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*Complex transitions between different  
learning contexts: a case study  
from a French vocational school*

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*Transiciones complejas entre diferentes contextos  
de aprendizaje: un estudio de caso  
de un centro de formación profesional francés*

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## **Abstract**

In France, secondary initial vocational courses are characterised by learning contexts that can vary greatly from one to another, both in terms of content and with regard to space configurations and transmission methods. In this paper, we look at the continuities and discontinuities caused by switching, daily or weekly, between three different teaching contexts (french lesson, technical theoretical lesson, practical session in a school workshop), in a secondary training course in the field of car repairing. We used sociological (classification, frame) and didactical (learning milieu) concepts to analyse and compare both the specificities of knowledge and the configuration each teaching situation in terms of space, material and symbolic components. Our results show more or less subtle and implicit continuities and discontinuities for students to shift from one context to another. The problem is that they generally receive very little help to identify these ruptures and continuities, due to a lack of pedagogical collaboration between the teachers of different disciplines.

*Key Words:* vocational education; learning environment; transitions

## **Resumen**

En Francia, los cursos de formación profesional inicial se caracterizan por contextos que pueden variar considerablemente de uno a otro, tanto en términos de contenido, de configuración de los espacios y en los métodos de transmisión de aprendizaje. En este artículo, nos centramos en las continuidades y discontinuidades producto de estas transiciones, que ocurren diaria o semanalmente, entre tres contextos de enseñanza diferentes (clase de francés, clase de teórica técnica, y clases prácticas en taller), en un curso de formación profesional en el ámbito de mantenimiento y reparación de vehículos. Para ello, movilizamos conceptos sociológicos (clasificación, marco) así como conceptos didácticos (campo de aprendizaje) para analizar tanto las características específicas de los conocimientos y la configuración de la situación de la enseñanza en términos de espacio como los materiales y componentes simbólicos. Nuestros resultados muestran las sutiles e implícitas continuidades y discontinuidades de los estudiantes para pasar de un contexto a otro. El problema es que generalmente reciben muy poca ayuda para identificar estas rupturas y continuidades, debido a la falta de colaboración pedagógica entre los profesores de las diferentes disciplinas.

*Palabras clave:* formación profesional; contextos de aprendizaje; transiciones

## 1. Introduction

In France, secondary initial vocational courses (e.g. ‘*Certificat d’Aptitude Professionnelle*’, ‘*Baccalaureat Professionnel*’) are characterised by learning situations that can vary greatly from the context to another, both in terms of content (general, technical and practical knowledge) and with regard to spaces and transmission methods (traditional lesson in a classroom, practical activities in a technical unit or a school workshop, work-place learning during a placement). This pedagogical organisation of training courses, which can be described as differentiated or segmented, inevitably creates a certain number of problems for students. Indeed, they have to move often from one context to another for very short periods of time. This requires the ability to adapt to a variety of educational methods, linguistic norms and forms of socialisation. In the longer term, this also requires the ability to transfer and integrate knowledge and experiences from these different contexts to build the complex skills expected at the end of the training. In this part of the education system where young people from underprivileged environments are overrepresented (Palheta, 2012), students receive very little help enabling them to do this two-fold task: 1) adapting to different educational methods; 2) integrating different forms of knowledge, even though several studies underline that this is a major difficulty, for the students having previously struggled the most at primary and then lower secondary school (BONNÉRY, 2007; ERAUT, 2004; JELLAB, 2008; SENSTRÖM & TYNJÄLÄ, 2009; AUTHOR, 2012; 2015).

In this paper, we look at the continuities and discontinuities caused by switching, daily or weekly, between three different teaching contexts, all included in the same secondary training course: a CAP (*Certificat d’Aptitude Professionnelle*), in the field of car repairing. This course is the most elementary qualification degree in the French vocational training system. Students who choose this training track have generally experienced important scholar difficulties at primary and lower secondary levels. In the first part of this paper, we present a theoretical approach enabling to conduct this type of study, before describing the methodology put in place (part 2). Then, we present some of the analyses conducted (parts 3 and 4). In the last part (synthesis and conclusion), we highlight the main continuities and discontinuities faced by students when they switch from one learning context to another and We outline some pedagogical directions to assist students during these transitions.

