Virtual reality and gamification in marketing higher education: a review and research agenda

Realidad virtual y gamificación en la educación superior de marketing: revisión y agenda futura de investigación

高等教育推广中的虚拟现实和游戏化： 文献回顾和未来研究议程

Sandra Maria Correia Loureiro and Ricardo Godinho Bilro
Instituto Universitário de Lisboa (ISCTE-IUL) and Business Research Unit (BRU-IUL), Lisboa, Portugal, and

Fernando José de Aires Angelino
Instituto Universitário de Lisboa (ISCTE-IUL), Lisboa, Portugal

Abstract

Purpose – The purpose of this paper is to review studies on the use of virtual reality (VR) and gamification to engage students in higher education for marketing issues to identify the research topics, the research gaps and to prepare a future research agenda.

Design/methodology/approach – A literature review is performed based on two search terms applied to Web of Science, resulting in a final pool of 115 articles. A text-mining approach is used to conduct a full-text analysis of papers related to VR and gamification in higher education. The authors also compare the salient characteristics presented in the articles.

Findings – From this analysis, five major research topics are found and analysed, namely, teaching methodologies and education, experience and motivation, student engagement, applied theories in VR and gamification. Based on this and following the theory concept characteristics methodology framework, the paper provides directions for future research.

Originality/value – There is no comprehensive review exploring the topics, theories, constructs and methods used in prior studies concerning VR and gamification applied to higher education services based on all the articles published in well-regarded academic journals. This review seeks to provide deeper insights, to help scholars contribute to the development of this research field.

Keywords Virtual reality, Gamification, Education, Learning process, Student engagement, Text-mining

Paper type Literature review

Resumen

Propósito – En este documento se revisan los estudios sobre el uso de la realidad virtual (RV) y la Gamificación para involucrar a los estudiantes en la educación superior en marketing, se identifican los principales temas de investigación tratados, las lagunas de investigación y se sugiere una agenda futura de investigación.

Diseño/metodología/enfoque – Una revisión de la literatura basada en dos búsquedas en Web of Science (WOS) permitió identificar 115 artículos. La minería de textos se utilizó para realizar un análisis de texto completo de los artículos relacionados con RV y gamificación en la educación superior. Los autores también compararon las características más destacadas de los artículos.

Hallazgos – A partir de este análisis, se encuentran y analizan cinco grandes temas de investigación: metodologías de enseñanza y educación, experiencia y motivación, compromiso de los estudiantes, aplicadas a la RV y la gamificación. Basándose en esto y siguiendo el marco del TCCM, el artículo proporciona una agenda futura de investigación.

Originalidad/valor – No hay una revisión exhaustiva que explore los temas, las teorías, construcciones y métodos utilizados en estudios anteriores relativos a RV y gamificación aplicados a servicios de educación superior basados en todos los artículos publicados en revistas académicas. Esta revisión proporciona una panorámica más detallada y sugiere a los académicos nuevas líneas de trabajo para seguir desarrollando este campo de investigación.

Palabras clave – Realidad virtual, Gamificación, Educación, Proceso de aprendizaje, Participación de los estudiantes, Minería de textos

Tipo de artículo – Revisión de la Literatura

摘要

目的 – 本文的目的是回顾为了提高学生参与高等教育而使用虚拟现实(VR)和游戏化的营销方面的研究，以确定它们的研究主题，研究差距，并以此准备未来的研究议程。

文章设计/方法 – 本文的文献综述是基于Web of Science的两个搜索词进行的，最终搜索出115篇文章。本文采用文本挖掘方法，对与高等教育中的虚拟现实和游戏化相关的论文进行全文分析。作者还比较了这些文章中呈现的显著特征。

研究结果 – 从这一调查中，我们发现并分析了五大研究主题，即教学方法与教育、体验与动机、学生参与、虚拟现实应用理论和游戏化。在此基础上，遵循理论概念、特征、方法论框架，为今后的研究提供了方向。

本文独创性/价值 – 目前，在权威学术期刊上发表的所有文章，都没有对以往关于虚拟现实和游戏化应用于高等教育服务的研究的主题、理论、结构和方法进行全面的综述。本文旨在提供更深刻的见解，以帮助学者们为这一研究领域的发展做出贡献。

关键词 – 虚拟现实，游戏化，教育，学习过程，学生参与，文本挖掘

1. Introduction

Technology is in continuous development, gaining increased relevance in several areas. Distinct stakeholders are willing to engage with organisations and recent technological advancements allow new ways to do so. In services, and specifically in higher education environments, these cases are even more pronounced as organisations are dealing with stakeholders with specific characteristics, such as students. Students are mainly from younger generations, such as

Millennials or Generation Z, who are digital natives (Mulvey *et al.*, 2019). Virtual reality (VR) is a computer-generated simulation of a situation that allows individuals to be immersed and abstracted from the real environment when interacting with the virtual environment in a manner that appears to be real (Flavián *et al.*, 2019a; Loureiro *et al.*, 2019c; Loureiro *et al.*, 2020). VR can make it easier for students to be more focussed and immersed in the simulation of a task that can be learned and repeated (with or without mistakes) until it is performed in a real environment without mistakes (Bower *et al.*, 2017). At the same time, the use of gamification (game-design elements in non-game contexts to improve the user's engagement) in education seems to emerge as a tool to motivate and captivate students to learn (Looyestyn *et al.*, 2017; Nurul and Mohamad, 2018; Lopez Carrillo *et al.*, 2019). Therefore, it became relevant for organisations to understand this phenomenon in the scope of marketing and services. In the field of education, there is still no study reviewing the current state-of-the-art on VR and gamification that can show the main research pathways already addressed, present the most important topics and studies, as well as future research avenues. This review gains interest at a time when a large number of universities, colleges and other institutions are converting to distance learning due to restrictive crowding measures (coronavirus disease – COVID-19).

The current study conducts a literature review based on research published in periodicals indexed to Web of Science (WOS). Two distinct search terms are applied to this database, returning a final group of 115 papers. To analyse the content of these papers, the current study resorts to a text mining technique called topic modelling to find latent topics on VR and gamification in higher education. Recently, topic modelling has been used to uncover correlated discussions in text (Loureiro *et al.*, 2019c; Loureiro *et al.*, 2020). The TCCM framework used in prior reviews (Terjesen *et al.*, 2013; Paul and Rosado-Serrano, 2019), in which T stands for theory, C for context, C for characteristics and M for methodology, is followed to present the future research agenda. As in the case of the review by Paul *et al.* (2017), this study adapts the framework to consider three components, namely, theory, characteristics and methodology. Consequently, the paper:

- provides an overview of the conceptualisation of the core concept of the topic in analysis;
- presents the theories, characteristics and methodologies found in the articles;
- analyses the most important topics and studies emerging from this literature; and
- suggests a future research agenda.

The remainder of this article is structured as follows: In Section 2, we discuss the review methodology, followed by the data analysis, describing the review, content analysis and clustering and the latent topics emerging from the review in Section 3. Section 4 presents directions for future research and in Section 5, the conclusions, limitations and implications are reported.

2. Review methodology
Systematic review papers can be of several types, namely, a structured review focussing on widely used methods, theories and constructs (Canabal and White, 2008; Kahiya, 2018), a framework-based review (Paul and Benito, 2018), a hybrid-narrative with a framework for setting a future research agenda (Bilro and Loureiro, 2020; Paul *et al.*, 2017), a theory-based review (Gilal *et al.*, 2019; Paul and Rosado-Serrano, 2019), a meta-analysis review (Knoll and Matthes, 2017), a bibliometric review (Randhawa *et al.*, 2016) and a review aiming for model/framework development (Paul and Mas,

2019). For this paper, the authors adopt a hybrid review, comprising a structured review followed by a TCCM framework.

