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One Step Forward: Advancing Knowledge on Italian VET-Laboratory Instructional Practices

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Abstract

The instructional practices implemented by the teacher in the Italian initial Vocational Education and Training (VET) system has rarely been the subject of empirical studies. Indeed, an exploratory literature review showed no results. Often, this kind of instructional practices risks being confined in the VET-laboratory framework, leaving unexploited their potential that could be able to cross boundaries between the classroom and the workplace. In order to provide transferable and reusable information on instructional practices of both VET teachers and the teachers of general school, ethnography and the Grounded Theory approaches were combined. Despite the data analysis is not yet finished and the model still to be elaborate, the principal findings of the present contribution represent a set of suggestions for VET teachers (both those who teach practical subjects and those who teach cultural subjects) and the teachers of the general school. Further analysis will aim to design a model which represent a middle-range theory of VET-lab teachers' instructional practices and a set of instruments that could be useful for VET teachers' (and for school teachers too) training and teaching practices.

Keywords

vocational education and training, instructional practices, work-based learning

1 Introduction

The core of the Italian initial Vocational Education and Training (VET) system, named *Istruzione e Formazione Professionale* (IeFP), resides in the 3 and 4 years programs. These paths aim to develop basic, transversal, and technical-occupational skills in order to obtain the Professional operator certificate (3 years program – Level 3 EQF) or the Professional technician diploma (4 years program – Level 4 EQF). The 3 and 4 years programs are provided by VET centers (private training centers accredited by the Region according to nationally established criteria) or by public vocational schools in subsidiarity form (CEDEFOP, 2014).

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Despite the recent apprenticeship reform (Accordo in Conferenza Stato Regioni, 24 September 2015), the new Italian dual system is not yet neither stable nor widespread. So, actually, the most part of the students' work practice activities do not take place in the workplace, but in the IeFP laboratories (students only can work in a company during the 3rd year for a 2/3 month internship). The IeFP laboratory (VET-Lab) is a specific instructional setting, inside the VET centres, where workplaces are simulated through the presence of professional instruments and equipment.

Inside the VET-Labs, students' learning takes place as result of real practice activities, in real situations. These activities seem to be motivated by the students' interest, and often for the pleasure of solving concrete and challenging professional problems. Although these activities take place in formal context (VET centres and VET schools), the just outlined learning process seems to have many things in common with the non-formal learning. In this practice-oriented setting, which is often characterised by high technological density, students also seem to improve their knowledge about cultural subjects, e.g. mathematics, literature, foreign languages, etc. (Tacconi, 2011, 2014; Tacconi & Gomez, 2010). Technologies could have a relevant role in this learning context because they "can serve many roles to support Work-Based Learning (WBL)" (Margaryan, 2008, p. 17).

The instructional practices implemented by the teacher in this particular learning context has rarely been the subject of empirical studies. Indeed, an exploratory literature review showed no results. This kind of instructional practices risks being confined in the VET-laboratory framework, leaving unexploited their potential that could be able to crossing boundaries between the classroom and the workplace. Therefore, on that basis, an analysis of instructional practices of VET-Labs' teachers could be useful for providing transferable and reusable information by both all the teachers of VET (also those of cultural subjects) and the teachers of general school. This contribution represents the first report of a wide research project so, the outcomes below shall to be considered as a provisional draft.

2 Research questions

As mentioned before, the aim of this study is to highlight the VET-Lab' teacher instructional practices in order to develop a model through which summarize the good practices maintaining results grounded in data. As result, the research questions that guided the present study are as follow:

- Which are the teaching strategies implemented in the VET-labs? Which are their features? Which are the features of the VET-Lab context?
- How are technologies used for fostering VET-Lab instructional practices and in the workplace? Which is their role?

In order to answer to the proposed research questions, ethnography (Van Manen, 1990) and the Grounded Theory (GT) approaches were combined (Charmaz, 2006; Glaser, Strauss, & Strutzel, 1968). The indicated methodological choice was made because of the lack of empirical research on VET-laboratory' instructional practices. As consequence a deep comprehension of the novel research topic environment was necessary.

