



**An exploration of the meanings of innovation held by
students, teachers and SMEs in Spain**

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Introduction

Recently, innovation has been at the forefront of the reforms and changes in the vocational education and training (VET) system in Spain and in other European countries (CEDEFOP 2010, 2012 and 2013). In particular, in the educational context, innovation has been defined as a necessary competence to be developed in students in order to improve their adaptation to the work context, given that the current global context requires companies to innovate to survive. Thus, innovation as the required outcome of nowadays society requires the development of innovation competences in current and future workers (OECD, 2009).

Despite the general consensus on the importance of innovation for developing the economy by maintaining companies' competitive advantage and performance (Becker and Gerhart 1996), developing the education system (CEDEFOP 2012) and for society itself (OECD 2009), there is no agreement about what exactly innovation is, how it is conceived (Fagerberg 2005), what innovation competences are needed (OECD, 2002) or how it should be measured (Smith 2005). As a case in point, several skills have been considered by the OECD since 2002 under the category of innovation competence: act with autonomy, ability to interactively use language, knowledge and technology and interact in heterogeneous groups. In an attempt to provide a common ground from which to conduct research on innovation, multiple definitions of this concept as well as typologies have been considered (Totterdell et al., 2002; Damanpour and Evan, 1984).

Notwithstanding the existing definitions and classifications of innovation by scholars, the phenomenological realities of this phenomenon by the different social actors implied in the innovative process have yet to be explored in the context of VET. To address this research gap, we conduct in-depth interviews with 42 VET teachers, 20 SMEs managers and 24 VET students to explore the meanings of innovation held by the different social actors in the context of VET.

The subjective perceptions about what innovation is or how it is defined are especially important if we consider that meanings are the base of all human expression (Kelly 1955), and thus might help explain the attitudes to innovation or the innovative behaviours. According to this and from a system perspective to innovation (Fagerberg, 2005), the meanings of the social actors implied in the innovative process can act as facilitators or inhibitors of this process. This approach considers different social actors and factors that take part in the innovative process, such as institutions, the political process, the public research infrastructure, the financial institutions and skills, with a focus on the processes involved in developing innovation, the role of drivers and barriers and the relationships among the main actors (CERI 2009). Hence, innovation is seen as the result of the interaction between actors and business factors in a specific cultural and institutional context. From this viewpoint, VET and its links with the SMEs in which students do their apprenticeships, have been identified as an important part of the innovative process (Moodie 2006) because the VET system is expected to prepare students for a work environment that requires constant innovation. Recently, Toner and Woolley (2016) stated that the workforce that VET develops is a key factor in the innovation process. In addition, Curtain (2004) defined the important role that VET plays in the innovative process as a bridge between SMEs and universities and research centres.

The ~~important~~ role that the VET system plays in the innovative process has been not only highlighted in the literature on innovation but also recognized by different international organisms (OECD 2009, 2015, CEDEFOP 2012, 2013). In particular, they emphasize the important role VET plays in training students in innovation competences as a necessary factor for innovating in the business context. But as Toner and Woolley (2016) recently indicated, the role of VET in the innovative process has been insufficiently explored. Similarly, the Centre for Educational Research and Innovation (CERI 2009) criticized that the analysis of innovation from a systemic perspective has been very limited in the VET field, thus ignoring the different views on innovation that actors in the VET system might have. Hence, despite the extant agreement in the literature and the international organisms of vocational education on the important role of VET in the innovative process, there is a lack of knowledge on what the different actors in this system understand by innovation. This study aims to address this gap by exploring the meanings of innovation by different VET actors as a crucial factor to

understand the role of VET in the innovative process since meanings are understood as the sources of innovative attitudes and behaviors in teachers and students (Weick, 1995; Kelly, 1991). In particular, we posed the following exploratory research questions:

RQ1 ~~What~~ What is understood by innovation competences or innovation?

RQ2 ~~Are these~~ Are these meanings shared by the different social actors in the VET system (students and teachers)? Moreover, are they ~~is it~~ also shared by SMEs?

These questions were part of a larger qualitative study exploring the transfer of innovation from the VET system to SMEs in Catalonia (Spain). ~~These~~ These questions need to be explored if we want to foster the culture of innovation required by the EU for the VET context given that “culture” has been traditionally defined as a set of shared meanings or cognitive representations in the minds of individuals (Geertz, 1973). Accordingly, different meanings or cognitive representations of innovation and innovation competences may hinder the innovation process and a shared understanding among social actors of what is innovation, can be a key factor for transferring innovation from the vocational training context to SMEs. This seems especially important when we talk about the common understanding of the innovation competences that need to be developed in students by VET institutions in order to make them able to innovate once they incorporate to the workplace of the SMEs and to create the culture of innovation claimed by the literature (Oppenheimer, 2014).

In this context, it seems well justified to explore the meanings of innovation held by the different VET actors (students and teachers) and SMEs managers as possible drivers or barriers in the process of transferring innovation from the VET context to SMEs. Our contribution lies in providing the unexplored phenomenological realities of innovation held by the different social actors in the VET context. In so doing, we hope to take the first step in encouraging a future line of research to explore the influence of meanings on the transfer of innovation from the vocational training context to SMEs and on the creation of the required culture of innovation.

In the following article, we briefly highlight the different definitions, types and approaches to innovation in the literature and in particular, we justify the adoption of a systemic approach to conduct this research. We then explain our methodology as part of a larger research project and describe the Spanish VET system. Third, we present our

findings on the meanings given to innovation by the different social actors: teachers, SMEs and students. Finally, we conclude with a discussion on the implications of the different meanings found for fostering the transfer of innovation from the educational context to SMEs and society, as well as achieving the culture of innovation the European Union aims for.

Conceptualizing innovation: Different types and approaches, but what about meanings?

This section outlines the contributions made to defining innovation in the literature, with the aim of providing a basis for comparing the meanings constructed by VET teachers, students and SMEs found in our study, as well as highlights the research gap on meanings of innovation.

