
THE ECOLOGY OF HIGHER EDUCATION – A SYSTEMATIC LITERATURE REVIEW

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Abstract

The process of literature review has been developed in a variety of ways, through systematic narrative models, scoping review, integrative review, critical review, review of the state of the art, mapping review, meta-analysis, etc. This article presents a practice of the systematic integrative review of the literature in the field of educational sciences in higher education. Precisely, it presents the systematic literature review process in the field of educational management, current higher education paradigms, curriculum design to the current information society and pedagogical innovation in higher education. The integrative review has resulted in a trajectory on evolution and the state of the art on the concerns of nowadays higher education. This process enabled the formulation of a theory supported on the intersection (integration) of the various studies analyzed.

Abstract in Portuguese

Resumo O processo de revisão da literatura tem sido desenvolvido de diversas formas, através de modelos narrativos sistemáticos, revisão por objetivo, revisão integrativa, revisão crítica, revisão do estado da arte, revisão por mapeamento, meta-análise, etc. Este artigo apresenta uma prática de revisão sistemática e integrativa da literatura no campo das ciências da educação no domínio do ensino superior. Concretamente, apresenta o processo sistemático de revisão da literatura no campo da gestão nos processos educativos, dos paradigmas educacionais no ensino superior, considerando o desenho curricular e a inovação pedagógica. A revisão integrativa resultou numa trajetória que descreve a evolução e o estado da arte sobre as atuais preocupações vividas no ensino superior. Este processo permitiu a formulação de uma teoria suportada na interseção (integração) dos vários estudos analisados.

Keywords: Curriculum Design; Higher education; Education Management; Pedagogical Innovation.

Introduction

The literature review aims to get a wider compression on a given subject through analysis and synthesis, more or less systematic, of previous works. It is an essential and structuring work for the creation of knowledge and for the immersion of gaps and fields of action in specific areas of knowledge. The simple synthesis of general knowledge about a given subject is not described in a cause-and-effect relationship. The process of literature review requires a complex organization and discussion of the matter under study.

There are several ways to review the literature. You can choose to simply research a particular topic in scientific databases, trying to gather, systematize and discuss, in a narrative way, the state of the art of a subject. More precisely and rigorously, methods should be applied to the selection of the papers to be studied and to the forms of analysis. According to Whitmore and Knafl (2005), existing methodologies will continue to proliferate and involve as well as the complexity of the topics to be studied.

Below is an overview of the process of literature review with application in a particular context of the field of education sciences in higher education. After the brief description of the main methods of literature review, a case of application and main results of the first stage of

an integrative literature review process is presented. It ends with the theorizing that resulted from the systematization of the generated knowledge.

General Methods of Literature Review

According to Greenhalgh (1997) the literature review process comprises a synthesis of primary studies that contains clearly stated objectives, materials and methods and is conducted according to a clear and reproducible methodology. A rigorous literature review process should be developed by using systematization strategies using clear, reproducible sequences, methods and techniques. When it takes the narrative form, used to describe the state of the art on a specific subject, from a theoretical or conceptual point of view, without indicating the methodology applied or the criteria used in the selection of sources, it is more permeable to the influence of the researcher.

The data collection that supports the literature review process is usually carried out based on bibliographic sources for later analysis and systematization of previous research results, developed by several authors.

In the field of education, and in social areas in general, the systematic review of literature seeks to discover evidence of facts, contradictions and gaps, in the sense of support to the creation of knowledge. For this, methods are used for data collection, categorization, evaluation and synthesis of research results.

The systematic review of the literature follows a methodology that involves the formulation of a more or less specific central research question, the collection of existing studies on the subject, the critical evaluation of the studies collected, the collection of data presented in each study, the Analysis and presentation of results, interpretation of results and production of a summary of the work. The methods to be used may include several forms, namely: meta-analysis, mapping review, state of the art, scoping review and integrative literature review.