3 Methods

The just outlined qualitative methodology mix has been recognised as a good solution for exploring new research topics because (Bamkin, Maynard, & Goulding, 2016; Charmaz & Mitchell, 2001): 1) the ethnographic elements allow the researcher to deeply enter in the studied environment and permit participants to be active in the research process; 2) the GT approach provides a structural framework for the data analysis, maintaining the emergent theory grounded in data. In this way, the “voices” and the experiences of the involved actors can be enhanced (Mortari, 2007; Tacconi, 2011). Given the difficulty to implement a long-stay ethnography and given the need to include different instructional situations, a multi-site ethnography methodology was used (Marcus, 1995).

3.1 Data collection

Data collection was carried out in two steps. In the first step, four VET centres were selected for the participant observation through a convenience sampling strategy (Pole & Morrison, 2003); all the selected centres belong to the same VET federation (CNOS-FAP). The observations took place over the course of the 2nd semester (4 months – about two days a week) in 17 classes of the 3rd year during the VET-Lab activities. In total, 18 teachers and about 300 students were involved in the observer activities. The selected classes belonged to 6 professional sectors: mechanic, automotive, hydraulics, electronics, marble, and graphics. The observer main focuses were the teacher instructional practices and the role of technology as the subject of learning. The gathered data consists of field notes, pictures, teaching materials, and documentation about curricula. The first step activities also allowed the researcher to improve his technical vocabulary concerning the professional sector of the observed instructional practices. In the second step, a semi-structured track questionnaire has been developed both on the basis of the research questions and the data gathered during the first phase (Mortari, 2007; Tacconi, 2014). Through a snowball-sampling strategy, 11 VET-lab teachers of other two VET federations (ENAIP and Scaligeraformazione) were involved in the research. These teachers and 10 of those involved in the first step were interviewed (21 in total). Following the principles suggested by GT, the questions were revised and corrected after each interview with the aim to improve the quality of the investigation (Charmaz, 2006). During and after the second phase, the interviews were recursively analysed following the GT procedure.

3.2 Interviews’ analysis

Before being analyzed, each interview and each answer were labelled with a progressive code (Mortari, 2007; Tacconi, 2011). For instance, the label [INT4/05] was assigned to the fifth question of the fourth interview. The coding phases proposed by the GT approach (open coding, axial coding and selective coding) were conducted with the support of a qualitative data analysis software (Nvivo 11). The open coding (1st phase) required a recursive read of interviews’ transcripts. The texts were coded, compared, and merged without distinction between the interviewees. Through this process, VET-lab teachers main actions (subcategories) were conceptualized maintaining them grounded in the interviewees’ answers (e.g. Table 1). Many significant units (about 90) were identified on the basis of the research questions (i.e. look at the right column of Table 2).

Table 1 Example of open coding

Main actions (subcategories)	Narratives
Reflecting with students on which could be the mistakes’ consequences in the real workplace	Even facing small problems, is important to find and understand a solution in order to create an attitude that could be a students’ advantage in the future, because knowing how to solve small problems today means maybe be equipped for the resolution of major problems tomorrow. [INT1/53] Whenever there is a problem, I usually stop the lesson. I show the problem to the students and I ask him to think about a solution, taking the opportunity for testing their problem solving ability. Some issues are simulated, but they are

	simpler. I say them that the customer demands an answer in a short time. [INT10/15] I always explain that most of the calls for those who is an industrial technician are related on breakups and failures. So, if you are no able to go to repair the faults ... it's a big problem. [INT16/31] Here, [during VET-lab activities] we forgive the mistakes. But, in the workplace, they will be not forgiven and they ll'have to pay through losing the job contract or in losing customers [INT5 / 30] …
…	…

After the open coding, axial coding procedure (2nd phase) was done. All the main actions (subcategories) identified in the first phase were compared with each other and clustered by affinity. Thanks to this recoursive process of analysis, 13 categories emerged, composing a provisional hierarchy of VET-lab teachers' actions (i.e. Table 2). Right after the 13 categories have been identified, they were compared with each other and with the data through the selective coding (3rd phase). Some connections between categories seems to emerge and several potential core categories have been identified, but the pieces of information are so much and complexly related. Since it is not yet possible to draw an exhaustive theoretical model baseing it on the analyzed data (the interviews); also the other collected data which have not yet been analyzed (field notes, document collection, etc) will be analysed with the same procedure in order to integrate the model draft. The results reported and discussed below represent the state of art of the research project before the return on the data.

