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What Are the Research Focuses Regarding Learning in the Field of Operations Management in Higher Education? The Case of Spain in 2017

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Abstract:

Purpose: What are the current research topics being studied by higher education professors in the area of operations management in Spain with regard to the learning of their students? Are the approaches that support these investigations adequate?

Design/methodology/approach: For the analysis, we have selected 25 publications in peer-reviewed scientific journals published by Spanish authors in 2017, and we have encoded them using Atlas.ti.

Findings: Most of the research centers on a very basic type of approach to learning, which reproduces the type of research typically conducted more than 40 years ago (type 1). For this reason, we propose an example of how to convert type 1 research questions into type 2 or 3 questions.

Originality/value: This paper collects and summarizes the main works on learning research carried out by members of ACEDEDOT and published in 2017, identifying themes, methods, levels of teacher conception and focus on the type of student learning. We intend to use this information to create a map of the current situation and propose possible suggestions to implement evidence-based instruction on operations management.

Keywords: Scholarship, student learning, student engagement, higher education.

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1. Introduction

Instruction based on the evidence of what best promotes the learning of our students (Burke-Smalley, 2014; Cascio, 2007; Morrell & Learmonth, 2015) is a trend in work and research that is gradually gaining ground, and is related to the foundation of the movement created under the label of scholarship (Boyer, 1990; Delbecq, 2007; Fernandez March, 2008; Mitchell & Harvey, in press; Pearce, 2007).

This movement has had some, albeit weak, repercussion in the area of management (Ashkanasy, 2007; Delbecq, 2007; Gallos, 2008; New et al., 2008; Pearce, 2007) and accounting (Wilson, 2012). However, to date, there does not appear to be any relevant manifestation in the area of operations management.

We believe that the deep and scientific reflection on the way in which the operations management contents are learned is a pending topic in this discipline. For example, this shortcoming is clearly manifest in the review by

Medina-López et al. (2011). This situation limits the impact or the efficiency of our work as scholars who not only conduct research, but primarily help transfer knowledge to students and professionals.

Furthermore, there has been a clear evolution in the meaning and implications of the levels of teaching conceptions and approaches to teaching (Gow & Kember, 1993; Kember, 1997; Kember & Gow, 1994; Prosser & Trigwell, 1997) and of the approaches to learning by students (superficial, strategic and in-depth) (Biggs & Tang, 2011 (1st edition 1999); Marton et al., 2005; Paricio Royo, 2013; Paricio Royo & Allueva Pinilla, 2011; Ramsden, 1992; Trigwell et al., 1999). All these classic developments in teaching have marked the methodology and focus of the research on learning at the end of the last century and the early part of this one.

However, this begs the question: Are operations management instructors taking advantage of these developments? What have we as university professors in the area been investigating over the last year? Are the approaches appropriate that support our research?

This research aims to collect and summarize the main works about research on learning in operations management conducted in Spain in 2017. This will be used to identify topics, methods, types of teaching approaches and focus on type of student learning. This will allow us to create a map of the current situation in this country, show a working protocol for other researchers to analyze broader periods of time or to cover other countries, and make possible suggestions for building an evidence-based teaching of operations management.

2. Objectives

To identify research focuses on learning from the studies published in peer-reviewed scientific journals by professors of operations management who teach university courses in Spain (as part of a degree or master's program).

To reflect on how to improve research on learning in this area of corporate organization and its possible generalization to other academic fields.

3. Context

In this research, we will work with two dimensions that will enable us to identify the research focuses (Table 1).

On the one hand, we will focus on the type of research questions and we will analyze the type of teaching approach that supports them (Kember, 1997; Prosser & Trigwell, 1997; Trigwell et al., 1999). We will characterize type 1 as those research questions that attempt to identify the best method/resource to achieve student learning. Type2 is focused on how the students learn, what the students do or what leads them to choose one learning approach over another. Type3 focuses its questions on identifying, in specific contexts, what good learning consists of and what students are learning during the course.

On the other hand, given that one of the variables that best explains the variability of the students' results or behaviors are the learning approaches that the student demonstrates (Marton et al., 2005), we will analyze which ones are present, explicitly or implicitly, in the published research.

