

E-learning design and entrepreneurship in three European universities

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Abstract

Purpose – According to Fee (2009), e-learning systems have three components: technology, learning content and e-learning design. Few studies have examined e-learning design as an educational process, although universities are increasingly using e-learning as they become more entrepreneurial. This article aimed to investigate how universities approach e-learning design.

Design/methodology/approach – The study used a mixed methods approach. First, the authors carried out a quantitative analysis of the websites of the top 100 European universities in the Quacquarelli Symonds Ranking. The authors then moved to a qualitative approach, analyzing a pilot case and three case studies. Semistructured interviews were conducted with managers of e-learning services at the chosen European universities.

Findings – The 100 best European universities in the Quacquarelli Symonds Rankings all use e-learning methods. The case study universities were selected from this list. The semistructured interviews with managers of e-learning services highlighted the importance of the design of e-learning courses. However, most focused on the professional figures involved, rather than the process for e-learning and the overall design of the course.

Originality/value – The article provides a detailed study of e-learning design in an educational context. The analysis of multiple case studies allowed the authors to identify how the selected universities carry out didactic design activity through the use of technology. It therefore contributes to knowledge of cases of digital academic entrepreneurship.

Keywords E-learning, University, E-learning/learning design, European universities

Paper type Research paper

1. Introduction

The adoption of information and communication technologies (ICTs) has spread across both public and private sectors (Al-Qahtani and Higgins, 2013). E-learning in particular could be an excellent aid and facilitator of learning in universities (Carril *et al.*, 2013). E-learning is a teaching and learning system (Aspen Institute Italia, 2014; Gros and García-Peñalvo, 2016) provided on a digital device such as a computer or a mobile device (Brown and Voltz, 2005; Clark and Mayer, 2011; Kukulska-Hulme and Traxler, 2005; Simkova *et al.*, 2012). It allows the transfer of specially designed didactic material (Carroll, 2013; Loh *et al.*, 2016) and broadens the training and knowledge management environment (CNPA, 2007; Secundo *et al.*, 2008). Within an integrated e-learning system, content can be



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delivered via a platform with asynchronous material or with the use of video conferences and virtual classrooms in synchronous mode. It may also be delivered collaboratively through the activities of the virtual learning community. Mixed learning, involving both classroom activities and e-learning, can also develop (Huang *et al.*, 2012; Lin and Wang, 2012). Data may be stored within the network through cloud computing (Masud and Huang, 2012) using secure hardware resources (Ahmed, 2015) on request, paying by use (Riahi, 2015).

There are three main reasons why e-learning systems are important for universities. First, it has been enabled by the introduction of digital technologies in universities (Alkhalaf *et al.*, 2012), which make it possible to overcome barriers of time and place (Arkorful and Abaidoo, 2015). This allows students to easily access courses at any time, regardless of distance from the university (Gorbunovs *et al.*, 2016). Secondly, a number of universities do not limit themselves to providing e-learning courses to enrolled students. Instead, they offer free online courses to all, without limits on frequency or geographical location. The only limit is the Internet connection (Jansen and Schuwer, 2015; Sinclair *et al.*, 2015; Testoni, 2014). These are known as Massive Open Online Courses (MOOCs). Finally, the use of e-learning systems in universities allows entrepreneurs and managers to develop their skills by following specific online courses on entrepreneurship (Jafari-Moghadam *et al.*, 2012; Jones *et al.*, 2009; Radović-Marković *et al.*, 2012a).

Fee (2009) carried out a specific survey and identified three components of e-learning systems: technology, learning content and e-learning design. However, there are two important issues. First, e-learning design is considered a complex educational process (Ghiringhelli and Quacquarelli, 2003). Secondly, the managerial literature on e-learning in universities is particularly strong on aspects related to technology (Al-Adwan *et al.*, 2013; Alavi and Leidner, 2001; Arbaugh, 2000; Bhuasiri *et al.*, 2012; Elkaseh *et al.*, 2016; Hassanzadeh *et al.*, 2012; Islam, 2013; Kurilovas *et al.*, 2014; Leidner and Jarvenpaa, 1995; Martins and Kellermanns, 2004; Masud, 2016; Piccoli *et al.*, 2001; Songkram, 2015; Venkatesh and Davis, 2000) and learning content (Adeola *et al.*, 2013; Almpanis, 2015; Arbaugh, 2008; Azeiteiro *et al.*, 2015; Carril *et al.*, 2013; Franceschi *et al.*, 2009; Hwang and Arbaugh, 2006; Koutsabasis *et al.*, 2011; Oproiu, 2015; Parkes *et al.*, 2013; Parkes *et al.*, 2015). However, e-learning design has not been studied (Islam *et al.*, 2015; Urh *et al.*, 2015).

This article aimed to use an empirical investigation to examine how universities approach e-learning design. The aim of the work was to understand whether the e-learning design of teaching courses within selected European universities, both in general and on entrepreneurship in particular, uses the process steps of learning outlined by Ghiringhelli and Quacquarelli (2003). The study used the training process set out by Ghiringhelli and Quacquarelli (2003) as a reference to compare to other models. This allowed us to verify aspects related to teaching and therefore analyze how to create and deliver courses through e-learning in universities. This study approach has not often been used in the managerial literature (Islam *et al.*, 2015; Urh *et al.*, 2015). Most learning environments neglect the pedagogical aspects of e-learning (Radović-Marković *et al.*, 2012a). These pedagogical variables in the Ghiringhelli and Quacquarelli (2003) model are important in the university context, because they facilitate three main objectives. The first is to design interesting and well-built e-learning courses (Chen *et al.*, 2012), the second is to stimulate motivation and allow students to learn (Castillo-Merino and Serradell-López, 2014; Horton, 2001) and the third is to avoid relying on the ideas and creativity of individual “teachers” (Anderson *et al.*, 2001; Bennett *et al.*, 2015), which in practice happens often.

The article is organized as follows. The first section reviews the main literature on the design of e-learning in universities, and the second describes the study methodology. The third section describes the results and is followed by a discussion and conclusions.

2. Literature review

2.1 E-learning design

“Good learning” in e-learning systems depends on a combination of technology, significant content and effective learning/e-learning design (Fee, 2009). Technology describes the basic infrastructure used for the implementation of e-learning (Urh *et al.*, 2015) and the transfer of information during the training course (Ghiringhelli and Quacquarelli, 2003). The learning content describes the learning material and associated activities (Al-Yahya *et al.*, 2015). The concept of learning/e-learning design is the set of decisions (Horton, 2011) about how to plan learning activities and interventions (Conole, 2013, p. 7), establish objectives and teaching plans (Rienties *et al.*, 2015) and deliver e-learning through appropriate use of resources and technologies (Brown and Voltz, 2005). The term “learning/e-learning design” means a learning process that can occur in the classroom or online, where a set of knowledge, skills and competences are required, both on learning methods and on the use of the different technologies adopted (MacLean and Scott, 2007).

According to Ghiringhelli and Quacquarelli (2003), e-learning design is a complex educational process characterized by four phases (Figure 1). The objective is to select the most suitable e-learning content consistent with the purposes of the e-learning course (Cocoza, 2006; Esposito and Mantese, 2003; Trentin, 2001). Figure 1 shows the four phases of the process outlined by Ghiringhelli and Quacquarelli (2003). We based on the concepts explained by the two authors have adapted this figure. It allows us to schematically show the basic concepts of the model itself and represent the different phases identified by Ghiringhelli and Quacquarelli (2003).

