

Skiing, Cheese Fondue and Swiss Watches: Analogical Discourse in Vocational Training Interactions

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Abstract When trainers or teachers in the field of initial vocational education explain abstract notions, refer to technical objects or emphasize the specificities of technical skills, they often call forth concepts and practices different from those that are directly salient in the training situations in which they engage. The aim of this paper is to contribute to a better understanding of the empirical realities associated with such phenomena by promoting a discursive and interactional approach of what we propose to term “analogical discourse”. Considering that analogies are performed and shared through language and speech, we propose that concepts and methodological tools borrowed from the field of linguistics can be profitably applied to the analysis of analogical discourse. Not only can they reveal the dynamic and collective nature of analogies as they are performed, disseminated and sometimes negotiated amongst participants, but they can also help reflect about the complexities of vocational learning as it takes place in specific material, practical and socio-cultural environments. From that standpoint, the paper proposes to see analogies not only as related to conceptual development and cognitive dimensions of learning, but as a substantial contribution to the social, cultural and relational dimensions of it.

Keywords Analogies · Apprenticeship · Situated learning · Conceptual development · Identity · Language

When trainers or teachers in the field of initial vocational education explain abstract notions, refer to technical objects or emphasize the specificities of technical skills,

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they often call forth concepts and practices different from those that are directly salient in the training situations in which they engage. They talk about electricity in terms of “fluids”, compare a metal piecework pierced with holes to a piece of “cheese”, associate the movement of throwing cement on a wall with playing “ping-pong”, etc. These phenomena appear as recurrent components of instruction practices in the context of vocational training interactions. They belong to a complex array of processes that can be referred to as *exemplifications*, *comparisons*, *metaphorical reasoning*, or *analogies*.

The aim of this paper is to contribute to a better understanding of the empirical realities associated with such phenomena by promoting a discursive and interactional approach of what we propose to term “analogical discourse”. Considering that analogies are performed and shared through language and speech, we argue that concepts and methodological tools borrowed from the field of linguistics can be profitably applied to the analysis of analogical discourse. Not only can they reveal the dynamic and collective nature of analogies as they are performed, disseminated and sometimes negotiated amongst participants, but they can also help reflect about the complexities of vocational learning as it takes place in specific material, practical and socio-cultural environments. From that standpoint, the paper proposes to see analogies not only as related to conceptual development and cognitive dimensions of learning, but as a substantial contribution to the social, cultural and relational dimensions of it.

To address these issues, the paper commences with a presentation of the theoretical and methodological principles underlying the research perspective adopted here (“[A Discursive, Interactional and Multimodal Approach to Analogies in Vocational Education and Training](#)”). A brief overview of the literature devoted to the role of analogies in teaching and learning is provided and discussed, and the specificities of a discursive, interactional and multimodal approach to analogical discourse are listed and highlighted. The paper then focuses on the cognitive dimension of analogies by investigating how these discourse processes relate to conceptual development in initial vocational training (“[Analogical Discourse as Conceptual Resource for Teaching and Learning](#)”). Different components of the referential organisation of analogies are examined in a large corpus of verbal and non-verbal interactions taking place between trainers and apprentices in the context of the Swiss VET system. The next two sections foreground the dynamic and collective nature of analogical discourse by identifying various ways apprentices may engage with analogies available in their ordinary work and training environments (“[Analogical Discourse as a Dynamic and Collective Construction](#)” and “[Analogical Discourse as Resource for Participation and Affiliation](#)”). It is then empirically illustrated how analogies initiated by teachers or trainers can be either ratified, contested or recycled by apprentices depending on the context and the ways apprentices position themselves regarding vocational knowledge and professional identities. In the final section of the paper, the theoretical and methodological consequences of these empirical findings are emphasized and discussed in more detail (“[Analogical Discourse and Workplace Learning](#)”). It is proposed that analogical discourse be conceived as resulting from broader cultural and historical constructions, as well as personal and subjective dimensions of vocational learning. From that standpoint, analysing analogical discourse in a linguistic perspective can

be seen as a way to address the complexities associated with workplace learning and hence as a useful contribution to vocational education research.

A Discursive, Interactional and Multimodal Approach to Analogies in Vocational Education and Training

In the last two decades, there has been a large amount of research devoted to the role of analogies in the field of education. Without providing an extended review of the literature available in this broad area, it appears that the studies conducted have developed in two main directions. A first kind of research has focused on the role of analogies in learning processes and their cognitive functions. Researchers in this line have thus established that new knowledge is often built in relation to already acquired knowledge and that analogies play a crucial role in linking the “old” to the “new” (Ortony 1979; Pugh et al. 1997; Sander 2002; Vosniadou and Ortony 1989). In the field of adult education, Billett (2001) also stresses the importance of analogies in workplace learning. He establishes that analogies provide helpful links for the learners in the workplace by making abstraction more concrete and assisting retention of what is being learnt:

As was their aim, analogies were able to provide helpful links for the learners, making the subjects more relevant. They were also held to assist with the retention of what was being learnt. Also, analogies were reported as being helpful in explaining complex ideas. (Billett 2001, p. 158).

A second kind of research has focused on analogies as resources for teachers. This line of investigation has shown how teachers often use analogies to make links between content they teach and the actual experiences of the students (Wortham 1996). From a similar perspective, researchers have stressed the importance of analogies to build mutual understanding and common ground amongst teachers and students in the context of classroom practices (Nonnon 1993).

All these approaches bring interesting contributions to the complex understanding of connections existing between analogies and education, but they also face serious limitations from the perspective we propose to adopt here. First, it appears that the empirical domain of school and formal education has gained major attention amongst educational researchers. Apart from Billett’s investigations, very little systematic research seems to have been devoted to analogies in vocational learning so far. Second, there is a strong tendency to consider analogies from a “monological” perspective. Analogies are studied either from the perspective of learners and the cognitive process they engage in *or* from the perspective of teachers and the kinds of resources they provide. Only few authors propose to consider these realities as “dialogic” joint constructions resulting from a collective participation of both teachers *and* learners. As a result, the active role of learners in the process of building links between various forms of knowledge is rarely sufficiently taken into consideration. Third, language seems to be considered as a transparent reality in most of the research results reported in the literature about analogies in education. Analogies are described and studied as conditions for learning or as components of teachers’ activities. But the

fact that analogies are shaped by language and are produced by means of specific semiotic resources is not systematically taken into consideration and perceived as playing an important role. As pointed out by Lee (2004), the linguistic and discursive nature of examples and analogies is often underestimated. Finally, some of the literature reported here focuses mainly on the cognitive dimensions of analogical reasoning. Analogies are associated primarily with knowledge transformation and retention, but their social dimensions relating to identity construction, interpersonal relation and cultural environments tend to be seen as a mere background.

