

Scaffolding Collaborative Reflective Writing in a VET Curriculum

Elena Boldrini · Alberto Cattaneo

Received: 15 July 2013 / Accepted: 4 February 2014 /

Published online: 18 February 2014

© Springer Science+Business Media Dordrecht 2014

Abstract Learning journal writing is an effective tool to foster the development of reflective capacity in the context of Vocational Education and Training (VET) if conceived as a collection of descriptions and reflections on real professional experiences. Reporting professional situations in a learning journal outside the workplace in turn fosters the connection between places of learning. Taking into account that collaborative writing with peer-feedback stimulates reflective writing and that comparisons between different professional experience boosts reflection, we conducted a study based on peer-to-peer commenting and revising on a reflective journal entry. Considering that this kind of reflection needs to be properly stimulated and scaffolded, we implemented a 3×2 study with three different levels of prompts (low-medium-high) for revision and commenting and two kinds of tool (paper-based vs. computer-based). We measured the improvement of the quality of reflection between the initial drafts and the final revised texts on the basis of the reflective grid by Bain et al. (2002). Results show the impact of scaffolding in medium and high scaffolded conditions, whose texts significantly outperformed the low-scaffolded ones in terms of reflection. Revisions and comments are mostly related to the Reporting and Relating dimensions. Moreover, the study confirms the impact of scaffolding on the number of comments produced by peers in the different conditions, but no mediating effect of comments on the text quality was found. The type of tool used has a significant role in determining the quantity of comments developed.

Keywords Reflective writing · Scaffolding · Prompts · Peer-commenting · Vocational education and training

E. Boldrini (✉) · A. Cattaneo

Research & Development, Swiss Federal Institute for Vocational Education and Training,
Via Besso 84, 6900 Lugano, Switzerland
e-mail: elena.boldrini@iuffp-svizzera.ch

A. Cattaneo

e-mail: alberto.cattaneo@iuffp-svizzera.ch

Introduction

In the last decades, professional competences have been conceived as a training paradigm capable of responding to the requirements of the post-Fordist workplace as characterised by highly complex and non-routine tasks (Mayer 2002). This has been achieved by implementing so-called competence-based curricula (Biemans et al. 2009). From the perspective of an interpretative approach to competences (Sandberg 2009; Billett 2001), being competent means being able to face effectively different and complex situations, and to accomplish the goals of the situation by mobilizing holistically various cognitive resources: declarative knowledge, procedural knowledge, and personal attitudes (Cattaneo and Boldrini 2009; Rychen and Salganik 2003).

There are two requirements to being a competent professional:

1. The capacity to interpret and *reflect about the situation* and about the resources to be mobilised in that situation;
2. The need for an adequate, holistic integration of diverse cognitive resources (Baartman and De Bruijn 2011).

Therefore, a central pedagogical and instructional question is how to develop the reflective capacity that leads to professional competence. This is particularly the case in Vocational Education and Training (VET), where professional experience and reflection upon competence development are often separate activities conducted in different learning locations.

Swiss VET Curricula: Three Learning Locations, One Professional Competence to be Developed

In Switzerland, the organisation of the VET sector at the secondary level is based on the “apprenticeship” model, which is informed by a concept of professional competence based on the alternation among work-based training, scholastic activities and the so-called intercompany courses so as to foster the integration of both theoretical and subject-based knowledge and of practical abilities, skills and procedural knowledge. Each of these three locations has a specific training role. In the training company, apprentices are confronted with real professional situations, where knowledge is integrated into practice (Tynjälä 2008). At school they are exposed to disciplinary-based explicit knowledge. Finally, the intercompany courses constitute an interface between the two that seeks to answer the well-known difficulty in the workplace where insufficient time is available while working to reflect on “the how’s and why’s of the work” (Poortman et al. 2011, p. 275; see also Aarkrog 2006; Van Woerkom 2004). In this training model, the organisational and epistemological cooperation between the different learning locations is not to be taken for granted. The integrative and iterative interplay of different kinds of experience and learning in varied locations requires considerable cooperation between institutions, despite their differing organisational and instructional goals (Virtanen and Tynjälä 2007). In general, the advantages of interdependence between generalised learning at school and situated learning at work have been underlined as necessary for the creation of professional competence. The development of this interdependence is not however self-evident (Wesselink et al. 2010).

Given these premises, we will examine a specific instructional approach that could contribute to develop reflective capacity in the learning journal writing, which also fosters professional competence. The approach developed foresees an intervention incorporating writing activities in the intercompany courses as a learning and reflective tool based upon professional experiences lived at the workplace. We will discuss the conditions required for the process of reflective writing on professional practices to be effective, whether different scaffolding strategies and a collaborative writing setting can foster the process, and whether the use of the computer has an impact on the quality of texts produced.

In the following sections we explain the main theoretical and conceptual premises that underlie this kind of intervention. That is: i) the reflection-on-action process as essential to the development of competence and integration of learning locations; ii) writing as a useful instructional tool to develop reflective capacity; iii) collaborative peer feedback and the comparison of perspectives as a promising strategy to enhance the quality of journal writing and; iv) scaffolding – in the form of prompts – as a way to adequately and effectively stimulate apprentices in journal reflective writing.

Finally, we also took into consideration the impact of the kind of writing tool for the collaborative process. We will then present a study that operationalizes these basic assumptions.

Reflection-on-Action

Reflective practices have been identified as a promising way to develop connectivity between learning places and experience, as well as encouraging the epistemological integration of theoretical and practical learning. They are also considered to be an integral part of professional competence. Accumulating experience is not sufficient to be an experienced professional. The experienced professional has undergone a process of learning *from* his experience *by reflecting* on and re-elaborating it, in a way which could be summarized by the well-known Kolb's (1984) experiential cycle of learning, based on the influential work by Dewey (1933). From Dewey's perspective, the process of reflection is a premise and a critical passage towards knowledge itself.

This work has also taken into account Schön's (1983) application of reflective practice to professional development theories. Schön claims that a reflective practitioner is a professional making use of reflection both *in-action* (where action and reflection are almost simultaneous) and *on-action* (when the subject reconsiders his experience afterwards) as a way to re-consider experience, to learn from it and to frame complex and ill-defined situations.

Since the very first theories related to reflective practice, many other models have been developed with a huge variety of interpretations of the concept of reflection. In a systematic review Mann et al. (2009) point out that most of the models of reflective practice have in common the premise of "returning to an experience to examine it, deliberating intending that what is learned may be a guide in future situations, and incorporating it into one's existing knowledge" (p.597). Beyond this shared assumption, models of reflective practice have been classified into two categories: iterative and vertical. In the first category, reflection is an iterative process triggered by the experience itself that then produces a new understanding and a transformation of perspective for future action. In addition to Schön, the authors put Boud et al. (1985) work in this

category. They define reflection as an “important human activity in which people recapture their experience, think about it, mull it over and evaluate it” (p.19). The vertical models like those of King and Kitchener (1994) and Moon (1999), see reflection as the passage through different vertical levels. Moon considers different stages in the reflective process: noticing, making sense, making meaning, working with meaning and transformative learning. This approach includes reflection in the wider process of learning that is characterized by different levels ranging from superficial to deep, with the latter requiring reflective practice. Hatton and Smith (1995) outline the necessity of various phases: description of experience; descriptive reflection; dialogic reflection; and finally critical reflection.

