Ski, cheese fondue and Swiss watches : the rhetoric of analogical discourse in vocational training interactions

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Abstract

This paper investigates the role of analogical discourse in vocational education. Drawing methodologically from metaphor theory (Lakoff and Johnson 1991), situated approaches to learning (Lave et Wenger 1991), and interactional and multimodal approaches to discourse analysis (Lee, 2004, Sacks, 1992, Gumperz 1999, Kress et al. 2001), this preliminary research examines 42 transcribed sequences drawn from ethnographic observations in various vocational education settings. It first establishes the pre-eminence of analogical reasoning in the VET-context, then establishes three functions played by analogical sequences in the training situations observed, namely referential, conceptual and interactional functions. The analysis shows that analogical processes are a property of situated learning as well as a resource to bridge across domains of experience.

Keywords: VET – analogy – metaphors – discourse analysis – situated learning

1. Introduction

This article seeks to investigate an issue empirically salient in vocational training situations: the pervasiveness of metaphorical reasoning and other forms of analogies. When trainers or teachers in the field of professional training present abstract notions, qualify technical gestures or point to properties of objects in a situation, they often call forth concepts and practices different from those that are directly salient in the situation. They talk about electricity in terms of fluids, compare a metal piecework pierced with holes to a bit of cheese, describe the gesture of coating a wall as akin to playing table-tennis, etc. For the purposes of this paper, we would like to refer to these processes of metaphorical reasoning as « analogies » or, more precisely, as forms of « analogical discourse ». Our aim is to contribute to the reflection on knowledge transformation in education by investigating the properties of this analogical discourse.

In the last two decades, there has been a large amount of research devoted to the role of analogical discourse in the field of education. The studies have developed in two important directions :

- A first kind of research focuses on the role of analogies in learning processes, notably its psychosocial functions. Research has 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 ; Vosinadou & Ortony, 1989 ; Pugh et al., 1997 ; Sander, 2002).
- A second kind of research focuses on analogies as resources for teachers. This research has shown how teachers often use analogies to make links between the content taught and the actual experiences of the students (Wortham, 1996), and more largely to build local mutual understanding and common ground (Nonnon, 1993).

This literature, however, has focused almost exclusively on classroom practices and on the interactions between teachers and pupils. Little research has been devoted to the study of analogies used outside of classroom interactions. To contribute to fill this gap, the aim of this paper is to focus on the use of analogies in situations of vocational education and training. It seeks to better understand the forms analogies can take in these situations. It finally also seek to investigate their effects on the overall organization of the activities in which learners and trainers are engaged.

To address these issues, our research takes a particular theoretical standpoint:

a) It first draws from the frame of « situated cognition » (Suchman, 1987) and « cognitive anthropology » (Lave & Wenger, 1991) the idea that vocational education and training practices are fundamentally both *situated* and *distributed*. We have thus not been much interested in the usefulness of analogies for acquiring new knowledge but have rather chosen to focus on the real-time activities in which analogical processes and metaphorical reasoning take place.

b) Secondly, our approach is also a *discursive* approach. Analogies are not for us just cognitive processes but also linguistic ones since they are expressed in and through language (Lee, 2004). We therefore rely on various discourse analyical frameorks, such as conversation analysis (Sacks, 1992), interactional sociolinguistics (Gumperz, 1999), multimodal semiotics (Kress et al. 2001) in our analysis to study them.

c) Finally, we adopt a broad view of analogies. For us an analogy is at the same time a cognitive, a discursive, a social and an interactional process. It concerns not only « knowledge transmission » but also the identities and the reciprocal positioning of individuals and their participations in professional communities of practice (Wenger, 1998).

2. Data and problem

The data discussed in this study is drawn from a larger research project examining the relations between time, knowledge and identity in vocational education[1]. In the Swiss educational system, youth who do an apprenticeship usually move back and forth across places and activities: from the formal educational setting of school to

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learning in the workplace (Gonon, 1999). In their trajectories of learning across these contrasted milieus and communities of practice, apprentices tune their tempo to different rhythms, learn to work and behave in a variety of manners with different professionals and display multiple situated identities. In these conditions, the research program proposes to view learning as a collective and distributed activity. Moreover, it focuses on how verbal and non-verbal interactions facilitate socialization into new work practices.