Traditionally, innovation has been conceived from a Neo-Schumpeterian and economist point of view (Schumpeter 1942; OECD 2005), in which innovations are either economical or technological, only produced in markets, carried out by companies, and measured through formal R&D, patents and numbers of entrepreneurs (Smith 2005), as the creation of completely new products or processes. Within this traditional view of innovation there are several types of innovation. The most common distinction has been made between technological innovation (changes in products, services and production processes) and administrative innovation (changes in activities, social processes and structures) (Damanpour and Evan 1984). There is a similar categorization between product (those innovations described as technological) and process innovation (those innovations which are administrative in nature) (Totterdell et al. 2002). In addition to these categorizations, innovations have also been classified according to their degree of risk and novelty into radical (if they imply a radical change) or incremental (if they imply an incremental change) (Totterdell et al. 2002).

The types of innovation considered by the literature are institutionalized by the OECD in the *Oslo Manual* (2005) and conform a restricted although hegemonic view of innovation. Regardless of the different types of innovation considered in this manual (see Table 1), they all share an economic view of innovation. Hence, the purpose of innovation is viewed to increase production and productivity to improve business competitiveness by reducing costs and increasing the presence of the business in

different markets. From this Oslo perspective, innovation is defined as “the introduction of a new or significantly improved product (good or service), process, commercialization method or organisational model, in the company’s internal practices, workplace organization or its external relations” (OECD 2005:56). From this viewpoint, novelty is restricted to the creation of new products or processes, and therefore refers to radical rather than incremental innovation (Totterdell et al. 2002).

DIFFERENT TYPES OF INNOVATION ACCORDING TO THE OSLO MANUAL			
TECHNOLOGICAL		ADMINISTRATIVE	
Product Innovation: The introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.	Process Innovation: The implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.	Organisational Innovation: It is the implementation of a new organisational method in the firm’s business practices, workplace organisation or external relations.	Marketing Innovation: The implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.

Table 1. Different types of innovation. Source: OECD (2005:47-52).

This conception of innovation has been criticized (Kline and Rosenberg 1986) because it ignores the incremental changes that take place within the workplace or society that have great potential to create innovation by accumulating small progresses (Lundvall 1992). It also confuses the concept of innovation with the concept of invention (Fagerberg 2005; Gurrutxaga 2010). Moreover, it has also been criticized for focusing only on outcomes, rather than on the innovative process, which is treated as a “black box” (Fagerberg 2005). What happens within this box has obviously to do with learning in groups, teams, systems and networks, and thus implies the social dimension of innovation, the study of which has been left to other disciplines such as sociology, organizational science and management studies.

These disciplines propose a broader concept of innovation that considers the social dimension, the processual focus and the systemic character of innovation processes at different analytical levels. For instance, the definition of innovation used most in HRM studies by West and Farr (1990: 9), defines innovation as “the intentional generation, promotion and realization of new ideas within a work role, group or organization, in order to benefit the individuals involved, the group or organization”.

Notwithstanding the implicit social dimension of innovation considered by the restricted economist view, it was not until the first decade of the 21st century that this dimension was formally recognized and highlighted. This was possible due to the European Union (EU) initiatives that began promoting a culture of innovation that went beyond the economist proposals and investments in R&D in the Oslo Manual (OECD 2005) and extended the concept of innovation to all social spheres (OECD 2009). Hence, the EU created the Social Innovation Union Initiative (EC 2010), which recognized and awarded social innovation projects. In so doing, it broadened the concept of innovation to include social innovation arising from private companies as well as civil society, the third sector and the public sector to improve society and solve social problems. From this perspective, innovation is defined as “the convergence of multiple social actors, who participate in sharing information and knowledge through social networks in which the degree of participation or social capital is a key element to the network diffusion” (Gurrutxaga 2010: 134). This view implies a systemic approach to innovation and a focus on the process through which innovation occurs and the social actors that take part: individuals, firms, organizations and networks (Fagerberg 2005). It also implies that meanings of innovation, as cognitive representations of the idea of innovation are key to understand the process of innovation. It is from this point of view that we conduct our study.

Research setting

The study was carried out in the Catalan VET system, in Spain. The Spanish VET system is composed by three subsystems (Brunet Icart and Rodriguez-Soler 2017): the educational subsystem, which is full-time, school-based and developed by VET centres, and two labour subsystems, which are occupational and driven by continual supply and demand training. For the purposes of this research, we focused on the first subsystem, carried out by VET centres. This formal education is organised on three

levels since the reform of 2013 (CEDEFOP, 2016): (1) Basic VET, in lower-secondary education which corresponds to ISCED (International Standard Classification of Education) 351 and is targeted at students in the last year of compulsory education, that is learners of 15 years old, who are at risk of leaving education; (2) Intermediate VET, in upper-secondary education which corresponds to ISCED 354 and usually begin at age 16, after the end of compulsory education; (3) Higher VET in higher education which corresponds to ISCED 554, begin at age 18 and allows VET graduates to progress to university. The duration of each level is of two years (2.000 hours).

These VET diplomas include a workplace training module which is compulsory since 2006 and which accounts for 400 hours in Intermediate and Higher VET levels. Additionally, since 2012 legislation (Royal Decree 1529/2012), the dual VET scheme is introduced to bring the VET system closer to the companies and to foster students' work-based learning (Brunet et al., 2017). The dual VET alternates periods in an education institution and the workplace and is managed through a learning agreement between the student, the education institution and a company or through a training and apprenticeship contract. In these cases, the duration of the programme can be up to three years. Currently, there is an educational offer of a total of 158 VET diplomas belonging to 26 professional branches (CEDEFOP, 2018).

Recently, according to the Spanish Royal Decree 1558/2005 (RD 2005), VET centres have been given a new role that consists in carrying out innovation and development projects according to the following dictates:

“To drive and undertake innovation and development projects in conjunction with local firms and social interlocutors, and transfer the context and evaluation of the experiences to other centres.” (Article 6, Point 2.b, RD 1558/2005, p.43143).