## 2. Theoretical approach

The current educational organisation of vocational training of workers and white-collar staff in France is the result of historical developments, which cannot be presented in this article in a detailed manner (LEMBRÉ, 2016; PELPEL & TROGER, 1993). Historians have accurately described the initiatives, debates and decisions that have led to courses followed mainly in State Vocational schools. But for more than 20 years, this school-based model was criticised due to its incapacity to prepare operationally and professionalise youngsters to the workplace. This led to introduce more work-based learning periods in the curricula, either as more frequent and longer internship phases, or by developing apprenticeship-training programs, which was quite neglected during a long time. On parallel, within the school-part of the curricula, new types of teaching situations were introduced in addition to general (French, History, Maths, Sciences) and

theoretical courses. The common idea of all of them is to be based on a competency approach, and to propose to students learning situations that are closer to workplace settings: serious educational games, simulation software, projects undertaken in small groups resulting in a deliverable (service or product for a customer). The result of this is a more varied curriculum than in the past, which introduces them to a wider range of learning situations and teachers with different profiles.

The *classification* concept of the sociologist B. Bernstein (1996) is of great interest to understand the differentiation of knowledge in vocational courses organised in different entities, with objects and epistemologies as well as methods and pedagogical learning practices which are specific to them. These entities, which I suggest describing as *learning contexts*, can generally be identified in the training programmes or frameworks, in the form of teaching disciplines or modules. A *strong classification* means that knowledge belonging to a teaching discipline or module has a strong identity and that it is transmitted without any (or with little) reference to those taught in other contexts. Boundaries between these learning contexts are consequently very clearly marked and relatively watertight. Conversely, a weak classification between learning contexts indicates that knowledge transmitted in each one has common links and characteristics (e.g. the knowledge taught in context A will serve as conceptual tools for activity and learning in context B for instance).

Each of these contexts can also develop situations and pedagogical practices which may be either in rupture, or more in continuity with those applied in other training situations. In particular an important feature of pedagogical methods used is their degree of *framing* according to Bernstein, i.e. the strength of the control exercised by the trainer on the knowledge transmission process (deciding on the order and timing of the introduction of knowledge, choosing supports, choice and degree of guiding tasks, cognitive operations to be undertaken, etc.) A *strong framing* is translated by a high degree of control from the teacher concerning these different educational aspects. Students will be highly oriented and guided with regard to the practical activities and the reasoning that they have to undertake. Conversely, a *weak framing* will give far more freedom and latitude to the students to manage pedagogical activities and develop their reasoning. In this case, they will have to draw far more upon their own cognitive and social resources.

The organisation of the learning environments can also vary considerably. This is firstly true in terms of arranging the space and material objects. A student, within the context of the same vocational training course, may experience very different types of space, from traditional classroom, with just a board, some tables and chairs, to complex school workshop, very well-equipped in terms of various technical objects which can be more or less similar to those found in current work situations (DE SAINT-GEORGES, 2008; PELPEL & TROGER, 1993). This organisation of the space and the objects in each context represents a feature of the *learning milieu* (BROUSSEAU, 1986; SENSEVY, 2007) put in place to enable certain types of practical and conceptual activities and to develop learning effects. But this *milieu* also contains symbolic and semiotic dimensions such as instruction sheets, resource documents, as well as oral and gestural interventions from the trainer and other students, etc. These different material and symbolic elements, events and actors who are present in the surrounding environment of students represents a system of constraints and affordances (possibilities of actions) for their activity and learning. Depending on their previous learning experiences and actual motivations, students are more or less able to perceive or understand these affordances (and

constrains), make some individual or collective activities and finally develop the learning dimensions expected by the teachers (BILLETT, 2006; DE SAINT-GEORGES, 2008).

This set of concepts (*classification, framing, learning milieu*) will enable us to characterise the students' different learning contexts and then to make some inferences concerning the nature of complex *transitions* (Beach, 1999) that they must ideally do when they move from one context to another in order to correctly adapt themselves to the requirements of each one. These transitions require more or less strong ruptures (e.g. moving from a traditional classroom when you are seated and you have to carefully listen to a teacher, to a workshop where you must do practical activities with another student without waiting for the trainer's explanations), as well as sometimes identifying continuities (e.g. understanding that a certain type of knowledge taught in a previous lesson can be used as a pre-requisite for the present learning context). These ruptures and continuities are not only cognitive, but also social or related to identity dimensions and even affective aspects. The empirical study that we present here should enable us to shed light some of them.