Thus, reflective practice has been widely recognized as a trigger for professional competence and for deep learning (Leung and Kember 2003; Moon 1999; Hiemstra 2001). For that reason Kember (2001), in line with Mezirow (1991), argues that *reflection-on-action* should be integrated not only in the practical part of the curriculum, but also in the theoretical part in the form of reflection on experience. The use of reflection has to be deliberately stimulated in academic contexts in a clear attempt to bridge the gap between the theoretical parts of the curriculum and the practical parts (Motta et al. 2013). Thus, the development of reflective capacity should foster the possible linkage and integration between professional concrete experience in the workplace and academic, theoretical and reflective knowledge developed in other learning locations.

Against this backdrop, a number of elements have to be considered when reflective practice is being integrated into VET *curricula*. Scholars stress that reflective practice is generally not spontaneous. Apprentices often do not reflect on their experience (De Jong et al. 2006; Taylor and Freeman 2011) and need to be stimulated to explicate it (Raizen 1994). Vocational educators have to find a way of fostering students’ reflection by asking critical and reflective questions and developing specific reflective prompts (De Bruijn and Leeman 2011; Krause and Stark 2010; Raizen 1994). Moreover, recent studies confirm that reflection by students is not yet a widely used didactical practice (Schaap et al. 2012).

These considerations lead us to investigate instructional modalities that could enable an active and effective reflective process in VET. These include the form the reflective process should take, ways of triggering it, specific kinds of scaffolding to apply to it and its institutional position within the VET three learning locations.

Writing-to-Reflect

The writing-to-learn approach (Galbraith 1999; Bereiter and Scardamalia 1987; Hayes 1996) claims that writing has a high potentiality for knowledge building and acquisition. Over the last 20 years research about writing has progressively expanded from a psycho-cognitive discourse to a more socio-cultural approach, investigating writing development as a meaning-making process in a wide variety of schools and professional contexts (Nystrand 2006). According to constructivist epistemology that insists on the learning process as being student-centred, writing functions both for “the comprehension and retention of information and concepts as well as reflections on ideas and conceptions” (Boscolo and Mason 2001, p.84).

The research review by Schumacher and Gradwohl Nash (1991) pointed to the relevance of writing as a learning tool. Rosaen (1989) has synthesized three main

aspects that make writing a powerful learning tool. Writing allows the expression of thoughts and experience in a way that can be re-examined afterwards. Writing down thoughts is a way of making thinking objective, allowing the development of awareness about the connections between thoughts themselves. And finally, writing can help students keep traces of their learning process, enabling a monitoring process.

It was for these reasons that the Writing Across the Curriculum (WAC) movement started in the 70s by extending writing assignments to all the academic disciplines, with writing no longer considered an issue limited to mother tongue teaching and learning (Bazerman et al. 2005). Nowadays the movement has the clear objective of “study and improvement of the role of writing in teaching and learning in specific disciplines and profession” (Boscolo and Mason 2001, p.87).

In this framework, learning journal writing assumes a central role as an instrument to trigger reflection on experience. As Segev-Miller (2005) has underlined, with the advent of the WAC and Writing-to-Learn movements, journal writing has become a standard component not only in writing instruction programs, but also in other disciplines, with diverse populations and different purposes. Kember (2001) has pointed out that the reflective process has to be stimulated. Reflection can be triggered by a problem or a disruption to the normal routine or thanks to a *stimulus*. Stimuli in the professional or academic environment can take various forms: questioning, discussion, journal writing and learning contracts (Kember 2001, p.153). There is a wide *consensus* that journal writing as a form of mediation fosters reflection and connectivity between learning experiences (Tynjälä et al. 2006; Tynjälä 2001; Kember et al. 1996) and promotes deep learning (Moon 1999). Writing transforms action into a different, objective symbolic representation. As a consequence, writing about experience allows the subject to “step-back” from the practice and “to reflect upon it and to return to it with understanding” (Lukinsky 1990, p.213).

In the VET context, writing about professional experience has been proved to be a promising approach to developing reflective competences, competence development and deep learning (Gavota et al. 2010a, b; Boldrini and Cattaneo 2013) and also to bridging the gap between learning locations (Motta et al. 2013).

Collaborative Writing and the Role of Technology

Although the value of reflective writing has been asserted by different scholars as a positive way of getting-to-know (e.g. Sarig 2005) and of producing awareness of knowledge itself, the instructional conditions under which the writing process can be effective need to be more precisely investigated, above all in the VET context. In fact, in the meta-analysis conducted by Graham and Perin (2007) about the effectiveness of various writing instructional strategies, all the collected and analysed studies relate to grades from 2 to 10-12 as well as to the high schools, but none of them focused specifically on vocational training basic education.

We considered that collaborative, reflective writing could be an effective way to motivate apprentices to write (as shown *inter alia* by Hidi and Boscolo 2006 and Duijnhouwer et al. 2012), to exchange different kinds of experience, and to interact positively via feedback on peers’ texts (e.g. according to Cho and MacArthur 2011). From a socio-cognitive perspective, interactions between students enable them to reach a higher state of development than they could without such interactions. The same

assumption can be made about writing. Hayes (2006) considers that “all writing is collaborative, involving division of labor and forms of co-authorship” (p.58). Other scholars assert that “collaborative writing situations can be conceived as generators of discussions leading to higher level of thinking” (Tynjälä 2001, p.49). Kember (2001) underlines that collective reflective writing has the advantage of making participants “aware of unconscious assumptions or false perspectives” (p.159). His study on reflective practices claims that individuals “used others, often one other, as a sounding board for working through their thoughts” (p.159). The different perspectives and narratives of others could lead to new insights about ways of working. Beach and Friedrich (2006) also underline the role of peers who “provide helpful feedback, but they need training on both strategies for providing specific, descriptive feedback and on group process skills for writing cooperatively with peers” (Beach and Friedrich 2006, p.229).

The studies conducted by Boscolo and Ascorti (2004) revealed that peer revision is more effective than teacher revision; Yarrow and Topping (2001) found that the collaboration among peers in drafting, revising and editing texts led to better results than individual composition.

Finally, Goldin et al. (2012), reporting on a meta-analysis about peer review carried out by Hillocks, maintain that peer-review is more effective than other instructional modes, such as individual teacher-student conferencing.

As different kinds of collaboration (or even of joint authorship) can be perceived in the way collaborative writing activities are designed, in this study we focus on “common planning”, i.e. how apprentices share their first drafts, then receive feedback from peers and finally complete and refine their text (Tynjälä 2001).

The role of technology is another much debated point concerning collaborative writing and draft revising. Technology useful for peer feedback can take on different forms, from synchronous messaging to asynchronous interaction, including text-based collaborative tools. Since the 1980s, different studies have investigated the role played by word processing software in writing, identifying its positive impact (Graham and Perin 2007). Moreover the role that technologies can play in a peer collaborative revising setting facilitates the process of understanding how to revise a peer’s text and to be not resistant on doing it (MacArthur 2009).

In our research, we wanted to test the validity of the comment and revision functions of the software, comparing the use of a word processor considered as a tool for peer-commenting and revising process (MacArthur 2006), but also as a form of Computer-Supported Collaborative Writing (Gavota et al. 2010a) with that of the traditional use of paper-pencil. We wanted to verify the effectiveness of the writing tool (paper-pencil versus computer) both on the quantity and quality of the revisions and, as a consequence, on the final quality of the texts.