There are a number of different perspectives on e-learning design, in the literature, on e-learning systems in universities. E-learning design can be understood as a “process,” and there are a number of possible models beyond that of Ghiringhelli and Quacquarelli (2003). For example, Bennett *et al.* (2015) considered e-learning design as a process characterized by two phases in which teachers play a decisive role. In the planning and preparation phase, the teachers define how they will interact with students during a teaching session. In the second phase, the teachers adapt their approach in response to their students’ reactions, reflecting on improvements and sharing design ideas. The same approach was outlined by Anderson *et al.* (2001), who considered e-learning design as the exclusive prerogative of teachers, who have to think about how to set up and build the course and what teaching materials to use. Everything occurs within a computer videoconferencing environment and takes place across

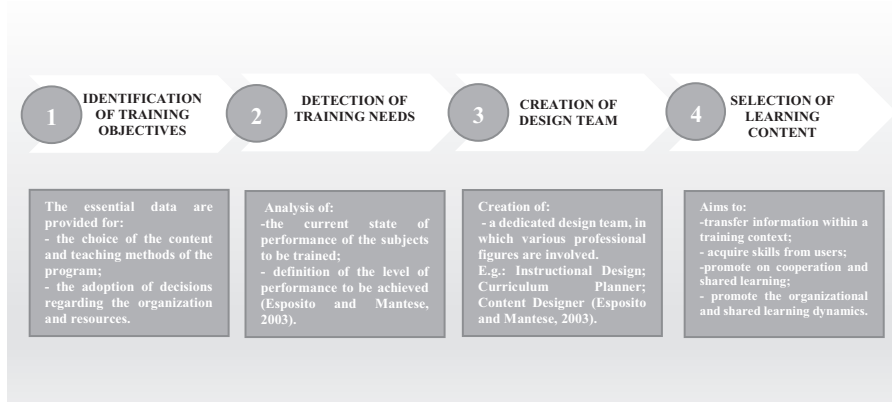


Figure 1.
E-learning design process

Source(s): Adapted from Ghiringhelli and Quacquarelli, in Nacamulli (2003), p. 170

three categories: planning and organization, speech facilitation and direct education. [Lister \(2014\)](#) focused on issues related to the components of e-learning design, through observation. She identified four main phases in the choice of components of e-learning courses: (1) the structure of the course, (2) presentation of the content, (3) collaboration and interaction between students and between students and teachers and (4) timely feedback. [Teräs and Herrington \(2014\)](#) distinguished between planning, implementation and improvement of learning in educational design in a complex educational context.

[Rienties et al. \(2015\)](#) focused on e-learning design and considered learning management systems and learning performance. They suggested that it was possible to identify a process characterized by the “mapping of modules” (i.e. the analysis and provision of visualizations of learning activities and resources in a single module). Through the work of a team of e-learning design specialists, it was possible to examine all available teaching materials, the types of activities and the length of time that students must devote to each activity.

Other research, however, connects the study of e-learning design as a process with the behavior of the user. For example, [Brown and Voltz \(2005\)](#) analyzed the e-learning resource design phase, which combines activities such as design and teaching, creative writing and specific software. They considered this across six areas (activity, scenario, feedback, delivery, context and impact) to focus on learning as a driver or motivation. These six elements provide focal points for educational designers and help them to navigate complexities and pressures, facilitating the development of effective e-learning that will enable student learning.

[Rienties and Toetenel \(2016\)](#) demonstrated empirically how teachers’ decisions on the e-learning design process take into account the involvement, satisfaction and performance of academics in virtual learning environments (VLEs). This allows them to build a shared vision. Other study approaches have considered the connection between learning design and learning analytics. For example, [Haya et al. \(2015\)](#) considered learning analytics as a key tool to support learning design related to the social learning of students. Learning analytics can support teachers and students participating in collaborative scenarios and allow effective learning. [Rodríguez-Triana et al. \(2015\)](#) aimed to help teachers monitor their design decisions in combined computer-supported collaborative learning scenarios. Based on a monitoring-sensitive design process and an underlying monitoring-sensitive scripting model, they were able to align scripts and monitoring of learning design and learning analytics. [Lockyer et al. \(2013\)](#) investigated how learning analytics can help determine whether learning design improves the understanding and evaluation of students’ intentions and learning activities. They demonstrated that the evaluation potential of the learning analysis could be significantly improved by taking into account e-learning design based on pedagogical intent.

Other studies, such as [Al-Samarraie et al. \(2017\)](#), focused on the structural characteristics of design and how these can facilitate cognitive processes in reading and storing content. These can influence users’ preference for the use of the e-learning system. Older research (see, e.g. [Benson and Samarawickrema, 2009](#)), however, considered the e-learning process in universities on the basis of the degree of distance. In particular, it examined the level of separation between students and between teachers and learners, and the type of e-learning design adopted, by identifying a relationship between dialogue and structure. They suggested that the design of student learning required adequate levels of dialogue and structure to reduce the distance.

2.2 E-learning design and academic entrepreneurship

The role of universities is constantly changing and they are increasingly managed in an entrepreneurial way ([Sousa et al., 2010](#)), far from the obsolete concept of “ivory towers” ([Barry et al., 2001](#)). However, entrepreneurship in an academic context is an intrinsically elusive concept ([Wadhvani et al., 2017](#)). The widespread assumption is that before the 1970s, academic scientists pursued work that interested them intellectually, without considering

any economic implications (Berman, 2011). There is now, however, general agreement that the role of universities is not education for education's sake (Martin, 2012). Entrepreneurship in academia usually describes an attitude of researchers pursuing business drawing on knowledge (Lam, 2010). There are a number of different approaches. Patents and licenses are easy tools for academic entrepreneurs and are especially used in the field of natural sciences (Fimi *et al.*, 2018). However, all challenges for universities can be considered using an entrepreneurial approach. E-learning adoption may be the frontier of digital academic entrepreneurship (Rippa and Secundo, 2019).

The concept of learning or e-learning design in the context of academic entrepreneurship can be used to create a prototype that shows the interaction of various technological components (Simeone *et al.*, 2017a). It can also be interpreted through activities such as analysis, synthesis and evaluation (Simeone *et al.*, 2017b) or as a strategic framework for the design of e-learning, consisting of the three main components of the educational system (Asgarimehr *et al.*, 2012): education, research and entrepreneurship. Government and industry are the two main wings in the design of e-learning in the entrepreneurial system.

Other contributions, such as that of Cirulli *et al.* (2016), examined personalized design of e-learning to build entrepreneurial skills through the use of MOOCs. This allows students to self-evaluate the state of their entrepreneurial knowledge and obtain appropriate recommendations for activities.

Some studies on e-learning design and entrepreneurship provide different points of view on e-learning design as a process, based on courses on entrepreneurship. Jones *et al.* (2009), for example, proposed designing courses using a process based on appropriate induction programs. This provides an initial phase of significant contact to allow students to follow an e-learning course on entrepreneurship. Stamatis *et al.* (2015) described the design of an intensive e-learning course on entrepreneurship, aimed at young ICT professionals. They aimed to design an e-learning course entitled "FLITE Innovation and Entrepreneurship." They wanted to allow a phase of the process where students could choose an innovative idea and transform it into a business plan for setting up a start-up. Maritz *et al.* (2011) explored approaches to blended learning. They examined the construction of the Stanford Technology Ventures online resource portal, commonly called "e-corner," in the context of entrepreneurship. They proposed specific e-learning design processes in which different teaching techniques would be used to instill entrepreneurial skills and behaviors among students.

Other studies have focused on the characteristics of the e-learning design process on entrepreneurship. For example, Jafari-Moghadam *et al.* (2012) identified the drivers and barriers of effective design of e-learning courses at the Faculty of Entrepreneurship of the University of Tehran (UT). They separated these into three groups: input factors (students, professors, curriculum, ICT infrastructures, personnel and budget), process factors (teaching methods, cultural and structural factors at the university) and environmental factors.