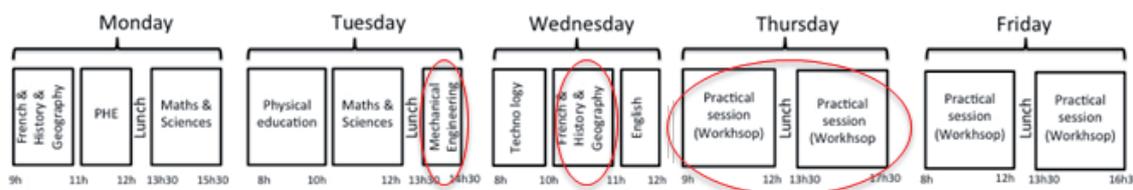
### 3. Methodology

Table 1 below shows the weekly amount of time (over 30 weeks) for the different subjects taught in the CAP in Motor Vehicle Maintenance, Private Cars (MVM-PC) option where we conducted our study.

**Table 1.** Weekly volume of the different teaching CAP subjects.

Practical sessions (workshop)	Technology	Mechanical Engineering	Maths & sciences	French & History & Geography	English	Artistic education	Physical education	Prevention & Health & Environment (PHE)
7h + 7h	2h	1h	2h+1h30	1h30+2h	2h	1h	2h	1h

Our initial goal was to observe and analyse a whole week of lessons forming part of the same training course, but this proved impossible, in particular due to the reluctance of many teachers to be observed during their class. Finally, after a negotiation period with some of them, we were able to observe three different teachers during the course of the week. Each lesson was video-recorded: a French lesson (1 hour), a Mechanical Engineering (1 hour) lesson and a full day's practical session in a workshop (see fig. 1).



**Figure 1.** Video-recorded Lessons (surrounding in red).

We conducted a two-step analysis concerning these different lessons.

1. First, we did an analysis of the characteristics of the knowledge to be taught and the approach used by each teacher to transmit this knowledge. We did this analysis using different sources: institutional reference texts (teaching programmes or activity and competency framework), setting out the content to be taught, pedagogical methods to be implemented and recommending materials to be used; pedagogical documents prepared by the teachers in charge of the lessons studied; interviews with these teachers; observations *in situ* (written observation notes and/or video recordings). These different data enabled us to undertake a first analysis of the features of the three lessons, as each teacher prepared them, and to identify a set of institutional, social and technical constraints structuring quite strongly the implementation of the different learning contexts.
2. Second, we developed an analysis of each teaching/learning process, especially based on video-recorded observations (and enriched by additional written observation notes). In the classrooms (French and Mechanical Engineering lessons), we used two cameras, placed in such a manner as to film what was happening in front of the board and in the rest of the room (see figures 2 and 3). In the workshop, we followed two pairs of students, each working on a specific task (replacing the shock absorbers and wheels on a car for the first pair; changing a timing belt for the second) and whose workstations were positioned next to each other. In this situation, we used three cameras: one mounted on a tripod, offering a panoramic view of the two workstations, and the other two, hand-held cameras on each of the two pairs (see figure 4). Consequently, when one of the two students from a pair left the workstation, for example to go and get a tool from an adjoining room, we could follow him without losing sight of what the second one, filmed by the mounted camera, was doing. From these video-recordings, we built synoptic tables enabling us to see how of each session was evolving from the point of view of different dimensions (Table 2).

Time and location	Description of main actions and interactions	Learning milieu components	Frame by the teacher
0:00:00 <i>(1 min. and 54 secs.)</i> Technical Room	<b>First instructions</b> Teacher (T) gives some instructions to all the students: - avoid the area where the cameras are for those who don't want to be filmed, - changing a pair; - feedback on the warnings issued during the <i>conseil de classe</i> (Term Evaluation Board).  T asks the students to take the cars out. He will give detailed instructions afterwards.  Students go outside taking the car keys.	- Teacher's instructions  - Other students	Strong  (Students have to listen carefully to the teacher's instructions)
0:01:54 <i>(12 mins. and 8 seconds)</i> Outside workshop	<b>Taking vehicles outside</b> Researchers put micros on the pairs, start the panoramic camera in the workshop and... action! Students take the vehicles out by pushing them. Discussions between them  T observes that the cars are taken out correctly. Pair 2 (pushing) and M (at the wheel) take the Polo outside. T talks with students from other pairs in local T13	- cars, with the engine stopped  - Other students	Strong  (Students have to respect strict rules to move cars outside)
0:14:02 <i>(2 mins. and 27 seconds)</i> Technical Room	<b>Allocation of the Practical Work and instructions</b> All the students stood around the teacher.  T hands out the Practical Work while referring to the table pinned up on the wall (allocation of Practical Work during the year) and hands out the Practical Work sheet to the pairs one by one. Pairs take their sheets + tools and go out one after the other. Ta and Ma receive their Practical Work second to last. T explains that the Car Repair Manual they will use is the one for the Peugeot 106 model because the one for the Citroen AX model has been mislaid. The two cars have the same mechanical characteristics. T and M go outside.	- Table with the allocation of the Practical Works  - Teacher's instructions  - Practical Work sheet  - Car Repair Manual  - Other students	Strong  (Students have to listen quietly teacher's instructions)