This new role has been emphasized and formally recognized by a programme developed by the Catalan government known as Innova VET. This initiative started in 2008 and it has been recently confirmed by a legal resolution (ENS/1080/2014). It aims to “develop innovation methods and knowledge transfer among the VET centres and the companies. It also develops courses and seminars to exchange experiences with the aim that VET centres give support to each other and exchange innovative practices. It also fosters innovation and the exchange of good practices. It enhances collective commitment among teachers, students and companies to develop key competences such

as initiative, innovation, entrepreneurship, planning, organization, teamwork, analysis, assessment, and responsibility towards business challenges. It motivates VET centres to interact with companies and institutions to develop, transfer and apply knowledge” (XTEC 2017). Thus, Innova VET tries to link companies’ innovation projects with VET centres. Specifically, the company chooses an innovation project and asks a VET student to develop it during their apprenticeship. The student is supervised by both a VET instructor and an instructor from the company.

Initially, from the resolution ENS/1080/2014, 37 VET centres joined the Innova VET project. Recently, according to resolution ENS/2269/2016, 10 additional VET centres have been included in this initiative. These centres can be found on the Education Department website (ED, 2017). From these 47 VET centres, we purposefully sampled 12 centres out of 23 based on their highest level of innovative activity. This level was a three-star rating provided by the Education Department to distinguish the centres that stand out in innovative practices and innovation projects. In order to control for contextual differences within Catalonia, we included centres and located in the four provinces of Catalonia: four in Barcelona, six in Tarragona (the province in which we started collecting data), one in Lleida and one in Girona. Of the 12 VET centres contacted, all agreed to participate in our study. We started our data collection in Tarragona and we reached the point of theoretical saturation in Girona. The ED gave this level of innovation to the centres. Of the 12 VET centres contacted, all agreed to participate in our study.

Method

This article presents the response to the exploratory questions: (RQ1) What are the meanings given to innovation by the different VET actors (students, teachers) and SME managers? and (RQ2) Are these meanings shared by the different actors or are they different? However, ~~these~~ ^{is} ~~were~~ ^{as} only ~~two~~ ^{one} of the different research questions posed within a larger research project¹ that aimed to explore the relationship between the VET system and SMEs of medium and high technology in Catalonia, specifically related to the drivers and barriers in the innovation processes. A qualitative

¹ Recercaixa 2014 “Formació Professional i Pimes: El repte de la Innovació a Catalunya” funded by Obra Social “La Caixa”.

methodology is most suited to answering these research questions (Denzin and Lincoln 2012).

Participants sample, data collection and analysis procedures

Although other social actors participated in the larger project, such as union representatives, political actors from the Education Department, people in charge of integrated centres for occupational training and VET centre directors, the purposeful sample we used in this research to respond to the posed question consisted in 24 VET students, 42 VET teachers and 20 SME workplace training instructors or CEOs. We purposefully sampled teachers and students according to the richness of information they could give about innovation. In particular, Teachers were selected because they were either working in an innovation project as instructors of the apprenticeship in the companies or they were the coordinators of the Innova VET programme in the centre. To select them, we asked VET centre directors to identify the most active teachers in innovation. Therefore, the selection criterion for teachers was that they were involved in some way in the innovation training, by being the apprenticeship instructor or the head of the innovation programme. The selection criterion for students was that the interviewed teachers perceived them as innovative or they were participating in an innovation project. Thus, we asked teachers to identify the most outstanding students in innovation. Participants were second year students of Higher VET Diplomas and their age ranged between 20 and 30 years old. The VET diplomas they were studying were on the following professional branches: information technology, mechanical manufacturing, business management, chemistry, social services, hotel industry, automotive, healthcare, personal image/film characterisation and horticulture professional branches, that is 10 out of the 26 professional branches. Approximately, a third of the students sample participated in the dual VET scheme. Finally, following snowball chain sampling (Patton, 2002), we interviewed the SME workplace instructors or CEOs who the teachers were collaborating or had collaborated with in the innovation projects. With the participants sample, we reached a point of theoretical saturation sample (Strauss and Corbin, 1990:212) whereby new data collected did not provided new information but validated the extant categories of meanings.

We conducted semi-structured interviews that were recorded and transcribed verbatim. They were held in Catalan or Spanish, but the quotes used in this article have

been translated into English. They took place in the VET centres or the SMEs between September 2015 and October 2016. Interviews lasted between 30 and 90 minutes. Participants were asked to define innovation and the adjacent term creativity from their own point of view. We did not give them any formal definition even in the cases in which they did not know how to define the terms. The interview further explored different aspects of the relationship between SMEs and the VET centres, although for the purposes of this article we only focus on the meanings provided. A deductive approach was adopted in the analysis using a category system derived from the theoretical framework. That is, we initially used the two broad categories of innovation considered in the literature: (1) a broad view of innovation, which included the social approach, and (2) a reduced and economical view of innovation. Interview transcripts were reviewed to identify excerpts to be included into these two broad categories. However, we also let inductive categories to emerge from the data. For instance, we create an “undefined” category to group all the responses of the participants who didn’t know how to define innovation. We also inductively created codes within each broad category, such as educative innovation, creativity, entrepreneurship and other concepts that arose to define innovation. We refined our analysis by undertaking repeated comparisons of excerpts that had been grouped in the same category, in order to ensure that the assignment of excerpts to categories was such that categories were non-redundant and discriminant (Miles and Huberman, 1994). NVivo qualitative data analysis package was used to codify all the qualitative data. An example of the categories created for Meaning of Innovation is provided in Figure 1. This analysis provided evidence for data saturation, that is, we reached to a point when excerpts were classified into the existing codes and no new code or category was necessary.

Findings

Based on the definitions of innovation given by the social actors we clearly identified some trends that need to be discussed in relation to the transfer of innovation from the VET context to the SMEs. Specifically, while the majority of SME actors provided a restricted, Neo-Schumpeterian and economical view of innovation guided by the needs of the market, teachers and students held a more diverse view. In this section we address the views of each of the three groups of actors separately.

The diverse views among teachers

From the three social actors in the study, teachers were found to hold the most contrasting perspectives, with some teachers holding a broad view of innovation that included educational and organizational issues within the VET centres, and other teachers conceptualizing innovation restricted to the needs of the market. This last perspective was held by a majority, with 25 out of 42 interviewees sharing this Neo-Schumpeterian view. Only 8 teachers held a broader view of innovation that included both the economic and social dimensions. Of the remaining 9 interviewees, 5 were categorized by defining the term unclearly, and 4 by defining it as an adaptation to the labour market needs and a way of increasing students' employability.