Programs and e-learning designs on academic entrepreneurship played a prominent role in three studies by Radović-Marković *et al.* (2012a, b, 2017). Radović-Marković *et al.* (2012a) examined the extent to which students from two universities in the Balkans (Turkey and Serbia) are interested in starting their own business after following in university e-learning courses on entrepreneurship characterized by a very simple design. Radović-Marković *et al.* (2012b) analyzed the likelihood that university students of economics and entrepreneurship from three developing countries (Serbia, Iran and India) would attend and select e-learning courses, characterized by particular learning design and the effect of these on their future success as entrepreneurs. Finally, Radović-Marković *et al.* (2017) suggested that the design of e-learning courses was important in the field of entrepreneurship. They administered questionnaires to Turkish students at the Faculty of Economics at the University of Anadolu and students at the Belgrade Business School in Serbia. They suggested that effective e-learning courses needed to be well-planned and -projected, with clear objectives and outcomes.

The literature on e-learning design in general and on entrepreneurship in particular shows that few studies have examined the dynamics of the didactic aspect of the four-phase process set out by Ghiringhelli and Quacquarelli (2003). Two studies (Islam *et al.*, 2015; Urh *et al.*, 2015) highlighted the lack of attention by universities to e-learning design connected to the educational aspect, especially for courses on entrepreneurship. Effective learning requires a design and distribution of course materials and appropriate ways to guide students. This allows teachers to transmit knowledge and skills, to manage the related processes and to enable students to learn (Fee, 2009; Ghiringhelli and Quacquarelli, 2003). This article therefore aimed to fill this gap.

The study focused on an empirical analysis of e-learning design across four elements: strategy, organization, users and context. Strategy, organization and context were identified by Roberts (2006), and the importance of people (users) by Daft (2010). This division was conceived to provide an e-learning vision based on different points of view.

Strategy covers the hypothetical choices made by universities about the design of e-learning (Yanson and Johnson, 2016). Organization is the way that e-learning design strategies are implemented in practice (Gill, 2000). Users are all possible users of the e-learning design service. This area includes questions relating to potential users of the service and about the adoption of tools to improve the user experience and learning effectiveness (Koh *et al.*, 2010; Shaw, 2010). Context covers issues related to the general concept of technology and the impact of technology on the organization. It also covers the influence of the organization itself on the design of e-learning (Dennis *et al.*, 2008).

3. Methods

This study used a mixed methods approach (Creswell, 2014). First, quantitative data were collected by examining the websites of European universities. The next step was to move to qualitative analysis by constructing a pilot case, identifying suitable cases for study (Yin, 2014) and conducting semistructured interviews (Qu, and Dumay, 2011). The investigation was carried out in two steps:

- (1) The collection of quantitative data on European universities, to identify the number of universities that provide teaching activities through e-learning.
- (2) The identification from within the sample of European universities, of some universities and the people responsible for e-learning services to interview. We have analyzed three case studies and a pilot case.

3.1 Sample for the identification of universities

The first phase of the study focused on the acquisition of documentary information available on the Internet (Corbetta, 2014). The activities carried out by the universities were identified through analysis of their websites (Gentile *et al.*, 2019). This method was considered a convenient way to obtain quantitative data on European universities in a short time. The study examined the websites of the top 100 European universities from a particular world ranking of universities, which allows data collection by region. The ranking used was from Quacquarelli Symonds, known as the QS World University Ranking. It includes the top 800 universities in the world divided into four sectors: research, teaching, employability and internationalization (ANVUR, 2014). We used the 2015/2016 ranking and took the top 100 universities that included the word “Europe” in the drop-down list. A database was created to store information about each university. Data included the country of origin, the dimensional aspect of the university and the type of training offered.

The research made it possible to verify the number of universities providing educational activities through e-learning platforms. Data were collected by entering each university’s

homepage and searching for specific keywords including “e-learning,” “MOOC,” “Online courses” and “Distance learning.”

3.2 Pilot case and multiple case studies

In the second phase, the main objectives were to identify a suitable university as a pilot case, to select three universities from within the 100 European universities in the original sample to be case studies and to conduct interviews to collect data.

3.2.1 Type and method of case study selection. 3.2.1.1 Pilot case. Pilot cases can be used in the design of case studies and may be selected for various reasons unrelated to the criteria for selecting the final cases (Yin, 2014). The development of a pilot case study allows researchers to improve their data collection plans for both the data content and the collection procedure. In our study, the pilot case was used to refine the interview questions. The pilot case was based on data from a university not included in the top 100 universities in the QS rankings: the University of Naples Federico II. The selection was on the basis of geographical proximity and ease of access to the university, because of some personal contacts (Yin, 2014). This university offers services through its Federica platform. This platform is used to deliver a considerable number of courses and attracts a large number of students and users. The study of the pilot case enabled us to better understand, from an empirical point of view, the problems related to e-learning design and how it was implemented.

3.2.1.2 Multiple case studies. We chose to analyze multiple case studies because the context of investigation (university and the design process) varies between cases (Baxter and Jack, 2008). It was possible to analyze, within these realities, different settings. The multiple case study approach also made it possible to examine similarities and differences between the cases (Yin, 2014; Eisenhardt, 1989). Case studies were selected using intentional random sampling, to increase the credibility of the results (Patton, 1990; Shakir, 2002). We randomly selected three European universities from among the 100 European universities in the QS World University international ranking: University of Dresden (Germany), Queen’s University Belfast (Northern Ireland, United Kingdom) and University of Bologna (Italy).

3.2.2 Data collection. After identifying the universities, we carried out interviews to collect the rich and empirical data (Eisenhardt, and Graebner, 2007). We used semistructured interviews, because these can reveal important and often hidden aspects of human and organizational behavior (Qu and Dumay, 2011). This therefore allowed us to obtain more data, using a flexible and modifiable approach to conversations. The interviews were with the managers of e-learning services at each university (pilot case and case studies), because they are most closely involved in the design and supply of e-learning services. The interviews were recorded using a special recorder, with the prior consent of the interviewees.

3.2.2.1 Pilot case. We tracked down a contact person for the e-learning services at the pilot university using a personal contact. After setting up a meeting, we conducted the interview in May 2016. We interviewed two managers from the Federico II University of Naples. Their roles were Production Manager of Federica Web Learning and Project Manager of the “Virtual Campus” project on the two web platforms, federica.unina.com and federica.eu. The university has a Federica Web Learning service center (Center for Innovation, Experimentation and Dissemination of Multimedia Teaching) that is active in the area of new multimedia technologies. The virtual Federica Campus project plays an essential role as an advanced web learning model for those who cannot attend university in the traditional way. Table 1 contains descriptive data about the university and the e-learning/MOOCs courses provided by the Federica center.

Following this dialogue with the two managers of Federica Web Learning, we changed the wording of some of the interview questions and tried to make their content more understandable and consistent with the purpose of the investigation. In particular, we divided

the interview questions for the multiple case studies into four sections covering strategy, organization, users and context of e-learning design. During the conversation with the two managers of the Federica platform emerged the importance of e-learning design and the need to examine this topic.

3.2.2.2 Multiple case studies. For each of the three universities selected (Dresden, Queen's and Bologna), we obtained the contact details of the managers of the e-learning services from the university website. We sent e-mails requesting a meeting and interview. The interviews were conducted between June and September 2016. We interviewed the person at each university who held the role of manager for the provision of the e-learning/MOOC service of the appropriate IT centers.

The first interview was with the director of the MedienZentrum (Multimedia Center) of the University of Dresden (Case study 1). The Multimedia Center is a multimedia infrastructure that aims to digitize learning and teaching (Schoop *et al.*, 2016). Almost 100 people work there, including scientists, designers, psychologists, educators and economists. MedienZentrum supports educators in planning, implementing and evaluating sustainable e-learning courses.