The meta-analysis combines the results of several primary studies using statistical formulas. In this process, each collected data is encoded, synthesized and recorded in a database. Subsequently, the data is categorized for the formulation of calculations. It is an important instrument for quantitative studies. The mapping review method foresees the elaboration of a concept map where the concepts studied and analyzed are presented and interconnected. Initially the researcher defines the general topic to study and writes it in the middle of a blank sheet. It then includes the various related terms. These terms will be used as search keywords. In the next step, the researcher searches the databases and records on the map the articles found in each of the themes and their possible links. While the researcher is doing the reading the terms and the map is growing, being possible to identify trends, in a visually described result (see Fink, 1998; Chiou, 2009). The state-of-the-art method corresponds to a systematic review of a particular theme in which the process of selecting articles is directly related to the quality of the research process (repeatable experience). This reviewing usually takes a narrative form. The scoping review method corresponds to a systematic review, but the process of selecting articles is not as related to the quality of the research process, as it is essentially to the comprehensiveness. Articles are selected by relevance to address the research question (and not just the quality itself). It is an exploratory process and all studies in a given field can be included. The relevance, ideas and results of the works found are discussed with specialists and stakeholders in the area. This type of literature review results from an interactive performance, allowing the participation of a number of professionals from different areas (Poth & Ross, 2009). Integrative review is a summary of empirical or theoretical studies for a comprehensive understanding of a particular phenomenon. This method aims to draw an analysis and synthesis to the existing knowledge allowing the creation of new knowledge. The term "integrative" comes from the integration of opinions, concepts or ideas. This method allows the extraction of general conclusions and the synthesis of the knowledge state of a given subject in addition to

pointing knowledge gaps. Among the methods of literature review this is considered the broadest (Mendes, Silveira, & Galvão, 2008).

Next, we present the steps of an integrative literature review process in the particular context of higher education.

Integrative Review of Literature in the Context of Higher Education

The process of integrative literature review follows different steps, as illustrated in the following image:



Figure 1. Main steps of an integrative literature review process

The research process leading to the extraction of knowledge about the main concerns in the context of higher education is summarized below.

First step: Set Question Research

The rigorous definition of the research question is fundamental and its nature influences the success achieved. Very complex research questions make difficult the research processes. The research process developed intends to answer the following questions: What model of pedagogical innovation should IES follow? What implications does the management of HEIs have?

This question / sub-question falls into the area of social sciences, a subarea of education.

Second Step: Identify Databases to be Consulted; Define Search Keywords

The Science Citation Index (SCI), Social Sciences Citation Index (SSCI) and Arts and Humanities (A & HCI) indexes of Thomson Reuters / ISI For the year 2011, the 2011 Science and Social Sciences editions of the Journal Citation Reports (JCR), integrated in the ISI Web of Knowledge were selected.

The method “Report-based expansion” was used to determine the keywords. This method uses the terms found in the first searches on original terms. Specifically, we used the b-on search engine according to the query based on the research question was selected, the first

10 documents found were selected and the most repeated terms extracted. Specifically the following search terms were defined:

1. Education management / governance IES; IES Administrative innovation; Curricular organization; Curricular innovation; IES management; Educational policies; IES model;
2. Higher Education / e-learning / b-learning;
3. Curriculum design / competencies / models curricular quality; Educational planning;
4. Pedagogical Innovation; IES pedagogy.

Step Three: Conduct Research in the Chosen Databases

The application of the research based on the key terms identified resulted in thousands of articles, as exemplified by the following figures:

The screenshot displays the b-on search interface. At the top, the logo and 'Serviço de Pesquisa' are visible. Below the search bar, filters are applied: 'management education', 'curriculum design', 'pedagogical innovation', and 'higher education'. The results section shows 'Resultados da pesquisa: 1 - 30 de 51,621'. The first result is 'Review: Sustainability in higher education: a systematic review with focus on management education' by Ege, Pinar, Schmitt, Baßler, and Erensen, published in 'Journal of Cleaner Production' in 2015. The second result is 'Transformative Curriculum Design in Health Sciences Education' by Halpa, Galvan, Series, Advances in Higher Education and Professional Development (AHEPD) Book Series, Hershey, PA, IGI Global, 2015. The third result is 'Developing Workforce Diversity Programs, Curriculum, and Degrees in Higher Education' by Scott, Charlotte L., Sims, Jennifer D., Series, Advances in Higher Education and Professional Development Series, Hershey, PA, Information Science Reference, 2015. The fourth result is 'Innovation in a Mental Health Course Design: Increasing Student Engagement and Interaction' by Chassens, Ashlar, Journal of the New York State Nurses Association, 2016, 44(2), 35-27.