Following the six Ws of the literature review method (Callahan, 2014) and the well-established guidelines for a search method for review articles found in previous reviews (Canabal and White, 2008; Tranfield *et al.*, 2003) an extensive search was conducted on WOS. The assessment of research based on the journal in which it is published is a widely adopted practice (Chavarro *et al.*, 2018; Loureiro *et al.*, 2019c). WOS is a renowned electronic database, the content of the WOS collections is selective and consistent and an independent and detailed editorial process ensures journal quality (Clarivate, 2019). The research process was undertaken by a research team comprising all the authors of the present paper, who looked for all publications in scholarly journals published until the end of 2019 in the WOS database. To locate the most relevant studies addressing the purpose of this review, the researchers made two queries using the keywords "VR" and "gamification". The use of these two keywords is central to the focus of our research. The reason for deciding to use both keywords was based on the prevalence of the terms in the existing literature. For these two sets of queries, the researchers added the keywords of "education" and the relevant marketing topics, such as "marketing" or "services", which resulted in the search expressions below. The search process was conducted for keywords in the title, abstract and keywords. These keywords were selected based on their relevance to the topic under review. Most of these keywords are followed by a wildcard to account for distinct possibilities from the root word. The final queries for our search are:

Query 1:

TS = (VIRTUAL REALITY* AND EDUCATION* AND (MARKETING OR SERVICE*))

Query 2:

TS = (GAMIFICATION* AND EDUCATION* AND (MARKETING OR SERVICE*))

The first results from using these two queries reveal a total of 281 articles for Query 1 and 150 articles for Query 2. These results show relevant information and indicate there is a lack of research on these topics, which highlights the relevance and appropriateness of this paper. The results achieved from the previous two queries were filtered to return only papers in English in peer-review journals, returning 128 articles for Query 1 and 69 articles for Query 2 (Figure 3). We can recognise the range of scientific areas these articles come from, considering their dispersion among the different journals publishing them. This analysis shows that this set of papers (197 in total) are from a varied set of scientific areas, such as not only marketing and educational environments but also computer science and engineering and medicine and health sciences. We can see the distribution of the most frequent WOS categories in Figure 1 for Query 1 and Figure 2 for Query 2.

As shown in Figure 1, with the distribution for Query 1 using the keyword VR, most of the WOS categories are related to computer science, surgery and educational research. On the other hand, when we analyse the distribution from Query 2 (Figure 2), we conclude that most of the WOS categories are related not only to educational research and computer science but also to business and management. These results show there are differences in the research outputs if we are referring to VR or gamification. VR is more present in research on medicine and health

Figure 1.
Distribution of
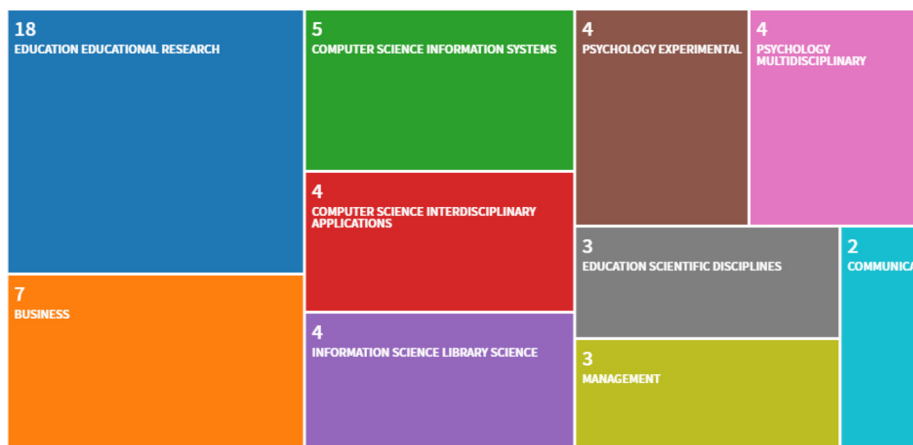articles per WOS
categories: Query 1

Figure 2.
Distribution of
articles per WOS
categories: Query 2

sciences, and other scientific areas, while gamification starts to be more widely used in studies on business and management.

Based on the dispersion analysis mentioned in the previous section, the authors resort to content validation of each paper to guarantee that this literature review focusses on our field of research. This content validation was made independently by each of the authors, and by two independent experts in these topics following the quality criteria adapted from Pittaway *et al.* (2004) and Macpherson and Holt (2007) (see Appendix). The output of this content validation results in our final set of 115 articles – 67 from Query 1 and 48 from Query 2 – which are used in this literature review (Figure 3).

3. Data analysis
3.1 Descriptive review
Analysing this final pool of 115 articles, we find that the first article published in the group of articles resulting from Query 1, related to VR, is from 1999 (Figure 4) and that the majority of articles are from the past five years (2015 onwards).
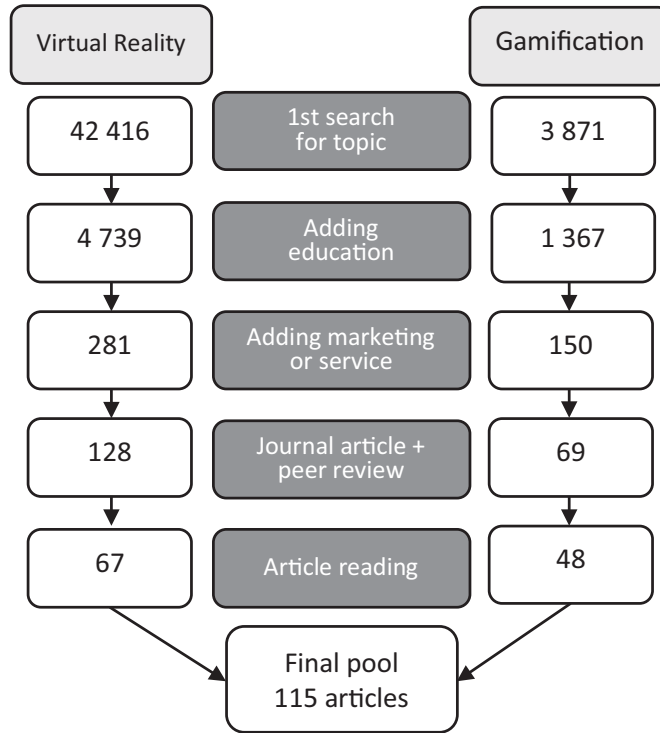
Figure 3.
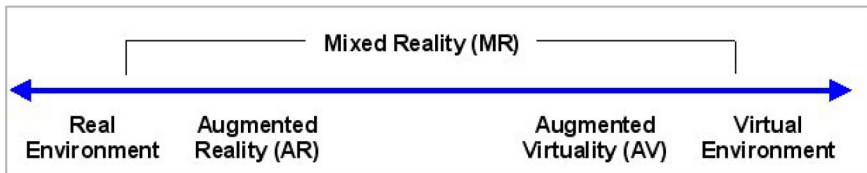Procedure flow chart
for selecting the final
pool of papers

Figure 4.
Reality–virtuality
continuum

Source: Milgram and Kishino (1994)

These results are quite different from the results achieved from Query 2, using the concept of gamification. As we can see in Figure 4, the first article to be published in this set of articles is from 2014, and most of the articles are from the past three years. We can see some significant differences between the results from VR and gamification. Articles devoted to VR are more common and have appeared since 1999. In contrast, articles on gamification are much more recent as we only find articles from the past five years (from 2014). These results show both topics as being very recent in the literature, with little research devoted to them, highlighting the need for further studies and the relevance of this paper.

Moving forward with this analysis, we underline another relevant issue, which is associated with the journals where the articles of our final pool were published. Once again, the division between both queries shows differences in the publishing of articles and

research development between VR and gamification. Table 1 shows the journals with most published articles from Query 1, devoted to VR. Overall, some journals devoted to human-computer interaction, such as Computers and Education or Computers in Human Behaviour have several articles published. Other journals, specifically devoted to the marketing sphere also appear, such as the Journal of Interactive Marketing and Journal of Consumer Research. Nonetheless, most journals still focus on other scientific areas such as computers and technology or medicine. This pool of papers only includes 27 papers out of a total of 67, meaning that most of the journals have only published one article on this topic.