The second interview was with the Head of the E-learning Service and MOOCs for Queen's University Belfast (Case Study 2). This university has a Center for Educational Development that offers consultancy and a series of professional development activities and support for study, learning, teaching and evaluation programs. It also provides e-learning services, often combined with other forms of learning.

The third interview was with the head of the E-learning Center for Information Systems and Applications at the University of Bologna (Case Study 3). This center designs, implements and manages the university's IT services. The e-learning team within that center aims to satisfy demand for e-learning services at the University and provides the necessary support to those who provide training through online teaching and blended learning.

The analysis of the case studies also included examining data from websites, including information on the number of e-learning courses and MOOCs provided by the universities. Table 2 shows some descriptive data on the characteristics of the three universities and their e-learning courses and MOOCs.

We also processed the data emerging from the interviews with the managers of the e-learning services at the three universities.

The semistructured interview questions were grouped into four parts, covering strategy, organization, users and context. Example questions included:

In the Strategy section: "In your opinion, what led the University to provide courses through e-learning?" (Example 1).

Description	Pilot case: University of Naples Federico II – Italy
Year of constitution	1,224
Students enrolled	75,982
Teaching staff	5,650
Technical-administrative staff	2,804
Faculties	Not available (N/A)
Schools	04
Departments	26
Graduate courses	143
Postgraduate courses	244
Graduate and postgraduate courses	387
Blended courses	They are approximately 300
MOOCs	75

Table 1.
A.Y. 2015/2016:
numerical data on the
university for pilot case
selected

Source(s): Adapted from website: <http://www.unina.it>

Description	Case study 1: University of Dresden – Germany	Case study 2: Queen’s University Belfast – UK	Case study 3: University of Bologna – Italy
Year of constitution	1,828	1,845	1,088
Students enrolled	35,961	23,870	78,026
Teaching staff	4,879	1,715	5,851
Technical-administrative staff	Not available (N/A.)	N/A.	3,021
Faculties	14	03	N/A.
Schools	05	20	11
Departments	N/A.	N/A.	33
Graduate courses	N/A.	77	210
Postgraduate courses	N/A.	138	154
Graduate and postgraduate courses	133	215	364
Blended courses	There are within Faculty of Languages, Literature and Cultural Studies; Education; Economics and Business and faculty of Civil Engineering	There are within Faculty of Literature, Humanities and Social Sciences; Engineering and Physical Sciences and Faculty of Medicine, Health and Life Sciences	There are within the School of Agriculture and Veterinary Medicine; Economics, Management and Statistics; Pharmacy, Biotechnology and Motor Science; Law; Engineering and Architecture; Letters and Cultural Heritage; Languages and Literature, Translation and Interpretation; Medicine and Surgery; Psychology and Education Sciences; Political Science
MOOCs	Not existing	02	Not existing

Table 2.
A.Y. 2015/2016:
numerical data on the
three selected
European universities

Source(s): Adapted from websites: <https://tu-dresden.de/tu-dresden/>; <http://www.qub.ac.uk/>; <http://www.unibo.it>

In the Organization section: “How do you develop the design of an e-learning program at the University? Who are the professionals involved?” (Example 2).

In the Users section: “What types of services are offered asynchronously, synchronously and collaboratively?” (Example 3).

In the Context section: “Does the use of e-learning technologies improve or worsen learning?” (Example 4).

The answers provided by the interviewees were summarized in a synoptic table. A final synoptic table allowed us to highlight the similarities and differences (Yin, 2014) between the universities in the design of e-learning.

3.2.2.3 Documentary analysis of the websites. We also checked the websites of the three selected universities. We examined the sections on the study plans for e-learning for first and second degrees and particularly the existence of degree courses or e-learning courses whose description included at least one of the following words: “entrepreneurial,” “entrepreneurship,” “enterprise” and “start-up.” We only looked at first and second degree courses, because the data

on the websites for these courses were easily accessible and available. Information on other postgraduate activities, such as advanced training courses (professional masters), was less clear.

The investigation involved several steps. First, the different websites of the three universities were included in the “search” section for the keyword “business.” This made it possible to identify the denomination of the different courses of study for undergraduate and postgraduate degrees in business. We checked that the teaching in these graduate courses was through e-learning systems. We examined the teaching plans for each degree course identified to find teaching on entrepreneurship.

4. Findings

4.1 Quantitative analysis

The quantitative work allowed us to identify the universities within the QS World University ranking to use for the case studies. It also enabled us to identify the number and type of e-learning courses offered generally and on entrepreneurship. The following results were found:

- (1) All 100 top European universities provided training through a variety of online courses. These online courses were designed for both students enrolled in the university and for other nonenrolled users, free of charge, through MOOCs. In total, 32% of universities provide e-learning training to enrolled students; 22% to all users free of charge via MOOCs and finally 46% to both students and other users (see [Figure 2](#)).
- (2) The websites of the three case study universities highlighted the presence of e-learning courses on entrepreneurship (see [Table 3](#)).

4.2 Qualitative analysis

[Table 4](#) shows the synoptic table of qualitative data. The questions and answers were divided into four parts (strategy, organization, users and context). The elements of homogeneity and diversity helped us to understand whether the e-learning design process for courses in general and entrepreneurship courses in particular reflected the four phases of the model of [Ghiringhelli and Quacquarelli \(2003\)](#).

Looking at the four areas (strategy, organization, users and context) ([Table 4](#)) and previous studies on e-learning design and academic entrepreneurship, we identified some particular points.



Figure 2.
Access to e-learning services/MOOCs in the top 100 European universities

Source(s): Adapted from *QS World University Rankings* © 2015/16

In the first box (Strategy), blended learning (Question 2: Presence of forms of teaching in blended learning mode), which is highlighted in e-learning design studies of [Maritz et al. \(2011\)](#), was common in all courses also in those on entrepreneurship at all three universities analyzed.

In the second box (Organization), there were a number of references to the development of e-learning courses and the professional figures involved (Question 3: choice of e-learning path and professional figures involved). According to [Jafari-Moghadam et al. \(2012\)](#), this is a standard process in e-learning design and academic entrepreneurship, which is identified with the teaching methods. It is possible to identify teachers among the professional figures involved ([Anderson et al., 2001](#); [Bennett et al., 2015](#)). Previous studies described a process in which teachers were the architects of the planning, setting up and carrying out of courses, including those on entrepreneurship. This idea of teachers building courses independently was raised in the interview with the head of the e-learning center at the University of Bologna ([Table 4](#)). The involvement of professional figures in the design of e-learning courses in general, and on entrepreneurship in particular, was highlighted by [Rienties et al. \(2015\)](#). They focused on the existence of a team of learning design specialists. This echoes the ideas of [Ghiringhelli and Quacquarelli \(2003\)](#) about the third phase of the learning process ([Figure 1](#)) and the different figures (such as educational designer, content designer and production manager) who make up the design team. Two of the interviewees (from University of Dresden and Queen's University Belfast) referred to these different professional figures.

The area of the interview on users (Question 7: e-learning services designed and offered to students in synchronous, asynchronous and collaborative mode) was consistent with [Haya et al. \(2015\)](#), who discussed learning analytics as a tool of learning design. Learning design can facilitate social forms among students within all the e-learning courses including those on entrepreneurship. We found identical answers provided by the managers of the e-learning services at Queen's University Belfast and the University of Bologna. Both commented on collaborative activities among students through chat rooms and forums.

Research by [Brown and Voltz \(2005\)](#), [Lockyer et al. \(2013\)](#) and [Teräs and Herrington \(2014\)](#) suggested that improvements in student learning resulted from the adoption of effective e-learning design systems for both courses in general and courses on entrepreneurship in particular. Within the context section, Question 9 asked about whether the use of technology resulted in "the improvement or deterioration of student learning." Only the interviewee from the University of Bologna was confident that use of technology resulted in improvements in learning ([Table 4](#)).