Considering these elements, the perspective we propose to adopt here borrows from concepts and methodologies developed in various fields of sociolinguistics, such as, for instance, conversation analysis (Goodwin 2000; Sacks 1992), interactional sociolinguistics (Gumperz 1982), discourse analysis (van Dijk 1997) and multimodal semiotics (Kress et al. 2001; LeVine and Scollon 2004). These various frameworks have developed distinct approaches to discourse and interaction, but they also share some common assumptions about language and social life. In particular, they view language not only as a way of sharing information between speakers and recipients, but as an historical and culturally shaped medium by which social actors take actions, achieve cooperation, participate in social events, align identities, etc., by engaging in complex meaning-making processes supported by a wide range of semiotic resources, such as speech, gestures, body motions, gaze and the handling of objects.

Adopting a linguistic perspective based on these premises supports a specific approach to analogies in educational contexts, which can be referred to as discursive, interactional and multimodal. The approach is defined as *discursive* in the sense that analogies are not seen as abstract cognitive processes taking place in learners' minds, but as complex and organised empirical constructions taking shape in language use. It is the internal organization of these analogical discourses as well as their relations to situated actions and social contexts that is the focus of interest. Secondly, the perspective is defined as *interactional* because analogical discourse is understood as a joint construction and as a collective elaboration involving not only teachers or trainers, but also learners themselves. It is precisely this fine-grained cooperation and coordination process that we wish to account for. Finally, the approach is referred to as *multimodal* in the sense that language is not seen as the sole semiotic system contributing to the construction of analogical discourse. On the contrary, these empirical constructions are resulting from a combination of semiotic modes, each of them contributing with its specific affordances to the complex meaning-making process at hand.

This linguistic perspective calls for appropriate and specific methodological requirements regarding data collection and analysis. Consistent with a discursive, interactional and multimodal approach, fine-grained and rich data of naturally occurring interactions must be collected, transcribed and analysed. These data usually take the form of audio-video recordings conducted by the researcher after a progressive immersion into the contexts observed. For the purpose of this study, a large corpus of audio-video recording of interactions between apprentices and vocational teachers or trainers has been used. These recordings were collected in the context of a research program conducted within the Swiss VET system¹ and aimed at a more informed understanding of the real conditions in which training and learning

¹ For a presentation of the specificities of the Swiss VET system, see Gonnon (2005) or Fillietaz (2010).

occurs within a practice-based apprenticeship model (Filliettaz et al. 2008; Filliettaz 2010). The recordings have been collected in three trades within technical occupations (car-mechanics, automation and electric assembly) and involve apprentices and expert workers in both vocational schools or training centres and training companies. From a total amount of 140 h of recordings, 42 sequences of analogical discourse have been identified and transcribed. These sequences are defined as segments of verbal interaction in the course of which knowledge associated with vocational practice is constructed by evoking another, distinct, conceptual domain. The relation established between these domains can be either a relation of similarity or of contrast.

In the following sections of this paper, we highlight some of the main characteristics of this collection of sequences as they are empirically attested in a variety of training situations. We do so from two successive vantage points. As a first step, we focus on the conceptual dimension of analogical discourse by describing the ways it refers to and combines various referential domains (“[Analogical Discourse as Conceptual Resource for Teaching and Learning](#)”). As a second step, we draw attention to the dynamic and collective organisation of these sequences of interaction (“[Analogical Discourse as a Dynamic and Collective Construction](#)”) and reflect on the social and cultural outcomes associated with analogies in the context of initial vocational education and training (“[Analogical Discourse as Resource for Participation and Affiliation](#)” and “[Analogical Discourse and Workplace Learning](#)”).

Analogical Discourse as Conceptual Resource for Teaching and Learning

Contemporary literature on metaphors has largely established the idea that analogies are not just phenomena of substitution of one idea by another. Under various and often disparate terminologies, numerous authors (e.g. Balibar-Mrabati & Corenna 2002; Lakoff and Johnson 1980) have proposed that metaphors contribute to the configuration of links between conceptual fields and play an important role in shaping these fields and their interconnections. From that standpoint, it becomes crucially important to understand how analogies contribute to a sharing of concepts amongst participants and to find out how they do so by referring to various domains of knowledge. It is this referential organisation of analogical sequences identified in our data that will be examined here in detail and approached as a possible resource for teaching and learning in vocational education.

As a starting point in that investigation, we borrow from Gentner (1989) the following definition of analogy, conceived as “a mapping of knowledge from one domain (the base) into another (the target), which conveys that a system of relations that holds among the base objects also holds among the target objects.” (p. 201). According to this definition, analogies are based on connections between three kinds of components: a) a “*target*” referential domain, b) a “*base*” or “*source*” referential domain and c) an “*analogical link*” or set of relations between these two sorts of conceptual domains (Fig. 1).

One example can help illustrate this terminology. In the following excerpt, a trainer (TRA) in a private training centre owned by the machine industry explains to apprentices how to harden steel pieces by heating them in a furnace and dipping them

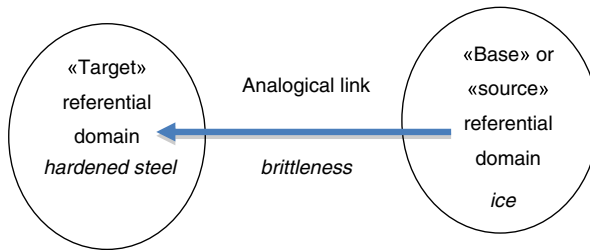


Fig. 1 The referential organisation of analogies

into oil. He mentions that immediately after the annealing process, steel remains easily breakable unless it is cooled of in a process known as quench hardening.