Figure 2. Search for papers in b-on

Título	Autores	Título de fonte	Data de publicação	Ano de publicação
Rethinking Giftedness and Gifted Education: A Proposed Direction Forward Based on Psychological Science	Subotnik, Rena F.; Olczewski-Kubilus, Paula; Worrell, Frank C.	PSYCHOLOGICAL SCIENCE IN THE PUBLIC INTEREST	JAN 2011	2011
Versatile, Immersive, Creative and Dynamic Virtual 3-D Healthcare Learning Environments: A Review of the Literature	Hansen, Margaret M.	JOURNAL OF MEDICAL INTERNET RESEARCH		2008
Barriers to Faculty Pedagogical Change: Lack of Training, Time, Incentives, and ... Tensions with Professional Identity?	Brownell, Sara E.; Tanner, Kimberly D.	CBE-LIFE SCIENCES EDUCATION	DEC 2012	2012
Use of research-based instructional strategies in introductory physics: Where do faculty leave the innovation-decision process?	Henderson, Charles; Dancy, Melissa; Niewiadomska-Bugaj, Magdalena	PHYSICAL REVIEW SPECIAL TOPICS-PHYSICS EDUCATION RESEARCH	JUL 31 2012	2012
Investigating university students' adaptation to a digital learner course portfolio	Lopez-Fernandez, Olaitz; Luis Rodriguez-Illera, Jose	COMPUTERS & EDUCATION	APR 2009	2009
Entrepreneurship education and the business school	Birka, M.; Stankevi, K.; Mahon, G.L.	TECHNOLOGY ANALYSIS & STRATEGIC MANAGEMENT	FEB 2006	2006
Understanding the real barriers to technology-enhanced innovation in higher education	Schneckenberg, Dirk	EDUCATIONAL RESEARCH		2009
Using reflection to promote teamwork understanding in engineering design education	Hirsch, Penny L.; McKenna, Ann F.	INTERNATIONAL JOURNAL OF ENGINEERING EDUCATION		2008
Academic Environments in Detail: Holland's Theory at the Subdiscipline Level	Lefkova, Lisa R.; Tennison, Patrick T.; Harper, Betty J.; Yin, Alex C.	RESEARCH IN HIGHER EDUCATION	FEB 2010	2010
Quality in e-learning - a conceptual framework based on experiences from three international benchmarking projects	Ossannilsson, E.; Landgren, L.	JOURNAL OF COMPUTER ASSISTED LEARNING	FEB 2012	2012

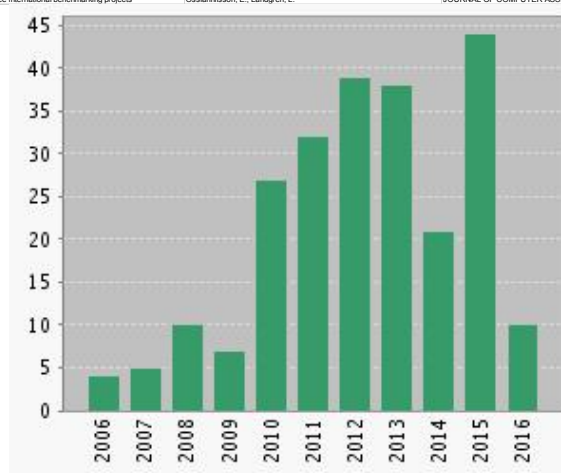


Figure 3. Research in ISI of knowledge

Fourth Step: Eligibility Criteria (Inclusion / Exclusion)

Given the impossibility of analyzing all the works published in this area, it is always necessary to apply mechanisms of inclusion and exclusion of the articles collected. For this study semantic filters were defined (e.g. IE – Teaching Institutions instead of Internet explorer), evidence filters (example: the experiment is repeatable, the research process is supported by evidence, is the evidence complete?), Language filters (Articles in Portuguese and English – reflections of the national and international reality), filters according to the nature of the works (only scientific articles of academic journals with online article availability) and temporal filters (only works done since 2010).