Description	Case study 1:	Case study 2:	Case study 3:
	University of Dresden – Germany	Queen's University Belfast – UK	University of Bologna – Italy
Undergraduate courses (UCs) and postgraduate Courses (PCs) found with keyword business	13	25	9
Courses found on "Entrepreneurial"	0	0	1 (UCs) 2 (PCs)
Courses found on "Entrepreneurship"	0	1 (PCs)	0
Courses found on "Enterprise"	0	6 (UCs) 6 (PCs)	1 (PCs)
Courses found on "Start-up"	0	4 (UCs)	0
Degree courses on Entrepreneurial and the like	1 (PCs)	7 (PCs)	0
Total courses found	1	24	4

Source(s): Adapted from websites: <https://tu-dresden.de/tu-dresden/>; <http://www.qub.ac.uk/>; <http://www.unibo.it>

Table 3.
Courses of entrepreneurial and the like within the three European universities

Area	Synthetic content question	Case study 1: University of Dresden – Germany	Case study 2: Queen’s University Belfast – UK	Case study 3: University of Bologna – Italy
Strategy	1. Motivating the adoption of e-learning courses in universities	Need to innovate their teaching methods	Opportunities to offer students/users service at any time	Opportunities to offer students/users service at any time
	2. Presence of teaching forms in blended learning mode	Adopting blended learning models	Adopting blended learning models	Adopting blended learning models
Organization	3. Choosing a course in e-learning and professional figures involved	The professionals involved in this project come from different fields	The professionals involved in this project come from different fields	The design is carried out independently by the teachers and there is only the coaching by a technician using the platform
	4. Technologies adopted cloud computing	No-existence of cloud computing	Using cloud computing	No existence of cloud computing
Users	5. Technologies adopted: mobile learning	Using mobile learning	Using mobile learning	No existence of mobile learning
	6. The number of students likely to follow these courses in e-learning	Lack of reliable data	Lack of reliable data	Lack of reliable data
	7. Types of services offered to users/ students in a synchronous, asynchronous and collaborative way	Provision of e-learning services in asynchronous form, without collaborative and synchronous forms	Adopting teaching methods both in synchronous, asynchronous form and also encouraging activities in a collaborative form	The main use of the asynchronous system and only in specific cases synchronous and collaborative forms, through forums and discussions
Context	8. The main factors affecting the increase/decrease in the use of e-learning teaching methods in universities	Increased use of such technologies as a result of the ease with which students can use online digital devices anytime and can share educational materials more easily with others	Increased use of such technologies due to the development that the technological factor has gained in recent years in the university context	Increased use of such technologies due to the development that the technological factor has gained in recent years in the university context
	9. The use of such technologies worsens or improves learners’ learning	Inadequate statistical data to make a difference with traditional teaching methods	Using technology could adversely affect learning	Technology would improve students’ learning

Table 4. Summary of parts of interviews conducted in three European universities

5. Discussion

We found a number of issues emerging from the interviews with the managers of the e-learning services of the three selected universities (University of Dresden, Queen’s University Belfast and University of Bologna).

First, the e-learning design of the courses provided, both in general and on entrepreneurship, was not uniformly managed in line with the learning process set out by Ghiringhelli and Quacquarelli (2003). There was little use of e-learning design in sequential mode, based on the four phases of the learning process (Fee, 2009; Ghiringhelli and Quacquarelli, 2003; Islam *et al.*, 2015; Trentin, 2001), as identified in Figure 1. In particular:

- (1) On the first phase “Identification of training objectives” (Ghiringhelli and Quacquarelli, 2003), in the strategy box in Table 4 and in response to Question 1 (how to adopt e-learning courses at universities), there were differences in the responses provided by respondents. The universities in Belfast and Bologna saw an opportunity to offer a service to students that was available at all times. However, the University of Dresden suggested that e-learning was developed as an innovative teaching method.
- (2) On the second phase “Detection of training needs” (Figure 1), in the users section of Table 4 in response to Question 6 (number of students attending e-learning courses), the same answer was provided by all three universities (Dresden, Belfast and Bologna). The respondents were unable to identify data on students interested in e-learning courses in general and on entrepreneurship in particular.
- (3) One important point in the design of e-learning courses in general and on entrepreneurship was about the professional figures involved in the design, particularly those in the project team (see answers from all three universities to Question 3 in the organization box in Table 4). The team was more closely associated with phase 3 of the e-learning project, on “Creation of Design Team” (Figure 1) than the entire e-learning project. The e-learning services manager at Queen’s University Belfast felt that those involved in the team could fulfill different roles, including educational designer, graphic designer, marketing team, technical support and coordinator.
- (4) Within the fourth phase, on “Selection of learning content” (Figure 1), answers to Question 7 (Table 4, on users) showed a preference for collaborative methods for course delivery at the universities in Belfast and Bologna. This included courses on entrepreneurship. The University of Dresden, however, favored asynchronous services.

Secondly, one particular problem was highlighted in the interview responses. It was clear that the idea of course design for e-learning was mainly focused on the composition of the team. Each university defined the professional figures to be involved in the team. This means that the focus of all the interviewees was on activity linked to the construction of the course and to the professional figures involved and not to the overall construction of the e-learning path. Considerable attention was paid by the three universities to the dynamics related to the design of e-learning courses, including courses on entrepreneurship. However, this attention was focused on a single phase and not on the entire process of e-learning design as identified in Figure 1. Further research is needed to understand these dynamics in detail, including additional surveys and interviews.

6. Conclusions

This article explored the topic of e-learning design within courses in general and courses on entrepreneurship in particular at three European universities: University of Dresden (Germany), Queen’s University Belfast (Northern Ireland, United Kingdom) and University of Bologna (Italy).

The study built on work by Fee (2009), who identified three components of the e-learning system: technology, content and learning/e-learning design. An analysis of the literature showed that there were few studies on e-learning design and particularly on the didactic aspect understood as a process within universities (Islam *et al.*, 2015; Urh *et al.*, 2015). There were a number of contributions on the relationship between e-learning design and entrepreneurship (Cirulli *et al.*, 2016; Maritz *et al.*, 2011; Simeone *et al.*, 2017a,b; Stamatis *et al.*, 2015). However, some of them were more focused on the characteristics of e-learning design of courses on entrepreneurship and how this could help to develop managerial and entrepreneurial skills (Jafari-Moghadam *et al.*, 2012; Jones *et al.*, 2009; Radović-Marković *et al.*, 2012a).

Our research aimed to use case studies of three European universities to examine the attention paid to e-learning design in the preparation of e-learning courses, both generally and on entrepreneurship. We wanted to consider phases of the process outlined by Ghiringhelli and Quacquarelli (2003), including identification of training objectives, detection of training needs, creation of design team and selection of learning content. We used semistructured interviews with the managers of e-learning services at the three universities to explore the process of design of e-learning courses in general and on entrepreneurship in particular.

There were a number of important findings. First, returning to the studies of Yin (2014) on the similarities and differences of the case studies, many similarities emerged between the three universities studied. Second, however, the similarity in the answers provided by the three universities was mostly around phase three of the learning process outlined by Ghiringhelli and Quacquarelli (2003), rather than the whole path. In essence, the interviewees responded identically because they had focused their attention on the different professional figures involved in the construction of the course, rather than looking at the overall e-learning design process across four phases.

Our results therefore reduce the gap in the literature on e-learning design as a process and provide options for future insights on the issue. They could allow more reflection in practical terms. For example, when universities and higher education institutions work on designing e-learning courses, they could try to modify the construction of their e-learning courses to take into account the four phases of the process. This could enable them to ensure that learning content is more suitable to the actual needs of users and students.

This research had some limitations. First, it is difficult to obtain a complete picture of e-learning design in general and for entrepreneurship courses in particular. This work was particularly limited by the small number of interviewees and universities involved. Future work will expand these activities by involving other actors (teaching staff, governance professionals) and further universities to acquire new data.