The following quotes show some of the definitions categorized as the restricted view of innovation:

Innovation means finding a system that, for example, saves costs or saves time for a company, that no-one has thought of before, you take it and say I will do it because we are practicing here, and I sell it to you, and then the institutes become small consulting companies. (TC4 Innova VET Coordinator)

I am a teacher of business, of the public administration, so when I explain to my students what is innovation I always tell them that it is an idea that is different from something that already exists but that can be implemented correctly in a system. I always give them the same example, which is gazpacho chewing gum, they all think it's disgusting, and I say, but this gazpacho gum doesn't have positive results on the market, this would not be innovation, for me innovation would be, a novelty that improves something that exists on the market and that the market accepts (BC2 Apprenticeship Coordinator)

Teachers with this view mainly consider the technological type of innovation according to the Oslo Manual (OECD, 2005). Moreover, some teachers restricted the possibility of innovation to certain VET studies, such as computing or technological studies, and consider it rare or more difficult in other VET studies related to services, such as the hotel industry, commerce, health services or administrative services. Accordingly, their idea of innovation was restricted to a product and was strongly linked to technology as the following quote illustrates:

It is much easier for the centres that have training for industry to do innovation projects than the centres that have training for services (GC2 Apprenticeship Coordinator)

They clearly did not consider organizational and social aspects in their concept of innovation. Interestingly enough, those who defined innovation from a restricted and Neo-Schumpeterian point of view had attended the courses on innovation provided by

the Education Department that were a prerequisite for being included in the Innova VET programme. They differentiated “innovation” as it was transmitted by the courses they had attended from other concepts such as “educative innovation” or “knowledge transfer” that weren’t considered in the Innova VET programme as innovation. The following quotes illustrate this distinction:

We have only been in Innova for a short time and in this time we have done three projects. A major project and two other simpler ones. And really I would say that of the three, the only one that was innovative was the big project, the one that is part of Innova FP. The Innova programme also in the first years led us to do programmes as if it were Innova but without the innovation expert, but there was the knowledge transfer expert, which for us is important. So these other two are more knowledge transfer than innovation. (TC5 Innova VET Coordinator)

This finding allows us to deduce that the Innova VET programme provided their participants with a market-orientated definition of innovation in line with the one provided initially by the Oslo Manual. From this point of view, innovation is not conceived as a radical change but rather as an incremental change or a small improvement, as the following participants stated:

We don't discover anything, the only thing we do is adapt to what we have on the market and with that try to improve the product or a series of products with which ... to improve their benefits. That's what I understand by innovation. (B C1 T2)

This idea of innovation being incremental rather than radical was also transmitted by the Innova VET network to foster initiatives as one participant stated:

Both X and I, the coordinator, go to a programme, to a network, we are in the network, and we meet on a regular basis once a month, we've been doing that for a bit over a year now and our thinking about the concept of innovation has evolved over this year and a bit. Before going to this network, I would have defined innovation, I don't know if I would have been able to, but I would have given a definition that included novelty, something not done before now, a discovery ... innovation as something never seen before. Maybe I'm exaggerating a bit with the terms but the idea that I had was this. Then, we created debate in the network and there are people who think differently, the people who have been doing this for a long time, the people who run the network, they define innovation, and you start believing it, innovation is also doing things differently to improve what you are doing. (T C2 Vice-director)

Because of the economical orientation of this view, the concept of innovation was sometimes overlapped or linked to the concept of entrepreneurship, as the following Innova VET Coordinator stated:

Well, innovation... it's difficult to define what innovation is because we usually mix the concept of innovation with that of entrepreneurship. Innovation is to try to develop a product or a service that is different from what is already being done. I understand this as innovation. And I distance myself a bit from the definitions of innovation. Innovation is providing a service or a product

that gives more than there is on the market. And entrepreneurship would be to take this service and carry it out. (BC1 Innova VET Coordinator)

We assume that having the Neo-Schumpeterian view was in part due to the socialization received in the Innova programme courses.

On the other hand, a minority of 8 teachers defined innovation in a broad way including organizational and educational changes as part of innovation, and therefore incorporating the social dimension. These teachers were characterized by being very involved in what they taught, so that they considered innovation as part of developing their knowledge and their professional development. Hence, they defined innovation as part of its role in transferring and developing knowledge, and therefore they included educative innovation and organizational innovation within their centres as part of their definition. Should we define them as innovators within the ranks of teachers? The following quotes illustrate this broad view of innovation:

Do something different to what has been done so far, what does this mean? We can innovate the way we do a curriculum, (...) but you can also innovate by collaborating with organizations, working with companies, and even doing activities with entities and companies. (BC2 T1)

Innovating is doing things differently to improve what you do, society, whatever. That means, every innovation has an aim. If there is no aim what meaning does innovation have? That is, doing new things to innovate, turn around or change what we have to improve. And of course, in the case, for example, of vocational training, it would be like when ... I am doing a kind of class with particular resource material and if I see that the students don't understand what I am teaching, they're not motivated by the classes, then I do the classes differently, set them up differently, update pedagogical methodologies to get results. I am innovating and changing. (TC3 Director)

It can be seen that these meanings of innovation are not only orientated to the market needs but also to the needs of society, and hence they are more in line with the systemic view of innovation and the new EU proposals to foster a culture of innovation (OECD 2009). Indeed, these teachers considered social issues like the internal organization of VET centres, networking with other institutions and discovering new ways of teaching as part of innovation. In so doing and without realising, they were in line with the CEDEFOP proposal of innovating through educating in competences that help develop thinking in students. We consider this meaning of innovation more appropriate for fostering innovation competences in students than the Neo-Schumpeterian view because teachers who hold this view act as role models of innovation.