Scaffolding and Prompts

As Gielen et al. (2010) pointed out, not every kind of peer-feedback leads to a better writing performance, as the feedback process has to be designed considering different conditions. In other words, collaborative writing per se does not necessarily foster learning; “rather, writing affects learning positively if specific cognitive and metacognitive strategies of self-regulated learning are explicitly supported by the

writing task” (Hübner et al. 2010, p.18). In the case of peer-commenting and revising, peers have to learn to and be accustomed to giving feedback to their peers, and be able to point out elements to be improved to better accomplish the task. Adopting the concept of scaffolding – in line with the first definition by Wood et al. (1976) – as “giving a support for allowing the subject to accomplish a task that would be beyond his/her possibility” (Hogan and Pressley 1997, p.2), we raise the question about the most effective way for students to scaffold each other in line with Davis and Miyake (2004), who address it as an important research area to be developed in the scaffolding-related studies. As an instructional technique, scaffolding can foresee different strategies, including examples, direct instructions, hints and prompts. They serve to assist the learners in the completion of a complex task and have to be suitable and adapted to the learner’s needs. In this study, we designed the scaffold based on both criteria (defined in terms of objectives by the curriculum) and related prompts aimed at letting apprentices focus on the ambits worth revising in the peer’s text. Thus, the scaffolding was intended to stimulate apprentices’ production of a reflective text, which otherwise – without the guidelines – would not have been completely achievable for them. In our case, we consider that peers’ revision of the texts would be beneficial for apprentices, enabling them to evaluate the texts based on criteria established for the task itself. Providing operational criteria to be evaluated facilitates assessment (Andrade 2000; Goldin and Ashley 2012). Such a strategy is seen as useful in the peer review process because it fosters analytical peer assessment prior to the revision and commenting phase.

Secondly, prompts meant as “questions or hints [...] designed to induce positive productive learning behaviour” (Hübner et al. 2010, p.20), and to “overcome superficial processing” (Berthold et al. 2007, p.566) provide structure that enables peers to consider – in the light of the operational criteria mentioned above – which elements should be improved in the text. Knowledge acquisition is highest when students received cognitive and meta-cognitive prompts for their writing (Hübner et al. 2010). Moreover, different studies have been conducted about online prompts for writing journals, aimed at developing computer-based scaffolds to alleviate difficulties in reflective journal writing (Lai and Calandra 2007; Davis and Linn 2000, Davis 2003). Prompts proposed in the form of questions (as meant *inter alia* by Davis and Linn 2000; Ge and Land 2004; Lai 2008), can represent a good support “to elicit reflection since they provide cognitively complex ways learners think about, feel about, and make connections in experience” (Wu and Looi 2012, p.339). By engaging in reflective activities such as responding to question prompts, “learners are enabled to observe the meaning they have taken from the experience and excavate the underlying qualities that made the experience significant” (p.339).

Research Questions and Hypothesis

The study we are presenting aims at verifying the effectiveness of prompted collaborative peer writing on personal professional experiences and its effect on the level of reflection about such practices. Our general hypothesis was that different typologies and levels of prompted peer feedback (Lai and Calandra 2007; Davis 2003) would lead to qualitatively different comments and revisions and therefore to a different quality in the final reflective writing products.

As previously argued, it is crucial that the adaptive trait of scaffolding be suitable for the completion of the task. In the study, we aimed to test the effectiveness of different levels of scaffolding while maintaining the level of difficulty of the task itself. In other words, the study aimed to gain some knowledge about the most suitable scaffolding modality for a reflective writing task in the VET domain. Differentiating the quality of the scaffolding in each condition, we put forth several hypotheses to generate different levels of quality of peers' feedback and, consequently, different levels of quality of the final productions. We differentiated three levels of scaffolding in order to avoid having only a dichotomous contrast and instead determine whether the intensity of the guidelines' structure would have an effect.

Moreover, the role of technology in the quality of the prompted peer revisions had to be evaluated as the literature underscores both its positive and consistent effects in the production (Graham and Perin 2007) and revision processes. In fact, as argued by Graham et al. (2004), the word processor facilitates the process of entering revisions and comments as well as the analytical revision of the text. In addition, the word processor enables the author to accept the revisions easily as well as accept, reject and elaborate upon suggestions.

These elements have to be included in the relationship with the study's target participants: apprentice office clerks. This target has specific characteristics that have to be considered. First, their curriculum stresses the relevance of the writing competence for communicating and elaborating upon work processes in the commercial field; second, they work with computers daily, particularly with word processors. As reported elsewhere (Gavota et al. 2010a, b), we demonstrated that the population of commercial employees (similar in terms of age, curriculum and professional experiences to that of the present study) is highly familiar with technology (PISA ICT familiarity scale): 92.8 % use computers almost every day. Their perceived level of computer literacy is also very high. They feel very confident with writing tasks (e.g., writing and sending e-mails=98.6 %; chatting online=98.5 %; using a word processor=94.1 %). Third, the qualification framework of their training requires them to complete an official document each year (called the Process Unit), reporting and reflecting on a professional process.

Therefore, apprentice office clerks are accustomed to the process of writing, including writing supported by computers; nevertheless, the reflective writing setting, and in particular collaborative reflective writing setting, has not been used before as a training intervention in this domain, preparing apprentices for the qualification requirements.

On these basis we elaborated three main research questions which underscored the study:

1. Does medium and high scaffolding trigger the production of more detailed comments and lead to better final production – in terms of reflective elements – with respect to low structuring?
2. Does high scaffolding based on the identification of more details differ in effectiveness from medium structuring?
3. Does the writing tool used (word processor versus paper-pencil) influence the quality and the quantity of peers' comments and revisions and therefore the final quality of the texts?

We structured the research considering the following hypotheses:

- H1: The impact of scaffolding on the quality of texts will be significant, with the quality of texts higher in medium and high scaffolded conditions than in the low scaffolded ones;
- H2: Within the scaffolded conditions, high scaffolding is expected to be more effective than medium scaffolding in terms of text quality;
- H3: Computer-supported writing is expected to outperform paper-pencil writing in terms of quality and quantity of comments and revisions inserted and in terms of final quality of the texts.

Method

Design

In order to test these hypothesis, the experiment was structured as a 3×2 factorial design, with two main factors: the level of scaffolding for the reviewing task (as anticipated, we distinguished three levels of structuring and detailing of prompts: low, medium, high) and the type of tool for the written production (word processor on a computer or paper and pencil). Participants were asked to describe the procedure used to manage a purchase order related to their practical experience. This description was conceived as a collaborative writing task, where the reviewer could do her/his revisions with or without guidelines, the latter being either operational criteria and/or scaffolding prompts, depending on the task.

Participants

The learning journal writing activity was conducted with six classes of apprentice office clerks during the second intercompany course in the second year of the curriculum in the Canton of Ticino, Switzerland. The total sample was 111 apprentices, who were randomly assigned to the different groups as shown in Table 1. This group represented the all population of second year-apprentices in this professional field in the Italian speaking region. Working with authentic classes, it was not possible to have completely homogeneous groups in terms of quantity of learners per each condition: nevertheless the homogeneity of gender and age was assured.

Table 1 Sample size in the six conditions

		Level of scaffolding		
		Low	Medium	High
Type of support	Paper	16	20	21
	PC	22	16	16

Materials and Procedure

The learning task was conceived as a collaborative writing task that dealt with the written description of management of a purchase order by a customer. This topic was selected with experts on the office clerks' basic vocational curriculum. It needed to be complex enough for it not to be trivial and yet guarantee that all participants had already experienced the situation in the workplace.

The whole procedure was structured as follows, taking into account Hatton and Smith's (1995) conclusions (see §1.2).

In a first phase, apprentices had 30 min to fill out a table. In one column they had to describe an experience they had had at the workplace about the procedure of "how to manage a purchase order". In the other column, starting from the description provided, they had to point out the main phases of the procedure.