Analysing the final pool of articles from Query 2 (Table 1), devoted to gamification and the journals with most published articles, we find, once again, some differences as in the previous analysis for Query 1. The journals with most published articles are the Journal of Interactive Marketing and Computers in Human Behaviour. Others, such as the Journal of Marketing Education and International Journal of Engineering Education, also have more than one article published. However, apart from these examples, every other journal only published one article on this topic. It seems relevant to highlight some journals that have published only one article, understand to what extent some journals devoted to business, management and marketing are already publishing research in these domains.

Analysis of Table 1 reveals that the journals publishing most articles (resulting from Query 2) are no longer from computer sciences or medicine but from the interaction between technology and marketing, marketing and interactive environments and education in marketing. These results show a significant difference from the pool of articles resulting from query 1, as these results are already more devoted to the scientific areas focussed on in this study. Table 2 summarises the theories, characteristics and methodologies used in the articles analysed, following the TCCM framework.

3.2 Content analysis and clustering

Content analysis of the final pool of papers (115) is based on a text-mining technique to find the latest topics in the literature review. This type of technique is widely used to reveal

Query 1 – VR Journal title	No. of articles	Query 2 – gamification Journal title	No. of articles
Computers and Education	4	Journal of Interactive Marketing	5
Computers in Human Behaviour	3	Computers in Human Behaviour	4
Multimedia Tools and Applications	3	Journal of Marketing Education	2
IEEE Transactions on Learning Technologies	3	International Journal of Engineering Education	2
Electronic Library	2	Teaching and Teacher Education	1
Sustainability	2	Computers and Education	1
Rural Special Education Quarterly	2	International Journal of Marketing Communication and New Media	1
Journal of Interactive Marketing	2	Tourism Management	1
Journal of Surgical Education	2	International Journal of Bank Marketing	1
VR	2		
Tourism Management	1		
Journal of Consumer Research	1		
Total	27	Total	18

Table 1.
Journals with most published articles

Authors	Theory	Characteritics	Methodology
Ma (2019)	Narrative persuasion and immersive media	Attitudes and willingness to help	Experiment
Tecau et al. (2019)		Experience with a disability, attitude barriers, physical barriers and lack of information	Qualitative approach
Pappa and Papadopoulos (2019)	Kolb's experiential learning model (do, observe, think, plan)	Learning experiences	Case study
Wu et al. (2019)	AHP theoretical framework	Experience and purchase	Survey
Sun et al. (2019)	Bowman's theory of interactive task	Interactive tasks: navigation, selection/ manipulation and system control. Key factors: navigation modes, operation methods, observation scales and background options	Experiment
Petit et al. (2019)	Theory of embodied cognition	Online experience, engagement, sensory congruency and mental imagery	Conceptual
Cooper et al. (2019)	Pre-service teachers' perceptions	Engage learning and experience	Case study
Fernandez et al. (2019)		Learning process	Experiment
Kim and Kim (2018)	Peer to peer network service model	Learning process, progress check, result feedback between instructor and learner in real-time and system for creative English education	Case study
Dyer et al. (2018)		Experience and empathy	Case study
Bum et al. (2018)		Experience, satisfaction and intent of sustainable participation (engagement)	Survey
Suh and Prophet (2018)	S-O-R	Cognitive and affective reactions and immersive technology	Conceptual
Dirin and Laine (2018)		User experience, emotions and engagement	Case study
da Silva et al. (2018)		Experience	Case study
Veselovsky et al. (2018)		Online experience and innovative activity	Case study
Pickering et al. (2018)	SERVQUAL/ SERVPERF	Experience, satisfaction quality (nursing education) and change behaviour	Case study
Kim et al. (2018)		Experience	Case study
Yim et al. (2017)		Experience, interactivity, vividness, immersion, usefulness and enjoyment and purchase intention	Mixed approach
Fombona et al. (2017)	Constructivism and connectivism (conceptual maps technique)	e-Learning and augmented reality	Conceptual
Muñoz-Cristobal et al. (2017)		Cooperative/collaborative learning, bricolage mode and learning buckets and orchestration	Case study

Table 2.
TCM framework map

Authors	Theory	Characteritics	Methodology
Bragge *et al.* (2017)		Business simulation, dynamic decision-making (DDM) in small groups and culture	Survey
Navarro *et al.* (2017)		Commitment and engagement	Case study
Bower *et al.* (2017)		Experience, communication and learning	Case study
Pechenkina (2017)		Experience	Case study
Jung and Dieck (2017)		Experience, co-creation, word-of-mouth and visitor intention	Case study
Durl *et al.* (2017)	Dietrich *et al.* (2017) six-step framework	Active participation and engagement	Survey and experiment
Fokides (2017)	TAM	Perceived usefulness and perceived ease of use	Survey
Hoffmann *et al.* (2017)		Experience and engagement	Survey
He *et al.* (2017)		Experience, participation, real-time bidirectional information exchange, cave automatic virtual environment and immersive technology	Case study
Lin and Yang (2016)		Experience, e-learning and interactive games	Case study
Fernandez *et al.* (2016)		e-Learning, gamification and VR simulation	Case study
Huang *et al.* (2016)		Knowledge sharing and e-learning	Case study
Portman *et al.* (2015)		Landscape architecture and environmental planning	Conceptual
Yoon, *et al.* (2015)		Experience, presence, satisfaction and real-time interaction	Mixed approach
Ludlow (2015)		VR and virtual environments	Conceptual
Hartley *et al.* (2015)		Learner participation	Case study
Cho *et al.* (2015)		Physical presence, social presence, epistemological belief, situational interest and perceived achievement	Survey
Bertram *et al.* (2015)		Motivation and perceived value	Mixed approach
Bogacheva and Voiskounsky (2015)		Experience, avatar-mediated and child game	Case study
Avellis *et al.* (2015a)	Open innovation paradigm	Co-creation, social learning, robotics and VR	Experiment
Avellis *et al.* (2015b)		Co-creation and e-learning	Conceptual
Muñoz-Cristóbal *et al.* (2015)		Experience and orchestration	Qualitative approach
Ali (2015)		Satisfaction	Mixed approach
Tian *et al.* (2014)	Cultural trauma theory	Experience, physical, emotional, sociocultural and VR	Survey
Billingsley and Scheuermann (2014)		Experience and virtual technology	Conceptual
Anstadt *et al.* (2013)		Experience and virtual world	Mixed approach
Tawfik (2013)		Experience and virtual technology	Case study

(continued)

Authors	Theory	Characteritics	Methodology
Maheu *et al.* (2012)		Experience and virtual technology	Case study
Macfadyen and Dawson (2012)		Experience, e-learning and engagement	Survey-panel
Takács (2011)		Experience and telepresence	Case study
Alterman *et al.* (2011)		Experience and e-learning	Qualitative approach
Packman and Meredith (2011)		Experience and e-learning	Qualitative approach
Cheng and Wang (2011)		Experience and e-learning	Case study
Guttentag (2010)		Experience, e-learning and authenticity	Case study
Cheong (2010)		Experience and collaborative learning	Survey
Gustavsson *et al.* (2009)		Experience and e-learning	Case study
Shuhuai *et al.* (2009)		Experience and virtual environment	Case study
Katsionis and Virvou (2008)		Experience, e-learning, emotions and gamification	Case study
Holobar *et al.* (2008)		Experience and e-learning	Case study
Bouras and Tsiatsos (2006)		Experience and e-learning	Case study
Saxena (2006)		Experience and e-learning	Case study
Mikropoulos *et al.* (2003)		Experience, virtual environments, presence and interaction	Survey
Parkinson and Hudson (2002)		Experience and interactive learning environments	Case study
Riva (2000)		Experience	Case study
Thrush and Bodary (2000)		Experience, military and game applications	Case study
Economou *et al.* (2000)		Virtual learning environments	Case study
Vouk *et al.* (1999)		Quality of service and e-learning	Case study
Martín-Del-Pozo *et al.* (2019)		Collaborative learning, experience, attitude and video game	Survey
Başal and Kaynak (2020)		Motivation and integration of gamification	Mixed approach
Robson (2019)		Gamification, engagement, emotions and personal brand	Experiment
Silva *et al.* (2019)	Flow theory	Gamification, game-based learning, concentration, clarity, feedback, challenge, autonomy, social interaction and perceived learning	Survey
Rodrigues *et al.* (2019)		Gamification, computer science and e-learning	Conceptual
Göksün and Gürsoy (2019)		Experience, gamification and engagement	Mixed approach
Lopez Carrillo *et al.* (2019)		Gamification, motivation and laboratory practice	Experiment
Araujo *et al.* (2019)		Gamification	Conceptual
Baydas and Cicek (2019)	Churchill paradigm	Experience and gamified learning environment	Mixed approach
Mavroeidi *et al.* (2019)		User engagement, gamification and privacy requirements	Conceptual

Table 2.