Learning approaches that students choose can be classified into three types (Coffey & Gibbs, 2002; Gibbs & Coffey, 2000; Marton et al., 2005; Paricio Royo, 2013; Paricio Royo & Allueva Pinilla, 2011; Ramsden, 1992): superficial (routinely storing unconnected information), strategic (doing homework or displaying behaviors that are rated favorably by the teacher, for the maximum possible grade, with the minimum effort required) and deep (engaging passionately in the learning by providing meaning to the concepts of the subject and linking them to personal development).

The categories of learning approaches have a direct relationship to the categories into which the learning conceptions, teaching conceptions or learning outcomes can be grouped. For example, the strategic approach will often require the student, in almost all undergraduate courses, to show some abilities or to be able to apply knowledge in a known context (exam-type questions or exercises similar to those done in class) or match what is shown in grading rubrics, but they normally do not go beyond presenting coherent responses with only limited arguments, since they have not invested time in trying to understand them in depth.

In principle, the research under any of the types of teaching approaches may be related to any of the learning approaches. Therefore, for example, a type 3 investigation can give rise to identifying the outcomes of student

learning and whether they merely reproduce information (superficial) or are able to understand it (deep). Similarly, a type 1 investigation can consider which is the best method for achieving in-depth learning by students.

In educational research, much progress has been made in general areas, but little has been accomplished with regard to specific aspects. That is to say, we have come a long way in terms of type 1 and 2 teaching approaches, but further research is needed on matters related to type 3. We must try to find out the external and internal factors that condition the learning of a subject in a particular context. To do this, the work of teachers investigating from their specific didactic fields is crucial (Fernandez March, 2008; Fernández March, 2010).

Research Focus		Approaches to learning	Conception of learning	Conception of teaching	Learning outcomes
Type 1 How do I teach? Focused on teaching. What is the best method for…?		Superficial	Storing information or expanding knowledge on a routine basis	Conveying information/ Transmitting knowledge	Incoherent lists of information. Reproduced brief descriptions
Type 2 How do they learn? Student-focused. What do students do or what leads them to choose one learning approach over another?	vs	Strategic	Applying knowledge and skills	Directing active learning	Outline of coherent responses without support
Type 3 What do they learn? Student-focused. What does it mean to learn/understand in the context of my course and how can I measure it?		Deep	Giving meaning to ideas and personal development	Facilitating deep understanding and enhancing conceptual change	Complete, substantiated explanations. Individual conceptions on the subject. Thinking like professionals think

Table 1. Dimensions of analysis for research focuses. (Adapted from Entwistle, 2000; Kember, 1997; Paricio Royo, 2017; Paricio Royo & Allueva Pinilla, 2011)

4. Methodology

We have only selected publications in peer-reviewed scientific journals for analysis. Works at conferences tend to suffer from incomplete methodological designs and show preliminary approaches which, if interesting, can be enriched in light of the opinions received at the conference to convert them into journal submissions. We believe that the works that have completed their academic journey in the conference phase and that have not been submitted to journals are incomplete or inconsequential works or works with low potential. Thus, their authors decide not to dedicate the effort needed to raise them up to a high-level academic discussion (such as that which may be fostered in the revision process and subsequent publication in scientific journals).

On the other hand, we believed that the course contents could be an important context variable (Entwistle & Ramsden, 2015). This is not only because of the differences that might appear in relation to the specific learning and/or teaching processes (for example, it might not be the same to teach physics or business management or structural calculation or psychology or literature), but also according to the cultural context that surrounds a group of teachers related to a specific academic discipline. The teachers of certain subjects may share the same basic qualifications or common research methods or the problems that get their attention or modes of interpreting reality. Therefore, in selecting publications, we will focus only on the context of Spanish universities and on one academic discipline (operations management).

