The Contribution of Digital Learning Ecologies in Online Higher Education Scenarios

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Study Introduction

At the beginning of the 21st century, a profound technological, social and pedagogi- cal shift has taken place in higher education (HE), accelerated by the adoption of new media and digital technologies across all sectors of society. Understanding such a dy- namic and complex process, especially while in the midst of it, is a demanding task. In this regard, not only has the system of higher education had to prepare for the transformation toward the digital university (Wilcox et al. 2016; Siemens et al. 2016), but so to have students had to navigate increasingly digital and globally networked learning scenarios. The academic changes that have manifested in higher education in the 21st century, as authors such as Altbach (2009, p.i) argue, have "fundamentally redesigned the nature of the university worldwide". The use of social networks, on- line communities and participatory media have all offered expanded opportunities for learning in informal and non-formal settings. The rise of digital media use among students across all aspects of their daily lives have led to what many authors define as both the challenges and opportunities of participatory cultures in a networked era (Jenkins, 2009, 2015). Traditional learning scenarios of the home, school and wider community are now expanded through a digital society, offering open, ubiquitous and networked learning scenarios, challenges and opportunities. The incorporation of new technologies in higher education, therefore, is putting into question traditional processes of learning and student development, moving learning opportunities in university settings beyond formal and traditional education scenarios.

Rethinking some of the central conventions and concerns of education, including connecting learning across formal, informal and non formal contexts, becomes criti- cally important when entering the era of the digital university (Wilcox et al., 2016; Siemens et al., 2016), helping educational institutions to consider how they provide learning opportunities to life-long learners. The aim of the research, therefore, is to analyze and make visible the contribution of digital learning ecologies to the de- velopment and process of formal learning opportunities of graduate students in on- line higher education. The research will aim to analyze the ways students shape and configure their digital learning ecologies as well as how they approach and conceive of learning in networked online higher education across formal, non-formal and in- formal scenarios. Following, this research aims to contribute recommendations for improving pedagogical practices in online HE through a digital learning ecologies framework.

Research Problem

Given the recent and far-reaching transformations in higher education in an era de- fined by Castells (2000) as the network society, the guiding research problem recog- nizes an urgent need to think more broadly and critically about learning across a va- riety of environments, and as Barron (2006 p. 17) articulates, "actively consider the interconnections and complex relations between formal learning experiences provid- ed by schools, and the informal learning experiences that students encounter in contexts out of school". Moreover, several authors assert the most significant (and solvable) challenges impeding technology adoption in higher education is connecting learning across formal and informal scenarios *and* improving digital literacy (Adams Becker et al, 2017).   At the graduate level (Masters), this is a particularly urgent chal- lenge as more and more traditional universities offer 100% online programs.

The departing **research   problem,** therefore is to understand the contributions of the components of digital learning ecologies that students activate to complement and support their formal learning in online HE.   In this sense, the research seeks to develop recommendations for online HE on the contribution of digital learning ecologies for student learning in online higher education.

Theoretical Framework

A burgeoning literature on "learning ecologies" has emerged (Barron, 2004, 2006; Brown, 2000; Luckin 2010; Jackson, 2013) with an interest in the possibilities of new technologies in facilitating self-sustaining, interest-driven, boundary crossing, and life- long and life wide learning. A particular emphasis in the literature is about research- ing the "synergies between participation in technologically mediated informal learn- ing activities and more formal educational environments" (Barron, 2006, p. 198). A learning ecologies perspective has been taken up by researchers across a variety of fields, although predominantly at the intersection of pedagogy and educational tech- nologies. Researchers such as Barron (2004-06), Brown (2000) and Sangra et al (2013b) began to apply ecological perspectives to learning across formal and informal educational settings. Within the new setting of digital contexts emerges a configura- tion of activities, resources and relationships that offer opportunities for learning in virtual spaces. These contexts are referred to as digital learning ecologies and will form the   focus   of   this   study.