(*continued*)

Authors	Theory	Characteritics	Methodology
Hakak *et al.* (2019)		Gamification and cloud computing education	Conceptual
Bayuk and Altobello (2019)		Gamification, financial well-being, app expertise and perceived benefits	Survey
De Guimarães *et al.* (2019)		Innovation in teaching, quality in teaching, organisational commitment and student retention	Survey
Dele-Ajayi *et al.* (2019)		Active learning, digital game and game-based learning	Case study
Leclercq *et al.* (2018)	Equity theory	Gamification, engagement, co-creation and online community	Mixed approach
Canals and Minguell (2018)		Gamification and learning	Case study
Eppmann *et al.* (2018)		Experience and gamification	Mixed approach
Nousiainen *et al.* (2018)	Game-based pedagogy (GBP)	Gamification, pedagogical, technological, collaborative and creative	Mixed approach
Calderón *et al.* (2018)		Motivation, engagement and meaningful gamification	Case study
Anouncia and Kalyanaraman (2018)		Gamification and e-learning	Case study
Schwade and Schubert (2018)		Gamification, e-learning and business simulation game	Case study
Torres-Toukoumidis *et al.* (2018)		Gamification and e-learning	Conceptual
Lamb *et al.* (2017)		Practice-based learning and improvement, gamification and experience	Survey
Kim and Ahn (2017)	SDT	Gamification, intrinsic motivation, extrinsic motivation, loyalty, need for autonomy and reward	Experiment
Oleksy and Wnuk (2017)	Appraisal theory	Satisfaction, social interactions and place attachment	Survey
Séraphin *et al.* (2017)			
Su (2017)		Adaptive learning and gamification	Qualitative approach
Xu *et al.* (2017)		Meaningful gamification, rewarding interaction, brand awareness and satisfaction	Case study
Çakıroğlu *et al.* (2017)		Gamification, engagement and achievement	Qualitative approach
Macfarlane and Tomlinson (2017)		Gamification, engagement, performativity, marketing, infantilisation, surveillance, gamification and opposition	Conceptual
Jurado and Echeverria Meza (2017)		Experience, engagement and gamification	Case study
Gañán *et al.* (2017)		Experience, engagement and gamification	Case study
Durl *et al.* (2017)		Gamification, VR, sensitisation and engagement	Case study

(continued)

Table 2.

Authors	Theory	Characteritics	Methodology
Garcia-Fernandez *et al.* (2017)		Gamification, motivation and effort	Case study
Ketyi (2016)		Gamification, effectiveness and user satisfaction	Case study
Garcia Gaitero *et al.* (2016)		Gamification, self-regulation and motivation	Conceptual
Canhoto and Murphy (2016)		Gamification and experiential learning initiative	Case study
Gopinath Bharathi *et al.* (2016)		Gamification, user engagement, game design features, behaviour change and user engagement	Case study
Hofacker *et al.* (2016)	Regulatory fit theory	Gamification, game design, story, aesthetics, attitude and engagement	Conceptual
Fernandez *et al.* (2016)		Gamification, VR and experience	Case study
Siemens *et al.* (2015)		Gamification, motivation, intrinsic motivation, brand attitudes, game effort and enjoyment	Experiment
Dicheva *et al.* (2015)		Gamification, experience and game design elements	Conceptual
Doumanis and Smith (2015)	Cognitive theory of multimedia learning	Gamification, mobile guide applications, player experience, cognitive accessibility and usability	Case study
Kaur and Geetha (2015)		Gamification, engagement and self-learning	Case study
Piñeiro-Otero and Costa-Sánchez (2015)		Game experience, engagement, interaction, motivation and participation and immersive game	Case study
Koivisto and Hamari (2014)	UTAUT theory (TAM)	Gamification, social, hedonic, utilitarian benefits, perceived enjoyment and usefulness and ease of use	Survey
Harman *et al.* (2014)		Gamification and diffusion of innovations	Network analysis
Kim (2014)		Gamification and decision support model	Case study

Table 2.

latent topics in scholarly documents (Loureiro *et al.*, 2019c; Loureiro *et al.*, 2020). Helping researchers to implement this technique is text-mining software (MeaningCloud), in which a text clustering technique is performed. This technique allows processing and aggregating a large amount of unstructured text to extract relevant information (Fan *et al.*, 2006), as it can create groups (clusters) by analysing the complete text (Fan *et al.*, 2006; Srivastava and Sahami, 2009). The software tool perceives a text as being in one group of concepts (known as clusters) rather than another, being more similar to each other than to those in other clusters (Spinakis and Chatzimakri, 2005) and then the text-mining system classification for cluster sizes is used to select the suitable number of clusters (Punj and Stewart, 1983). The algorithm receives a set of texts and returns the list of detected clusters. Each cluster is assigned a descriptive name, a size value (indicating its relative importance in relation to all clusters) and the list of elements included in the cluster.

After the cluster analysis is performed using the text-mining software tool, a large variety of clusters emerges. In deciding the relevant number of clusters to use in this review, the researchers stopped accepting new clusters when they were too small (Milligan and Cooper, 1985), which means using a cut-off size value to identify the most appropriate

cluster size. In this case, it was decided to use a cut-off value $>= 300$, meaning that only clusters with a size larger than 300 are accepted. The choice of cut-off value is associated with the number of clusters, this being the size value that allows isolating the 10 largest clusters for each query. Based on this, there are two distinct sets of clusters, one for each query made. The results for both queries were not joined, as the intention is to compare the results from Query 1 (VR) and Query 2 (gamification) and find similarities and differences from this analysis. Table 3 presents the results for both queries.

Starting by analysing the results of the clusters for query 1 (Table 3), the main clusters are related to VR and virtual environments, which is an expected result. Analysing the rest of the clusters, the second largest group is related to education and teaching, followed by the user's experience (both as immersive virtual experience and other aspects of experience). Finally, the student engagement cluster emerges, which, combined with the topics mentioned above, warrants further investigation. The same analysis is made for the second query on gamification (Table 3). The results show that the main clusters are related to experience and context analysis, aligned with the results for Query 1. The second group of clusters is related to platforms, applications and game elements, which is also an expected result. Another group of clusters is related to learning environments and teaching methodologies and courses in Marketing, followed by the clusters of student engagement and intrinsic motivations.

Based on this analysis and the set of results, it is possible to identify emerging latent topics. An interconnection of topics is perceived among the clusters from each query, and between the two distinct groups of clusters (Table 3) and the results can be aggregated into five major latent topics which are proposed below and considered for further analysis.

3.3 Latent topics
Topic 1. Applied theories in VR. According to Loureiro *et al.* (2019c), four main theories support studies on VR: self-expansion theory, the theory of planned behaviour (TPB), unified theory of acceptance and use of technology (UTAUT) and stimulus-organism-response (S-O-R) Theory. The last two theories tend to be used more often (Loureiro *et al.*, 2019c).