Excerpt 1: *as brittle as ice* (Seq. 7)²

1. TRA: on the other hand after that it will break very very easily/ .
2. because **it will be as brittle as ice** right [#1]
3. CAB: it's hard\
4. TRA: so here's what we do\ .. first we have the piece heated to 820 degrees ((*opens the furnace*))



#1: TRA handles a piece of hardened steel

In this excerpt, the knowledge referred to by the trainer—the *hardened steel*—acts as the target referential domain: it is the chemical structure of this metal at that precise moment that is foregrounded in his explanation. The *ice* is used as a base or source referential domain: it belongs to an external conceptual field, imported to illustrate properties of the target. The notion of *brittleness* acts as a shared property between *steel* and *ice* before completion of the hardening process. It is that concept that acts as an analogical link between the imported source and the targeted knowledge.

These three elements (i.e. (a) source, (b) target, (c) link) capture constitutive elements of the referential organisation of analogical discourse. In the next sections, we take in turn the study of these elements as they appear in the data we have examined. More specifically, we begin by identifying the main elements of training

² These data have been translated from French. Conventions and symbols used in the transcripts are listed and explained at the end of this paper.

interactions that constitute targets for analogical discourse (“[Targets of Analogical Discourse](#)”). We then investigate which conceptual sources participants are calling forth to illustrate or support these targeted elements (“[Sources of Analogical Discourse](#)”). Finally we describe how analogical links between these conceptual domains operate in discourse (“[Linking Sources to Targets](#)”). In all, we propose to see the explicit nature of analogical discourse as an important resource for learning and as a means used by participants to establish links between vocational knowledge and available experience borrowed from ordinary life.

Targets of Analogical Discourse

The data taken into consideration for our study belong to distinct technical occupations. Nevertheless, the conceptual domains targeted by analogical sequences of discourse we examined recurrently refer to two main components of training practices: a) actions and body positions, and b) material objects or tools.

A first domain that often acts as a target of analogical sequences refers to actions and body positions proper to the work practices being taught and learnt. Trainers often use analogies to illustrate or demonstrate specific properties of technical skills that are not easily understandable and acquired unless they are being experienced on a perceptual level. We give an example of this in the following excerpt, recorded in a training workshop of a large public company. First year apprentices in the domain of electric assembly undergo a short-term training program in building, before they join the workplace. The trainer, a skilled builder working for the company, explains to an apprentice (PED), how to use bricks and cement to build a wall.

Excerpt 2: cheese fondue (Seq. 4)

1. TRA: ((takes the trowel from PED's hands))
2. here/ like THIS/ ((shows how to apply cement on bricks)) [#1]
3. a hollow in the middle/ . for insulation\ .
4. right/ ((lays the trowel on the wall))
5. there\ . two strokes\
6. ((makes an iconic gesture with his hand)) [#2]
7. **like this/ like cheese fondue**
8. PED: like fondue/
9. TRA: **yes . a figure of eight**
10. ((draws a figure of eight with his right hand))



#1: TRA shows PED how to apply cement on bricks



#2: TRA repeats the gesture with his right hand

At the beginning of excerpt 2, PED applies cement with care and spends much time in spreading cement with his trowel before he covers it with a brick. Having noticed that, TRA approaches PED and explains how to perform a more efficient version of this action. To do so, he takes the trowel from PED's hands (l. 1) and comments on his action of applying cement on the wall ("here like this", l. 2; "a hollow in the middle for insulation", l. 3). He then illustrates the specificities of the technique by using two successive analogies. The first one refers to the action of preparing and mixing cheese fondue (l. 7.). The second refers to the shape of the number eight (l. 9). Both these analogies co-occur with iconic gestures performed by the trainer (see image #2). This illustrates how specific properties of technical actions or gestures are becoming progressively meaningful in the training situation and how analogies contribute to make these specificities available to learners.

A second element of vocational training interactions that often acts as a target domain for analogical discourse in our data refers to material objects and tools apprentices engage with during their tasks. Teachers or trainers often use analogies to make the properties of these objects or tools more salient. Excerpt 3 provides such an example. It is extracted from a mechanics workshop held in a vocational school. Apprentices in the field of car mechanics learn to use different techniques and tools to transform an iron sheet into a box.

Excerpt 3: real cheese (Seq. 20)

1. TEA: ((observes TON's iron sheet and looks sceptically)) [#1]
2. TON: yes I know/. but I'll fix rivets there\ ..
3. TEA: ((looks sceptically at TON))
4. TON: no I know/ . I'll fix rivets here and here\ .
5. TEA: ((looks sceptically at TON))
6. TON: no I'm serious sir\
7. TEA: well yes you're serious that's for sure/
8. because soon it'll be real cheese your box\



#1: TEA observes TON's iron sheet

At the beginning of excerpt 3, the teacher (TEA) approaches one of the apprentices (TON) and assesses what he has done so far. He observes that TON's iron sheet is full of holes and looks sceptically at him (see image #1). TON then provides justifications and argues that the holes will not affect the final shape of the box since they will be filled with rivets ("yes I know but I'll fix rivets there", l. 2; "no I know I'll fix rivets here and here", l. 4, "no I'm serious sir", l. 6). The teacher reacts ironically to these justifications, comparing TON's iron sheet to a slice of cheese: "well yes you're serious that's for sure because soon it'll be real cheese your box" (l. 7-8). In this example, it is thus not so much an action or a technical movement that is targeted by analogical discourse, but its result as it can be observed on the surface of an iron sheet.

Sources of Analogical Discourse

After having identified the recurrent elements of training interactions that are targeted by analogies in our data, it becomes equally relevant to understand what conceptual domains are being used as *sources* of these analogies: what sorts of concepts or practices are being referred to when participants use analogies to target specific actions or objects belonging to vocational practice? What kinds of knowledge help them to make specific properties of these actions or objects more salient in the training contexts?