References

- Adeola, O.S., Adewale, O.S. and Alese, B.K. (2013), "Integrated e-learning system (IES) for the Nigeria universities: an architectural overview", *American Journal of Database Theory and Application*, Vol. 2 No. 1, pp. 1-8.
- Ahmed, F.F. (2015), "Comparative analysis for cloud based e-learning", *Procedia Computer Science*, Vol. 65, pp. 368-376.
- Al-Adwan, A., Al-Adwan, A. and Smedley, J. (2013), "Exploring students acceptance of e-learning using Technology Acceptance Model in Jordanian universities", *International Journal of Education and Development Using Information and Communication Technology*, Vol. 9 No. 2, p. 4.
- Al-Samarraie, H., Selim, H., Teo, T. and Zaout, F. (2017), "Isolation and distinctiveness in the design of e-learning systems influence user preferences", *Interactive Learning Environments*, Vol. 25 No. 4, pp. 452-466.

-
- Al-Yahya, M., George, R. and Alfaries, A. (2015), "Ontologies in e-learning: review of the literature", *International Journal of Software Engineering and its Applications*, Vol. 9 No. 2, pp. 67-84.
- Alavi, M. and Leidner, D.E. (2001), "Research commentary: technology mediated learning - a call for greater depth and breadth of research", *Information Systems Research*, Vol. 12 No. 1, pp. 1-10.
- Alkhalaf, S., Drew, S. and Alhussain, T. (2012), "Assessing the impact of e-learning systems on learners: a survey study in the KSA", *Procedia-Social and Behavioral Sciences*, Vol. 47, pp. 98-104.
- Almpanis, T. (2015), "Staff development and institutional support for technology enhanced learning in UK universities", *Electronic Journal of E-Learning*, Vol. 13 No. 5, pp. 366-375.
- Al-Qahtani, A.A. and Higgins, S.E. (2013), "Effects of traditional, blended and e-learning on students' achievement in higher education", *Journal of Computer Assisted Learning*, Vol. 29 No. 3, pp. 220-234.
- Anderson, T., Liam, R., Garrison, D.R. and Archer, W. (2001), "Assessing teaching presence in a computer conferencing context", *Journal of Asynchronous Learning Networks*, Vol. 5 No. 2, pp. 1-17.
- ANVUR (2014), *Rapporto Sullo Stato del Sistema Universitario e Della Ricerca 2013*, ANVUR, Roma.
- Arbaugh, J.B. (2000), "Virtual classroom characteristics and student satisfaction with internet-based MBA courses", *Journal of Management Education*, Vol. 24 No. 1, pp. 32-54.
- Arbaugh, J.B. (2008), "Does the community of inquiry framework predict outcomes in online MBA courses?", *The International Review of Research in Open and Distributed Learning*, Vol. 9 No. 2.
- Arkorful, V. and Abaidoo, N. (2015), "The role of e-learning, advantages and disadvantages of its adoption in higher education", *International Journal of Instructional Technology and Distance Learning*, Vol. 12 No. 1, pp. 29-42.
- Asgarimehr, M., Shirazi, B., Eskandari, M.J. and Rostami, S. (2012), "A strategic framework for designing e-learning system with focus on university entrepreneurship", *International Journal of Computer Science Issues (IJCSI)*, Vol. 9 No. 1, p. 129.
- Aspen Institute Italia (2014), "E-learning: la rivoluzione in corso e l'impatto sul sistema della formazione in Italia", available at: https://www.aspeninstitute.it/.../Formazione_Online_exec_summary.pdf (accessed 24 September 2015).
- Azeiteiro, U.M., Bacelar-Nicolau, P., Caetano, F.J. and Caeiro, S. (2015), "Education for sustainable development through e-learning in higher education: experiences from Portugal", *Journal of Cleaner Production*, Vol. 106, pp. 308-319.
- Barry, J., Chandler, J. and Clark, H. (2001), "Between the ivory tower and the academic assembly line", *Journal of Management Studies*, Vol. 38 No. 1, pp. 87-101.
- Baxter, P. and Jack, S. (2008), "Qualitative case study methodology: study design and implementation for novice researchers", *Qualitative Report*, Vol. 13 No. 4, pp. 544-559.
- Bennett, S., Agostinho, S. and Lockyer, L. (2015), "Technology tools to support learning design: implications derived from an investigation of university teachers' design practices", *Computers & Education*, Vol. 81, pp. 211-220.
- Benson, R. and Samarawickrema, G. (2009), "Addressing the context of e-learning: using transactional distance theory to inform design", *Distance Education*, Vol. 30 No. 1, pp. 5-21.
- Berman, E.P. (2011), *Creating the Market University: How Academic Science Became an Economic Engine*, Princeton University Press, Princeton, NJ.
- Bhuasiri, W., Xaymoungkhoun, O., Zo, H., Rho, J.J. and Ciganek, A.P. (2012), "Critical success factors for e-learning in developing countries: a comparative analysis between ICT experts and faculty", *Computers & Education*, Vol. 58 No. 2, pp. 843-855.
- Brown, A.R. and Voltz, B.D. (2005), "Elements of effective e-learning design", *The International Review of Research in Open and Distributed Learning*, Vol. 6 No. 1, pp. 1-10.

- Carril, P.C.M., Sanmamed, M.G. and Sellés, N.H. (2013), "Pedagogical roles and competencies of university teachers practicing in the e-learning environment", *The International Review of Research in Open and Distributed Learning*, Vol. 14 No. 3, pp. 462-487.
- Carroll, N. (2013), "E-learning—the McDonaldization of education", *European Journal of Higher Education*, Vol. 3 No. 4, pp. 342-356.
- Castillo-Merino, D. and Serradell-López, E. (2014), "An analysis of the determinants of students' performance in e-learning", *Computers in Human Behavior*, Vol. 30, pp. 476-484.
- Chen, Y., Little, H., Ross, M. and Zhao, Q. (2012), "Factors motivating the adoption of e-learning technologies", *Journal of E-Learning & Higher Education*, Vol. 2012, pp. 1-17.
- Cirulli, F., Elia, G., Lorenzo, G., Margherita, A. and Solazzo, G. (2016), "The use of MOOCs to support personalized learning: an application in the technology entrepreneurship field", *Knowledge Management and E-Learning: International Journal*, Vol. 8 No. 1, pp. 109-123.
- Clark, R.C. and Mayer, R.E. (2011), *E-learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning*, John Wiley & Sons, San Francisco, CL.
- CNPA (2007), "Glossario ASFOR 'Le parole dell' e-Learning" in Cnipa (Ed.), *Vademecum per la Realizzazione di Progetti Formativi in Modalità E-Learning nelle Pubbliche Amministrazioni*, II Edizione, I Quaderni CNPA, Roma, Vol. 32, pp. 347-399.
- Cocozza, A. (2006), *Direzione delle Risorse Umane. Politiche e Strumenti per L'organizzazione e la Gestione delle Relazioni di Lavoro*, FrancoAngeli, Milano.
- Conole, G. (2013), *Designing for Learning in an Open World*, Springer Science & Business Media, London.
- Corbetta, P. (2014), *Metodologia e Tecniche della Ricerca Sociale*, Seconda edizione, Il Mulino, Bologna.
- Creswell, J.W. (2014), *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 4th ed., Sage Publication, London.
- Daft, R.L. (2010), *Organizzazione Aziendale*, Quarta edizione, Apogeo, Milano.
- Dennis, A.R., Fuller, R.M. and Valacich, J.S. (2008), "Media, tasks, and communication processes: a theory of media synchronicity", *MIS Quarterly*, Vol. 32, pp. 575-600.
- Eisenhardt, K.M. (1989), "Building theories from case study research", *Academy of Management Review*, Vol. 14 No. 4, pp. 532-550.
- Eisenhardt, K.M. and Graebner, M.E. (2007), "Theory building from cases: opportunities and challenges", *Academy of Management Journal*, Vol. 50 No. 1, pp. 25-32.
- Elkaseh, A.M., Wong, K.W. and Fung, C.C. (2016), "Perceived ease of use and perceived usefulness of social media for e-learning in Libyan higher education: a structural equation modeling analysis", *International Journal of Information and Education Technology*, Vol. 6 No. 3, pp. 192-199.
- Esposito, G. and Mantese, G. (2003), *E-learning: una Guida Operativa. Come Realizzare e Valutare un Progetto*, FrancoAngeli, Milano.
- Fee, K. (2009), *Delivering E-Learning: A Complete Strategy for Design Application and Assessment*, Kogan Page Publishers, London.
- Fini, R., Rasmussen, E., Siegel, D. and Wiklund, J. (2018), "Rethinking the commercialization of public science: from entrepreneurial outcomes to societal impacts", *Academy of Management Perspectives*, Vol. 32 No. 1, pp. 4-20.
- Franceschi, K., Lee, R.M., Zanakis, S.H. and Hinds, D. (2009), "Engaging group e-learning in virtual worlds", *Journal of Management Information Systems*, Vol. 26 No. 1, pp. 73-100.
- Gentile, T.A.R., De Nito, E., Canonico, P. and Reina, R. (2019), "Understanding e-learning design in European universities: a mixed method study" in Schiuma, G., Demartini, P. and Yan, M.R. (Eds), *Knowledge, Ecosystems and Growth. Proceedings*, IFKAD, Matera, pp. 1504-1521.