In the second phase, all the apprentices worked on a peer's text. They had 10 min to read the production made by a peer. Then, they had 30 min to rate the peer's text and directly intervene in the peer's text with comments and revisions. For each task, depending on the conditions fixed for their group, each apprentice reviewing the peer's text received a different set of guidelines. For the assessment of the text they were provided with a list of five criteria, exactly those used by the professional association to rate an official document (called "Process Unit") on specific professional procedures. Apprentices have to produce such a text each year of the curriculum. A major part of the Process Unit is devoted to a detailed description of a professional procedure, providing examples taken from personal experience.

In the low scaffolding groups, apprentices received only the list of criteria. In the other groups, the list was supplemented by indicators – the number and extent of details varying in the medium and high scaffolding groups – corresponding to the categories (Goldin and Ashley 2012; Andrade 2000) related to the same criteria. Particular emphasis was given to the criteria about the description being detailed. Each of these elements (both indicators and criteria) had to be assessed on a 10-points Likert scale (see example in Fig. 1.).

For the revision task, all groups – independently from the condition – were required to contribute to the peer's text by adding comments, writing suggestions, and making corrections. The task was explicitly incorporated the official criteria for this kind of written text across their curriculum (i.e. "so that your peer's text is more complete, correct, understandable and detailed"). A checklist was provided to the reviewers to monitor that they revised all the elements related to each criterion.

Additionally, the medium-scaffolded groups received a check-list to ensure that the revision process was appropriate. In the high-scaffolded groups, this list was detailed using sets of prompts for the corresponding criteria to give higher guidance and structure the revision process (see examples in Fig. 2.).

The third phase, lasting 30 min, required apprentices to 1. Read the ratings their peer gave them; 2. Read the comments and revisions proposed; 3. Consider all those suggestions and revise their own text. The outcome of this third phase was the final written production.

In the last phase, apprentices had 10 min for 1. Self-evaluating their own final production and 2. Answering a brief questionnaire on the activity. The self-evaluation

Reviewer n. ____

Step 2.

1. **Exchange** the form you have written with your peer.
2. **Read** carefully both part A and part B.
3. **Give a rating** to your peer's text (both part A and part B) with respect of the following points (1 = awful; 10 = excellent)

1. **In the description (part A)** there are concrete details which allow me to well understand

- **what** my colleague did?
- which **objective** did she/he have?
- the **context** (where was she/he, with whom, when,...?)
- what **resources**, documents, tools, did she/he make use of?
- what **rules**, norms, indications did she/he refer to?

Rate (1-10)

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

2. **Concretely, in the list of the phases (part B) all the main elements of the procedures are present**

3. **Then, finally,**

- the description (part A) is **clear**
- the description (part A) is **detailed**
- the list of the **phases** foreseen by the procedure (part B) is **complete**: all the phases are present
- the description and the list of the phases are **correct**
- if a person who hadn't attended our course read parts A and B would she/he be able to correctly manage the ordering?

Rate (1-10)

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

Fig. 1 Example of the assessment sheet guiding Phase 2., in the high-scaffolded condition

<p>Follow step by step all the points you find here as a guide to intervene on the text. Check them gradually as you face them.</p> <p>1. I verified: the description (part A) is complete. <input type="checkbox"/> If it was not complete, I inserted some elements. <input type="checkbox"/></p> <p>2. I verified: in the description (part A) there are enough details. <input type="checkbox"/> I added further details. <input type="checkbox"/></p> <p>3. I verified: the procedure description (part B) is correct and the main phases are present. <input type="checkbox"/> I corrected where I found wrong or missing elements. <input type="checkbox"/></p> <p>4. I verified: the text allows a person who didn't attend the course to understand how to manage an order. <input type="checkbox"/> I inserted some suggestions to improve the understandability of the text. <input type="checkbox"/></p>	<p>Follow step by step all the points you find here as a guide to intervene on the text. Check them gradually as you face them.</p> <p>1. I verified: the description (part A) is complete. <input type="checkbox"/> If it was not complete, I inserted some elements. <input type="checkbox"/></p> <p>2. I verified: in the description (part A) there are enough details: <input type="checkbox"/></p> <ul style="list-style-type: none"> - what your colleague did - the context (where she/he was, when, with whom,...) - what was her/his objective - if she/he reached the goal - how did she/he do it - in which sequence - with whom - if she/he used specific resources/documents/tools, and which ones - if she/he referred or recurred to specific norms/rules <p>I inserted material if something was missing <input type="checkbox"/></p> <p>3. I verified: the procedure description (part B) is correct and the main phases are present. <input type="checkbox"/></p> <ul style="list-style-type: none"> - The right order in the phases of the procedure is cited - All the phases are present - Needed tools are spoken about - Norms and rules tied to the procedure are mentioned <p>I corrected where I found wrong or missing elements. <input type="checkbox"/></p> <p>4. I verified: the text allows a person who didn't attend the course to understand how to manage an order. <input type="checkbox"/></p> <ul style="list-style-type: none"> - All the elements to describe how to do it (objective, phases, resources, tools, norms,...) are clear enough. <p>I inserted some suggestions to improve the understandability of the text. <input type="checkbox"/></p>
--	--

Fig. 2 Examples of guidelines to support the revision process in the medium- (left) and high-scaffolded (right) groups

used the same criteria cited above, with a 10-points Likert scale. The final questionnaire, which was separate from the previous self-evaluation, included questions about:

- The perceived general effectiveness of the learning activity (e.g. “Describing the management of an order helped remind me how to manage it”, “Remembering a concrete situation helped me understand how to manage the procedure”, “making a list of the phases of the procedure helped me memorize it”),
- The effectiveness of the peer-review for one’s own production (e.g. “To read my peer’s text made me reflect on my text”, “To read my peer’s text allowed me to see what my description lacked”, but also, as a reviewer, “To comment my peer’s text helped me understand how to improve my text”),
- The perceived quality of the review itself (“The comments and revisions I received were good in quality”, “The comments and revisions I received helped me improve my description”), ...

The whole procedure is summarized in Table 2.

Each of the above described groups could perform the whole process with a classic paper-pencil approach or using a computer. In the first case, we provided apprentices with a horizontally-oriented A3 sheet for the first step, with half of the space reserved for writing and half for commenting, as illustrated in Fig. 3. In the computer-supported groups, apprentices used Microsoft Word and its revising functions. Apprentice office clerks are used to word processors and the specific functions to add visible revisions and insert comments are already known to them. Despite this, we took several minutes reminding the group about them.

Table 2 Overview of the whole procedure and main tasks in the six conditions

Condition	Low		Medium		High	
	Paper	Computer	Paper	Computer	Paper	Computer
Phase 1 (30 min)	Describe an experience related to the procedure “how to manage a purchase order” (part a) and its main phases (part b)					
Phase 2 (10 min)	Read your peers’ texts (both part a and b)					
(30 min)	Rate your peers’ text on the given criteria					
	Intervene directly in your peer’s text (comments and revisions) No check-list		Intervene directly in your peer’s text (comments and revisions) Check-list		Intervene directly in your peer’s text (comments and revisions) Check-list detailed with prompts	
Phase 3 (30 min)	Read the ratings your peer gave to your text Read the comments and revisions proposed by your peer Consider all those suggestions and revise your own text					
Phase 4 (10 min)	1. Self-evaluate your text on the given criteria 2. Fill-in the questionnaire (satisfaction)					

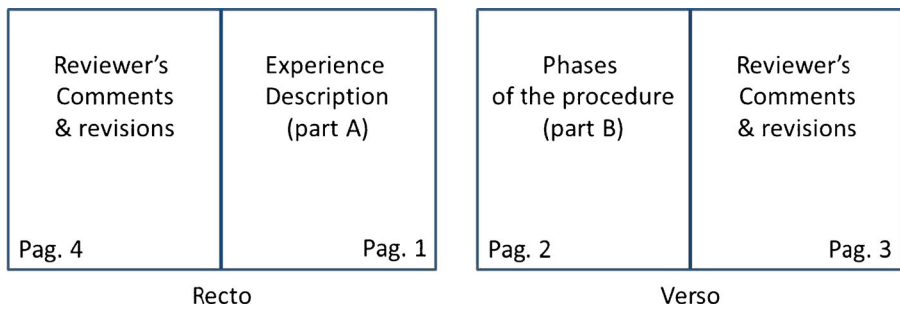


Fig. 3 The A3 paper sheet structure for phase 1 in the paper groups

Main Measures

The following four main measures were taken into account when testing the hypotheses listed above: 1. The quality of the initial text; 2. The quality of the final text; 3. The quantity and typology of comments and revisions inserted and proposed by the peer; 4. Apprentices' satisfaction with the activity measured through a self-reported questionnaire.