The analysis conducted in that direction shows that two domains of reference are mainly being explored by vocational teachers or trainers as resources for their analogical discourse. The first consists of objects or practices that can be seen as external or distant from the occupational domain being taught and learnt in the situated interactions. These domains often belong to experiences of ordinary life. For instance, many analogical sequences available in our data refer to food. Trainers compare for instance masonry with *cheese fondue* (see excerpt 2), associate the form of a screw to a *mushroom* or link the properties of metal pieces with *cheese* (see excerpt 3) or *meat*. They also explain specific actions or body positions by referring to sports activities. For instance, the positioning of feet when filing metal is said to be similar to *skiing* (see excerpt 5), and the technique of throwing cement on a wall is associated with a backhand stroke when playing ping-pong (see excerpt 9).

But interestingly, analogies do not exclusively borrow from concepts, objects or actions distant from professional practices. It is also sometimes elements belonging to the same occupational field and referring to past joint experiences that act as sources for analogical discourse. We have an illustration of this "internal" analogical linking in the following excerpt, recorded in the garage of a large public company. In this sequence, an experienced mechanic (DOM) explains to an apprentice (MIC) how to fix tires by plastering heated patches of rubber on them.

Excerpt 4: *rubber patches* (Seq. 23)

1. DOM: ((cuts a strip of heated rubber))
2. do you remember I showed you yesterday the: the cold- cold patches when we were fixing the air tubes how they were homogeneous when we stuck them together\
3. ((removes the protection from the rubber patch)) [#1]
4. MIC: mmmm/
5. DOM: OK/
6. MIC: yes\
7. DOM: to show you/ ((rolls up the rubber)).
8. so it's the same texture
9. this thing that's natural rubber/ . ninety per cent of it\



#1: DOM removes the protection of the rubber patch

In this sequence, DOM's explanation focuses on the specific texture of the rubber patch used for fixing tires. To do this, he explicitly refers back to an activity the two participants accomplished jointly the day before, that is the use of a "cold" technique for patching tires ("do you remember I showed you yesterday the cold patches when we were fixing the air tubes how they were homogeneous when we stuck them together", l. 2). Here, DOM weaves an analogical link between the two situations, in order to establish that "it's the same texture" (l. 7). In this case, both the *target*—the "hot" patching—and the *source*—the "cold" patching—of the analogy belong to the same referential domain, that of techniques and tools used in car mechanics. This "internal" connexion between practices belonging to the same occupational field show how experts sometimes recycle past experiences as a resource for training apprentices and for enhancing their understanding of the current situation. These connections, as is evidenced here, count as an important base or source for analogies in vocational training interactions.

Linking Sources to Targets

After having identified the main targets of analogies and some of the sources participants borrow from, we would like to turn to describing in a more detailed way how connections are constructed between these conceptual domains in initial vocational training interactions. The point we wish to make here is that analogical links between

sources and concepts targeted in interaction do not rely exclusively on linguistic forms but combine a variety of resources belonging to various semiotic modes.

Specific linguistic constructions are used to establish relations between targets and sources in interaction. These often take the form of markers of comparison such as *it's like, it's for example, it's a little bit the same as, it looks like*, etc. But interestingly, these markers are also complemented by gestures or body positions displayed by participants when talking. Excerpt (2) provided evidence for the importance of gestures in sharing knowledge about “Swiss fondue” and construction. Below, another excerpt will give another illustration of this multimodal combination of speech and non-verbal behaviour. Excerpt 5 was recorded in a mechanics workshop held in the training centre of a public company. Apprentices are learning basic techniques for working with metal and accomplish various exercises in which they use a wide range of tools. The sequence transcribed shows how the trainer (TRA) explains to an apprentice (THI) how to position his feet when filing a metal cube.

Excerpt 5: *it's a bit like skiing* (Seq. 8)

1. TRA: you're too/ . you're too much like this\
2. ((imitates THI's body position)) [#1]
3. you won't manage you're too stiff on your leg\
4. ((puts weight on his leg and bends his knee in a flexible fashion))
5. be more flexible\
6. THI: mmh but if I stand like this afterwards I can't-
7. TRA: I am not telling you to swing forward/
8. ((makes a swinging motion forward))
9. I am telling you to be . to put your knee at the same level as- look/
10. ((adopts the right position by aligning his left knee to his foot))
11. THI: like this now it's lined up\
12. TRA: **it's a bit like skiing** ((holds the position)) [#2]
13. THI: yes\



#1: TRA imitates THI's body position



#2: TRA aligns his left knee to his foot

In this excerpt, it is again a specific body position that is being targeted by TRA's explanations. THI's position while filing the metal cube is seen as too stiff and this risks leading to an uneven surface of the metal piece. This false body position is both

represented in discourse (“you’re too you’re too much like this”, l. 1; “you won’t manage you’re too stiff on your leg”, l. 3) and made visually available to the apprentice through the mimicking of postures by the trainer (see image #1). Likewise, the reference to the source domain of skiing is also multimodal: it is both verbally communicated (“it’s a bit like skiing”, l. 12) and bodily displayed through the flexion of the knees the trainer makes while giving his explanation (see image #2). Consequently, the bridging between different forms of knowledge and experiences in analogical discourse has to be seen as a global process including both verbal and non-verbal resources.

The examples analysed so far illustrate the variety of conceptual domains targeted and connected by analogical discourse in our data. They also underline the complex work accomplished by trainers and teachers in order to make these connections explicit and meaningful for apprentices. From that standpoint, analogies appear as important resources both for teaching and learning. From the perspective of teachers, they constitute recurrent components of explanations. From the perspective of apprentices, they help to connect new conceptual fields related to vocational practices with elements of experience they are more familiar with. This being said, it remains an open question to determine whether learning arises or not from these analogies. To what degree are analogies effective in securing the kinds of knowledge that they are enacted to achieve? What exactly do apprentices learn from these analogies? The methodology used for this study certainly is not able to provide comprehensive answers to these questions, at least not on a cognitive level. But it can contribute to a reflection on the learning outcomes of analogies by understanding how apprentices engage in these analogical sequences of discourse and how they provide various sorts of reactions to their introduction by teachers or trainers. Our hypothesis is that these interactional accounts displayed by apprentices give cues to the ways they make sense and ultimately learn from analogical discourse. This calls for a more dynamic approach to analogy, focused not only on its conceptual organisation but also on its sequential unfolding in interaction. It is this latter analytical perspective we propose to adopt in the following sections of the paper.