Fifth Step: Using the Cutting Criteria

The application of each of the eligibility criteria was reducing the number of papers to be studied, as shown in the images below:

pedagogical innovation Selecionar um campo...

AND > higher education Selecionar um campo...

AND > Selecionar um campo...

[Pesquisa básica](#) [Pesquisas avançadas](#) [Histórico de pesquisas](#)

Refinar resultados

Pesquisa atual para

Localizar todos os meus termos de pesquisa:
[pedagogical innovation AND higher education](#)

Experiências

☐ Pesquisar também no texto integral dos artigos

☐ Pesquisar assuntos relacionados

Limitadores

☐ Disponível na Coleção de Biblioteca

☐ Data de publicação: 2006/01-20/01/2011

Limite para

☐ Texto integral

☐ Revisão por especialistas

☐ Disponível na Coleção de Biblioteca

2006 2010

Data de publicação

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☒ Todos os resultados

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Publicação

Editor

Idioma

Fornecedor de Conteúdos

☐ Todos os Provedores

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☒ Science Citation Index (16)

☒ Scopus® (15)

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Artigos

1-38 de 112

Página: 1 2 3 4

Data Adicionada

☐ Selecionar/desmarcar todos

☐ 1. Review: Sustainability in higher education: a systematic review with focus on management education



Período científico acadêmico

By Figueroa, Paula Schmitt, Rautfert, Emmanuel. In *Bridges for a more sustainable future: Joining Environmental Management for Sustainable Universities (EMSU) and the European Roundtable for Sustainable Consumption and Production (ERSCP) conference*, Journal of Cleaner Production. 1 November 2015. 106-22-33 Language: English. DOI: 10.1016/j.jclepro.2015.04.116, Base de dados: ScienceDirect

Sustainability has received increasing attention in management education over the past ten years. This article reviews a decade's worth of research in a systematic analysis of 63 articles published...

[Exportar Endnote Web / Mendeley](#)

☐ 2. Innovation in a Mental Health Course Design: Increasing Student Engagement and Interaction.



Período científico acadêmico

Chasseen, Akhtar Ebrahimi. Journal of the New York State Nurses Association, 2016, 44(2): 20-27. 8p. (Article) ISSN: 0028-7644, Base de dados: CINAHL Plus with Full Text

Assuntos: Curriculum Development, Mental Health Education, Student Role, Education, Nursing, Teaching Methods

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☐ 3. DIGITAL INNOVATION AS A FUNDAMENTAL AND POWERFUL CONCEPT IN THE INFORMATION SYSTEMS CURRICULUM.



Período científico acadêmico

By Fichman, Robert G., Dos Santos, Brian L., Zhang, Zhigang (Eric). MIS Quarterly. Jun2014, Vol. 38 Issue 2, p409-A15. 41p. 3 Diagrams, 22 Charts.

The 10-year march of Moore's Law has led to the creation of a relatively cheap and increasingly easy-to-use world-wide digital infrastructure of computers, mobile devices, broadband network connections...

Assuntos: BUSINESS education -- Research, INFORMATION resources management -- Research, BUSINESS planning -- Research, TEACHING, MOBILE communication systems -- Research, KNOWLEDGE management, INFORMATION technology -- Study & teaching (Higher) -- Research

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☐ 4. Research Notes: An experiential learning pedagogical framework for enterprise systems education in business schools



Período científico acadêmico

By Riut, Umar. In *International Journal of Management Education*. July 2016. 14(2): 198-211 Language: English. DOI: 10.1016/j.ijme.2016.04.006, Base de dados: ScienceDirect

Enterprise Systems (also known as Enterprise Resource Planning or ERP systems) have experienced mainstream adoption across various industries as a comprehensive solution for cross-functional information systems...

Conteúdo da pasta
+ Voltar
Para armazenar estes itens na pasta para uma sessão futura, [Registre-se em Meu ERSCOnline](#).