**Table 2.** Excerpt of a synopsis (first minutes of the practical session).

The first column indicates the location where the scene took place and also provides indications of time. The second describes the students' actions and interactions with their technical and human environment during different phases. In the third column, we tried to identify the different components of the learning milieu for each phase, while in the fourth, we have attempted to specify the degree of framing (high, medium, low) exercised by the teacher on the students' actions. When we found more interesting moments (e.g. during conversations between the students and the teacher), we transcribed them more precisely.

In the following parts, we present some of the results of the analyses done.

### **3. Different types of knowledge and their degree of classification**

A first point of differentiation between the three lessons concerns the reference of the different types of knowledge to be taught and their degree of classification.

For the French lesson, there is a pedagogical programme defining the aims and the teaching content over the two years of the course. Its objectives are situated explicitly in the continuity of the common knowledge base to be acquired at lower secondary school. The four major teaching themes are the followings: personal development; becoming part of a group; entering the world of work; finding one's place in society. The third issue explicitly refers to professional needs in terms of written and oral expression. Examples provided are as the following ones: "being able to explain a technical process; attending a meeting and be able to express one's ideas; [...] writing a CV; linking up and comparing different written supports (text, tables, diagrams)". However, the concrete supports to be used during the lessons, which are recommended later on in the programme, are mainly artistic or scholarly works: such as films, encyclopaedias and dictionaries, written works of fiction, etc. The programme clearly recommends using "company documents", but this recommendation is only one line long and provides no further details. How can we understand this gap between a clearly-stated didactic objective (develop vocational linguistic skills) and the very few vocational written documents which are recommended to be used during the lessons?

The first reason must undoubtedly be related to the difficulty to be more precise because of the common nature of the French programme in all the CAP specialities. This means that students who follow a CAP course in the personal services field and those who are learning about car mechanics follow the same teaching programme. Choosing a technical written document that is specific to a given trade, or an oral situation that is typical to a job, is referred to each teacher responsibility in his or her establishment. Another reason probably lies with the persistent historic tension in France, with regard to role of general teaching in vocational training, a tension which can be summarised in the following manner: should general teaching be at the service of vocational needs or should the aim be to acquire a non-utilitarian general culture for all type of students (PELPEL and TROGER, 1993)? Some researches show that for some years now, the balance of power seems to lean mainly in favour of studying artistic and general works (books, films, etc.), at the expense of written and literary skills used in vocational spheres (BELHADJIN & LOPEZ, 2010). This question of the aims of the French Teaching in vocational secondary schools remains a subject of debate amongst teachers of this discipline. However, we can note a tendency on the part of the youngest generations to see themselves more as French literature teachers, rather than trainers to written and spoken linguistic skills. The transformation of the training of these teachers of French (as a first language), which has become much more aligned with the teachers from the general courses, is undoubtedly a major reason of this tendency (LOPEZ, 2010).

The interview with the teacher who prepared the session shows that she follows this orientation. She is still a young teacher (under 40). She said that she gives priority to working with items such as the news, cartoons, short films or film excerpts. Priority is

given to short and, if possible visual works, due to the difficulties experienced by students to concentrate for a long time and “access” the reading and writing activities. In the case of the filmed session, she uses a short film and the transcription of the dialogues to tackle the notion of black comedy. She explained us that she generally does not use, or uses very little, vocational written texts or situations involving oral communication of a vocational nature.

A body of evidence converge to the idea that this teaching takes place in a relatively independent manner, without a great deal of interaction with others (the vocational subjects in particular). A strong classification can therefore be attributed to it according to the concept developed by Bernstein. This closed nature of the discipline with regard to the other types of knowledge taught is undoubtedly reinforced by the way the teacher of French works. Most of the time she prepares her lessons alone without collaborating with her colleagues, be they French or workshop teachers. More generally, this type of collaborative work seems to exist very little in the establishment for different reasons:

- The choice of many French/History teachers to prepare their lessons alone and their reluctance to allow other colleagues observe their lessons. This reluctance is without doubt reinforced by their own training background that did not prepare them very much to work in collaboration with other teachers and a relative lack of recognition on the part of the establishment with regard to collaborative work between teachers.
- A shared reluctance (or fear) on the part of many teachers to go to the technical workshops in order to talk with their colleagues who teach vocational subjects (and vice versa). This was not however always the case of this teacher who told us that she go sometimes to see some of her workshop colleagues (which we were able to see for ourselves through “in the field” observations) and would like to be involved with them in more common projects. But she said she lack of time to make regular visits. However, many other teachers of general subjects do not share her interest and intellectual curiosity and very rarely go into the workshops.
- The layout of the establishment, which polarises the teaching locations depending on the subjects. The rooms for teaching general subjects such as French-History/Geography, English, Arts etc., are situated in a building located at some distance from where the vocational teaching takes place. In comparison, the science classrooms are much nearer. It is therefore highly unlikely for French-History/Geography teachers to see their colleagues who teach vocational subjects, unless they go out of their way to go into the workshops (and vice versa).
- The restrictions imposed by the timetables leave very limited opportunities to find timeslots when teachers are free to work together.

For the Mechanical Engineering workshop sessions, the situation is somewhat different. For these two teaching situations, to which we can also add the technology sessions, conducted by the workshop teachers, there is no set programme. The teachers must build their lessons based on the activity and competency frameworks, which are common to all of them. The first describes the typical activities and tasks of the trade

(“1. Booking in the vehicle; 1.1 greeting the customer and/or the driver, listening to their requirements; 1.2 taking in vehicle after assigning by the Workshop Manager”, etc.), as well as the task exercise conditions (technical equipment and resources required) and the expected results. The second specifies the skills and competencies required to be able to do the tasks and activities, and indicates the underlying knowledge required for each skill. The discussions we had with the teachers of these two subjects show that there is significant collaborative work, if not each year, but whenever the competency framework changes, in order to decide which teaching approach will be used to transfer such or such knowledge or train such or such skill.

“- ENS: “So we already have a sort of teaching progression, that we have defined during some meetings with of all the teachers in car under the authority of our inspector [...] Therefore, the teachers of the same speciality [both theoretical and practical teachers] meet together with the inspector and define a pedagogical progression [...] For example, the workshop teachers on the car mechanics, both those who teach in CAP or BAC courses, meet together and look at how best to plan the progression [...]

- CHE: When does this take place?

- ENS: In general, in May/June for the following year. But after, there are several more meetings during the year, because we work like that whenever there are things to be put in place.”

This method of coordinating all the vocational teachings, also driven by the inspector, is not restricted to building a uniform progression. It is also used in terms of sharing certain equipment, which is tackled from a theoretical viewpoint in Mechanical Engineering (also called mechanical construction) and from a more practical angle in workshop sessions.

“- ENS: “The teachers in theoretical car mechanics try to do technical studies using workshop items. [...] They come to see us to ask if we have a component or whether we have something that would enable them to undertake a theoretical study with the students during their lesson. For instance, we made some technical models. So when they want to tackle a new subject, we lend them the model to allow them to look at it and, above all, they are given the documentation which goes with it and enables them to make a substantial training aid. If need be, they go to the workshop in order to dismantle the model with us, see how things are going, and we can explain them some aspects if necessary. This is a form of cooperation.”

The Mechanical Engineering session that we filmed is a good example of this practice of sharing technical objects used in the workshop. The goal of this lesson is to study the different types of mechanical connections (translation, rotation, fixed) between mechanical parts. In order to do this, the teacher took a door contact, a relatively simple small part that is used to turn the interior light on or set the car alarm off if the door is opened. The students had already seen this part in several types of vehicles during some previous workshop sessions. They see it again during this lesson in a more theoretical angle.

During our observations, we were able to see that the Mechanical Engineering teachers often go into the workshops to talk to the teachers in charge of these practical sessions. This is fairly easy for them as the Mechanical Engineering classrooms are situated opposite the workshops. Discussions between the teachers of these subjects are also

made easier by the way the workshop sessions are organised. Students work in pairs at different workstations and have to work on the vehicles. They do it in relative autonomy, which gives some free time to the teacher who is in charge of these sessions. He can consequently use this time to talk with colleagues about other subjects that sometimes crop up in the workshop. During the time when we were observing, we were able to see that a large amount of information (about students, their difficulties, their behaviour and whether a session is running as planned or, on the contrary, is delayed, etc.) circulated during these informal conversations ensuring an important coordination role. All these factors contribute towards significantly weakening the knowledge *classification* between these two learning contexts, and therefore, on the face of it, create continuities in terms of the knowledge transmitted.