Analogical Discourse as a Dynamic and Collective Construction

From the examples shown up to now, one could gain the impression that analogies in our data are always local discourse units initiated and conducted by teachers or trainers as a contribution to the conceptual dimension of their explanations. This section foregrounds a quite different view on analogical discourse, namely that in vocational training interactions, analogies are better understood as a dynamic and collective construction, that is not located in isolated utterances, but rather developed collectively in the sequential organization of dialogues (Lee 2004). From that perspective, it becomes crucially important to understand the active role played by apprentices in the unfolding process of analogical discourse.

To do so, we turn to another excerpt of interaction belonging to our data. This excerpt is drawn from the same hands-on course in mechanics as the one presented in excerpt 5. At that particular moment of the course, apprentices are learning for the

first time to tap holes in a metal workpiece. The trainer (TRA) requests that they use special lubricating oil for that task.

Excerpt 6: motor oil (Seq. 1)

1. FLO: sir/ . why don't we use that same oil for drilling/
((looks at the oil used for tapping)) [#1]
2. TRA: because this one is made . especially for that\
3. FLO: but what's the difference/
4. TRA: well it's not the same/
5. FLO: the DENSITY is not the same/
6. TRA: it's like for example in an engine we put motor oil then in a gearbox we put gearbox oil\
7. FLO: oh really/
8. TRA: it doesn't have the same texture\
9. MAT: it's: the VISCOSITY that changes\
10. TRA: yes that's it\
11. FLO: it's magic\
12. TRA: the COLOUR changes too\
13. FLO: ((laughs)) but that the engine can't see that can it/ oh/ BLUE petrol today isn't that funny/



#1: FLO looks at the oil can used for tapping

In line 1, FLO implicitly asks the trainer (TRA) about the difference between the oil used for drilling and the oil used for tapping (“sir why don’t we use that for drilling”). In asking this question, he makes a connection between the activity he is currently conducting (the tapping) and an activity which he accomplished just before (the drilling). A local analogy thus begins to be woven between two close domains of reference. In line 2, TRA provides a first response to the question, by saying “because this one is made especially for that”. But for FLO this answer is not informative enough as shown by his reaction (“but what’s the difference”, l. 3). The trainer then elaborates a bit on his explanation (“well it’s not the same”, l. 4), and uses analogical discourse to build an explicit link between the tapping and the domain of car mechanics. He thus establishes a link between different kinds of oil used in general mechanics (lubricating oil for drilling vs. lubricating oil for tapping) and different kinds of oil used in car mechanics (motor oil vs. oil for the gearbox). He explains this relation by discussing a general property of oil: “it doesn’t have the same texture” (l. 8).

Another interesting point to note is that in the transcribed excerpt, the explanation is not restricted to an interaction between the trainer and FLO. Another apprentice, MAT, observes the exchange and also contributes to it, as in line 9 for example, when he

explains that it is the viscosity that changes across oils (“it’s the viscosity that changes”). Both TRA and FLO ratify this comment by saying “yes, that’s it” (l. 10), and “it’s magic” (l. 11). On line 12, the trainer attempts to further refine the categories for distinguishing different oils. He mentions oils have different colors (“the color changes too”, l. 12), but FLO reacts by making fun of the complementary explanation (“but that the engine can’t see that can it, oh blue petrol today isn’t that funny”, l. 13).

This brief example thus shows how analogy consists in a dynamic and conversational construction. Analogies appear as sequentially organized. In our example, “texture”, “viscosity” and “color” are progressively defined as relevant categories belonging to the concept of “oil”. It is the specific dynamics of sequential conversation that brings these successive categories into action. Consequently, analogies appear as collective elaborations. In the sequence just analysed, the analogical link between “general mechanics” and “car-mechanics” is initiated by the trainer but jointly elaborated with apprentices. It is FLO who first uses the analogy to try to bridge his knowledge of drilling and that of tapping. It is FLO again who makes fun of the analogy proposed by the trainer, considering that “color” cannot be seen as a relevant category for distinguishing different sorts of oils. MAT also contributes to the elaboration of the analogy by enriching the explanations given by the trainer and mentioning “viscosity” as a relevant feature. From that standpoint, apprentices are not only interpreting analogies initiated by trainers in work and learning environments. They also actively participate in the unfolding of analogies and position themselves regarding the kind of knowledge provided by trainers. This latter observation relates to the ways apprentices engage with analogical discourse in vocational training interactions. It deserves additional attention, as shown in the following paragraphs.

Analogical Discourse as Resource for Participation and Affiliation

There are different ways apprentices may engage with analogies in training situations observed in our data. In some cases, apprentices seem to ratify these analogies by reusing them in subsequent tasks they carry on after explanations provided by teachers (“[Ratifying Analogies](#)”). In other cases, apprentices contest the adequacy of these analogies and negotiate their validity (“[Contesting Analogies](#)”). Finally, in other situations observed, they transform these analogies and recycle them for purposes other than those intended by trainers (“[Recycling Analogies](#)”). These contrasted types of responses provided by apprentices shape various sorts of “interactional destinies” for analogies in training and work activities. A careful description of these distinct forms of responses can lead to a better understanding of the ways apprentices participate in training activities and position themselves regarding teachers, trainers, and the professional communities they belong to. From that standpoint, these responses stress the importance of the social and cultural dimensions associated with the production of analogical discourse in the context of initial vocational education.

Ratifying Analogies

As just mentioned, a first way in which apprentices may react to analogies introduced by teachers is to validate the kind of knowledge they support. One can

find evidence for such a validation when for instance apprentices transfer these analogies in another interactional setting and use them again in a different context. This is what we propose to term “ratified analogies”. Below, we provide an illustration of this first possible type of response by returning to empirical data.