Clusters – VR	Score	Clusters – gamification	Score
VR	3,524.43	Experience and context analysis	887.30
Virtual environments	2,082.39	Teaching methodologies	657.70
Teaching methodologies	1,929.97	Platform to support	525.80
Education and training program	833.18	Mobile applications	436.74
Immersive virtual experience	721.46	Game elements	382.96
Special education	693.32	Learning management system (LMS) and learning environments	375.76
Aspects of orchestration and experience	507.4	Perceived benefits	364.34
Real-world	497.65	DBA\courses in marketing	344.95
Student engagement	497.02	Student engagement	340.20
Virtual instrument systems in reality and learning environments	341.24	Intrinsic motivation	329.22

Table 3.
Cluster analysis

The first (self-expansion theory) lies in the assumption that consumers desire and can accomplish their goals, and so self-expansion is related to psychological models of self-efficacy, intrinsic motivation, self-actualisation and self-improvement motivation. Hence, the self is created through relationships with close others and these relationship partners can draw out otherwise hidden aspects of the self to create greater wholeness (Aron *et al.*, 1998).

TPB claims that subjective norms, attitudes towards behaviour and perceived behavioural control, together shape a consumer's behavioural intentions and actual behaviours (Ajzen, 1991). Here, subjective norms are the person's beliefs about whether other people approve or disapprove of the behaviour. Attitude means the degree to which a person has a favourable or unfavourable evaluation of the behaviour of interest. Perceived behavioural control refers to a consumer's perception of the ability (ease or difficulty) of performing the behaviour of interest. Finally, behavioural intentions are the motivational factors that influence a given behaviour. A strong behavioural intention may lead to actual behaviour.

UTAUT (Venkatesh *et al.*, 2003) is a unified model of the well-known TAM model suggested by Davis *et al.* (1989). Technology acceptance model (TAM) comprises the perceived usefulness (the degree to which a consumer believes that using a technological system enhances their performance) and perceived ease-of-use (the degree to which consumers believe that using a technological system implies effort) as two main drivers of attitude and behavioural intentions. UTAUT provides a unified view to explain users' acceptance of new technology and acts as a baseline for new technologies inside organisations (Venkatesh *et al.*, 2003). Afterwards, UTAUT is extended to the consumer use context (Venkatesh *et al.*, 2012), by including hedonic motivation, price value and habit and UTAUT2 emerged.

Mehrabian and Russell (1974) propose the S-O-R framework from the perspective of environmental psychology. Afterwards, S-O-R was introduced in the retail context by Donovan and Rossiter (1982). In retail – both online and offline – the stimulus is operationalised as the atmospheric cues, the organism as consumers' emotional and cognitive states and the response as approach or avoidance behaviours (e.g. intention behaviour, re-patronage or store search). S-O-R has provided the theoretical basis also in m-commerce (Huang, 2017) and emerging technologies including VR (Kim *et al.*, 2018) or the tourism context (Flavián *et al.*, 2019b; Flavián *et al.*, 2020; Loureiro *et al.*, 2014). Environmental stimuli or atmospheric cues or even the stimuli provided by an experience initiate the perceptual, physiological, feeling and thinking activities and cause a change in the consumer's cognitive and emotional state (Roschk *et al.*, 2017; Sherman *et al.*, 1997). The thinking and feeling activities (Organism) intervene in the relationship between the stimulus and the consumer's responses (Roschk *et al.*, 2017).

Topic 2. Applied theories in gamification. Following Kapp (2012, p. 10), "gamification is using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning and solve problems", whereas Zichermann and Cunningham (2011, p.14) consider gamification as "the process of game-thinking and game mechanics to engage users and solve problems". Huotari and Hamari (2012, p. 20) define from a marketing perspective as "a process of enhancing a service with affordances for gameful experiences to support user's overall value creation". However, the most common definition is provided by Deterding *et al.* (2011, p.13), as "the use of game design elements in non-game contexts". Hence, gamification is an umbrella term focussing on the use of game elements instead of fully-fledged games to improve user experience and engagement in non-game contexts (Deterding *et al.*, 2011), including education. Gamification has its support in motivational

theories which include self-determination theory (SDT), self-regulation theory and flow theory.

SDT highlights that an understanding of human motivation requires consideration of innate psychological needs for competence, autonomy and relatedness, leading individuals to have intrinsic and extrinsic motivation to achieve a specific goal. Indeed, individuals are motivated to grow and evolve because of three needs – competence, connection and autonomy. The theory also points out that extrinsic motivators need to be continuous because individuals become addicted to them (Deci and Ryan, 2000).

Self-regulation theory refers to the ability to moderate the thoughts and emotions that govern human behaviour (Leventhal *et al.*, 1984), which one could argue as a sequel to SDT. Indeed, self-regulation has direct associations with motivation (Bandura, 1991), which can be perceived as the motivation to achieve success and is connected to self-discipline and adherence to the strategies that encourage goal achievement.

Finally, the flow theory proposed by Csikszentmihalyi (1990) indicates that flow is an optimal psychological state that individuals experience when engaged in a challenging activity, often resulting in immersion and concentrated focus on a certain task.

Topic 3. Experience and motivation. One of the first authors to claim the importance of experience is Abbott (1955, p.40) saying that "what people really desire are not products but satisfying experiences". In the 1980s, theories emerge in experiential marketing (Hirschman and Holbrook, 1982). Hirschman and Holbrook (1982) study hedonic versus utilitarian consumption, where hedonic consumption represents the multisensory and emotional aspects of consumers' interactions with goods and services, whereas utilitarian consumption is associated with goods and services which are necessary for survival, to fulfil basic needs. However, the roots of customer experience may start in the 1960s when Howard and Jagdish (1969) showed interest of researching the topic.

The 1970s and 1980s are devoted to research focussed on the buying behaviour process, customer satisfaction and service quality. Satisfaction emerges with cognitive and emotional components (Oliver, 1980; Westbrook and Oliver, 1991), followed by the importance of customer delight (Loureiro *et al.*, 2014; Oliver *et al.*, 1997). The effects of satisfaction on loyalty or intention behaviour are extensively confirmed in several studies (Gupta and Zeithaml, 2006).

The 1990s feature models and scales to measure service quality such as SERVQUAL and SERVPERF. In these years, the discussion about the process to measure quality and the best way to use the scales were very prominent (Cronin and Taylor, 1994; Parasuraman *et al.*, 1988), followed by the rise of relationship marketing as a new field in marketing research, focussed on a long-term relationship where both the buyer and seller have an interest in a more satisfying exchange, using the experience to create stronger relationships with customers (Sheth and Parvatiyar, 1995).

The 21st century has seen advanced customer relationship management, paving the way to customer experiences and engagement (Badenes *et al.*, 2019; Brodie *et al.*, 2011; Hollebeek *et al.*, 2014), exploring how organisations can take advantage of customer engagement (Kumar and Pansari, 2016; Rather *et al.*, 2018). Probably, the next steps on this journey will be the development of further studies on the relationship between brands (or non-human mechanisms), humans and devices (Orús *et al.*, 2019), through distinct emerging concepts such as what a brand coolness/device coolness relationship could be (Warren *et al.*, 2019).

The conceptualisation of consumer experience has two major perspectives: experience economy and brand experience. The first perspective is developed by Pine and Gilmore (1998) and considers that experiences occur when firms use services as stages and transform events in memorable experiences. Pine and Gilmore (1998) present the realms of the

experience using two axes. In one axis, there is active or passive participation, whereas education and escapism are on the active side. Education represents the stimulation to learn something new and escapism means immersion in a different time or place. These two facets belong to different parts of the yy axis, that is, education is absorption (being focussed) and escapism is immersion (being completely in a different place) (Billingsley and Scheuermann, 2014; Jung and tom Dieck, 2017; Loureiro *et al.*, 2014). Regarding entertainment, this facet is located in passive and absorption axes suggesting that the activities are fun to watch. Finally, aesthetics (passive and immersion) represents the setting where the experience occurs.