We categorized another group of 5 teachers by their fuzzy way of defining innovation, as the following quotes illustrate:

No idea, I've never even thought about it, I'll look it up later in the dictionary! I suppose any action that implies thinking beyond what we already know. (Interviewer) And the difference between innovation and creativity? (Interviewee) Maybe creativity is more linked to doing something, to an action. Innovation is more about...thinking? (BC1 T1)

I think that is something that is beginning, until now, there was very little innovation in any aspect, I think it is something, innovation and entrepreneurship that are like two new things, right? That they have popped up now like mushrooms, and now schools have to work on entrepreneurship and we don't know very well, we don't know what it means (TC4 Apprenticeship Coordinator)

This inability to define innovation certainly makes it a challenge to foster innovation competences in students, because if teachers do not know what innovation is, how can they facilitate the development of innovation competences in students? Indeed, if teachers are to train students in innovation competences, it seems important that they have a view of innovation that allows students' innovative potential to develop.

Finally, we considered a fourth category of meaning to include those responses that define innovation as a way of increasing students' employability and adapting them to labour market needs. This view reflects teachers' concern to incorporate students into the labour market as the final aim of VET. The following quote exemplifies this meaning:

Innovation would be to adapt the student to a future workplace, that they have the skills and the know-how to do what a company is asking for. (GC2 T3)

Faced with this diversity of meanings, it seems clear that not all meanings facilitate the innovative process, the development of innovation competences in students or the expression of these competences in the SME workplace, as we'll discuss further on.

The homogeneous view among SMEs

In comparison with the diverse views held by teachers, SMEs showed an unvarying perspective in line with the Neo-Schumpeterian view of innovation. Hence, the social dimension of innovation was ignored by 19 out of the 20 interviewees from SMEs. This is not surprising given that SMEs focus on profitability. The following quote illustrates the view held by SME instructors:

It is being able to adapt to the manufacture of a very specialized product and being able to evolve this project or that product or whatever, to make yourself stand out (BC2 IE1)

Certainly, the market acquires a privileged role in these definitions:

Something that is new, a thing, a process, a system, a device that is not on the market (LC2 IE1)

Although this finding was not surprising, it poses some difficulties in achieving the culture of innovation proposed by the EU, in which the social dimension and the interaction among social actors is conceived as key for innovation.

The vague and idealistic view among students

In view of the meanings of innovation held by the social actors mentioned, and given that students occupy an intermediary position between these social actors, studying with teachers but doing their apprenticeships in SMEs, we may wonder which meanings would be predominant in students, if the broad and social view or the restricted and exclusively economical one? However, the answer is not so simple. Interestingly, neither of these two meanings were predominant among the students. On the contrary, the predominant meaning, given by 14 out of the 24 interviewed students, was a vague and ill-defined one, blurred with other concepts like creativity and entrepreneurship, as the following quotes exemplify:

Let's see, since second grade we are taught to be innovative, taught to ... create a hotel, create a product, create a brand, create a logo, and then sell the product in front of three judges, which is the last point of the project that gets people to buy it. This is how to innovate and ask: What do my competitors have that I don't have, should I lower prices, put them up? What should I do so the hotel next door doesn't have what I should have? (TS13)

I think, if I'm not mistaken, that it is to renovate something, improve something? which is what the word says, innovate. But...I've never really thought about it. (Interviewer) and creativity? What would creativity be for you? (Interviewee) They are...no, they are very good words, that have a lot of meaning but it's a ... I mean ... creativity. A person is creative if they are very original, for me a creative person is very original. Or they think of a thousand things to do. Very ... how can I explain it? (BS8)

Hmm ... good question. Innovation. OK. We could say it is ... I don't know how to say it. As an example? (Laughs). These questions are very good. Creativity is then, I mean, what I think ...hmm, I don't know when you start being creative, I don't know from what age we begin to be creative ... I don't know, the truth, yet. But I guess it's ... I like this question but I can't say it in words. (BS7)

This finding questions the real development of innovation competences among VET students as it was aimed for by the institutional regulations LOE and LOMCE and by the Innova VET programme itself, unless knowing the meaning of innovation is unnecessary for developing these competences.

Notwithstanding their difficulty in defining this concept, they were all very determined to give examples of innovation. Therefore, they all knew how to identify an innovation although didn't know how to define it. Curiously enough, all the examples of innovations provided were technological, as the following excerpts demonstrate:

something ... that improves... our situation and that ... what .we already have, is not able to improve it. For example ... you have a mobile phone that can't call all 24h, for example, or for 12 hours, and if you innovate and make a phone that goes over 12 pm and you can call, well that's something that improves your life situation. (BS2)

I don't know how to explain it exactly. (Interviewer) With an example, perhaps? (Interviewee) The innovation that Steve Jobs did with mobile phones. (BS5)

Therefore, below the surface of un-definition, we can identify the Neo-Schumpeterian view of innovation through these technological examples. However, only 5 students explicitly mentioned markets or companies in their definitions and gave innovation a final economic purpose.

To be able to do something that will save the company time, expenses and keep being just as good or better. (BS5)

Similarly, the broad view of innovation was even scarcer with only 4 out of the 24 students interviewed considering the social dimension of innovation, and specifically including educative innovation, as the following quotes show:

Both are what we would call innovation, for me innovation would be those nine months you have at school and you go and get out of that routine a bit. (B S2)

I think it's improving something and... like changing it. I've never thought about it before. (Interviewer) An example. (Interviewee) Seeing you are talking about degrees, well, how to improve the environment of the degree, I mean, change depends on things, more practical, a bit of practice and a bit of theory. I think that is innovation.

Finally, although in the minority, there were 3 students who provided a different meaning of innovation, an idealistic and romantic view which, although vague, we consider to be in a different category because below its blurry exterior was not the Neo-Schumpeterian view but rather the broad view of innovation, as these examples illustrate:

Innovation? Wow. How abstract (laughs) (...) it is to look for new methods or elements that can improve the system, whether work, life or whatever we're studying (T S13).

Do something new (...) you can reach everyone, because if you make or think of something new, that is useful for people, that everyone can use and it's something revolutionary, that at least tries to change or your own life or the lives of others, basically it would be this. (B S6).