## 4. Learning Milieu

We are now going to look at the educational environments lesson by lesson that we have characterised in term of learning milieu. Figures 2, 3 and 4 below contain information about the way space and the objects (technical equipment, written documents) are organised for each type of teaching.

French (fig. 2) and Mechanical Engineering (fig. 3) lessons take place in very similar spaces. In both cases this is a classroom equipped with a board and a video projector connected to a laptop, with small groups of students (10, but with 2 missing in Mechanical Engineering), sat individually at separate tables. The only notable difference is the use of a white board in French and an overhead projector for transparencies in Mechanical Engineering. The temporal and social organisation is also relatively similar, with a session limited to one hour most of which is spent with the whole class, interspersed with short periods when the students do individual written work on paper.

From a didactical viewpoint, the *learning milieu* of the French lesson is set aside for studying the language, and more specifically a particular literary genre: black comedy. Starting the lesson with a short film aims at understanding of a story using two different media: image and text.

“- Ens: it’s a way of looking at the message from two angles. Our students are not good at reading and they often do not understand the story. It’s a good thing for them to hear several reading and re-reading proposals. By starting with the short film they begin by pictures and oral languages and then, with the scenario, we tackle written work.”

Space organisation		Objects within the milieu
<ul style="list-style-type: none"> <li>- Classroom with 26 places. Separated tables, arranged in four rows, one behind the other in a circle. Two chairs per table.</li> <li>- 10 students, one per table</li> <li>- ‘Véléda’ board (2) with the video-projection (1) on the right-hand side of it</li> <li>- Teacher’s office on a dais with a laptop connected to the video projector (3)</li> <li>- Cupboard with the students’ folders to the right of the dais</li> </ul>		<ul style="list-style-type: none"> <li>- Short film (video projected)</li> <li>- Transcription of the dialogues in the film (sheet and video projected)</li> <li>- Map (video projected)</li> <li>- Question sheet built around three parts: understanding the story; what is amusing; black comedy.</li> <li>- Annotations on the video projected transcription and sentences written on the board</li> </ul>

**Figure 2.** Description of the teaching environment for French lessons.

The film plays a didactical role in helping with reading comprehension (and perhaps also in enhancing their motivation), but it is not the main working medium, which remains the written work. The piece of paper handed out to the students contains, in addition to the transcription of the dialogues on the front, three parts on the back: - understanding the story, a series of very precise questions about the film; - what is funny, questions aiming at characterising the type of humour from different points of view (language register, the offbeat comedy of the situation, etc.); - and, lastly, black comedy, an open question relating to defining this notion. It can also be added that the video projector, apart from showing the film, makes it possible to project additional comprehension elements, often of a visual nature (e.g. the map to locate Brest, French city mentioned in the story), as well as the transcription, on which the teacher has just added annotations with a felt pen. The part of the board on the side is used to write down the words or expressions spotted in this transcription, which must then be copied by the students on their piece of paper.

Furthermore, this session is based on an important dialogue important between the teacher and the students. For instance, they are orally requested to give a definition of black comedy (writing the suggestions on the board that are then followed up in order to build a common definition), or for the whole class to work together to create a short text representing a continuation of the story. The written work can also be individual (working in silence on a document), also with the possibility of another exercise which consists of reusing and projecting written work produced during a previous session, in order for the whole group to spot spelling and/or syntax mistakes. During the lesson, two students are asked by the teacher to correct the text on her laptop. The didactical progress of the session is therefore strongly based on the involvement and contributions of the students who are given an important role in the production of knowledge. Supervising the exercise is not simple for the teacher who has to regularly steer the common activity back towards the fixed didactic objective, in order to avoid all the digressions, which his students are very keen on. Consequently, it was possible to observe switches between *weakly framed* periods, giving the students a large amount of leeway in terms of initiatives and interventions and other periods that were *strongly framed*, when it is necessary to exert traditional school discipline in order to bring the students under control.

The learning milieu of the Mechanical Engineering lesson is arranged in such a way to study a technical object from different viewing angles, in order to identify the different components and characterise the mechanical connections between them. One particular important difficulty for the students, underlined by many teachers, is establishing a link between an object and its symbolic representations in accordance with the strict standards of industrial design. From this point of view, the arrival of CAD software (Computer-Aided Design), combined with the introduction of video projectors in the classrooms, provides an important training assistance, insofar as these tools make it possible to very quickly show different representations of a technical object, complete or partial, static or dynamic. Unlike the French lesson, the visual and graphic dimensions are just as important in this context, indeed much more so than the written aspect. The first part of the work consists of observing the object, identifying its different parts, and colouring the surfaces, which are in contact from a technical drawing of this object. This is followed by a written work to conceptually characterise the mechanical links (rotation, translation, fixed) observed. In itself this written work is minimal: it is limited to writing the binary values in the tables and naming the type of connection in a document that the teacher has almost completed. The teacher justifies this minimal written part of the students' work

by the fact that “it’s pointless asking the students to do the layout given that on the day of the exam, it will be done for them.” Lastly, it should be underlined that the colouring, the values and the names of the mechanical links are shown on the transparency displayed by the overhead projector, with this method institutionalising the answers in a format which is exactly the same as the format on the document given to the students.