The second perspective, brand experience, was initially proposed by Brakus *et al.* (2009) and is conceptualised as sensations, feelings, cognitions and behavioural responses evoked by brand-related stimuli that are part of a brand's design and identity, packaging, communications and environments. These authors propose four dimensions for brand experience: sensory, which is related to aesthetics and sensory perceptions; affective, which relies on affect and emotions; behavioural, which is connected with actions when using the brand; and intellectual, which reflects the fact that the brand stimulates curiosity.

Topic 4. Teaching methodologies and education. Teaching means that someone should be interested in learning (Schunk, 2012), so to have the right teaching approach one should also learn about "learning", thus ensuring that learning takes place in the classroom. Therefore, when we observe some of the research by distinct educational psychologists – behaviourist, constructivist and cognitive psychologists – (Agarkar, 2019; Illeris, 2009; Schunk, 2012), several different definitions of learning arise. Based on the definitions presented by Pritchard (2009, p. 2), learning is "a change in behaviour as a result of the experience of practice" and the acquisition of knowledge is "to gain knowledge of or skill in, something through study, teaching, instruction or experience".

One of the biggest challenges faced by lecturers is to be able to capture and retain students' attention, in such a way they can assimilate the teachings and concepts even after they leave the classroom. So, all classroom experiences should be re-evaluated, and new innovative ideas to create a more effective teaching-learning process should be tested and implemented (Kalyani and Rajasekaran, 2018; Kim *et al.*, 2013).

Lecturers can choose from various teaching methodologies and apply those that best suit the needs and circumstances where the teaching-learning process takes place. When choosing teaching methodologies, teachers also need to reflect on how they intend to conduct their classes – a more *teacher-centred approach*, where teachers are the leading authority or a more *student-centred approach*, where teachers and students play a similarly active role in the learning process (Lasry *et al.*, 2014; Sesen and Tarhan, 2011).

Some examples of teacher-centred methods of instruction are "flipped classrooms" (O'Flaherty and Phillips, 2015), where students prepare for their in-class assignments at home, watching pre-recorded lessons. Another example is the "direct instruction" method, the more traditional method based on teaching through lectures (O'Flaherty and Phillips, 2015). Regarding student-centred methods of instruction, some examples are "problem-based learning" (Jalani and Sern, 2015), where students are asked to solve problems collaboratively. A similar method is "project-based learning", repeatedly confused with the previous method, but with the difference that here it is the student who has to present a problem or question to investigate (Hmelo-Silver, 2004; Jalani and Sern, 2015).

The emergence of new teaching and learning tools and technologies is also a permanent challenge for educators at all levels of education, creating a need for permanent updating on their functioning, usefulness and application in the classroom, which leads to an increase in research on how students learn and respond to different teaching methods (Nilson, 2010).

This has been the case with gamification (Çakıroğlu *et al.*, 2017; Martí-Parreño *et al.*, 2016; Subhash and Cudney, 2018) and VR (Bhattacharjee *et al.*, 2018; Fernandez, 2017; Janssen *et al.*, 2016; O'Connor and Domingo, 2017), as they are receiving increasing attention and research in the field of education and particularly in higher education, proving to be valid tools both in supporting the teaching-learning process and in arousing increased interest and involvement among students. Several authors, such as Englund *et al.* (2017) and Kim *et al.* (2013) claim that the successful use and implementation of some of these educational technologies, as they are mostly dependent on and integrated with various technological supports, means that teachers who want to use them should have some knowledge of how to integrate them into their teaching process.

Technology alone is not enough to change the learning environment. For that to happen, and intense intervention should also occur so that technology follows the teaching and learning strategies, seeking to ensure students' acquisition of knowledge based on digital resources (Marcelo *et al.*, 2015). The use of technology in education also raises several barriers for educators, not only because of the learning curve but also because of the implementation of teaching methods and pedagogical approaches that can generate benefits. Educators need a better understanding of some of the benefits of using technology, especially those that promote greater interest and autonomy among students (Alonso *et al.*, 2019; Sinclair and Aho, 2017).

Topic 5. Student engagement. Stakeholders must become engaged in actively cooperating with organisations to plan, develop, co-create or improve what already exists (Loureiro *et al.*, 2019b). Organisations, whether companies, NGOs or higher education institutions need to know how to stimulate innovation through their stakeholders' engagement (Huggins and Thompson, 2015; Ramaswamy and Ozcan, 2018; Shams and Kaufmann, 2016). The literature has already studied the link between distinct stakeholders' engagement, such as consumers, suppliers, shareholders or students, from different perspectives (Loureiro *et al.*, 2019b; Monferrer *et al.*, 2019).

Researchers have been attempting to understand engagement between firms and distinct stakeholders such as consumers (Bilro *et al.*, 2019; Brodie *et al.*, 2011; Hollebeek *et al.*, 2014; Loureiro *et al.*, 2019a; Pansari and Kumar, 2017; Sprott *et al.*, 2009). Research in this domain is not new, as it has been discussed in areas such as psychology or sociology (Garczynski *et al.*, 2013; Morimoto and Friedland, 2013). Moreover, technological advances have provided people with global communication platforms that promote interaction to exchange information and knowledge (Chen *et al.*, 2010; Dessart *et al.*, 2019). In these online environments, consumers may seek relevant information to make decisions and/or achieve something in their lives (Brandão *et al.*, 2019; Sicilia and Palazón, 2008). So, consumer engagement can be described as a cognitive and affective commitment to an active relationship with the brand as personified by the technology to communicate a specific firm value (Mollen and Wilson, 2010).

Concerning students, a relative consensus emerges in the literature concerning motivation as one of the driving sources for engagement (Ketyi, 2016; Macfarlane and Tomlinson, 2017; Robson, 2019). Motivation can affect students' behaviour or action in a specific environment (Appleton *et al.*, 2008; Skinner *et al.*, 2009). The effect of motivation on students is that the more they are motivated to learn, the more likely it is they will be engaged in learning activities (De Guimarães *et al.*, 2019; Kim *et al.*, 2015). Motivation can be seen as a two-fold concept:

(1) controlled motivation; and

(2) autonomous motivation (Ryan and Deci, 2000b, 2000a).

First, controlled motivation appears in student behaviours to respond to external stimuli, such as commenting on peers' discussion board postings to earn a mark for participation (Ryan and Deci, 2000b). In autonomous motivation, student behaviour is consistent with other values and needs (Ryan and Deci, 2000b). Considering these two distinct types of motives, we can see that students with autonomous motivation are more willing to engage in online discussions than students with controlled motivation. Students with autonomous motivation may behave more actively (Xie *et al.*, 2006), maybe more individualistic and collaborative or sustain their actions in cognitive engagement (Xie and Ke, 2011).

Although not consensual in the literature, student engagement can be defined as their psychological investment and behavioural involvement in learning activities (Appleton *et al.*, 2008). Moreover, student engagement is often defined as a multidimensional construct and is usually defined as having three dimensions, namely, behavioural engagement, cognitive engagement and emotional or affective engagement (Fredricks *et al.*, 2004; Jimerson *et al.*, 2003). If we look more deeply into the literature, most research about this topic is found to relate behavioural engagement with students' participation, observation of rules in the classroom and involvement in learning activities (Finn and Voelkl, 1993; Fredricks *et al.*, 2004; Jimerson *et al.*, 2003). Behavioural engagement in online contexts can usually be through discussions or replies to peers. Several authors argue that the number of discussions among peers can be perceived as an indicator of behaviour engagement (Goggins and Xing, 2016). In line with this, research also observed an exciting relationship between discussions among students and achievements (Ramos and Yudko, 2008). Nevertheless, this relationship tends only to exist when discussions are needed.

Concerning emotional engagement, research defined this as students' psychological response to academic environments, such as the feeling of boredom or enjoyment from learning activities (Finn and Zimmer, 2012). It can also be influenced by the relationship with tutors or lecturers and their peers (Fredricks *et al.*, 2004). In the online context, emotional engagement can be linked to students' interests or enjoyment in being part of online conversations and based on social interactions with tutors and colleagues.