Tynjälä (2001) pointed out that very few studies provide results about not only the process of collaborative writing but also the learning outcome in terms of domain-content learning. We wanted to evaluate the quality of the final texts, adopting the 5Rs Framework and assessment scale for reflective writing and thinking (Bain et al. 2002). This model helps identify the five main components in a reflective text, depending on how they relate to different levels of reflection about professional experiences. This grid is in line with the vertical models on reflection-on-action, proposing a progressive movement from elements related to a descriptive account of the experience to a more transformative and critical reflection. The five components of the framework are as follows: (1) a descriptive account of a situation (Reporting); (2) an emotional or personal response to the situation, incident or issue (Responding); (3) a relationship between current personal or theoretical understanding and the situation: connection between the incident and the author's own skills, experience, learning or understanding (Relating); (4) an exploration, interrogation or explanation of the situation: description about how the circumstances are important, their impact on the situation, the potential inter-relations between elements of the situation (Reasoning); (5) drawing a conclusion and developing a future action-plan based on reasoned understanding of the situation (Reconstructing).

Based of the five components and benefits from the professional trainers' competence, we were able to identify a set of indicators. Using these elements, three independent evaluators analysed the quality of both the initial and final texts. An evaluation on each indicator was given using a 5 point Likert scale (1=poor, 5=excellent). An overall score for each initial and final text was therefore computed. A similar approach was used with comments and revisions, but in this case we computed the number of elements proposed and which of the five components they belonged to. A preliminary study on peer-writing where we adopted the same approach, is reported in Motta et al. (2013) and in Boldrini and Cattaneo (2012).

To ensure a high level of inter-rater agreement, a first subset of texts was coded together by the 3 evaluators, discussing non-shared opinions in order to refine ratings.

To measure apprentices' perceived satisfaction, we used a 10-point Likert scale questionnaire (See §2.3) with 10 items (Cronbach's $\alpha=0.80$). For apprentices working on computer we added an item related to the perceived motivation due to working with the computer.

Results

1. The quality of the initial texts differed little from group to group. ($F(5,105)=1.799$, $p>0.10$), confirming that the groups were comparable and had a similar level of prior knowledge on the specific content. The normal distribution of the groups was also confirmed using a Shapiro-Wilk test.
2. The difference of quality between the final and the initial texts was, however, significant (see Table 3. for descriptive statistics). We ran a linear regression using contrast coding to test our three hypotheses: a. a significant effect of scaffolding (high and medium versus low), b. an effect of scaffolding intensity (high vs medium), c. an effect of the medium per each group (computer versus paper-pencil in each of the three scaffolding groups). The model is significant ($\text{Adj } R^2=0.101$, $F(5, 105)=3.459$, $p<0.01$). The main effect of scaffolding is significant ($\text{Beta}=0.274$, $t(5, 105)=2.996$, $p<0.01$) with medium and high scaffolded conditions significantly outperforming low-scaffolded ones. There is no significant difference between medium and high scaffolded conditions ($\text{Beta}=0.134$, $t(5,105)=1.467$, $p>0.05$), whereas the type of tool is significant only in the medium-scaffolded condition ($\text{Beta}=0.202$, $t(5, 105)=2.221$, $p<0.05$), thus indicating that there is no clear impact of the type of tool used at this regard.
3. As for the quantity and typology of comments and revisions, we can see from Table 4. that most of the interventions were related to content issues. To be consistent we used the same coding scheme applied in the analysis of the quality of texts, based on the 5Rs model (Bain et al. 2002). In addition to a large number of interventions aimed at detailing the procedure or correcting the grammar (Reporting), we also have an important number of interventions aimed at finding a link between the particular experience reported and the general flowchart of the procedure (Relating). No comments or revisions were made concerning Responding (emotional response to the situation), Reasoning (problematization),

Table 3 Increase of quality of texts (final-initial), per condition

Condition	N	M	SD
High scaffolding, paper	21	2.07	2.21
High scaffolding, PC	15	1.57	1.29
Medium scaffolding, paper	20	0.20	2.32
Medium scaffolding, PC	15	1.84	2.62
Low scaffolding, paper	16	-0.09	2.68
Low scaffolding, PC	21	0.19	1.94

Table 4 Frequency and category of peer interventions (comments and revisions), per condition

Condition	Reporting	Relating	Reinforcing
High scaffolding, paper	58	21	15
High scaffolding, PC	42	17	-
Medium scaffolding, paper	27	9	9
Medium scaffolding, PC	15	23	5
Low scaffolding, paper	1	8	22
Low scaffolding, PC	9	28	9
Total	152	106	60

or Reconstructing (difficulties, self-evaluations...). In addition, we counted 60 feedbacks aimed at providing reinforcement to the peer (which we labeled “Reinforcing”).

We checked for a mediating effect of comments on the outcome, using a bootstrapping procedure (Hayes 2009; Hayes and Matthes 2009). The analysis reveals no mediating effect of comments on the outcome, even if we can confirm an effect on the number of comments produced in the different comparisons. The model is significant ($\text{Adj } R^2=0.277$, $F(5, 105)=9.441$, $p<0.0001$) and coefficients show a non-significant effect only contrasting in high versus medium scaffolding (see Table 5. for details). This implies that the number of comments is significantly higher a. in scaffolded conditions and b. when using a computer.

- All groups were satisfied with the activity, reporting an average score of 7.92/10 (see Table 6.). No clear patterns were found to contrast the different scaffolding conditions or the type of support as no statistical differences existed among the conditions. Even if the references differ across conditions, the only possible way to conclude from this measure that apprentices value the peers’ reading activity as a good strategy is at a general level as this process make them reflect on their own texts ($M=7.93$, $SD=2.37$). The groups working with computers also reported a fair motivation for the activity due to the tool itself ($M=7.60$, $SD=2.40$). Finally, they

Table 5 Effects of contrasts on the number of comments received

Outcome variable: comments						
Model Summary						
R	R-sq	Adj R-sq	F	df1	df2	p
0.5569	0.3101	0.2773	9.4413	5	105	0.0000
Model Coefficients						
			Coeff.	s.e.	t	p
Constant			4.7435	0.3765	12.5984	0.0000
High and Medium versus Low scaffolding			1.5418	0.5298	2.9104	0.0044
High versus Medium scaffolding			0.1269	0.4635	0.2739	0.7847
Paper vs Computer in High scaffolded			1.5461	0.6519	2.3716	0.0195
Paper vs Computer in Medium scaffolded			3.4875	0.6589	5.2925	0.0000
Paper vs Computer in Low scaffolded			1.8892	0.6455	2.9267	0.0042

Table 6 Satisfaction descriptive scores, per condition (10 items)

Condition	N	M	SD
High scaffolding, paper	21	7.41	1.69
High scaffolding, PC	16	7.84	1.78
Medium scaffolding, paper	20	8.39	1.08
Medium scaffolding, PC	16	8.02	0.92
Low scaffolding, paper	16	8.03	1.24
Low scaffolding, PC	22	7.87	1.10
Total	111	7.92	1.34

perceived the comments and revisions to be of good quality ($M=8.04$; $SD=2.58$). This general appreciation across conditions can be due to the fact that, independent of the kind of prompts and the tool used, learners perceived the learning task to be innovative when compared to the standard setting of the intercompany courses, where collaborative reflective activities are not usual.