The academic discipline of operations management in Spain falls within the scientific field of business sciences. The subjects in this discipline are usually present only in the degree or master's programs on business administration and in some of the engineering programs in the industrial branch (especially in the industrial engineering degree or in the industrial engineering master's degree). Perhaps for this reason, university professors of a course on operations management often have basic training in business administration or engineering. In Spain, there are two scientific associations to which university professors of operations management usually belong. On the one hand, there is ACEDEDOT, which is the operations and technology section of the Scientific Association of Economics and Business Administration (ACEDE). On the other hand, there is the association for the development of organizational engineering (ADINGOR). Although some professors belong to both associations, in general, we can state that ACEDEDOT is dominated by teachers with a more business administration profile, who are more closely linked to social sciences (although there are also engineers or people from the operational research area); while there is more of a presence of engineers in ADINGOR.

For this work, we will select articles related to university learning, published in 2017 by professors belonging to ACEDEDOT or ADINGOR. In addition, they must meet the criteria listed in Table 2.

After an initial literature search in which we identified 20 works, we contacted the professors of both associations either by email or in person, requesting them to send us the papers published on research in learning. As a result, we obtained 5 new works that form part of the total of 25 works that we will analyze.

Each of the selected works has been encoded, extracting the following information:

- Academic area of each of the authors: marked as "operations management" or "other" on the basis of the author's main publications, indexed in Scopus and Web of Science or Google Scholar, in the last 3 years (2014-2017)
- Research questions addressed in the article: the questions or contribution are explicitly established in the work
- For each contribution or research question:
  - Type of approach to instruction: type 1, type 2, type 3, undefined
  - Approaches to learning: superficial, strategic, deep, undefined
- Context information:
  - Academic level of the contribution: 1st/2nd year of the degree, 3rd/4th year of the degree, master's, undefined
  - Course subject to the study: if research focused on a specific course
  - Average group size (students enrolled per group): small (less than 20 students), medium (more than 20 and less than 60), large (more than 60 students), undefined
  - The name of the qualification of which the subject(s) are taught
  - University

The process of encoding and analysis has been carried out with the help of the Atlas.ti program (Claver-Cortés et al., 2018; Marin-Garcia, 2007; Morente & Ferràs, 2017).

Inclusion criteria	• Published in scientific journals • During 2017 • Research whose main contribution concerns the learning of university students • At least one of the authors belongs to ACEDEDOT or ADINGOR and their lines of research and/or teaching have to do with operations management
Exclusion criteria	• Contributions to conferences, theses, blog entries, or other unpublished material • Research on aspects of operations management whose contribution is not associated with learning • The contribution does not apply to university students (it only focuses on professionals)

Table 2. Inclusion and exclusion criteria

5. Results

In the 25 works analyzed, we found abundant disinformation to contextualize the experiences. Some works (between 4 and 6, depending on the variable to consider) have a generic approach and are not restricted to a specific context (university, degree, course, year of study or group size), because their contribution, in principle, is proposed as generalizable to any of these contexts. However, the rest of the works make reference to a specific experience. Seven of them explicitly state that they are contextualized in the business administration degree program, two others refer to electronic engineering, one to aerospace engineering and the other three including information about the degree are postgraduate studies (a master's degree in economics, another in business management and a university specialization in lean production). With regard to the courses, 7 are in operations management, 1 is on the supply chain, another is on lean production, another is on process improvement, two are on end-of-degree or master's projects and the other two are related to business organization. Given the selection criteria, it is not surprising that qualifications abound that are related to business administration, and that most of those contributing information are focused on subjects related to operations management. There is not much information about group size, but when it is provided, research on learning is usually conducted on courses with small groups (less than 20 students).

The research questions addressed by the works analyzed focus mainly on Type 1 approaches to conceptualization. 28 of the 33 research questions identified focus on what the professor does, and seek to justify the "best way to achieve something", either the best methodology for achieving a learning outcome by the students or the best method to assess what students have acquired (N is greater than 25 because some works have several questions/contributions, each of them in the same or different type of teaching or learning approach). Only in 5 cases have we detected signs that the contribution focuses on the student, either on how they learn or what it would be appropriate for them to learn in the course.

In Table 3 we can observe how most of the works have a Type 1 of research focus and, at the same time, they analyze a superficial learning approach. However, 4 of the works with Type 1 seek to reflect on the deep learning of students and three others on aspects that could be associated with strategic learning. Apart from that, there were 9 research questions that we could not associate with any particular learning approach, due to a lack of information.