Finally, cognitive engagement can be perceived as the idea of expending extra effort to understand multifaceted concepts and/or to master upscaled skills (Finn and Zimmer, 2012; Fredricks *et al.*, 2004). The relevance of this third dimension of cognitive engagement was also perceived and noted in distinct online contexts (Garrison *et al.*, 2000; Putman *et al.*, 2012; Zhu, 2006). Cognitive engagement in online discussions can be stated as the attention and the effort that students spend on interacting through discussions, posts or comments with their peers or tutors (Garrison *et al.*, 2000). It involves the use of multifaceted concepts and/or students' upscale skills, such as analysing, critiquing or reasoning (Putman *et al.*, 2012; Zhu, 2006). Table 4 summarises the five latent topics, key theories and correlated papers.

4. Directions for future research
This literature review demonstrates that this field is still rife with many unexplored areas for further study. We divide our recommendations into three distinct, but related aspects, namely, theory, characteristics and methodology. We also suggest research questions that emerge from the literature as a whole and others that come from specific articles analysed.

The question as to how this lack of answers can be rectified comes from novel contributions that continue to be highly valued by this research field, particularly given the fast-paced nature of technological innovation that underpins much of interactive marketing space nowadays. In addition, however, we recommend that research building directly on prior work in a meaningful, relevant and constructive way should also be considered.

Topic name	Key theories and concepts	Topic terms and explanation	Correlated papers
T1. Foundation theories in VR	Self-expansion theory	Self-expansion is related to psychological models of self-efficacy, intrinsic motivation, self-actualisation and self-improvement motivation	Aron *et al.* (1998)
	TPB	Subjective norms, attitude toward behaviour and perceived behavioural control, together shape a consumer's behavioural intentions and actual behaviours	Ajzen (1991)
	UTAUT	Unified view to explain user's acceptance of new technology and acts as a baseline for new technologies; comprises the perceived usefulness and perceived ease-of-use as two main drivers of attitude and behavioural intentions	Davis *et al.* (1989); Venkatesh *et al.* (2003, 2012)
	S-O-R	The stimulus is operationalised as the atmospheric cues, the organism as consumers' emotional and cognitive states and the response as approach or avoidance behaviours	Donovan and Rossiter (1982); Mehrabian and Russell (1974)
T2. Foundation theories in gamification	SDT	Understanding of human motivation requires consideration of innate psychological needs for competence, autonomy and relatedness, leading individuals to have intrinsic and extrinsic motivation to achieve a specific goal	Deci and Ryan (2000)
	Self-regulation theory	The ability to moderate the thoughts and emotions that govern human behaviour. Has direct associations to motivation to achieve success, self-discipline and adherence to the strategies that encourage goal achievement	Bandura, (1991); Leventhal *et al.* (1984)
	Flow theory	Flow is an optimal psychological state that individuals experience when engaged in an activity that is challenging, often resulting in immersion and concentrated focus on a certain task	Csikszentmihalyi (1990)
T3. Experience, user experience and motivation	Experience economy	Experiences occur when firms use services as stages and transform events in memorable experiences. Four realms of experience are presented, namely, entertainment, educational, aesthetic and escapism	Pine and Gilmore, (1998)
	Brand experience	Sensations, feelings, cognitions and behavioural responses evoked by brand-related stimuli that are part of a brand's design and identity, packaging, communications and environments	Brakus *et al.* (2009)
	Teacher-centred approach	Teachers are the leading authority	

(continued)

Table 4.
Latent topics, key theories and correlated papers

Topic name	Key theories and concepts	Topic terms and explanation	Correlated papers
T4. Teaching methodologies and education	Student-centred approach	Teachers and students play a similarly active role in the learning process	Lasry *et al.* (2014); Sesen and Tarhan (2011)
	Flipped classrooms	Students prepare for their in-class assignments at home, watching pre-recorded lessons	O'Flaherty and Phillips (2015)
	Direct instruction method	The more traditional method based on teaching through lectures	
	Problem-based learning	Where students are asked to solve problems collaboratively	Jalani and Sern (2015)
	Project-based learning	Where the student has to present a problem or question to investigate	Hmelo-Silver (2004); Jalani and Sern (2015)
T5. Student engagement	Student engagement	Students' psychological investment and behavioural involvement in learning activities	Appleton *et al.* (2008)
	Behavioural engagement	Students' participation, observation of rules in the classroom and involvement in learning activities	Finn and Voelkl (1993); Fredricks *et al.* (2004); Jimerson *et al.* (2003)
	Emotional engagement	Students' psychological response to academic environments, such as the feeling of boredom or enjoyment from learning activities	Finn and Zimmer (2012); Fredricks *et al.* (2004)
	Cognitive engagement	The idea of spending extra effort to understand multifaceted concepts and/or to master upscaled skills	

Table 4.

4.1 Theory: new research directions

The majority of the papers analysed (Table 2) tend to be descriptions of practices, cases and examples of applications of VR and gamification for the purpose of learning. Thus, the theories supporting the research analysed tend to be dedicated to the learning process (Cooper *et al.*, 2019; Petit *et al.*, 2019; Sun *et al.*, 2019; Pappa and Papadopoulos, 2019; Doumanis and Smith, 2015). However, we also find theories usually associated with the marketing field, for instance, SERVQUAL/SERVPERF for service quality (Pickering *et al.*, 2018), theories in marketing connected to the adoption of new technologies TAM (Fokides, 2017) or UTAUT (Koivisto and Hamari, 2014). Other theories come from psychology, sociology or biology and are often used in the marketing field, such as appraisal (Oleksy and Wnuk, 2017), self-determination (Kim and Ahn, 2017), S-O-R (Suh and Prophet, 2018) or the flow that is used in the games field (Silva *et al.*, 2019). In this review, we note a deficiency in the use of theories to support each research. Therefore, other theories or the combination of two or more theories used in marketing can be considered in the future, for instance: congruity theory (attitude change towards learning), social identity (modify students' self-identity or part of their self-concept that derives from the knowledge learned and interpreted) or value-belief-norm (norms are active when students believe that violating them would have adverse effects on what students value). New theoretical lenses that can be specific to this context of using technologies to enhance the learning process in marketing will boost our knowledge. Hence, the following research questions are suggested:

RQ1. What theories often used in the marketing field could be adapted and combined to give support to studies on the learning process context using VR and gamification?

RQ2. How to develop a specific theory on the learning process context, using VR and gamification?

4.2 Characteristics: new research directions

A substantial body of research is focussed on concepts and constructs such as experience, engagement, emotions, satisfaction, immersive technologies and gamification (Table 2) (Robson, 2019; Göksün and Gursoy, 2019; Baydas and Cicek, 2019; Cooper *et al.*, 2019; Navarro *et al.*, 2017; Bower *et al.*, 2017). The meaning of these concepts is presented in Sections 4.1 and 4.3. Further research can explore concepts such as co-creation (a joint process of learning among students and/or among lecturers, educators, students and enterprises). The learning process is no longer just an in-person relationship between students and an educator in the classroom. The learning system is evolving to a complex network connecting different actors (e.g. students, lecturers, enterprises, researchers and other stakeholders of higher education institutions) in a community where virtual and real environments are combined. Thus, some research questions arise:

RQ3. How can we build a learning community that allows an integrative educational process? An integrated learning process tends to narrow the gap between educators and students, through creating and implementing new approaches to teaching and learning, using a comprehensive set of teaching tools and methods able to improve students' engagement, motivation and learning outcomes.

RQ4. How to implement an integrated process of learning using gamification and VR, bringing onboard the total cooperation of stakeholders (institutions, educators and students)?

RQ5. How to develop a collaborative system where lecturers and students can create and discuss their experiences from using multimedia lectures and the knowledge benefits gained?

RQ6. What are the best methods to disseminate and encourage educators to explore and learn about new technologies applied to teach?