Discussion and Conclusions

We have presented here an instructional activity aimed at clarifying whether scaffolded collaborative writing could play a role in fostering reflective capacity in professional practices in VET curricula related to commerce. Contrasting three different levels of scaffolding the reviewing process through prompts (high, medium and low) and additionally looking at a possible effect of the tool used (paper versus computer), we found an important impact due to scaffolding. Both medium- and high-scaffolded conditions significantly outperformed the low-scaffolded one in terms of final quality of reflective texts describing an experience about the same professional procedure. Medium- and high-scaffolded conditions did not differ statistically from each other, even if texts that profited from the latter had a relatively higher increase in the quality. The tool for writing, on the other hand, does not seem to have had a generalized effect in terms of learning outcome, while the opposite was the case for the number of comments produced. At the same time, this last indicator does not seem to contribute to the learning outcome.

Finally, when asked about the perceived usefulness of such an activity, independent of the conditions, all apprentices were fairly satisfied, confirming the feasibility of such writing activities. This homogeneity could be explained by the fact that independent of the support and more generally from the single conditions, the proposed learning activity per se, structured around a collaborative writing task, was more dynamic and innovative than the usual format and setting of traditional intercompany courses.

Ultimately, the effect of scaffolding is the main focus of the results of this study. Scaffolding with structured prompts was shown to be an effective instructional strategy for fostering reflective writing at this point in the curriculum in order to develop reflective writing capacity and then support competence development (in line with Wesselink et al. 2010). In addition, by using personal experiences of apprentices at the

workplace, we found a way to create a strong connection between this practical dimension and the theoretical one, which is sometimes more evident in intercompany courses. This allowed for a deeper interplay between the two learning locations, which is also indicated by the high number of comments about Relating, (i.e., aimed at finding a link between the particular experience reported and the general flowchart of the procedure or, – in other words, between practice and theory). However, no evidence indicates that receiving a lot of comments is directly connected to an increase in the quality of such reflections. This might be due to the fact that we focused on the quality of the final product rather than on the intermediary process. In other words, a subsequent step would be to further investigate the quality of comments as well as the relationship between such quality and the related prompts. This leads to a second open question in terms of how to foster those kinds of comments lacking in our sample. As already reported by Beach and Friedrich (2006), we also found that “written feedback may be particularly effective in fostering certain kinds of revisions, such as adding details/examples, improving coherence, or dealing with editing matters” (p.228). This was not unexpected, and is consistent with the vertical models of reflection presented in the first section of this paper. According to these models, the first step towards deep learning and critical reflection is a descriptive account of the experience faced. With respect to critical reflection, the reported approach has not yet fully reached the ultimate objective of competence development, but the reported results are encouraging in showing that it was still able to promote the development of some skills and enable apprentices to mobilize some of the resources comprising the sought-after competence. In this perspective, Bain et al.’s (2002) 5Rs model could be seen as the “complete” set of resources needed; the presence of many relating comments would already be a second step – a further result beyond mere description. The additional integration of meta-cognitive prompts could be helpful in fostering increased comments in the Reasoning and Reconstructing categories as well, which in turn could lead to additional revisions. In this respect, we could benefit from other experiences in the VET sector which have already showed the effectiveness of meta-cognitive prompts on apprentices’ metacognitive skills development through the reflection of writing in professional experiences (Mauroux et al. 2013).

A third source of improvement for these results and those of similar research stems from scaffolding the role of the reviewer, thereby implicitly scaffolding the author in the final revision as well. Considering the ratings given to the peer and ultimately to one’s own text, a measure of the extent of this implicit scaffolding is lacking in our analysis. In light of this, consideration should be given to the fact that peers reviewing low-scoring papers usually produce better second drafts than peers reviewing high-scoring ones (Cho et al. 2007; Goldin et al. 2012).

The effectiveness of the experience has to be further investigated, even considering the peculiarity of the professional field involved; as has been said, commercial apprentices have strong writing skills, as required by the curriculum, and are also skilled in the use of word processors. In different professional fields, other strategies should be found in order to make apprentices elicit their reflections, both in terms of the process (writing) and tools (word processor).

Nevertheless, the study was able to demonstrate the feasibility and effectiveness of an instructional approach to foster the interplay between two learning locations referring respectively to theory and practice through the use of prompts to scaffold reflective

writing. The approach used instructional steps compliant with Hatton and Smith's (1995) phases to foster reflection: description of experience in the first phase, where the author writes descriptive reflection, and dialogic reflection in the second phase, where the peer gives reasoned comments to the schoolmate, and finally critical reflection, when the author has to consider what to do with the comments received and if and how to implement them. Despite the limitations and improvements cited herein, the feasibility of the instructional approach has been proven. Furthermore, its implementation along the VET curricula – through progressive scaffolded steps, from reporting to reconstructing – seems to be feasible as well. By way of conclusion, the results presented here fill a research gap with respect to i) the validity of the application of the writing-to-learn perspective in the VET domain; 2) the use and effectiveness of collaborative writing and peer feedback; 3) the kind and level of scaffolding needed by apprentices to write in a reflective way; and 4) the feasibility of this instructional method within VET, particularly with respect to the development of an online learning journal for office clerks' curriculum that includes scaffolded collaborative reflective writing scenarios.

Acknowledgments The study presented here is part of a series of activities of the Swiss “Technologies for Vocational Training” Leading House funded by the State Secretariat for Education, Research and Innovation (SERI) within the Federal Department of Economic Affairs, Education and Research (EAER) [BB.2009.0175]. We would thank Claudia Sassi and all the trainers at the Società Impiegati di Commercio (SIC Ticino) whose support was fundamental for this experience; Elisa Motta, Luca Bausch, Carlo Tomasetto for their precious contribution and suggestions.

References

- Aarkrog, V. (2006). Practical training as a means of reflecting on practice: an evaluation of a vocational and education and training programme for rescue officers. *Learning in Health and Social Care*, 5, 155–165.
- Andrade, H. G. (2000). Using rubrics to promote thinking and learning. *Education Leadership*, 57, 13–19.
- Baartman, L., & De Bruijn, E. (2011). Integrating knowledge, skills and attitude: conceptualising learning processes towards vocational competence. *Educational Research Review*, 6(2), 125–134.
- Bain, J. D., Ballantyne, R., Mills, C., & Lester, N. C. (2002). *Reflecting on practice: Student teachers' perspectives*. Flaxton, Queensland: Post Pressed.
- Bazerman, C., Little, J., Bethel, L., Chavkin, T., Fouquette, D., & Garufis, J. (2005). *Reference guide to writing across the curriculum*. Indiana: Parlor Press.
- Beach, R., & Friedrich, T. (2006). Response to writing. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 222–234). New York: The Guilford Press.
- Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, NJ: Erlbaum.
- Berthold, K., Nückles, M., & Renkl, A. (2007). Do learning protocols support learning strategies and outcomes? The role of cognitive and metacognitive prompts. *Learning and Instruction*, 17, 564–577.
- Biemans, H., Wesselink, R., Gulikers, J., Schaafsma, S., Verstegen, J., & Mulder, M. (2009). Towards competence-based VET: dealing with the pitfalls. *Journal of Vocational Education and Training*, 61(3), 267–286.
- Billett, S. (2001). Learning through work: workplace affordances and individual engagement. *Journal of Workplace Learning*, 13(5), 209–214.
- Boldrini, E., & Cattaneo, A. (2012). Collaborative writing on professional experiences as a means for fostering reflective thinking in VET curricula. In C. Gelati, B. Arfè, & L. Mason (Eds.), *Issues in writing research* (pp. 180–188). Padova: Cleup.
- Boldrini, E., & Cattaneo, A. (2013). Written identifications of errors to learn professional procedures in VET. *Journal of Vocational Education and Training*, 65(4), 525–542.