-
- Ghiringhelli, C. and Quacquarelli, B. (2003), "Progettare l'apprendimento dentro e fuori dalla rete", in Nacamulli, R.C.D. (Ed.), *La Formazione, il Cemento e la Rete*, Etas, Milano, pp. 139-178.
- Gill, M. (2000), "E-learning technology and strategy for organisations", in Fry, K. (Ed.), *The Business of E-Learning: Bringing Your Organization in the Knowledge E-economy*, University of Technology, Sydney.
- Gorbunovs, A., Kapenieks, A. and Cakula, S. (2016), "Self-discipline as a key indicator to improve learning outcomes in e-learning environment", *Procedia-Social and Behavioral Sciences*, Vol. 231, pp. 256-262.
- Gros, B. and García-Peñalvo, F.J. (2016), "Future trends in the design strategies and technological affordances of e-learning", in Spector, M., Lockee, B.B. and Childress, M.D. (Eds), *Learning, Design, and Technology. An International Compendium of Theory, Research, Practice, and Policy*, Springer, Cham, pp. 1-23.
- Hassanzadeh, A., Kanaani, F. and Elahi, S. (2012), "A model for measuring e-learning systems success in universities", *Expert Systems with Applications*, Vol. 39 No. 12, pp. 10959-10966.
- Haya, P.A., Daems, O., Malzahn, N., Castellanos, J. and Hoppe, H.U. (2015), "Analysing content and patterns of interaction for improving the learning design of networked learning environments", *British Journal of Educational Technology*, Vol. 46 No. 2, pp. 300-316.
- Horton, W. (2001), *Leading E-Learning*, American Society for Training and Development, Alexandria.
- Horton, W. (2011), *E-learning by Design*, John Wiley & Sons, San Francisco, CA.
- Huang, E.Y., Lin, S.W. and Huang, T.K. (2012), "What type of learning style leads to online participation in the mixed-mode e-learning environment? A study of software usage instruction", *Computers & Education*, Vol. 58 No. 1, pp. 338-349.
- Hwang, A. and Arbaugh, J.B. (2006), "Virtual and traditional feedback-seeking behaviors: underlying competitive attitudes and consequent grade performance", *Decision Sciences Journal of Innovative Education*, Vol. 4 No. 1, pp. 1-28.
- Islam, A.N. (2013), "Investigating e-learning system usage outcomes in the university context", *Computers & Education*, Vol. 69, pp. 387-399.
- Islam, N., Beer, M. and Slack, F. (2015), "E-learning challenges faced by academics in higher education", *Journal of Education and Training Studies*, Vol. 3 No. 5, pp. 102-112.
- Jafari-Moghadam, S., Zaeferian, R. and Salamzadeh, A. (2012), "Challenges of entrepreneurship education: evidence from a developing country", *Entrepreneurship Education-A Priority for the Higher Education Institutions*, Forthcoming.
- Jansen, D. and Schuwer, R. (2015), *Institutional MOOC Strategies in Europe. Status Report Based on a Mapping Survey Conducted in October-December 2014*, EADTU, Heerlen.
- Jones, P., Jones, A. and Packham, G. (2009), "E-learning induction design for an undergraduate entrepreneurship degree", *International Journal of Management*, Vol. 8 No. 1, p. 37.
- Koh, J.H.L., Herring, S.C. and Hew, K.F. (2010), "Project-based learning and student knowledge construction during asynchronous online discussion", *The Internet and Higher Education*, Vol. 13 No. 4, pp. 284-291.
- Koutsabasis, P., Stavrakis, M., Spyrou, T. and Darzentas, J. (2011), "Perceived impact of asynchronous e-learning after long-term use: implications for design and development", *International Journal of Human-Computer Interaction*, Vol. 27 No. 2, pp. 191-213.
- Kukulska-Hulme, A. and Traxler, J. (2005), *Mobile Learning: A Handbook for Educators and Trainers*, Routledge, Abingdon.
- Kurilovas, E., Kubilinskiene, S. and Dagiene, V. (2014), "Web 3.0-Based personalisation of learning objects in virtual learning environments", *Computers in Human Behavior*, Vol. 30, pp. 654-662.
- Lam, A. (2010), "From 'ivory tower traditionalists' to 'entrepreneurial scientists'? Academic scientists in fuzzy university—industry boundaries", *Social Studies of Science*, Vol. 40 No. 2, pp. 307-340.