The data examined consists in audio-video recordings documenting activities accomplished by apprentices in various technical trades (automotive mechanics, electrical assemblers and automation specialists). The sequences recorded display interactions between apprentices and teachers in vocational schools, and interactions between apprentices and trainers or colleagues in various workplaces.

For this study, 42 “analogical sequences” were identified out of 50 hours of recordings. By the term “analogical sequence” we mean : a segment of verbal interaction in the course of which knowledge about the current situation is constructed by evoking another, distinct, conceptual domain. The relation established between these domains can be either a relation of similarity or of contrast. Among the 42 analogical sequences, we selected 23 that were systematically transcribed.

In the remainder of this article, we will analyze the analogical sequences from two vantage points. First, we will describe the referential and conceptual functions of the analogical sequences(§ 3). Next, we will examine the role played by analogies in the setting (§ 4).

3. The referential dimensions of analogical sequences

Contemporary literature on metaphors and analogies has largely contributed to developing the idea that analogies are not just phenomena of substitution of one idea by another. Under various and often disparate terminologies, numerous authors (Lakoff & Johnson, 1980; Balibar-Mrabati & Corenna, 2002) have proposed rather that metaphors contribute to the configuration of links between conceptual domains. They play an important role in shaping the expression of pre-established ideas and an even more crucial role in the conceptualizing of notional domains and of their inter-relations.

For the purposes of this paper, we borrow from Gentner the following definition of an analogy:

> « An analogy is 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. » (Gentner, 1989, p. 201).

According to this definition, analogies imply connections between three kinds of “ingredients”: a) a *“target”* referential domain, b) a *“base”* or *“source”* referential domain and c) a *“analogical link”* between the two domains.

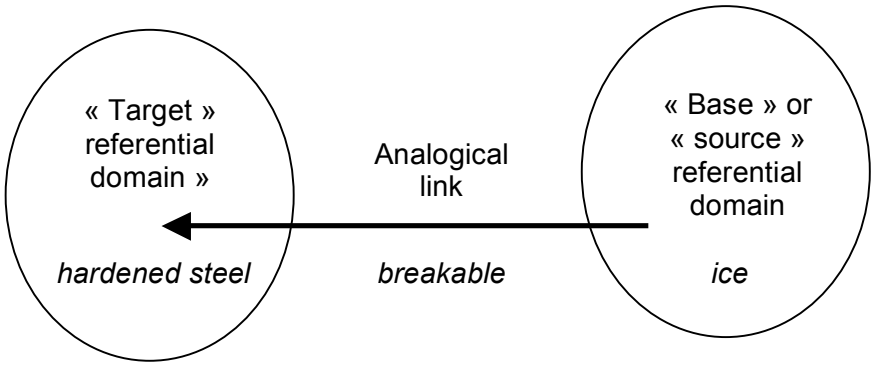

Figure 1 : The referential dimensions of analogy

One example can help illustrate these categories. In the following excerpt, a monitor (MON) in a vocational training center explains to future automaticians how to harden steel pieces by dipping them into oil:

- Excerpt 1: Sequence 7 (*breakable like ice*)

1. MON: on the other hand after that it will break very very easily/ .
2. because **it will break like ice** right
3. CAB: it's hard

In this example, the object of knowledge presented through the discourse of the monitor—the *hardened steel* –is the target referential domain. The *ice* is the source referential domain. It contributes to the configuration of the target referential domain. The link that the monitor establishes explicitly between the two domains is the *property of breaking* easily.

These three elements (source, target, link) capture constitutive elements of the referential functions of analogical discourse. In the next section, we will take in turn the study of the target, source, and the analogical linking. More specifically, we will begin by identifying the types of knowledge which constitute targets for analogical processes in the data (§ 3.1). We will next investigate which source referential domains participants are calling forth (§ 3.2.). And finally we will describe how analogical links between these domains operate discursively (§ 3.3.).

3.1. « Targets » of analogical processes

The domains targeted by analogical processes in our corpus concern various professions. Three categories recur regularly in our data: a) gestures and body postures, b) material objects or tools, and c) participants.

a) A first domain that is often the target of analogical processes concerns gestures and body postures specific to the work activity.