RQ7. What is the impact of the coopetition settings increasingly used to design co-creation platforms? (Leclercq *et al.*, 2018)

RQ8. What are the strategies that can be used to keep the gamified activity engaging, following a win/lose decision? (Leclercq *et al.*, 2018)

RQ9. Can some dimensions of gameful experiences, such as enjoyment, explain the gameful experience consumers feel when they engage with gamified applications? (Eppmann *et al.*, 2018)

RQ10. Can the perceptions of experience lead to engagement? What might be the mediators between experience and engagement? (Loureiro *et al.*, 2020)

RQ11. Are stakeholders (such as students, consumers or *others*) more dependent on visualised information (i.e. visual learner) than on text-based information? (Yim *et al.*, 2017)

RQ12. What is the relationship between brands (or non-*human* mechanisms), humans and devices, through distinct emerging concepts such as what a brand coolness/device coolness relationship could be? (Warren *et al.*, 2019)

4.3 Methodology: new research directions
Case studies, followed by surveys, are the most commonly used methodologies (Table 2). The sample size tends to range between 100 and 300 (Koivisto and Hamari, 2014; Cho *et al.*, 2015; Fokides, 2017; De Guimarães *et al.*, 2019). A small number of studies (10) use a mixed approach, where authors consider the combination of survey/experiment and a qualitative technique (e.g. interviews, focus group and content analysis) (e.g. Anstadt *et al.*, 2013; Ali, 2015; Başal and Kaynak, 2020). The studies using surveys and experiments tend to use structural equations, regression analysis or factorial analysis for data treatment (Fokides, 2017; Silva *et al.*, 2019). Another group of studies is more conceptual, attempting to discuss previous studies, presenting frameworks and suggesting plans to implement learning practices) (Mavroeidi *et al.*, 2019; Torres-Toukoumidis *et al.*, 2018). Living lab experiments are becoming a differentiated methodology in the group of experiments (Avellis *et al.*, 2015a, 2015b; Ma, 2019). Only one study is devoted entirely to network analysis (Harman *et al.*, 2014). Therefore, the challenge is to develop methodologies that can aggregate a community of educational stakeholders, which together can transform the traditional way to teach and learn. The following research questions are proposed:

RQ13. What technological tools and teaching methods could be used simultaneously to promote students' engagement and academic success?

RQ14. Which teaching methods and technologies could be widely tested in higher education institutions to ensure the best learning outcomes?

RQ15. How can 5G technology contribute to enhancing the learning process using VR and gamification?

RQ16. What is the influence of factors such as screen size, image motion, stereoscopic presentation or a realistic and detailed design on VR experiences? (Loureiro *et al.*, 2019a, 2019b, 2019c)

RQ17. For how long does a mobile augmented reality application succeed in supporting its users' emotional engagement? (Dirin and Laine, 2018)

RQ18. How can the integration of VR into cyber-physical systems and the Internet of Things induce innovative education services in the near future? (Kim *et al.*, 2018)

RQ19. How can the student's interest be enhanced through speech recognition functions, and be used as the educational method to increase experience and engagement? (Kim and Kim, 2018)

RQ20. How do offline and online environments differ in terms of multisensory information processing? How can the optimal personalised multisensory balance be assessed? (Petit *et al.*, 2019)

5. Conclusions, implications and limitations
Recent technologies such as VR and gamification are gaining attention in the field of marketing research, and more specifically, in the marketing of services such as education. Through VR and gamification, it is possible to build different teaching scenarios and approaches to be able to
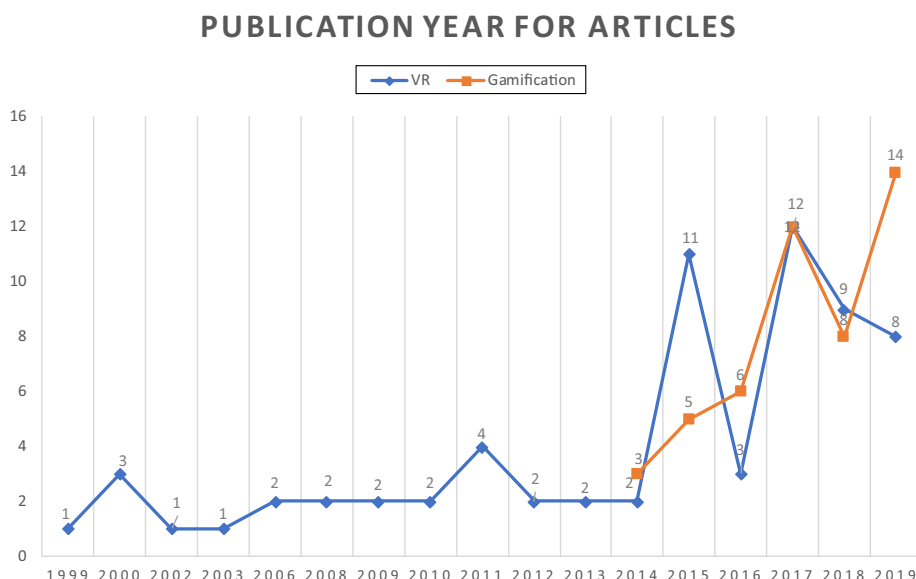
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collect and understand students' reactions, motivation and engagement in their experience with these scenarios and teaching methods. Services in general, and educational methods in particular – especially some of the teaching methods used in higher education- are increasingly subject to the pressure of recent technologies, to supply newer alternatives to support the mission to spread knowledge and to motivate all stakeholders (e.g. students, educators, enterprises). Hence, understanding how to engage students with their subjects may contribute not only to learning strategies but also to services, and society as a whole.

The current research also offers insights for managers. Firstly, managers must perceive gamification and VR in services as having several characteristics linked to users' interactions, as identified in the literature. Managers should be able to understand and design these interactions to achieve the desired results. Secondly, by interacting and participating, users/ participants create levels of engagement. Gamification, specifically, is being used nowadays mainly for educational purposes and market research, with the results of engagement varying amongst studies. The results of this systematic review show that gamification has a positive impact on engagement, especially in the short term. So managers should devote time to determining the effectiveness of gamification in different settings and investigate how gamification can be used to increase long-term engagement with services in general. Thirdly, our research shows that applications with realistic surroundings and which are easy to use by lecturers and students are the basic design requirements for educational VR purposes. Managers should adopt this same strategy either for educational or general service organizations. Fourthly, most articles describe VR applications for knowledge sharing, with a focus on curricula and declarative knowledge. Managers can observe this reality as an opportunity to use VR in a more practice-oriented context, offering opportunities to users/ participants to learn/know by doing/using/visiting. Fifthly, by revisiting our findings and our research agenda, we claim that the existing literature does not present so far a comprehensive set of recommendations or best practices for managers. Therefore, managers should use our

results and findings as an initial list of different scenarios to help them decide when to use VR or gamification, for what purpose and what technology to use.

Due to the nature of this literature review, and its selection and filtering process, this work is not without its limitations. Firstly, it was not possible to perform a meta-analysis due to the large degree of heterogeneity in the studies included in this review. Secondly, it is important to identify the possibility of publication biases, as the search was limited to English and peer-reviewed papers available on a single database, which may limit the number of potential papers identified and included in this review. Nevertheless, none of these limitations detracts from the value of the present research. Indeed, they provide an opportunity to advance research in this domain.

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Corresponding author
Sandra Maria Correia Loureiro can be contacted at: sandramloureiro@netcabo.pt

Appendix

Element	0: Absence	1: Low level	2: Medium level	3: High level	Not applicable
1. Directly related to the objective of the research	There is not enough information to evaluate this criterion	Not related	Somehow related	Totally related	Not applicable
2. Theory robustness	There is not enough information to evaluate this criterion	Weak development of literature	Superficial development of theories and constructs within the existing literature	Robust use of theory	Not applicable
3. Congruence of theory, methodology and findings	There is not enough information to evaluate this criterion	Incomplete data and not related to the theory	Data somehow related to the arguments	Strong link between the arguments presented and data	Not applicable
4. Contributions to theory and/or practice	There is not enough information to evaluate this criterion	Makes a low contribution	Makes a medium contribution	Makes a high contribution	Not applicable

Table A1.
Quality criteria