Table 2 Provisonal hierarchy of categories

Categories	Main Actions (subcategories)
Accustoming students in taking and rearrange notes	• Asking students for transcribing theoretical lectures and practical demonstrations • Guiding students in taking notes • Letting students choose how to take notes • Letting students to film lectures and practical demonstrations using mobile devices • Making students gradually autonomous in taking notes during the three years
Choosing and developing students' learning material	• Asking students for searching technical documentation • Developing handouts based on school handbooks (school-based handouts) • Developing handouts based on the user guide about the machines which students should learn to use (work-based handouts) • Developing handouts with the students • Directly using the user guide about the machines which students should learn to use • Frequently updating the learning materials • Integrating school-based and work-based learning materials • Using educational technologies for searching pieces of information • Using traditional educational learning materials (school based) • Using work tools and technologies
Elaborating a professional handbook with students	• Asking students for a rearrangement of notes to create a professional handbook, integrating it with teachers' handout and practical exercises reports • Asking students for taking care of their school notebook

	• Assessing the contents and the quality of school notebook • Collecting practical exercises • Guiding students in organising notes and teacher' handouts • Using students' handbook during the practical exercise
Enhancing connections with cultural subjects	• Collaborating with cultural subjects' teachers in the elaboration of practical exercises, activities planning, and final qualification exam • Developing students' technical language, communication, and writing skills • Recalling topics of cultural subjects to activate students' attention • Reflecting with students on the importance of cultural subjects in whole life • Supporting the development of technical skills in connection with mathematics knowledge • Using English users' guide - connection with the English language
Giving value to students' internship experience	• Bringing innovation in host companies through the upgraded students' skills • Comparing internship experiences and previous training; confirming reciprocal mutual trust between student and teacher • Selecting the host company for internship depending on the student talent • Visiting students during the internship
Implementing competence-based learning	• Aiming at the development of competencies through the teaching of work' procedures (step by step approach) • Asking students for logical storytelling about their work process - exercise execution • Enhancing connections between theoretical concepts and practice • Reflecting with students on the importance of knowledge - e.g. definitions and concepts • Answering to the students' questions with other questions that foster logical reasoning
Involving students in solving unexpected real problems that occur during the lab' activities	• Asking students for finding a solution without continually help them but suggesting useful references • Considering mistakes and unexpected technical problems as a learning opportunity • Including the problem-solving ability in the students' curriculum • Reflecting with students in good practices to prevent problems • Reflecting with students on which could be the mistakes' consequences in the real workplace • Searching for a solution with students through a technical/professional dialogue • Getting the students' attention talking about problems emerged in the past as an example during theoretical lessons
Personalizing learning activities	• Actively supporting the students with special needs • Assigning tasks and practical exercises depending on the single students learning abilities • Assigning tasks and practical exercises depending on the students' groups learning abilities • Establishing the minimum level of skills that students must achieve • Using educational Technologies to support special needs students
Planning instructional activities	• Adapting activities plan and regional standard curriculum in the course of training' year on the basis of class students' outcomes and feedbacks • Adapting regional standard curriculum to personal work experience and companies' requests