Excerpt 7 is drawn from the same car mechanics workshop as the one examined in excerpt 3. First year apprentices are participating in a practical course in general mechanics held in a vocational school. They are learning how to use various tools and techniques in order to build a metallic box from an iron sheet. At the beginning of the transcribed sequence, the trainer asks all the apprentices to stop their individual tasks and to come and listen to important instructions. He then draws their attention to the fact that the iron sheet may be out of shape after having been cut with shears. Apprentices must therefore use a hammer and flatten the sheet before they move on to the next steps in the task.

Excerpt 7: hammer like a goldsmith (Seq. 17)

1. TEA: we are meeting here for two reasons\ .
2. first .. once you have cut your iron sheet\ .
even if you have cut it right/ and carefully
with the shears/ you'll see that it is a little
bit out of shape\
3. you need to go to the anvil/
((points in the direction of the anvil)) [#1]
4. you wipe the anvil so that there is no more dirt
on it/
5. and hit it with a hammer/ .
6. **but you should hammer it like a goldsmith/**
((laughter))
7. APP: I take the mallet/
8. ??: a crazy goldsmith
9. TER: what mustn't you do/ with the hammer\
10. TEA: XXXX
11. ??: leave marks/
12. ??: put it sideways/
13. TEA: what you must not do/ is to lengthen the sheet\.
14. if you lengthen the sheet you've had it\
15. you will end up with a box that will be/ that
16. will definitely be out of shape\ . ((makes
twisting movements with his hands)) [#2]
17. so you should straighten out the folds with very
gentle blows of the hammer/.
18. it should just flatten the sheet\



#1: TEA points the anvil and holds the iron sheet



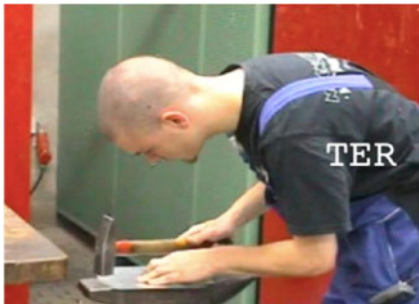
#2: TEA makes twisting movements with his hands

In line 6 of the transcript, the teacher (TEA) reminds the apprentices to use the hammer with care and moderation when flattening the iron sheet. To do so, he draws an analogical link between the required action and the way goldsmiths use hammers in their vocational practice, namely with tiny little blows (“but you should hammer it like a goldsmith”). This analogical reference to the goldsmith is not unnoticed by apprentices, who provide multiple accounts as interaction unfolds. Some apprentices start laughing (l. 7). One apprentice imagines he takes a mallet (l. 8). Another, TER, comments on the fact that the goldsmith could go crazy (“a crazy goldsmith”, l. 9). At the end of this sequence, the teacher makes the link between general mechanics and goldsmith’s art more explicit and gives additional explanations about the way apprentices should use the hammer in order to flatten the iron sheet (“so you should straighten out the folds with very gentle blows of the hammer it should just flatten the sheet”, l. 17-18).

It is interesting to observe how apprentices engage with this reference to the goldsmith not only during the explanations given by the teacher, but later on, once they are on their own carrying out the task to flatten the iron sheet. Below, we describe how TER, one of the apprentices, deals with the task after the teacher has completed his explanations.

Excerpt 8: go for it goldsmith (Seq. 18)

1. TER: hey SAM/ . like a goldsmith/
2. SAM: go for it goldsmith/
3. TER: ((*hammers the sheet carefully on the anvil*,
1 min 8 sec.)) [#1]
4. JUL: ((*moves towards the anvil*)) are you finished/
5. TER: ((*stops hammering*)) yeah I am
6. JUL: so it’s my turn
7. TER: just like a goldsmith\
8. ((*leaves the anvil to JUL*)) [#2]



#1: TER hammers the iron sheet carefully on the anvil



#2: TER leaves the anvil to JUL

When approaching the anvil with his hammer and iron sheet, TER addresses another apprentice (SAM) prepared to carry out a similar task and reminds him to hammer like a goldsmith (“hey SAM like a goldsmith”, l. 1). SAM responds with a reciprocal advice (“go for it goldsmith”, l. 2). TER then flattens the sheet by applying gentle blows with the hammer, following exactly the teacher’s instructions (see image #1). After approximately 1 min, another apprentice (JUL) approaches the anvil and asks TER if he is finished (“are you finished”, l. 4). TER agrees, leaves the anvil to JUL and rephrases the teacher’s advice once more (“just like a goldsmith”, l. 7).

The interesting point about these two successive sequences of interaction is that the reference to the goldsmith as an analogical illustration to the action of hammering the iron sheet very smoothly is not only noticed during the teacher’s explanation. It is also reused by apprentices themselves once the instruction phase is finished. It is used by TER a first time when talking to SAM, and a second time when addressing JUL. This shows how TER in particular, but also SAM, engage actively with this analogy by reproducing it in various settings of the training environment and in distinct participation frameworks. This sort of ratification of the analogy initially introduced by the teacher progressively transforms the reference to the goldsmith into a shared knowledge within the community of apprentices present in the workshop.

Contesting Analogies

These cases of shared and ratified links between targeted knowledge and analogical resources are not the only way apprentices may respond to analogies in training interactions. In some circumstances, apprentices distance themselves from the analogies used by teachers, engaging in a negotiation process rather than in a direct ratification.

Excerpt 9 provides a good illustration of such “contested analogies”. It refers to a situation observed in the same building workshop than we discussed in excerpt 2. In this sequence, BRI, a first year apprentice, is learning how to throw cement on a brick wall. This knowledge requires the use of a trowel with specific technical skills, based on suppleness and appropriate timing. BRI is having a hard time to learn this technical skill. The trainer observes BRI’s numerous attempts and tries to explain him how to use the trowel properly.