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Artigos
21 de 42 de 42
Página: 1 de 1
Data Adicional + Opções de página +

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☐ 31 **Technology transience and the challenges it poses to higher education**
By Ancelet, Ray J. In: Quarterly Review of Distance Education, Summer, 2013, Vol. 16 Issue 2, p1, 18 p., Information Age Publishing, Inc. Language: English, Base de dados: Academic OneFile
A HISTORICAL CONTEXT FOR TODAY'S PERSPECTIVES ON TECHNOLOGY Technology has stood the test of time. Or has it? Does technology endure, or is it rapidly replaced? This question is in [...]
Assuntos: Technology in education; Market trend/market analysis; Technology application; Educational technology - Forecasts and trends; Educational technology - History; Education; Higher - Technology application; Instructional design - Technology application; Technological innovations - Models
[Texto completo em HTML](#) [Texto completo do PDF](#) [Exportar Endnote Web / Mendeley](#)

☐ 32 **The Trend of Technologisation of Modern Education (the Use of Humanitarian Technologies)**
By Ignatova, Inna. In: Worldwide trends in the development of education and academic research, Sofia, Bulgaria, 15-18 June, 2013, Proceedings - Social and Behavioral Sciences, 5 December 2015 214-606-613
Language: English, DOI: 10.1016/j.sbspro.2015.11.795, Base de dados: ScienceDirect
The article discusses the technological approach in higher education. The analysis of the process of technologisation of vocational higher education is given. Such concepts as "humanitarian technol...
Assuntos: INFORMATION & communication technologies; TEACHING models; EDUCATIONAL technology - Universities & colleges; CURRICULUM planning - Universities & colleges; EDUCATIONAL technology planning; HIGHER education - Great Britain; YOUNG adults; HIGHER education
[Texto integral disponível](#) [Exportar Endnote Web / Mendeley](#)

☐ 33 **Conceptualising the role of information and communication technologies in the design of higher education teaching models used in the UK.**
By Card, Sally Jane, Arley, British Journal of Educational Technology, Jan2015, Vol. 46 Issue 1, p55-70, 13p, 2 Charts, Publisher: Wiley-Blackwell
Despite the widespread availability of information and communication technologies (ICTs) and some research into specific pedagogical practices using them, there has been little research on the r...
Assuntos: INFORMATION & communication technologies; TEACHING models; EDUCATIONAL technology - Universities & colleges; CURRICULUM planning - Universities & colleges; EDUCATIONAL technology planning; HIGHER education - Great Britain; YOUNG adults; HIGHER education
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☐ 34 **Virtually unlimited classrooms: Pedagogical practices in massive open online courses**

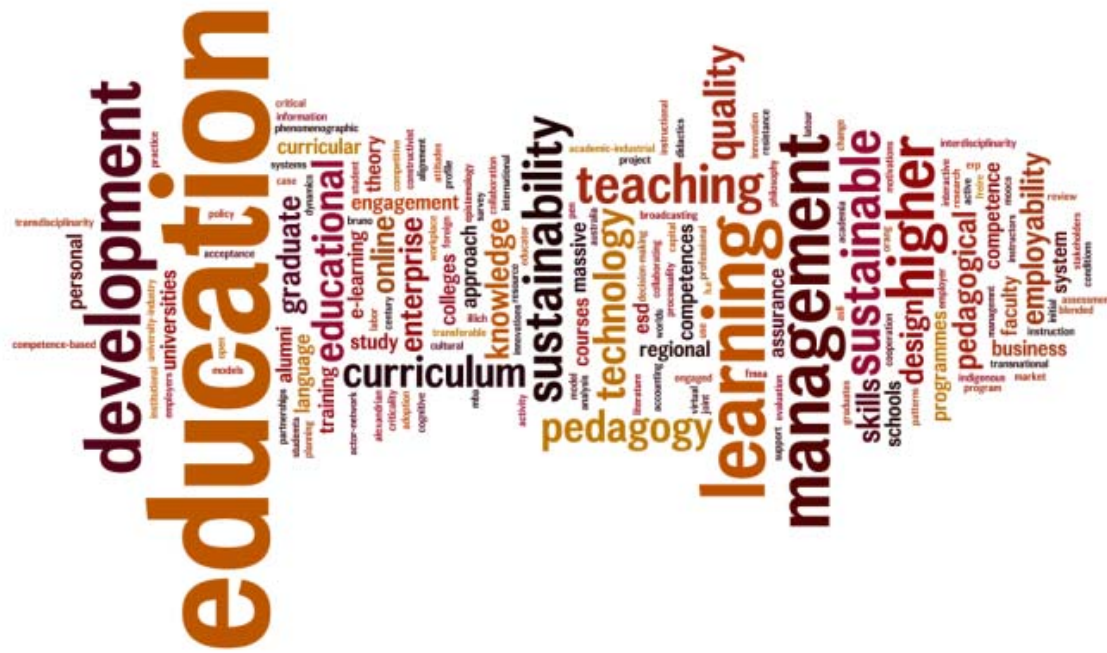
Figure 4. Successive application of the eligibility criteria