- Boscolo, P., & Ascorti, K. (2004). Effects of collaborative revision on children's ability to write understandable narrative texts. In L. Allal, L. Chanquoy, & P. Largy (Eds.), *Revision: Cognitive and instructional processes* (pp. 157–170). Boston: Kluwer Academic Publishers.
- Boscolo, P., & Mason, L. (2001). Writing to learn, writing to transfer. In P. Tynjala, L. Mason, & K. Lonka (Eds.), *Writing as a learning tool: Integrating theory and practice* (pp. 83–104). Dordrecht, NL: Kluwer Academic Publishers.
- Boud, D., Keogh, R., & Walker, D. (1985). *Reflection: Turning experience into learning*. London: Kogan Page.
- Cattaneo, A., & Boldrini, E. (2009). 11 competences for the teacher using ICTs: A quali-quantitative research pattern. In U. Bernath, A. Szücs, A. Tait, & M. Vidal (Eds.), *Distance and E-learning in transition learning innovation, technology and social challenges* (pp. 261–286). London/Hoboken, NJ: ISTE/WILEY Publications.
- Cho, K., & MacArthur, C. (2011). Student revision with peer and expert reviewing. *Learning and Instruction, 20*, 228–238.
- Cho, K., Schunn, C. D., & Kwon, K. (2007). Learning writing by reviewing in science. In *8th International conference on computer-supported collaborative learning* (pp. 141–143). New Brunswick, NJ, USA: International Society of the Learning Sciences.
- Davis, E. A. (2003). Prompting middle school science students for productive reflection: generic and directed prompts. *The Journal of the Learning Sciences, 12*(1), 91–142.
- Davis, E. A., & Linn, M. C. (2000). Scaffolding students' knowledge integration: prompts for reflection in KIE. *International Journal of Science Education, 22*(8), 819–837.
- Davis, E. A., & Miyake, N. (2004). Explorations of scaffolding in complex classroom systems: guest editors' introduction. *The Journal of the Learning Sciences, 13*(3), 265–272.
- De Bruijn, E., & Leeman, Y. (2011). Authentic and self-directed learning in vocational education: challenges to vocational educators. *Teaching and Teacher Education, 27*, 694–702.
- De Jong, J. A., Wierstra, R. F., & Hermanussen, J. (2006). An exploration of the relationship between academic and experiential learning approaches in vocational education. *The British Journal of Educational Psychology, 76*(1), 155–169.
- Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. Boston: Heath.
- Duijnhouwer, H., Prins, F. J., & Stokking, K. M. (2012). Feedback providing improvement strategies and reflection on feedback use: effects on students' writing motivation, process, and performance. *Learning and Instruction, 22*(3), 171–184.
- Galbraith, D. (1999). Writing as a knowledge-constituting process. In M. Torrance & D. Galbraith (Eds.), *Knowing what to write: Conceptual processes in text production* (pp. 139–160). Amsterdam: Amsterdam University Press.
- Galvato, M., Bétrancourt, M., & Schneider, D. (2010a). Writing and commenting on professional procedures. In K. Gomez, L. Lyons, & J. Radinsky (Eds.), *Learning in the disciplines: Proceedings of the 9th international conference of the learning sciences (ICLS 2010) – volume 1, full papers* (pp. 683–689). Chicago IL: International Society of the Learning Sciences.
- Galvato, M., Cattaneo, A., Arn, C., Boldrini, E., Motta, E., Schneider, D. K., & Bétrancourt, M. (2010b). Computer-supported peer commenting: a promising instructional method to promote skill development in vocational education. *Journal of Vocational Education & Training, 62*(4), 495–511.
- Ge, X., & Land, S. M. (2004). A conceptual framework for scaffolding ill-structured problem-solving processes using question prompts and peer interactions. *Educational Technology Research and Development, 52*(2), 5–22.
- Gielen, S., Peeters, E., Dochy, F., Onghena, P., & Struyven, K. (2010). Improving effectiveness of peer feedback for learning. *Learning and Instruction, 20*, 304–315.
- Goldin, I. M., & Ashley, K. D. (2012). Eliciting formative assessment in peer review. *Journal of Writing Research, 4*(2), 203–237.
- Goldin, I. M., Ashley, K. D., & Schunn, C. D. (2012). Redesigning educational peer review interactions using computer tools: an introduction. *Journal of Writing Research, 4*(2), 111–119.
- Graham, S., & Perin, D. (2007). A meta-analysis of writing instructions for adolescents students. *Journal of Educational Psychology, 99*(3), 445–476.
- Graham, S., Harris, K. R., & MacArthur, C. (2004). Writing instruction. In B. Wong (Ed.), *Learning about learning disabilities* (pp. 281–313). Orlando, FL: Academic.
- Hatton, N., & Smith, D. (1995). Reflection in teacher education. *Teaching and Teacher Education, 11*, 33–49.
- Hayes, J. R. (1996). A new framework for understanding cognition and affect in writing. In C. M. Levy & S. Ransdell (Eds.), *The science of writing: Theories, methods, individual differences, and applications* (pp. 1–27). Mahwah, NJ: Lawrence Erlbaum.