	• Collaborating with colleagues • Focusing activities on the final exam • Focusing learning activities on products realisation and professional instruments • Integrating the training programme with extraordinary activities - e.g. competitions (also announced by technical equipment providers), participation at fairs, VET centres equipment maintenance • Integrating training programme with additional projects to cope with an external company order • Planning activities for the whole three years program • Referring to the standard curriculum indicated by professional associations • Sharing learning materials and experiences with colleagues
Promoting students' autonomy	• Actively supporting students during practical exercises • Giving confidence to the students, maintaining a light supervision • Gradually letting students work with autonomy • Gradually raising the difficulty level of the practical exercises • Leaving students free to make mistakes • Progressively moving from individual activities to teamwork activities
Promoting students' sense of responsibility	• Asking students for taking care of laboratory equipment and VET centre environment (accountability for the use and maintenance) • Asking students for keeping the learning environments tidy and clean • Asking students for keeping work tools and materials organized during practical exercises • Asking students for taking care of practical activities products • Assessing students' ability in keeping the work environment organized • Assigning roles to students and/or asking them to attribute roles within the teams • Implementing work safety courses • Introducing students in the real world of work (arranging internships) • Reflecting with students about the consequences of their actions in the real work context
Promoting students work adaptability-versatility	• Accustoming students to ask the right questions • Finding the right balance between executive rigour and creativity • Keeping students' attention on the work tasks instead of used technology or products • Providing different versions of the same instruments or technology to do the same task • Reflecting with students on internship experiences
Simulating work contexts	• Using both work technologies simulators and real work machines • Simulating company roles • Simulating interactions with clients • Simulating technical failures and mistakes • Using simulators used also in the workplace • Structuring lessons in work task simulations

4 Results

As the Table 2 shows, the teaching practices implemented by VET-lab teachers to carry out their instructional actions have been identified and indexed. A brief comparison between the findings and the literature (theorerical sampling) shows several similarities between VET-lab teacher actions and the following theorethical concepts: personalized learing and instruction (Spector, 2015; Jonassen & Grabowski, 1993), the reflecting pratictioner (Schön, 1993, 2006), boundary crossing (Suchman, 1994), boundary objects (Star, 1989), simulation-based learning (De Jong, 2015). Through the recursive analysis of the interviews and with the support of several functions of Nvivo 11 software (i.e. matrix coding, relational nodes and sets), the most important actions and their connecctions have been found: promoting students' sense of responsibility and work adaptability, simulating work contexts, involving students in solving unexpected real problems that occur during the lab' activities, enhancing connections with cultural subjects, implementing competence-based learning. Probably one of these will be the core category of the emerging model, but further in-depth analysis of data are necessary. Also some transversal elements seem to emerge crossing the core categories with the identified instructional practices: "connection with labour reality", "curricula personalisation", "workplace care" and, "familiarity with technologies". A complex theoretical model of "VETLab instructional practices" seems to emerge but, as mentioned before, the theoretical saturation has not been reached yet and the theoretical model has not been defined. As an in-progress research, there are future steps to be considered. Therefore, the recursive analysis of data will continue in depth. In the next step, the data gathered during the first research phase (mainly the field notes) will be included in the corpus of data and will be analysed too. The emerging model will also be compared with a wider corpus of literature through the theoretical sampling procedure

5 Conclusion and expected outcomes

Despite the data analysis is not yet finished and the model still to be elaborate, the principal findings of the present contribution (see Table 2) represent a set of suggestions for VET teachers (both those who teach practical subjects and those who teach cultural subjects) and the teachers of the general school. The aim of the further analysis is to design a model which represent a middle-range theory of VET-lab teachers instructional practices and a set of instruments that could be useful for VET teachers' (and for school teachers too) training and teaching practices.

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Marco Perini, PhD student, enrolled in the third year of the PhD program in the Human Sciences at the Department of Human Sciences, University of Verona. He is also member of CARVET (Center for Action Research in Vocational Education and Training). His main areas of interest and research include, Vocational Education and Training, educational technologies, work based learning and teacher education. Prior to enrolling at University of Verona he worked for four years as freelance Moodle and IT teacher in VET centers and schools. He also worked as training manager and tutor in several projects founded by the European Union.

Monica Pentassuglia (University of Verona) has completed her PhD in Humanities in December 2016. Her Doctoral thesis is on the use of Arts-Based Research (ABR) in Teaching and Teacher Education. Her PhD focused on several ABR issues including: the study of the body in professional practice; embodied ways of knowing in professional contexts; and the use of ABR and dance-based methods in educational research. She uses Laban Movement Analysis (LMA) and the Labanotation coding system in Educational Research. She also works in the field of research methodology, educational assessment theories and related issues including summative and formative assessment, and feedback.