Discussion

In this article, we have examined from a systemic approach the different meanings of innovation held by VET teachers, VET students and SMEs, as important social actors implied in the innovative process (Fagerberg, 2005). In doing so, we have responded to the two posed research questions: (RQ1) What are the meanings given to innovation by the different VET actors (students, teachers) and SME managers? and (RQ2) Are these meanings shared by the different actors or are they different? Overall, we can conclude on the diversity of meanings of innovation among the social actors examined and on their different views of this concept. Nonetheless, the Neo-Schumpeterian view of innovation was found to be predominant among all the actors examined if we consider the technological examples provided by VET students following their unclear attempts to define the concept. Some theoretical and practical implications can be derived from these findings.

Theoretically, with this research we have contributed to shedding light on the “black box” of the innovative process by showing the different meanings of innovation that VET teachers, students and SMEs hold. According to Cooke (2002) the “black box” of the innovation process refers to the tacit and intangible elements that make innovation possible. Since shared meanings have been defined as the key ingredient of a culture (Geertz, 1973), we assume that meanings of innovation are the tacit element to construct the culture of innovation and the positive attitudes to innovation that form the “black box” of the innovation process. Hence, although we can't conclude on the role of VET in the innovative process and on its influence on innovation in SMEs with our research, In exploring the meanings of innovation held by VET actors and SMEs, we have contributed to the set the basis for covering the highlighted gap of studying the role played by VET in the innovative process (CERI, 2009; Toner and Woolley, 2016).

Specifically, assuming that meanings are the sources of positive attitudes to innovation and innovative behaviours (Kelly, 1955; Geertz, 1973), and that “shared” meanings or an alignment between the educational and the work environments is an important factor for the transfer of learning from the educational context to the workplace (Pineda-Herrero et al., 2015; Mulder et al. 2015), we can conclude that the type of meanings found as a response to RQ1 and the “shared” predominant Neo-Schumpeterian view among actors as a response to RQ2, faced with such a diversity of meanings, we suggest a good transfer of the New Schumpeterian innovation from the VET context to SMEs. ~~suppose that not all kinds of meanings promote the development~~

of innovative competences in VET students and the transfer of innovation from the VET context to SMEs in the same way. Thus, on one hand, and based on existing research reporting the alignment between the educational and the work environments as an important factor for the transfer of learning from the educational context to the workplace (Pineda-Herrero et al., 2015; Mulder et al. 2015), In particular, if we can assume that “sharing” if the social actors share the same perspectives or meanings of innovation among the social actors, this would facilitate the transfer of innovation from one context to the other. ~~In~~ our particular case, regardless of the vague and imprecise definitions given by students, a school-work alignment could be seen when the students were asked to exemplify innovations. Hence, we found that both SMEs and most students shared a Neo-Schumpeterian view of innovation in line with the Oslo Manual (2005), in which innovations are either economical or technological, produced in markets and carried out by companies and which excludes the social dimension of innovation. Likewise, we also found this alignment with most teachers (25 out of 42). As a result, we surmise that the socialization facilitated by the Innova VET programme through its networking and training, which has led to the spread of the Neo-Schumpeterian view of innovation among VET centres, has helped foster the innovative process by aligning the view of the VET centres with that of the SMEs. Nonetheless, in excluding the social dimension of innovation, the transfer of innovation that might derive seems far away from the culture of innovation aimed for by the European Union (EC 2010), since it only recognises the economical dimension of it.

Also, However, based on our findings we can also suggest the hypothesis that teachers who hold a broader view of innovation not aligned with the meanings held by SMEs and far from the “standard” view of innovation transmitted in the Innova VET programme, are more prone to foster innovation competences in their students than those teachers who share the same meaning with SMEs but who don’t consider new educative or organizational practices as innovation. This is because they act as role models themselves as they try to innovate with different and new educational methods and organizational and social practices they consider as innovations. Although the lack of congruence between the school-based supervisors who held a broader and social view of innovation (5 teachers) and the work-based supervisors can be viewed as a hindrance in the transfer of learning from the school to the work context (Mulder et al., 2015) according to our assumption of the need of alignment and shared meanings, in light of

our results we consider that more research into the role of meanings in the innovation process and the development of innovation competences is necessary to predict the result on innovation of this lack of congruence of meanings, given the unstructured and non-institutionalized nature of innovation. That is to say, it may not be necessary to have a shared view or meaning of innovation to innovate but rather it could be more important to have role models to imitate without knowing exactly how to define what innovation is. Faced with these two alternative scenarios depending on the type of meanings VET teachers hold, we recommend to conducting further explanatory research that relates the explored meanings of VET teachers with measured innovation onve competences in VET students and measured -innovation in SMEs.

In particular, and based on the findings of this exploratory research on meanings and the discussion on them, we posed the following four explanatory hypothesis to be tested by further research:

H1: “Shared” meanings of innovation among VET actors and SMEs facilitate innovation in SMEs.

H2: The type of meanings “shared” (broad view including social dimensions or the economical view) determines the type of innovation in SMEs.

H3: Teachers with a broader view of innovation are more prone to foster innovation competences in their students than those teachers who hold just an economical view of it.

H4: Meanings of innovation held by teachers mediate between students’ meanings of innovation and innovation in SMEs.

By testing these hypotheses in further research, it~~it~~ would therefore be possible to reach further conclusions about ~~the two possible scenarios and determine~~ the specific role that meanings of innovation play as drivers or barriers in the transfer of innovation from the VET context to SMEs. Thus, although our exploratory study suggests that the meanings given to innovation by VET students, teachers and SME managers play an important role in the innovative process, further research is needed to clarify this mediating role depending on the content of these meanings and the agreement among