- Hayes, J. R. (2006). New directions in writing theory. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 28–40). New York: The Guilford Press.
- Hayes, A. F. (2009). Beyond Baron and Kenny: statistical mediation analysis in the new millennium. *Communication Monographs*, 76, 408–420.
- Hayes, A. F., & Matthes, J. (2009). Computational procedures for probing interactions in OLS and logistic regression: SPSS and SAS implementations. *Behavioral Research Methods*, 44, 924–936.
- Hidi, S., & Boscolo, P. (2006). Motivation and writing. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 144–157). New York: The Guilford Press.
- Hiemstra, R. (2001). Uses and benefits of journal writing. *New Directions for Adult and Continuing Education*, 90, 19–26.
- Hogan, K., & Pressley, M. (1997). *Scaffolding student learning. Instructional approaches & issues*. Cambridge, MA: Brookline Books.
- Hübner, S., Nückles, M., & Renkl, A. (2010). Writing learning journals: instructional support to overcome learning-strategy deficits. *Learning and Instruction*, 20, 18–29.
- Kember, D. (2001). *Reflective teaching and learning in the health profession*. Oxford: Blackwell Publishing.
- Kember, D., Jones, A., Loke, A., McKay, J., Sinclair, K., Tse, H., Webb, C., Wong, F., Wong, M., Wa Yan, P., & Yeung, E. (1996). Developing curricula to encourage students to write reflective journals. *Educational Action Research*, 4(3), 329–348.
- King, P. M., & Kitchener, K. S. (1994). *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults*. San Francisco: Jossey-Bass.
- Kolb, D. (1984). *Experiential learning. Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall.
- Krause, U.-M., & Stark, R. (2010). Reflection in example- and problem- based learning: effects of reflection prompts, feedback and cooperative learning. *Evaluation & Research in Education*, 23, 255–272.
- Lai, G. (2008). *Examining the effects of selected computer-based scaffolds on preservice teachers' levels of reflection as evidenced in their online journal writing*. Unpublished PhD Dissertation, Georgia State University, Atlanta, GA.
- Lai, G., & Calandra, B. (2007). Using online scaffolds to enhance preservice teachers' reflective journal writing: a qualitative analysis. *International Journal of Technology in Teaching and Learning*, 3(3), 66–81.
- Leung, D. Y. P., & Kember, D. (2003). The relationship between approaches to learning and reflection upon practice. *Educational Psychology*, 23(1), 61–71.
- Lukinsky, J. (1990). Reflective withdrawal through journal writing. In J. Mezirow & Associates (Ed.), *Fostering critical reflection in adulthood* (pp. 213–234). San Francisco, CA: Jossey-Bass.
- MacArthur, C. (2006). The effects of new technologies on writing and writing processes. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 248–262). New York: The Guilford Press.
- MacArthur, C. (2009). Reflections on research on writing and technology for struggling writers. *Learning Disabilities Research & Practice*, 24(2), 93–103.
- Mann, K., Gordon, J., & MacLeod, A. (2009). Reflection and reflective practice in health professions education: a systematic review. *Advances in Health Sciences Education*, 14(4), 595–621.
- Mauroux, L., Dehler-Zufferey, J., Jimenez, F., Wehren, R., Cattaneo, A., & Gurtner, J.-L. (2013). Autorégulation des apprentissages et dossiers de formation en formation professionnelle. In J.-L. Berger & F. Büchel (Eds.), *L'apprentissage autorégulé : Perspectives théoriques et recherches empiriques* (pp. 195–227). Nice: Ovidia.
- Mayer, K. (2002). Vocational education and training in transition: From Fordism to a learning economy. In W. Nijhof, A. Heikinen, & L. Nieuwenhuis (Eds.), *Shaping flexibility in vocational education and training: Institutional, curricular and professional conditions* (pp. 17–33). Dordrecht, Netherlands: Kluwer Academic Publishers.
- Mezirow, J. (1991). *Transformative dimensions of adult learning*. San Francisco, CA: Jossey-Bass.
- Moon, J. (1999). *Reflection in learning & professional development: Theory and practice*. London: Kogan Page.
- Motta, E., Boldrini, E., & Cattaneo, A. (2013). Technologies to “bridge the gap” among learning contexts in vocational training. In P. M. Pumilia-Gnarini, E. Favaron, E. Pacetti, J. Bishop, & L. Guerra (Eds.), *Handbook of research on didactic strategies and technologies for education: Incorporating advancements* (Vol. 2, pp. 247–265). Hershey, Pennsylvania: IGI Global.
- Nystrand, M. (2006). The social and historical context for writing research. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 11–27). New York: The Guilford Press.
- Poortman, C. L., Illeris, K., & Nieuwenhuis, L. (2011). Apprenticeship: from learning theory to practice. *Journal of Vocational Education & Training*, 63(3), 267–287.

- Raizen, S. A. (1994). Learning and work: The research base. In *Vocational education and training for youth: Towards coherent policy and practice* (pp. 69–115). Paris: Organisation for Economic Co-operation and Development.
- Rosaen, C. L. (1989). Writing in the content areas: Reaching its potential in the learning process. In J. Brophy (Ed.), *Advances in research on teaching: Teaching for meaningful understanding and self-regulated learning* (pp. 153–194). Greenwich, Conn: JAI Press.
- Rychen, D. S., & Salganik, L. H. (2003). *Key competencies for a successful life and a well-functioning society*. Göttingen: Hogrefe & Huber Publishers.
- Sandberg, J. (2009). Understanding of work: The basis of competence development. In R. C. Velde (Ed.), *International perspectives on competence in the workplace. Implication for research, policy and practice* (pp. 3–20). Dordrecht: Springer.
- Sarig, G. (2005). Fostering reflective writing by structuring writing-to-learn tasks. In G. Rilaarsdam, H. Van den Bergh, & M. Couzijn (Eds.), *Effective teaching and learning of writing: A handbook of writing in education* (pp. 499–518). Dordrecht, The Netherlands: Kluwer. Studies in Writing.
- Schaap, H., Baartman, L. K. J., & De Bruijn, E. (2012). Students' learning processes during school-based learning and workplace learning in vocational education: a review. *Vocations and Learning*, 5, 99–117.
- Schön, D. A. (1983). *The reflective practitioner. How professionals think in action*. New York: Basic Books.
- Schumacher, G. M., & Gradwohl Nash, J. (1991). Conceptualizing and measuring knowledge change due to writing. *Research in the Teaching of English*, 25, 67–96.
- Segev-Miller, R. (2005). Writing-to-learn: Conducting a process log. In G. Rijlaarsdam, H. Van den Bergh, & M. Couzijn (Eds.), *Effective teaching and learning of writing: A handbook of writing in education* (pp. 533–546). Dordrecht, The Netherlands: Kluwer. Studies in Writing.
- Taylor, A., & Freeman, S. (2011). 'Made in the trade': youth attitudes toward apprenticeship certification. *Journal of Vocational Education & Training*, 63, 345–362.
- Tynjälä, P. (2001). Writing, learning and the development of expertise in higher education. In P. Tynjälä, L. Mason, & K. Lonka (Eds.), *Writing as a learning tool. Integrating theory and practice* (pp. 37–56). Dordrecht, the Netherlands: Kluwer Academic Publishers.
- Tynjälä, P. (2008). Perspectives into learning at the workplace. *Educational Research Review*, 3, 130–154.
- Tynjälä, P., Välimaa, J., & Boulton Lewis, G. (Eds.). (2006). *Higher education and working life*. Amsterdam: Elsevier.
- Van Woerkom, M. (2004). Kritisch reflectief werkgedrag: de verbinding tussen individueel leren en organisatieleren. [Critical reflective work behavior: the connection between individual learning and organizational learning]. *Tijdschrift voor HRM*, 3, 67–82.
- Virtanen, A., & Tynjälä, P. (2007). Students' experiences of workplace learning in Finnish VET. *European Journal of Vocational Training*, 44(2), 199–213.
- Wesselink, R., De Jong, C., & Biemans, H. (2010). Aspects of competence-based education as footholds to improve the connectivity between learning in school and in the workplace. *Vocations and Learning*, 3, 19–38.
- Wood, D. J., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry*, 17(2), 89–100.
- Wu, L., & Looi, C.-K. (2012). Agent prompts: scaffolding for productive reflection in an intelligent learning environment. *Educational Technology & Society*, 15(1), 339–353.
- Yarrow, F., & Topping, K. J. (2001). Collaborative writing: the effects of metacognitive prompting and structured peer interaction. *British Journal of Educational Psychology*, 71, 261–282.

Elena Boldrini is Senior Researcher and Teacher at the Swiss Federal Institute for Vocational Education and Training (SFIVET). She attends to DualIT project in the framework of the “Technologies for Vocational Training” Leading House since 2008. In 2009 she completed a PhD programme in Philosophy of Social Sciences, preparing a thesis on the professional competence development. Main research fields: reflective writing, professional competence analysis, instructional design and technologies in VET, e-Portfolio.

Alberto Cattaneo is Responsible for the Research Field “Innovation in VET” at the Swiss Federal Institute for Vocational Education and Training (SFIVET) and in this framework he also leads the Dual-T project for SFIVET. He got his PhD in Social, Developmental and Organizational Psychology in 2005, discussing a thesis on Blended Learning and Virtual Learning Environments. His actual main research fields concern the integration of ICT in teaching and learning, reflective learning in VET, instructional design, multimedia learning, teachers' training, competence development.