Barron (2004 p.6) defines a learning ecology "as the set of contexts found in physical or virtual spaces that provide opportunities for learning". She later identifies that "each context is comprised of a unique configuration of activities, material re- sources, relationships, and the interactions that emerge from them" (2006 p. 195). As individuals become increasingly immersed in digital environments, questions emerge about how students convert the digital resources and activities they are engaged in into opportunities for learning. There has been limited research on the concept of digital learning ecologies applied to authentic settings in higher education, however the current study will be contextu- alized through the work of Williams et al. (2008), who conceptualized a 'digital learn- ing ecologies' theoretical framework in higher education, Esposito (2014), who devel- oped a qualitative case-study of doctoral students transition from students to e-re- searchers in Italian and English higher education contexts as her phd dissertation, Ito et al. (2013) who developed learning and design principles for connected learning in digital contexts, Sangra et. al (2013a), who analyzed the the ways in which learning ecologies contribute to the professional development of primary school teachers, Saadatmand et al. (2012) who researched the self-organized, emergent and disruptive qualities of learning in open and networked environments.

Much of the theoretical underpinnings of a "learning ecologies" perspective draw from socio-cultural theory on learning, often called sociocultural, cultural historical, social constructivist, or situated approaches, that originated in the work of Vygotsky (1978). The contribution of sociocultural theory continues to have notable impact on educational and social research, particularly in the age of new media and collabo- rative and emerging online learning paradigms. This perspective offers a rich framework to research student learning, interaction and activities in the digital envi- ronments of the 21st century university learner, complemented by the allied concepts of situated learning (Lave & Wegner, 1991) and community of practice (Wegner, 1998).

This study will also apply a student approaches to learning perspective (Marton and Säljö, 1976; Marton et al. 2005). Marton and Säljö's (1976) seminal paper intro- duced the concepts of surface and deep learning that maintains impact on educa- tional research today. Similarly, the conceptualizations of life-long, life wide and life- deep learning and the interrelations these concepts have with formal, informal and non-formal learning contexts will be invaluable constructs when examining digital learning ecologies. Life-long learning is understood as the ongoing, voluntary and self-motivated learning that occurs for personal or professional reasons. In the 21st century, authors such as Banks et al (2007) have further conceptualized the constructs of life-long and life-wide learning. Life-wide learning recognizes that learning takes place not only in school, but also in multiple contexts in our everyday lives through valued practices, activities and interactions that happen contemporaneously.

Likewise, the constructs of formal, informal and non-formal learning are equally im- portant, having emerged from education and international development policy in the 1970's. An early typology of these forms of learning was developed by Coombs et al. (1973) while others have updated these typologies for our modern networked times (Sefton-Green, 2013). It is generally accepted that informal learning is the truly life- long and interest-driven process whereby individuals acquire knowledge, value and skills from daily experience and interactions undertaken at the learner's own speed. Formal learning, on the other hand, is understood as a hierarchically structured 'edu- cation system' running from primary school to university and professional training that often leads to credentialing, while non-formal learning is any structured educa- tional activity that is organized outside an established formal system, usually not lead- ing to credentials.

Research Questions and Objectives

Informed by the aforementioned educational problem, research questions have been formulated in relation to the following purpose of the research: to understand the contribution of digital learning ecologies in online HE by analyzing the way students shape and configure their digital learning ecologies as well as how they approach and conceive of learning across formal, informal and non-formal environments.

1. What components configure the digital learning ecologies of higher education students?

2. What strategies do students use to connect the different components of their digital learning ecologies?

3. What are students' conceptions of the contributions of the different components of their digital learning ecologies to their development as university learners?

Research Objectives

Main Objective: To analyze the contribution and potential of the digital learning ecologies of online graduate students in order to provide rec-ommendations for improving pedagogical practice in online HE.