Excerpt 9: *you can't be any good at ping-pong* (Seq. 13)

1. BRI: ((throws cement on the wall with his trowel))
[#1]
2. TRA: you are not supple enough with you wrist\
3. BRI: ((goes on doing the same movement))
4. TRA: it looks like you've got a crowbar in your
hands\
5. be supple/ ((performs the correct movement with
his hand))
6. BRI: what's a crowbar/
7. TRA: **you can't be any good at ping-pong/**
8. you are much too-
9. you are not supple enough you should be supple/
10. ((goes on making the same movements with his
arm))
11. BRI: **I'm good at ping-pong** ((throws cement on the
wall))
12. TRA: your whole body/ your legs/ your arms/ should be
supple\ ((performs the correct movement with his
arm))
13. MAT > BRI: look/ . you come you come closer like this/
and straight/ ((approaches the wall and handles
the trowel)) [#2]
14. BRI: **it's not like ping-pong\ ping-pong is much
easier**
15. MAT: no no\ .. you should do it like this\ ((performs
the correct movement))
16. BRI: ((BRI tries again))
17. TRA: ((approaches BRI, takes the trowel from his hand
and gets some more cement))
18. BRI: **I'm good at ping-pong**



#1: BRI tries to throw cement on the wall with his trowel



#2: MAT approaches the wall and shows BRI how to throw cement

When guiding the apprentice towards performing the specific arm movement required for throwing cement on the brick wall with his trowel, the trainer (TRA) brings two successive analogies to BRI's attention. The first analogy targets the inadequate arm position of BRI by linking it to a "crowbar" ("it looks like you've got a crowbar in your hands", l. 4). The second analogy elaborates on the similarity between the required movement and a ping-pong game ("you can't be any good at ping-pong you are not supple enough", l. 7–9).

Interestingly, BRI seems to engage with none of these two analogies. He does not understand what a crowbar is and asks TRA about clarifications (“what’s a crowbar”, l. 6). Moreover, he recurrently contests the analogical link between throwing cement with a trowel and playing ping-pong. He does so a first time arguing that he is good at ping-pong (“I’m good at ping-pong”, l. 11). He does so a second time by criticizing the validity of the established analogy (“it’s not like ping-pong ping-pong is much easier”, l. 14). He finally does this again at the end of the excerpt, when repeating that he is a good ping-pong player (“I’m good at ping-pong”, l. 18).

It is also noteworthy that this interactional training sequence does not involve exclusively BRI and the trainer. Similarly to excerpt 6, another apprentice, MAT, plays an active role in the way BRI experiences and practices the movement associated with throwing cement. In line 13, MAT approaches the wall and gives advice to BRI regarding his position (“look you come closer like this and straight”), before demonstrating a correct performance of the arm movement (“you should do it like this”, l. 15).

Finally, this excerpt is of particular interest in the sense that it underlines the social and relational implications associated with analogies in vocational training interactions. As a matter of fact, analogies used in this excerpt do not only aim at specifying properties of vocational knowledge. They also consist in categorizing the apprentice as a specific person, who “is” not supple enough, or who “is” not any good at ping-pong. When arguing against the proposed analogical links, BRI is not only failing to engage with specific vocational knowledge. He is also contesting the validity of these claims made about himself. From that standpoint, strong links appear to exist between the ways apprentices engage with proposed analogies and the ways vocational training interactions contribute to the construction of their identities. In this particular context, it is BRI’s global position within the group that is challenged by the trainer, which in a sense goes far beyond a matter of vocational knowledge or skill.

Recycling Analogies

There is a third way for apprentices to engage in analogical discourse when responding to teachers or trainers in the data we observed. These responses consist in reusing these analogies for different purposes than the ones initially intended by teachers. This is what we propose to term “recycled analogies”. In what follows, we give an illustration of this third form of engagement.

Excerpt 10 is extracted from the same workshop as the one observed previously in excerpts 2 and 9. At the beginning of the sequence, the trainer supervises THI, one of the apprentices. THI is behind others in his work and will soon be running out of time. The trainer encourages him to move on quickly and to stop caring about details when adjusting the bricks on the wall.

Excerpt 10: *we're not with Rolex* (Seq. 9)

1. TRA: that's not like that/ ((spreads cement with
 the trowel)) [#1]
2. go on put this block/ next/ one two three/ ...
3. THI: ((fetches a brick and puts it at the top of
 the wall))
4. TRA: **I've already told you we're not with Rolex/
 right**
5. PED > TRA: ((laughs)) **we're not with Rolex\ ..**
6. **I'll tell that to my mom next time she asks me
 to tidy up my room**
7. TRA > THI: OK but first you put it in the right position
 then you align the bricks
8. PED > ETI: ((moves away from THI's wall and gets closer to
 ETI)) **if my mom tells me/ .**
9. **is that what you call a tidy room/**
10. **I'll say oh but we're not with Rolex here/
 ((laughs))**
11. ETI: ((laughs))
12. PED: ((laughs)) **I've cut her off\.. I'll tell her
 that I swear**
13. ((goes back to THI's wall)) [#2] **ah I swear to
 you .. it's a good idea**
14. PED > THI: **you know THI if my mom tells me/ .**
15. **you think this is a tidy room/**
16. **I'll say oh well we're not with Rolex here are
 we/ ((laughs))**
17. THI: ((laughs and takes cement with his hands))
18. TRA > THI: use the TROWEL not your hands/



#1: TRA spreads cement with the trowel and shows THI how to work more quickly



#2: PED goes back to THI's wall and shares his joke with him

Various resources are used by the trainer in order to teach THI to work faster. These resources consist in a non-verbal demonstration (i.e. spreading cement quickly), in linguistic instructions (“go on put this block next one two three”, l. 2) and in prosodic cues (an increasingly fast prosodic tempo when counting “one two three”). Finally, they take the form of an analogical comment: “I’ve already told you we’re not with Rolex right” (l. 4). In saying so, the trainer is drawing a link between the building and the clock industry. He is stressing the idea that the nature of these two occupations differ substantially and that masons should not work like clockmakers.