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3 the social actors that hold them. Therefore, we hope this research constitutes a first step
4 for more explanatory studies to be carried out in this area.
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8 These theoretical considerations lead us to some discussion on the practical
9 implications of our findings in relation to firstly, the role played by institutions, such as
10 the Education Department through the Innova VET programme, in the transfer of
11 innovation from the educational context to SMEs, and secondly, achieving the
12 innovation culture promoted by the EU initiatives. Concerning the first consideration, it
13 is clear that the socialization in innovation received by the VET teachers of the centres
14 that participate in the regional program called Innova VET, has been effective in
15 transferring to teachers an institutionalized meaning of innovation in line with the Neo-
16 Schumpeterian view shared by SMEs. This finding illustrates the important role played
17 by political and institutional support in the form of regional programmes such as Innova
18 VET in the innovative process. Although we can affirm that the programme has been
19 effective in transmitting an institutionalized meaning, the question is whether this
20 meaning promotes innovation, and if so, what kind of innovation does this institutional
21 programme foster. In addition, if in accordance with the CEDEFOP (2013) proposal
22 educating in innovation competences means helping to develop a new way of thinking
23 to solve business and social problems, then making teaching innovation compulsory can
24 be detrimental to the desired divergent thinking, and thus the vague and romantic view
25 of students found in this study is certainly good news. Hence, another call for future
26 research which derives from this reflection is to explore the role of the Innova VET
27 programme as a mediator variable in fostering certain meanings among VET actors by
28 conducting a comparative research including the centres that do not participate in this
29 programme.
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47 With respect to the practical implications of our findings in achieving the
48 innovation society promoted by the EU in its Innovation Policy (2009), in which the
49 social dimension of innovation is considered key, we can conclude that we are far from
50 the model proposed by the EU since the broad meaning of innovation that includes the
51 social dimension was held by only a minority of our social actors. Indeed, if, as it has
52 been proposed by the EU, innovation should be used for social benefit, then a broad
53 meaning of innovation that includes the social dimension needs to be spread among
54 social actors (OECD2009). According to the EU, we must go beyond the need for
55 innovation as a return on investment for businesses towards the idea of innovation as a
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need of society for social return. Public policy should not only stimulate business innovation but also social innovation. In this regard, the predominant Neo-Schumpeterian view we found among our social actors facilitated by the Innova VET programme is far from the shared meaning of innovation the EU aims for. Hence, we recommend that the Innova VET programme considers a broader meaning of innovation as a first step to achieving the EU's aim of transforming a knowledge society into an innovation society. We recommend this new promoted meaning in line with the idea of innovation as a social act (Mauss, 2006) produced by the interaction among social actors in institutional and cultural contexts.

Finally, our study has an important limitation that needs to be acknowledged. Given our purposeful sampling of VET centres that participated in the Innova VET programme promoted by the Education Department in Catalonia, we cannot generalize our findings to other VET centres in Catalonia or elsewhere that did not participate in this programme.

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Responses to reviewers' comments and changes implemented

The issues raised by reviewers 1 and 2 have been numbered and subsequently responded in the table below:

Reviewer's comment	Authors' response and locations of the changes in the new version
Reviewer 1	
R1.1. The paper has been significantly improved. The authors have accommodated the comments in an adequate manner.	Thanks for your previous useful comments and expertise which have helped to develop the article and in our opinion to improve it by following your suggestions. We are happy that the previous changes performed have fully satisfied your demands.
Reviewer 2	
R2.1. This paper, according to the topic, was about researching the meanings of innovation held by students, teachers and SMEs in Spain. While it was an interesting paper, I had found the paper started off without really defining a (or a set) of research question(s). The paper was very rich in many dimensions of an exploratory study, essentially looking into different dimensions of innovation (or meanings of innovation) from a student, teacher and SME perspective. However, I had found at the end of the paper, everything doesn't converge back into answering a certain (a certain set) of question(s). If the purpose was just a solicitation of feedback on meanings of innovation, then I was not sure if it is a JVET-level paper.	Attending to your suggestion, we have incorporated the two research questions that guide the data collection and analysis for this research (see page 3) in a clear way as RQ1 and RQ2. We hope to have improved the explicitness of the objective pursued in this research by clearly stating the research questions. These questions are picked up again in the Discussion section (see page 17). Finally, we have highlighted in yellow all the arguments provided throughout the article and mostly in the introduction to justify the importance of exploring the meanings of innovation held by VET actors and SMEs as a first step previous to explore the role of VET in the innovative process. We firmly think this is an important contribution as a first step in developing this new line of research and that it is commendable of being published in VET for future researchers to follow on this.
R2.2 In the beginning of the paper, the author tried to highlight (in p.2 line 44 onwards) "the important role VET plays in training students in innovation competences as a necessary factor for innovating in the business context". At the discussion and conclusion of paper, this was not really answered one way or another. I guess the author didn't quite define what aspects/elements of innovation competences he/she was trying to look into and innovation competences could be many things.	As we posed in our response to R2.1, the aim of this article is not to explain the influence of VET training in innovation competences on the innovation in the business context, but to explore the meanings held by different actors of the innovative process as a previous step to understand the role of VET in the innovative process. Henceforth, we can't conclude on the influence of VET on the innovative process in the business context, but set the basis to explore it in future research. Hence, in page 19 we have posed 4 hypotheses to be tested in future research, derived from our findings.

R.2.3. Another observation was the ratio of the no. of teachers, students and SME managers. I looked at the website and there were over 40 VET centres in the Innova VET project. Assuming each centre would have quite a few students, say tens or maybe hundreds (?), why only 24 students were chosen for the study? What sampling criteria were used? Why this sample size? Was it representative enough to provide a comprehensive enough understanding for this study even of exploratory nature? Also, presumably those centres included in the Innova VET project were “innovative enough” to be selected, why particularly choosing these twelve centres? Averaging out, only 2 students from each centre were chosen. The sampling criteria also needed to be clearly stated for SMEs and teachers. The reason I am cautious about this is for an exploratory study, one of the purposes is to formulate hypotheses to be tested in a larger scale at

What we tried to highlight in the introduction is that despite the important role of VET in training students in innovation competences as a necessary factor for innovating in the business context, there are a multiplicity of understandings on what an innovation competence is. As you suggested “innovation competences could be many things”. The “many things they could be” is what we explored through this paper and in particular from teachers, students and SMEs views. This is already justified in the second paragraph of the Introduction when highlighting the different skills considered by the OECD (2002) when referring to the innovation competence and the dearth of research on what different actors of the VET system understand by “innovation”.