- Leidner, D.E. and Jarvenpaa, S.L. (1995), "The use of information technology to enhance management school education: a theoretical view", *MIS Quarterly*, Vol. 19 No. 3, pp. 265-291.
- Lin, W.S. and Wang, C.H. (2012), "Antecedents to continued intentions of adopting e-learning system in blended learning instruction: a contingency framework based on models of information system success and task-technology fit", *Computers & Education*, Vol. 58 No. 1, pp. 88-99.
- Lister, M. (2014), "Trends in the design of e-learning and online learning", *Journal of Online Learning and Teaching*, Vol. 10 No. 4, pp. 671-679.
- Lockyer, L., Heathcote, E. and Dawson, S. (2013), "Informing pedagogical action: aligning learning analytics with learning design", *American Behavioral Scientist*, Vol. 57 No. 10, pp. 1439-1459.
- Loh, C., Wong, D.H., Quazi, A. and Kingshott, R.P. (2016), "Re-examining students' perception of e-learning: an Australian perspective", *International Journal of Educational Management*, Vol. 30 No. 1, pp. 129-139.
- MacLean, P. and Scott, B. (2007), "Learning design: requirements, practice and prospects", *Campus-Wide Information Systems*, Vol. 24 No. 3, pp. 187-198.
- Maritz, A., Brown, C. and Chich Jen, S. (2011), "A blended learning approach to entrepreneurship education", *Actual Problems of Economics*, Vol. 13 No. 115, pp. 83-93.
- Martin, B. (2012), "Are universities and university research under threat? Towards an evolutionary model of university speciation", *Cambridge Journal of Economics*, Vol. 36, pp. 543-565.
- Martins, L.L. and Kellermanns, F.W. (2004), "A model of business school students' acceptance of a web-based course management system", *The Academy of Management Learning and Education*, Vol. 3 No. 1, pp. 7-26.
- Masud, M. (2016), "Collaborative e-learning systems using semantic data interoperability", *Computers in Human Behavior*, Vol. 61, pp. 127-135.
- Masud, M.A.H. and Huang, X. (2012), "An e-learning system architecture based on cloud computing", *System*, Vol. 10 No. 11, pp. 255-259.
- Oproiu, G.C. (2015), "A study about using e-learning platform (Moodle) in university teaching process", *Procedia-Social and Behavioral Sciences*, Vol. 180, pp. 426-432.
- Parkes, M., Reading, C. and Stein, S. (2013), "The competencies required for effective performance in a university e-learning environment", *Australasian Journal of Educational Technology*, Vol. 29 No. 6, pp. 777-791.
- Parkes, M., Stein, S. and Reading, C. (2015), "Student preparedness for university e-learning environments", *The Internet and Higher Education*, Vol. 25, pp. 1-10.
- Patton, M.Q. (1990), *Qualitative Evaluation and Research Methods*, Sage Publications, Beverly Hills.
- Piccoli, G., Ahmad, R. and Ives, B. (2001), "Web-based virtual learning environments: a research framework and a preliminary assessment of effectiveness in basic IT skills training", *MIS Quarterly*, Vol. 25 No. 4, pp. 401-426.
- Qu, S.Q. and Dumay, J. (2011), "The qualitative research interview", *Qualitative Research in Accounting & Management*, Vol. 8 No. 3, pp. 238-264.
- Radović-Marković, M., Marković, D., Demiray, U., Demiray, E., Vučeković, M. and Salamzadeh, A. (2012a), "Fostering entrepreneurship in higher education through e-learning: case study of Serbia and Turkey", *1st Annual International Conference on Employment, Education and Entrepreneurship*.
- Radović-Marković, M., Salamzadeh, A., Marković, D., Grozdanić, R. and Vučeković, M. (2012b), "E-learning in business and entrepreneurship: an evidence of Serbia, Iran and India", available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2203718 (accessed 18 November 2019).
- Radović-Marković, M., Marković, D., Simović, V., Medić, Z. and Zivadinović, J. (2017), "E-learning as a tool for empowering entrepreneurship", *Journal of Women's Entrepreneurship and Education*, Vols 3-4, pp. 65-72.

-
- Riahi, G. (2015), "E-learning systems based on cloud computing: a review", *Procedia Computer Science*, Vol. 62, pp. 352-359.
- Rienties, B. and Toetnel, L. (2016), "The impact of learning design on student behaviour, satisfaction and performance: a cross-institutional comparison across 151 modules", *Computers in Human Behavior*, Vol. 60, pp. 333-341.
- Rienties, B., Toetnel, L. and Bryan, A. (2015), "Scaling up learning design: impact of learning design activities on LMS behavior and performance", *Proceedings of the Fifth International Conference on Learning Analytics And Knowledge, LAK '15, ACM*, pp. 315-319.
- Rippa, P. and Secundo, G. (2019), "Digital academic entrepreneurship: the potential of digital technologies on academic entrepreneurship", *Technological Forecasting and Social Change*, Vol. 146, pp. 900-911.
- Roberts, J. (2006), *L'impresa Moderna*, Il Mulino, Bologna.
- Rodríguez-Triana, M.J., Martínez-Monés, A., Asensio-Pérez, J.I. and Dimitriadis, Y. (2015), "Scripting and monitoring meet each other: aligning learning analytics and learning design to support teachers in orchestrating CSCL situations", *British Journal of Educational Technology*, Vol. 46 No. 2, pp. 330-343.
- Schoop, E., Köhler, T., Börner, C. and Schulz, J. (2016), "Consolidating eLearning in a higher education institution: an organisational issue integrating didactics, technology, and people by the means of an eLearning strategy" in Spender, J.C., Schiuma, G. and Noenning, J.R. (Eds), *Towards a New Architecture of Knowledge: Big Data, Culture and Creativity*, Proceedings, IFKAD, Dresden University of Technology, Dresden, pp. 1545-1557.
- Secundo, G., Elia, G. and Taurino, C. (2008), "A process-oriented and technology-based model of virtual communities of practices: evidence from a case study in higher education", *International Journal of Web-Based Learning and Teaching Technologies*, Vol. 3 No. 1, pp. 90-102.
- Shakir, M. (2002), "The selection of case studies: strategies and their applications to IS implementation case studies", *Research Letters in the Information and Mathematical Sciences*, Vol. 3, pp. 69-77.
- Shaw, R.S. (2010), "A study of learning performance of e-learning materials design with knowledge maps", *Computers & Education*, Vol. 54 No. 1, pp. 253-264.
- Simeone, L., Secundo, G. and Schiuma, G. (2018), "Arts and design as translational mechanisms for academic entrepreneurship: the metaLAB at Harvard case study", *Journal of Business Research*, Vol. 85, pp. 434-443.
- Simeone, L., Secundo, G. and Schiuma, G. (2017b), "Fostering academic entrepreneurship through design-as-translation to align stakeholders' needs: the MIT SENSEABLE city lab case", *Technovation*, Vols 64/65, pp. 58-67.
- Simkova, M., Tomaskova, H. and Nemcova, Z. (2012), "Mobile education in tools", *Procedia-Social and Behavioral Sciences*, Vol. 47, pp. 10-13.
- Sinclair, J., Boyatt, R., Rocks, C. and Joy, M. (2015), "Massive open online courses: a review of usage and evaluation", *International Journal of Learning Technology*, Vol. 10 No. 1, pp. 71-93.
- Songkram, N. (2015), "E-learning system in virtual learning environment to develop creative thinking for learners in higher education", *Procedia-Social and Behavioral Sciences*, Vol. 174, pp. 674-679.
- Sousa, C.A.A., de Nijs, W.F. and Hendriks, P.H.J. (2010), "Secrets of the beehive: performance management in university research organizations", *Human Relations*, Vol. 63 No. 9, pp. 1439-1460.
- Stamatis, D., Hansson, B., Hjeltnes, T.A. and MacKinnon, L. (2015), "A distributed concurrent design based e-learning approach to entrepreneurship education", *Proceedings of ICEIRD*, pp. 18-19.
- Teräs, H. and Herrington, J. (2014), "Neither the frying pan nor the fire: in search of a balanced authentic e-learning design through an educational design research process", *The International Review of Research in Open and Distributed Learning*, Vol. 15 No. 2, pp. 232-253.

- Testoni, L. (2014), "MOOCs e biblioteche accademiche: tra possibilità di "esserci" e criticità", *JLIS. it*, Vol. 5 No. 1, pp. 241-263.
- Trentin, G. (2001), *Dalla Formazione a Distanza All'apprendimento in Rete*, FrancoAngeli, Milano.
- Urh, M., Vukovic, G. and Jereb, E. (2015), "The model for introduction of gamification into e-learning in higher education", *Procedia-Social and Behavioral Sciences*, Vol. 197, pp. 388-397.
- Venkatesh, V. and Davis, F.D. (2000), "A theoretical extension of the technology acceptance model: four longitudinal field studies", *Management Science*, Vol. 46 No. 2, pp. 186-204.
- Wadhvani, R.D., Galvez-Behar, G., Mercelis, J. and Guagnini, A. (2017), "Academic entrepreneurship and institutional change in historical perspective", *Management and Organizational History*, Vol. 12 No. 3, pp. 175-198.
- Yanson, R. and Johnson, R.D. (2016), "An empirical examination of e-learning design: the role of trainee socialization and complexity in short term training", *Computers & Education*, Vol. 101, pp. 43-54.
- Yin, R.K. (2014), *Case Study Research: Design and Methods*, 5th ed., Sage publications, London.

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