By way of example, we present in Table 4 how a Type 1 research question could be transformed into a battery of questions that would place the focus of research on a Type 2 or Type 3 conceptualization of teaching.

ID	Type 1	Type 2	Type 3	SAL-super	SAL-strat	SAL-deep	SAL-undef
(Alfalla-Luque et al., 2017)		1					1
(Alhely et al., 2017)							1
(Álvarez-Gil et al., 2017)	2			2			
(Andreu-Andrés et al., 2017)	1						1
(Avella Camarero, 2017)			1	1		2	
(Blanco & Sanchez-Ruiz, 2017)	1						1
(Canós-Darós et al., 2017)							1
(De Burgos Jiménez et al., 2017)	1			1	1		
(Díaz Garrido et al., 2017)	1			1			
(Fernández-Zamora & Arias-Aranda, 2017)	3	2		2		3	1
(Fossas-Olalla et al., 2017)	1			1	2		
(García-Ramos & Martínez-Campillo, 2017)	1					1	
(Guitart-Tarrés et al., 2017)	1						1
(López-Sánchez et al., 2017)	1			2			

ID	Type 1	Type 2	Type 3	SAL-super	SAL-strat	SAL-deep	SAL-undef
(Lopez Vargas & Real, 2017)	1						1
(Maqueira Marín et al., 2017)	1						1
(Marimon & Berbegal-Mirabent, 2017)	1			1			
(Marin-Garcia et al., 2017)	2			2	2	2	
(Martínez Jurado & Moyano Fuentes, 2017)	1						1
(Oltra Mestre et al., 2017)	1					1	
(Ramírez & García-Villaverde, 2017)	1			1		1	
(Rosillo et al., 2017)	2			1			
(Sanchez-Ruiz et al., 2017)	1						1
(Vidal et al., 2017)	2			1			
(Vidal-Carreras et al., 2017)	1	1		2		1	
Total	27	4	1	18	5	11	11

Table 3. Works and number of questions/contributions by teaching and learning approaches

Instead of… (type 1)	… Express it in this manner (type 2 and type 3)
Is gamification a good teaching tool? or does gamification help students to learn more?	What happens with students of the course XXXX in the 2017/2018 academic year when faced with gamified activity (or set of activities) YYYY? Do they become more stressed or are they more motivated? Is it only extrinsic motivation that is generated or does that motivation cause them to invest more hours and, in addition, increase intrinsic motivation? Are they aimed only at the outcomes highlighted in the gamification panel, or do they develop a deep learning with high intensity in relation to the course objectives and, in addition, extend their personal goals? What type of learning objectives/outcomes help build this gamification experience?

Table 4. Example of a proposal for the reformulation of research questions to go from a type 1 to a type 2 and type 3 approach

6. Conclusions

After the analysis carried out, it seems that the majority of the research is limited to a very basic approach that reproduces the usual type of investigations prior to 1980. This type of questions are considered obsolete, because they aspire to find a "silver bullet" that works successfully in any context and for any student. That is to say, if we teachers choose the correct method or activity, our students will achieve the expected learning results. It is as if the problem consisted of identifying the button or lever that activates the learning process in all of our students that leads to aligning them with the objectives that we propose, and devoting the effort required to achieve them.

However, the results of the last 30-40 years of research on learning seem to suggest that the mechanisms that guide the learning processes of the people enrolled in our courses are too complex and are the result of the interaction of too many variables to be able to conform to models as simple as those that support type 1 investigations. Therefore, the research that may be useful at this time is that representing type 2, or even better, type 3.

As limitations to this work, we have only analyzed the publications from the last year (2017) and from a subset of Spanish university professors in the area. It would be desirable in future research to expand to publications in recent years. For example, it could extend back to 2012, to incorporate the new contributions following Medina-Lopez et al. (2011). Furthermore, the identification of articles has been carried out on the basis of the responses from potential authors. This procedure may have resulted in false negatives due to the lack of response or an oversight by the authors. Future research could use the updated review by Medina-Lopez et al. (2011), restricting it to the most recent years and Spanish authors.

We understand that the reflections arising from the results cannot be generalized to all of the learning research conducted by Spanish university professors without performing similar studies in other areas of knowledge.

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