Results Obtained

Step 6: Analyse Critically and Evaluate the Studies

As a result of the process, it was possible to verify the existence of several works in this area of knowledge. Essentially framed in group of keywords 3 and 4 (3 – Curriculum design / competencies / models curricular quality; Educational planning; 4 – Pedagogical Innovation; Pedagogy IES) and less at the level of group of key words 1 and 2 (1 – Education management / governance IES; IES Administrative innovation; Curricular organization; Curricular innovation; IES management; Educational policies; Model IES; 2 – Higher Education / e-learning / b-learning). There was also a trend in the evolution of the number of publications in this area.

The following terms stand out:



Regarding the titles of scientific journals, the following publications were analyzed: The following terms stand out:

Figure 6. Title of scientific journals analyzed

Step 7: Prepare a Summary Summing up the Information Available

At a conceptual level, there are concerns about governance and current challenges facing HEIs, it is concluded that as a management model, HEIs should seek to develop a structure of Global Quasi- Companies, look for models of competitiveness, in a complex system guided by values of prestige and shared market. Management should be supported by entrepreneurial visions (Pucciarelli & Kaplan, 2016) and in the assumption of corporate social responsibility (Pucciarelli & Kaplan, 2016; Hesselbarth & Schaltegger, 2014). It is essential that higher education institutions seek to respond to the competitiveness that emerges in the context of an increasingly free and global market where brand and marketing, leadership and strategy issues are increasingly structuring. The new educational practices that emerge in higher education institutions, as well as the driving force of the students themselves, require regulatory and financing policies. Increasingly, institutions should seek co-creation of management and knowledge models integrating the vision of key stakeholders (Pucciarelli & Kaplan, 2016; Bolton & Nie, 2010), including collaboration with industry and teachers (Sheppard, Minocha, & Hristov, 2015).

Above all, it is important to ensure the sustainability of HEIs, when making decisions about which management models should be adopted (Figueiró & Raufflet, 2015; Viegas et al., 2016). This sustainability should reflect the comprehensive assessment and individual options that best fits in the dynamics of the complex reality (Viegas et al., 2016). This vision also incorporates the concept of humanization of technologies (technologies for the production of knowledge, change and annexation of meaning) (Măță & Suci, 2011), of flexibility and administrative innovation, change management and adult training throughout the life. This view implies the promotion and development of specific skills from teachers (Măță & Suci, 2011), including training of general and specific skills as well as technological skills (Ponnan & Ambalavanan, 2014). Nonetheless, the significant number of higher education institutions that are resistant to the adoption of new technologies (Watty, McKay, & Ngo, 2015) is not negligible.