- Excerpt 2: Sequence 4 (*cheese fondue*)

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1. MON:    ((continues to coat cement))
2.         here like THIS .. a hole in the middle .
3.         for insulation . ((lays the trowel on the wall))
           here . two strokes
4.         ((makes the gesture with his hand))
5.         like this like cheese fondue
6. PED:    like fondue/
7. MON:    yes . in the shape of an eight
           ((draws the shape of the eight with his hand))
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Excerpt 2 was recorded during a practical workshop in masonry, geared at youth doing an apprenticeship in the field of electricity. The monitor (MON) explains and shows how to cement bricks to an apprentice (PED). During his explanation, he uses the analogy of stirring a cheese fondue (line 5), drawing the shape of the number eight (line 7) to show what gesture must be accomplished.

b) A second domain which analogical sequences often target are material objects and tools present in the situation, and that the apprentices are supposed to use. In excerpt 3, we find such an example. A teacher (MON) in the field of general mechanics evaluates the work done by an apprentice (TON) shaping an iron plate. The plate being full of holes after the apprentice has worked on it, the monitor refers to it as “real cheese”.

- Excerpt 3: Sequence 20 (*cheese*).

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1. MON:    ((looks at TON's iron plate))
2. TON:    yes I know/. but I'll fix rivets there/ ..
3.         no I know/ . I'll fix rivets here and here/ . XX/
4.         . no it's serious sir/
5. MON:    well yes it's serious that's for sure/
6.         because soon it'll be real cheese your box
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c) Finally, the interactants use analogical discourse to characterize each other. In that case, the participants themselves are often the target of the analogy. We find an example of this in excerpt 4, recorded in an auto-repair workshop:

- Excerpt 4: Sequence 16 (*the whale*)

1. DOS > RIE:I don't care ((laughs))
2. boom ((pretends to hit something)) .
3. X on the Internet
4. RIE: ((laughs))
5. DOS: ((laughs))
6. MON: ((arrives)) why are you laughing/ **. like a whale**
7. DOS: what do you mean sir I'm not a whale/

3.2. « Sources » of analogical processes

We have also examined the sources of analogical processes. In our data, it was observed that interactants tended to make references to source domains "external" or "distant" from the professional practices being taught or learned in the interaction. Most recurrent in our data were references to the conceptual domains of food items (participants talked about cheese, fondue, « roblochonnade[2] », or meat). They also made references to the domain of sport (ski, table tennis) and to other professional domains.

Interactants also wove links to the current situated activity or to jointly shared past experiences. This is the case in our next example, recorded in a large company. An auto mechanics (DOM), expert in tires explains to a novice (MIC) how to fix them by plastering heated patches of rubber on them.

[2] A type of melted cheese meal.

- Excerpt 5: Sequence 23 (*rubber patches*)

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

In this sequence, DOM explicitly refers to an activity the two participants accomplished jointly the day before, that is the use of a « cold » technique for patching tires (line 1) in order to teach how to fix a tire. He weaves an analogical link between the two situations: « It's the same texture this thing that's natural rubber ninety per cent of it ». In this case both the target – the « hot patching » – and the source – the « cold patching » – belong to the same referential domain.

More generally, the example shows that the knowledge which circulates through a moment of work is both built from extra-professional domains and also from shared professional experience. These common experiences are thus particularly useful resources for learning when they are brought in the situation through analogy.

3.3. Analogical linking between source and target

After having identified the main targets of analogies and some of the source domains analogies borrow from in the data, we would like to turn to describing in a more detailed way how connections are constructed between referential domains.

A first general comment that can be made is that the interactants in the data usually use explicit forms of linking, using comparative markers such as *it's like*, *it's like for example*, *it's a little bit the same as*, *it looks like*, etc. to signal the analogy process:

- so the gesture **it's like** table tennis (Seq. 11)
- **It's like for example** in an engine you put oil in the engine (Seq. 1)
- **It's a little bit like** if you cut meat with a knife (Seq. 2)

- It looks **like** melted cheese (Seq. 15)

In other cases, but less frequently, the analogy is constructed as a metaphorical link instead of an explicit comparison. No linguistic marker is used to connect the source and target domains:

- [about cement] you know this is flour that you know (Seq. 5)
- It will soon be real cheese your box (Seq. 11)
- [about sand] so then you go and get some semolina (Seq. 6)

Interactants also use gestures, postures and thus the material inscription of their body in space to facilitate the interpretation of the links woven between different domains of reference. This can be shown through examining the following excerpt, drawn from a course on general mechanics addressed to future electricians, during which a monitor tries to mend the position of an apprentice filing a metal workpiece.