### Organising the space

- Classroom with 24 chairs. Separate tables, placed one in front of another in a line. One chair at each small table.
- Eight students
- Transparencies are projected on the right-hand side by the OHP (2)
- Object is projected in CAD by the video projector onto the Velléda board in the middle (1)
- Teacher’s office on the left, with computer connected to the overhead projector on the left, with a laptop connected to the video projector (3)



### Objects in the environment

- Door contact (in the teacher’s pocket and hands)
- 3D modelling of the contact (CAD, video projected)
- 2D drawing (shown by the overhead projector): view from above (parts 2 and 3); profile cutaway view
- Table showing the links
- Document used for the final plotting of the links graph

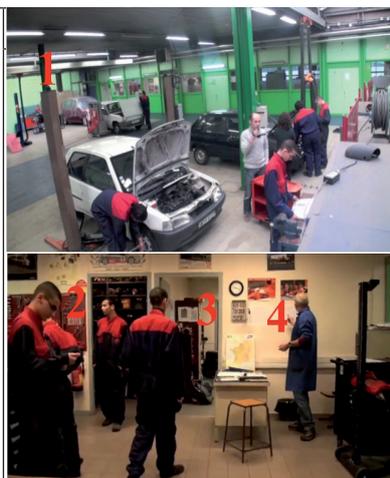
**Figure 3.** Description of the teaching environment for the Mechanical Engineering lesson.

The teacher conducts this Mechanical Engineering session in a very dynamic fashion and keeps up the tempo by asking the students several series of quick questions, and requesting equally quick answers which he rephrases every time. He very often provides them visual and symbolic resources (handling the door contact, showing some 3D views by using the CAD software and some 2D drawings from the transparencies shown with the overhead projector, in addition to numerous deictic gestures to show certain parts of the object or its symbolic representations) so that they can answer quickly. Perception and reasoning are therefore permanently heavily supervised. In other terms, this teacher conducts proceedings from end to end, leaving very little opportunity for his students to take the initiative. The documents given to the students also contribute to this *strong framing* leaving little latitude to the students in terms of writing.

The space organisation of the workshop session (fig. 4) differs greatly from the previous two lessons. In contrast to the rather characterless classrooms, the features of the school workshops vary significantly from one to another depending on the vocational specialities taught. In most cases however they are large open spaces where several groups of students and several teachers work at the same time. In many cases, it is also possible to observe operations on the “material”, which involve many people moving around and a noisy environment making it impossible to teach in the standard manner of traditional classrooms.

**Organisation of the space**

- Workshop area, reserved for the CAP and shared by two groups of students. Five workstations per group (1)
- adjoining technical room, with tools (2), the teacher’s office (3), and distribution of the Practical Work displayed (4)
- storeroom for special tools



**Objects in the environment**

- Car (106, old model)
- Two post car hoist
- Workbench with vice
- Tools specific to the pair (in the technical room and then on the pair’s workbench)
- Common tools (technical room; storeroom)
- Special equipment (tyre changer)
- Practical Work sheet
- Manufacturer’s technical journal

**Figure 4.** Description of the teaching environment for the workshop sessions.

In the situation observed, the students were not restricted to one location but instead moved between several rooms. The workstation, in the car workshop is their “base” but the students can often go into the adjoining technical room to listen to the teacher’s instructions for the whole group or to get tools (see Fig. 5, first photo). They can also go, after being authorised to do so by the teacher, to the storeroom if they need a very specific tool or product. This multiplicity of locations is, predictably, accompanied by a multiplicity of technical objects: firstly, the car on which the students will have to carry out the tasks requested by the teacher, as well as the objects situated on the workstation (car hoist, workbench with a vice), hand tools (various wrenches, torches, etc.) and more specialised equipment (e.g. tyre changer, located in a corner of the workshop). Furthermore, the students work with three main types of documents during these sessions: the Practical Work Sheet prepared by the teacher which gives them working instructions in different stages; the car’s repair manual, which contains all the information required to carry out the work (diagrams showing parts, assembly and dismantling instructions, tightening and tyre pressure values etc.); lastly more marginally words inscribed on technical equipment (e.g. graduation a sliding caliper or a multimeter screen for example).