As far as learning environments are concerned, it is concluded that these should be developed according to a transdisciplinary paradigm (Dlouhá & Burandt, 2015) and interdisciplinary (Crișan & Enache, 2011). The perspective should be self-sufficient, interdisciplinary, multidisciplinary, transdisciplinary, a sustainable creation centred on the course / program / student (Figueiró & Raufflet, 2015). The specialization of higher education institutions should increasingly be supported by the capacity to generate knowledge in detriment of physical or geographical boundaries. The concept of higher education grows in the direction of transnationality, with no boundaries to education (Brown, 2013). The relationship with students should engage international students (Larina, 2015) and flexibility for the concepts of Homeschooling (Neuman & Guterman, 2016). It requires new definitions that consider the characteristics of mobile learning and informal learning (Singh et al., 2014) that are structured around complex systems and skills relationships and blended-learning environments (Caird & Lane, 2015) or e-learning (Songkram, Khlaisang, Puthaseranee, & Likhitdamrongkiat, 2015; Pavel, Fruth, & Neacsu, 2015; O'Connor, 2014). This should include specifications for adaptation to personal environments learning (PLE), the PLPlan (personal learning plans) and PLNetwork (personal learning network) (Dočekal & Tulinská, 2015), a guideline for the development of autonomous capabilities of Critical and social learning, considering social and historical movements (Lotz-Sisitka, Wals, Kronlid, & McGarry, 2015), including the promotion of critical thinking and fluency in foreign languages (Rivža, Bikse, & Brence, 2015). The personal networks should result in the co-creation of knowledge (Bolton & Nie, 2010) and knowledge networks (Fenwick & Edwards, 2014). Among other characteristics, learning environments should be flexible, interactive, collaborative, e-learning, lifelong learning and be adapted to student workers (Azeiteiro, Nicolau, Caetano, & Caeiro, 2015). Collaboration can also be promoted in a regional dimension (regionalization of education) and for local communities (Anand, Bisailon, Webster, & Amor, 2015).

In a more operational dimension, many studies have emphasized the importance of changing curricula, but few have presented concrete solutions of how to do it, where the educational paradigm is explicit (Figueiró & Raufflet, 2015). Nevertheless, the literature reveals that curricular design should not neglect traditional models, but it should add to the concerns of research in the field of education and technology, with a strong emphasis on competence development and evaluation (Koenen, Dochy, & Berghmans, 2015). Pedagogical mediation processes become more and more stressful, and teachers should be able to offer appropriate mentoring in a coaching format, interacting and guiding students (Koenen et al., 2015; Dlouhá & Burandt, 2015). Pedagogical support must be involved in technological, pedagogical and content dynamism. The first steps of the learning process should be to reach objectives classified in the first and second levels of the Bloom taxonomy, in a second step levels 3 and 4 and in the last step levels 5 and 6 (Mouasher & Lodge, 2016). Skills / soft skills should be developed at all stages of the pedagogical process (Mouasher & Lodge, 2016; Hesselbarth & Schaltegger, 2014; Singh, Thambusamy, & Ramly, 2014). They should promote self-learning and self-direction (Dlouhá & Burandt, 2015). The MOOCS can be used for specific purposes and can bridge individual learning deficits (teachers and students) (Toven-Lindsey, Rhoads, & Lozano, 2015; O'Connor, 2014). The pedagogical practices should promote learning in a business context (students + employers), in a more than experimental environment (Sheppard et al., 2015), based on real problems (Carriger, 2015) in a concept of Embedding enterprise education. Among the learning strategies different versions of: seminars / lessons, case studies, discussions, demonstrations, tutorials can be used; Screencast tutorial, Walkthrough assignments; Capstone projects (Smith & Paton, 2014; Alwehaibi, 2012), simulations, interactive evaluation, (Pozdeeva & Obskov, 2015) creative tasks, group work, learning games, interactive lessons, heuristic conversation, performance, discussions, study of Cases, projects. 3D Projects (Baumann, Mantay, Swanger, Saganski, & Stepke, 2016).

Future Work

With this work it was possible to design the current scenario of higher education in conceptual and operational terms. In a paradigmatic dimension, attention is focused on the definition of theories and management models that give response to the current challenges of governance and management of HEIs, namely a model of flexibility and inclusion and personalization of formal and informal spaces in a knowledge network. In a more operational dimension, there is a concern with the selection of implementation methodologies that contemplate current visions using digital methods, techniques and tools to support learning and guarantee the quality of processes and results achieved.

Recognizing that this type of research and eligibility strategies in the selection of scientific papers may leave out important works such as books, unsubscribed journals, publications in other languages, reports, etc. It is expected in a future work to develop the deeper theorization on the subject studied, namely with the inclusion of elements derived from experience in context, combined with other theories on the subject, namely through books and other authors, with the respective validation by pairs.

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