definitions for knowledge and content in an e-learning project: knowledge is dependent on conceptual skills and cognitive abilities, trough action oriented and systematic tasks in contextual practices, or through social interaction. Content refers to the encoded "unprocessed material" which succeeds in achieving the objectives that the content creator has set for it.

Despite such claims an important question arises: it is possible to categorize such concepts within each pedagogical choice? In behaviourism, cognitivism and constructivism (traditional learning approaches), content is categorized in accordance to its etymological meaning, because it is already settled and the aim is that learner's master knowledge through drill and practice; while, in social theory/cultural theory and connectivism (recent theoretical developments), due to collaborative networks how information is processed and used is more important rather than content (which is continuously edited). So, the aim is that student's master knowledge by constructing it, which leads to an important open-question: how to validate such knowledge, or how to create knowledge standards? Furthermore, the most fruitful contribution to understand the possible categorization of the "knowledgeable files" is given by [36], which provide four dimensions that allow recognizing content and knowledge combinations: knowledge must be encoded using a formal language; interoperability especially for cross domain aspects; different interpretations of content objects; clear definition of possible relations between content and knowledge.

In spite of the positive contribution some critics could be pointed out to the arguments of such authors: knowledge it not necessarily encoded or it is not always characterized by formal language. For example, tacit knowledge or informal learning allowed by social networks, contradicting such claim; interoperability is not always observable in learning environments; it seems difficult for e-learning agents, to understand all the possible relationships.

Plus, considering that e-learning is globally accepted as a prerequisite for future social and economical development [38], to understand that we need to move from technological to methodological requirements, is a key feature for its success, being digital divide at some level a consequence of technological strategies.

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