We explored these multiple meanings or “the many things it could be” because meanings are the source of attitudes and behaviours (Weick, 1995; Kelly, 1991). Therefore if we want to understand certain attitudes towards innovation or the innovative behaviors of students and teachers, first we need to understand the meanings the main actors in the VET system held about it. In sum, we didn’t define what aspects of innovation competences we looked for, because this was precisely our focus, to explore the different meanings held on innovative competences and innovation. In other words, this is not an explanatory study on the role of VET in innovation processes, but a previous and exploratory one on the meanings of innovation developed in the VET context in order to better understand in future studies what is the role of VET in the “innovation chain”. We hope that by highlighting the research questions in p.3 in response to your suggestion R.2.1., the purpose of the article is clearer now.

We used purposeful sampling and not theoretical sampling (Patton, 2002) to select our centres and our teachers and students. That is to say, we selected our sample of interviewees and centres beforehand and not in response to prior data collection. The criterion to select our sample of centres, teachers and students was the high degree of innovation. In the case of VET centres this was assessed by the ranking provided by the Education Department with a three-star classification of VET centres based on their degree of activity in innovation. We selected those classified as very active (the three-star ones). In the case of teachers, we asked VET centre directors to identify the most active teachers in innovation programmes. They designated the coordinators of the Innova VET

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some stage, or theory-building. If the theories built or hypotheses formulated are biased or not representative, then future researches based on this study might have blind spots.

R.2.4. I have found there was a very detailed discussion about innovation, its process, aspects and newer views on the social aspects of innovation. Ironically, there was a lack of pinpointing how innovation drove the innovation spirit either within the VET system, or how teachers diffused innovation through their teaching, or how students learned and deployed innovation in their future workplaces, or how tangibly identify SMEs benefited from this “innovation chain” spanning VET centre, teaching and learning and deployment in practice.

R.2.5. In the Findings section starting p. 12 Line 46, there were quotations and discussion. How common each of the quoted views/comments among the sample wasn't clearly illustrated. Were they majority's view? Or just anecdotal? Not sure. The question is, are these quotes sufficient to build a foundation of theories for next steps of research?

programme in the centre and the instructors of the apprenticeship in the companies. Following a snowball sampling, teachers themselves identified the outstanding students based again on an innovation criterion. We asked them to identify the most innovative students. Normally, they pointed out one or two students on average. Finally, we purposefully selected the SMEs workplace training instructors who had supervised or were supervising an innovation project. We reached a point of theoretical saturation with the participant sample (Strauss and Corbin, 1990:212) whereby new data collected did not provided new information but validated the extant categories. So, this is the main reason to justify the sample size. As a qualitative study, our final aim was not to statistically generalize our findings but to explore and identify different meanings of innovation to generalize analytically (certain meanings were associated to VET actors). Following your suggestion, we have incorporated these arguments to the main text (pages 8 and 9) in the method section.

Thanks for your comment. We share your view on the importance of exploring the processes of transfer of innovation either from teachers to students or from students to teachers or from students to the workplaces but in our opinion this is a different focus and study. But we only focused on meanings as part of this process. We think that particularly exploring these processes is a different study. Nonetheless, we have considered your suggestion in proposing our hypotheses to be tested in future research.

The representation and frequency of each view among the sample was already stated in the text. However, we have highlighted them in yellow. Regarding your question about if there is enough evidence to suggest next directions and steps for research, we certainly believe there is enough evidence as the patterns found among actors and the meanings identified repeated until reaching a theoretical saturation point. Having said that, and

R.2.6. Overall, I think the author had done a tremendous amount of work building up this piece of research. It was “content rich” and also contained much information to be analysed. However, the findings weren’t presented in a manner pointing towards certain key questions to be answered. In fact, it started off, as the author suggested to be inquiring whether “the important role VET plays in training students in innovation competences as a necessary factor for innovating in the business context”, but ended up not really answering if this had happened. I believe the paper had contained too much philosophical discussion on the concept of innovation, but not sufficient evidence or framed discussion on whether innovation had transformed/affected the innovation of SMEs through VET students/graduates/teachers.

as we caution in the discussion (p. 19) this is just a exploratory study so future research needs to validate these meanings and relate them with innovation outcomes.

Thanks so much for recognising the effort and for your valuable comments to improve this work! We hope that by clarifying the research questions in the introduction we have now contribute to generate realistic expectations about our paper. As we responded to the comment R2.2.our aim was not to discern if innovation in the VET context had affected the innovation of SMEs but just to explore meanings on innovation and propose them as important factors in the innovation chain.

In order to respond to your query, we have also introduced some changes in the discussion (p.18 and 19) to make clearer the responses to the initially posed research questions and also to highlight that our study is a previous and necessary exploratory step to discern in future research what meanings and what processes facilitate the transfer of innovation from the VET context to SMEs. In accord, we have posed 4 hypotheses based on our exploratory study to be tested in future research.

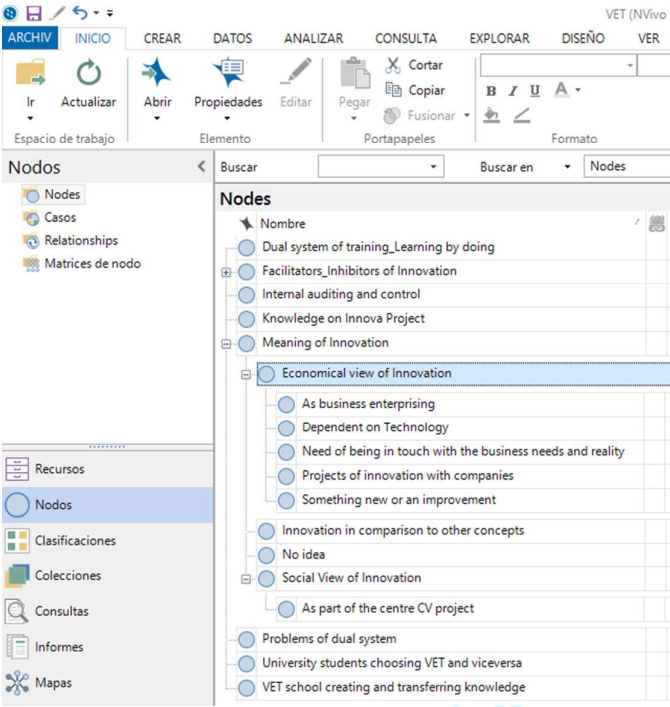


Figure 1. Example of NVivo categorisation for Meaning of Innovation