- Excerpt 6: Sequence 8 (*ski*)

1.	MON:	you're too/ . you're too much like this
		((shows the position))
2.		you won't manage you're too stiff on your leg\
3.		((puts the weight on his leg)) . be more flexible
4.		((gestures with his hand))
5.	THI:	mmh but if I stand like this afterwards XX
6.	MON:	I am not telling you to swing forward/
7.		((makes a swinging motion forward))
8.		I am telling you to be . to put your knee at the
		same level as- look
9.		((shows him the position))
10.	THI:	like this ((shows his position)) now it is lined up
11.	MON:	**it's a bit like ski** ((maintains the position))
12.	THI:	yes
13.	MON:	you're going to tell me I don't ski I sledge […]

In this example, it appears that the target domain is a specific body posture. This body posture is both represented in discourse (line 1: "you're too/ . you're too much like this); line 2 "you're too stiff on your leg\") and made visually available to the apprentice through the mimicking of postures by the monitor (line 1, line 3) . Likewise, the reference to the source domain is also multimodal: it is both verbally communicated (through the verbal reference to ski, line 11) and bodily displayed (through the squat the monitor makes while giving his explanation, line 11). The bridging between different forms of knowledge is thus a global process, including

both verbal and non-verbal dimensions. More generally, this interaction reminds us that the study of discourse should not be reduced to the study of linguistic units, but should take into account the multiple resources for meaning available in collective activities as multimodal approaches to discourse have proposed (see Goodwin, 2000; LeVine and Scollon, 2004).

4. The interactional dimension of analogical sequences

From the examples shown up to now, we could get the impression that analogies in our data are always local, situated phenomena that would play a role exclusively at a conceptual level. What we would like to illustrate now is quite the opposite. Namely, in situation of vocational training analogies are better understood as a dynamic and collective construction, developed collectively in the sequential organization of dialogues (Lee, 2004), rather than being inscribed in isolated utterances. In particular, we would like to look at the role played by apprentices in the development of analogical sequences, and more specifically how they evaluate monitors' explanations. We will consider again an example from a hands-on course in mechanics addressed to future electricians. At the beginning of the sequence, the apprentices are learning to tap a metal workpiece for the first time and the monitor (MON) requests that they use special lubricating oil for the process.

- Excerpt 7: Sequence 1 (*motor oil*)

1.	FLO:	sir/ . why don't we use that for drilling/ ((looks at the oil can))
2.	MON:	because this one is made . especially for that\
3.	FLO:	but what's the difference/
4.	MON:	well it's not the same/
5.	FLO:	the density is not the same/
6.	MON:	**it's like for example in an engine we put motor oil then in a gear-box we put gear-box oil**
7.	??:	oh really/
8.	MON:	**it doesn't have the same texture/**
9.	MAT:	**it's: the viscosity that changes**
10.	MON:	yes that's it\
11.	FLO:	it's magic/
12.	MON:	the color changes too/
13.	FLO:	((laughs)) but that the engine can't see it can it/ oh blue petrol today it's funny

In line 1, Florian (FLO) asks MON what's the difference between the oil used for drilling and the oil used for tapping. In asking this question, he makes a link between

the current activity (the tapping) and an activity which he accomplished in the recent past (the drilling). A local analogy thus begins to be woven between two close domains of reference.

In line 2, MON offers 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 »). MON then elaborates a bit on his explanation (« well it's not the same »), and uses analogical discourse to build an explicit link between the tapping and the domain of auto 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 auto mechanics (motor oil vs. oil for the gear-box). He explains this relation by discussing a general property of oil: « they don't have the same texture » (line 8).

Another interesting point to note is that in the sequence, the explanation is not restricted to an interaction between the monitor and the apprentice, 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 texture that changes across oils. Both MON and FLO ratify this nature of oil by saying (« yes, that's it », and « it's magic »). On line 12, MON attempts to further refine the criteria for distinguishing different oils. He underlines that they have different colors (« the color changes too), but FLO reacts by making fun of the proposition (line 13 « but that the engine can't see it can it »).

This example thus shows analogy to be a truly dynamic process. First, it is progressively elaborated and sequentially organized. *Texture*, *viscosity* and *color* are progressively presented as variables defining the material dimension of oil. Secondly, we also see that the analogical sequence is initiated by MON but collectively elaborated. FLO uses analogy as an attempt to bridge links between his knowledge of drilling and that of tapping. MAT also contributes to the elaboration of the analogy by enriching the explanations given by the monitor.