THI, the addressed recipient, does not respond verbally to this comment. But PED does. At that particular moment, PED is having a small break and is paying a visit to his colleagues. He immediately echoes the trainer’s comment by laughing (“we’re

not with Rolex”, l. 5), and by transferring the expression in another possible context: “I’ll tell that to my mom next time she asks me to tidy up my room” (l. 6). The trainer does not respond to PED’s comment but keeps exclusively oriented towards THI (“OK but first you put it in the right position then you align the brick”, l. 7). This leads PED to move away from THI’s wall and to select another addressee, ETI, by telling him the joke he just imagined: “if my mom tells me is that what you call a tidy room I’ll say oh but we’re not with Rolex here” (l. 8–10). He finally comes back to THI and repeats the same joke again: “you know THI if my mom tells me you think this is a tidy room I’ll say oh well we’re not with Rolex here are we” (l. 14–16).

By moving from one place of the workshop to another and by transferring the trainer’s expression from one context to another, PED engages with the proposed analogy in a specific way. He takes it out of its original meaning context and recycles it into a joke addressed to his colleagues. He uses it for different purposes than the ones intended by the trainer, and supporting the construction of vocational knowledge.

Again, this specific way of engaging with analogies is closely related to processes of identity construction and the social conditions in which training takes place. A strong identity claim first underlies the trainer’s analogical expression itself. Reminding apprentices that they are not working for Rolex argues for the establishment of specific values associated with masonry and stresses clear-cut boundaries between occupational practices. Reciprocally, the type of responses provided by PED to these analogies appear as highly meaningful. By transposing the trainer’s expression in the family context of his mother complaining about his messy room at home, PED seems to develop a weak sense of alignment with the values transmitted by the trainer. He displays a social identity that appears to be closer to that of a teenager joking with parents or friends rather than a professional identity related to masonry. Consequently, recycled forms of analogies also give cues to the specific ways apprentices interpret vocational instruction and position themselves within the various social communities they belong to during their training program.

Analogical Discourse and Workplace Learning

The empirical approach proposed in this paper has shown that analogies were found in a variety of material settings in which apprentices engage in the Swiss apprenticeship system, namely vocational schools, private training centres and workplaces in training companies. As such, they appear as recurrent patterns of teaching and training practices. Our study has aimed to stress some of the formal and functional properties of analogies when they are enacted in discourse. On a formal level, various discursive constructions have been identified and illustrated, ranging from explicit comparisons to more implicit metaphorical reasoning, and taking the form of local comments to complex interactional sequences. On a functional level, both cognitive and social dimensions of learning have been seen as strongly related to the production of analogical discourse. From the perspective of knowledge transmission and acquisition, our analysis stresses the wide range of vocational competences targeted by analogies in vocational training interactions. These may consist in *conceptual knowledge* (e.g. Explaining abstract notions such as brittleness

or viscosity), *procedural knowledge* (e.g. Explaining how to apply or throw cement, how to position the feet when filing, etc.) or even *dispositional knowledge* (e.g. Explaining that builders do not work the same way than clockmakers). But as shown in the data, analogies also have strong social implications for teachers, trainers and apprentices. Their creation and dissemination appear as powerful mediations for doing humour and for accomplishing relational work amongst participants.

These findings may well extend beyond the specific context of initial vocational education. They also lead to theoretical and methodological implications for workplace learning and for the research field associated with it.

Recent research in adult education has been devoted to a better understanding of the conditions that enhance learning in workplace settings. In Billett's work for instance (Billett 2001, 2008, 2009), these conditions are seen as relational dualities linking both social and individual factors. More precisely, vocational learning arises not only from workplace *affordances* as they can be found in the conditions workers have access to specific activities or guidance. They also result from the ways individuals *engage* with these affordances, depending on their biographies, previous experiences and personal beliefs. Interestingly, analogical discourse seems to be deeply embedded in both of the sorts of components.

From the perspective of *affordances*, analogies can be seen as important resources provided by training and workplace environments in order to enhance learning. These resources take the form of instructions, explanations or advice provided by various kinds of experts, ranging from vocational teachers to professional trainers, including workmates. As seen in our data, these resources appear as indexical to the material environment in which they are produced and belong to broader cultural and historical realities. They make sense in specific cultural contexts and can be understood only if mutual knowledge of these conditions is shared amongst participants. Skiing, cheese fondue, watches and gold are certainly not universal conceptual references for trainers and apprentices. They function as appropriate resources and rich affordances for learning within specific communities in which these elements are part of ordinary experience. Consequently, learning associated with these analogies appears as strongly determined by the social context in which participants engage.

From the perspective of *personal engagement* in vocational learning, the empirical description of analogical discourse also leads to interesting reflections. As shown in this paper, analogies are not exclusively shaped by teachers or trainers and should not be seen as a one-directional information flow from expert to novice. They take the form of joint elaborations and are collectively negotiated by both teachers and apprentices. As pointed in the analysis, apprentices may engage with analogies in a variety of ways, ranging from explicit ratification to recurrent contestation. Apprentices can display willingness to make use of these resources, react critically to their introduction by teachers or even recycle them in distinct and sometimes quite distant contexts. What is at stake in these processes of negotiation goes far beyond cognitive dimensions of learning. It relates to how apprentices make sense of the resources provided to them by teachers and trainers, and how they position themselves with regard to teachers, colleagues and more general professional communities. From that standpoint, analogies seem to provide rich opportunities for learners to express agency, to react to power and to endorse or

contest specific identities in the various environments in which they engage during their apprenticeship.

Finally, from a methodological perspective, the kind of empirical and interactional approach developed here seems of particular interest to account for the complexities of analogical discourse in relation to workplace learning. By focusing not only on teachers' or trainers' instructional discourse but by opening up the scope of analysis to the dialogic and multimodal process shaping these instructions, such an approach can track fine-grained outcomes of these instructions not so much in learners' minds, but in their subsequent actions. This probably does not answer the question of whether learning really arises out of the use of these analogies. But it fosters the idea that analogies have the power to introduce observable changes in the ways learners engage with objects, knowledge and culture in vocational training.

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Transcription Conventions

CAP	accented segments
/	raising intonation
\	falling intonation
XX	uninterpretable segments
(hesitation)	uncertain sequence of transcription
:	lengthened syllable
.	pause lasting less than 1 s
..	pause lasting between 1 and 2 s
>	addressor-addressee relation (TRA > THI)
??	unidentifiable speaker
<u>Underlined</u>	overlapping talk
((comments))	comments regarding non verbal behaviour

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