1.1. To identify and analyze the component elements that students activate to shape and configure their digital learning ecologies in the context of 100% online masters in education program.

1.2. To identify and analyze the affordances of the components of students' digital learning ecologies in online HE.

1.3. To detect and analyze how students activate and apply the components of their digital learning ecologies to support learning processes in online HE.

1.4. To identity key success factors and learning strategies that HE students use to connect and activate the different components of their digital learning ecologies.

1.5. To identify and analyze students' conceptions of the contribution of digital learning ecologies to their development as learners in online HE.

1.6. To develop recommendations on the contribution of digital learning ecologies for student learning in online HE.

Research Design and Methodology

i.) Methodology

The research design will follow a constructivist and interpretivist paradigm using a qualitative multi case-study approach. An interpretivist epistemology is an approach that is focused on the meaning of social action and the individual's perspective of their own subjective reality. A case-study is a method used to deeply observe the

characteristics of a person, group, or community and is a common category of educational inquiry, an investigation into a specific social phenomenon in its real-life context where social phenomena are both constructed and are dependent on interactional accomplishments (Cohen et al, 2007; Yin, 2003). Although predominantly qualitative, the study will also utilize some embedded quantitative data collected through a digital survey that will allow data triangulation and provide "a supporting role to the study" (Creswell, 2007 p. 208). The research will also be characterized by an emergent design, meaning that the initial plan for the research will not be fixed or tightly prescribed, as phases of the research, the form of data collection, or research sites may shift or change as the researcher enters the field and begins to collect data (Creswell, 2009).

The research design will also use emerging digital ethnography techniques to collect data and shape the design. Digital ethnography, as Standlee (2017) defines, is "a multi-modal qualitative research technique that seeks to understand digitally mediated communication, communities, identities, and norms, while acknowledging the complex liminal relationship between offline and online environments by following the objects, texts, and bodies that inhabit such spaces" (p.5).

ii.) Research scenario

The study will use 3 different higher education sites across 3 distinct Masters of Education programs. The cases will be composed of 5 students from each M.Ed. program. The university sites will be selected at 3 universities where the program will be 100% online either in an open university or traditional setting with an online M.Ed program. Online Masters of Education sites have been chosen because of their intensive use of digital technologies and, in many cases, they represent the vanguard of new learning scenarios, often applying emerging pedagogical designs, characterized by innovative learning practices that may be able to offer new knowledge and insight into the potential of online digital learning. The master's level is also important be- cause it represents students as they continue their professional updating who have been proven learners in undergraduate programs, thus each student case-study will be able to offer rich data and observation opportunities on emerging lifelong learning practices.

The UOC Masters of Education and the University of Illinois Urbana Champagne Masters of Education in Learning Design have been secured as research sites, while the University of Edinburgh's Master in Digital Education is currently being negotiated with as the final case site.

iii.) Data gathering techniques and instruments

Data will be collected using a sequential exploratory design emphasizing qualitative data gathering and analysis following quantitative gathering (Creswell, 2009). The study will use three primary case-study collection techniques emphasizing the value of multiple sources of data for rich analysis. These include: 1. digital mixed methods survey that relies on collecting both qualitative and quantitative data 2. two phases of pre and post observation semi-structured in-depth interviews among the 15 student cases (Cohen 2007), and 3. participant observations that will rely on digital ethnography techniques including structured observing of the interactions, relations and participation in digital scenarios and activities among the 15 student cases (Standlee,

2017). The collection of data will occur in the 2017-2018 school year, and each student group (5) will be observed in a university site throughout a 3 month trimester period.

Finally, the analysis procedure will follow 4 phases: 1.) Conceptualization of Learning Ecologies in Higher Education through literature review 2.) Diagnosis of Digital Learning Ecologies components + affordances of digital learning for University Students through digital survey 3.) Multi Case-study (student participants as cases). 4.) Data Analysis by contrasting the prevalent situation with the individual case-studies.

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