Finally, the example illustrates that the monitors are not the only ones to construct analogies. Analogies are also evaluated and appropriated by the apprentices, either positively or negatively. In this example, FLO makes fun of the analogy proposed by MON. Analogy thus participates in transforming knowledge. It is also linked with ritual and relational dimensions of interactions. They can be a resource for the apprentices to position themselves vis-à-vis their trainers and the communities of practice they represent.

A last example drawn from a masonry workshop make this point even clearer. At the beginning of excerpt 8, the monitor explains to THI that he must go faster and waste less time with the details. To convey this idea, he constructs an analogy with the work of a watchmaker, saying « I've already told you, we're not with Rolex, right ».

- Excerpt 8: Sequence 9 (*it's not Rolex*)

1. MON: that's not like that/ ((spreads cement with the trowel))
2. hop put this block/ next/ one two three/ ...
3. THI: ((fetches a brick))
4. MON: **I've already told you we're not with Rolex/ right**\
5. PED>MON : ((laughs)) **we're not with Rolex**\ ..

6. **I'll tell that to my mom next time she asks me to tidy my room**\
7. MON>THI : ok but first you put it in the right position then you align XX
8. PED>ETI: ((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)) she won't get over it\.. I'll tell her that I swear\
13. ((goes back to THI's wall)) 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. MON>THI: the trowel/

In this example, PED, taking a small pause from work, appropriates the analogy constructed by MON (line 5: « we're not with Rolex ») and transfers it to another domain of practice, the tidying of one's bedroom (line 6: « I'll tell that to my mom next time she asks me to tidy my room »). But MON does not ratify what he says, and continues giving his explanations to THI (line 7: « Ok but first you put it in the right way then you align »). PED moves on to select another addressee, ETI, by telling him « if my mom tells me/ . is that what you call a tidy room, I'll say oh but we're not with Rolex here » (lines 8-10). At this point he gets closer to THI and repeats once more the anecdote to him (lines 14-16).

This example illustrates the power of analogies in the training situations in which it is used. On the referential level, it allows to make relations between distinct spheres of activity. These relations are either contrasting relations, or relations of similarity. The work of masons becomes linked with the work of watchmakers and with the cleaning activity of a teenager. On the interactional level, the analogy also migrates from one point in space to another and circulates among the participants in the perceptual space of action. MON initiates the analogy, which is then relayed and elaborated on by PED, and finally ratified by ETI then THI. This migration confirms that analogical processes are largely distributed processes, playing moreover an important role in terms of the relations entertained by the apprentices among themselves and with the trainer.

5. Concluding remarks and discussion

This preliminary research on analogical sequences in the field of initial vocational training aimed to address both empirical and theoretical issues. To conclude the article, we would like to come back to considerations regarding these two levels of analysis.

Empirically, the analysis has allowed us to identify first that analogies are very frequently used in situations of vocational training, and that this seems to be the case both in school settings and in work situations. The study has moreover allowed us to show the diversity of forms analogical reasoning can take, from explicit comparison to metaphorical reasoning, and from punctual comparisons to whole sequences collaboratively developed. In the cases analyzed, what we sought to highlight is the collective dynamics in which analogical processes are caught.

These observations also have implications on the theoretical level. With regards to the research already developed in the field of education, it shows that analogies cannot be reduced and considered only as cognitive processes through which knowledge gets transformed. More largely, in the situated and contextual approach that we have put forward, analogies are also creative forms of participations in situated activities. Moreover, the study of analogies gives us important information about processes of knowledge transfer from one situation to the next. Our study indeed has shown that professional learning is always indexed to real-time activities, but that it also entails the ability to make links to other situations, and to weave links with other forms of experiences, either from the workplace or elsewhere. Thus, we can say that analogical processes are both a property of situated learning and a crucial resource to go beyond the limits of locally experienced situations. To learn through analogy is in fact at the same time « learning *in* a specific situation » and « learning *from* other situations ».

Transcription notations

CAP	accented segments
/	raising intonation
\	falling intonation
XX	uninterpretable segments
(hesitation)	uncertain sequence of transcription
:	lengthened syllable
. .. ...	appropriately timed pauses
>	interactional address (MON > THI)
??	unidentifiable speaker
Underlined	overlapping talk
((comments))	comments regarding non verbal behaviour

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