Given the complex nature of this environment, it is tempting to ask oneself if, in fact, there is a *learning milieu* organised for the study. How does this space differ from a real garage? A first part of the answer lies in the choice of vehicles for each Practical Work.

“ENS 2: “If you think about the start of the course, the work must be accessible and easy to find and not too complex. After, you can add to that, resource documents, which will be used either to provide additional technical information, or to use certain types of tool. Let’s say, the precautions to be taken when using such or such equipment.”

Consequently, as a general rule, the old vehicles are often used for students starting their course due to the much greater visibility and accessibility of their different parts compared with more recent vehicles. Certain models from the same period may also be preferred to others for working on a particular part. It can therefore be said that the vehicles have characteristics, which are more or less favourable for didactic use.

The teacher also ensures that the technical documentation is available and accessible to the students, in accordance with the level of their knowledge. He generally gives them copies of the pages of the Car Repair Manual (see an excerpt in fig. 5) corresponding to the task to be undertaken thus avoiding them getting lost in the parts of the document which are not relevant for the operations they have to carry out. A last very important structuring element for the students' activity comes from the Practical Work sheet. It not only sets out the instructions, but also specifies the successive steps of the action and indicates the resources to be mobilised for each of them. Lastly, it can be seen that as in the Mechanical Engineering lesson, the written work is very limited during the workshop sessions. The students only have to find values (tightening torque in particular) in the car repair manual and write them in the boxes on their Practical Work sheet. The teacher justifies this limitation in particular by the recommendations of his inspector: the students write to a sufficient extent in other parts of the training course (in general subjects in particular), and vocational teachers must not require them to write too much in the workshop. What matters the most is that they work with their hands.

The teacher has to move all the time between six pairs of students, each pair working at different workstations in separate parts of the workshop. As a result, the students enjoy a significant degree of autonomy with regard to carrying out the tasks described on the Practical Work sheet. They can move around freely to go and get tools from another room, or even stop working to talk with other students. This low level of supervision of the workshop activity is however somewhat tempered by the Practical Work sheet, which divides their work up into different stages. At the end of each stage, the students must call the teacher to come and check their work. On the sheet it is possible to see, for instance, in bold, the following heading: "Call Teacher: Your work will be checked. You will indicate the method to be followed in order to change the front shock absorbers." This layout of the Practical Work sheet therefore enables the teacher to maintain an overall control on the progress of the students' work, which is also very important in terms of ensuring their safety.

But between these inspections, many of the students find it difficult to act autonomously, in particular when it is necessary to look for information in the technical documentation (Car Repair Manual) in order to carry out certain tasks (dismantling and reassembling procedure, part tightening values, etc.). Consequently, this type of document is very complicated as can be seen below, insofar as it involves very different semiotic modes: texts describing actions, photos with superimposed symbols, 2D and 3D diagrams, tables, lists of values, etc. Finding the correct information is often a great challenge for students who generally have poor skills in literacy.

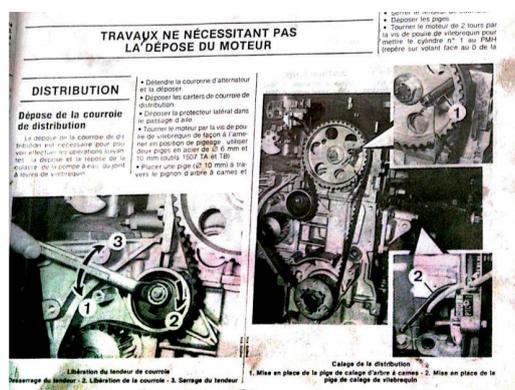


Figure 5. Excerpt from a Car Repair Manual.

In order to circumvent this problem, we observed that the students often ask the teacher for help. The teacher tries as much as possible to avoid their constant requests to get some information. Instead, he answers them to look for the information by themselves. However, if some pairs fall behind too much, the teacher has to help them to a greater extent.

## 5. Summary and conclusion

The table 3 provides an overview of the comparative analysis of these three learning contexts. The first results of this comparative work already provide several indications concerning the nature of the continuities and discontinuities between the three types of teaching.

From the viewpoint of the different types of knowledge to be taught, French is characterised by a strong degree of classification compared with the other content. Conversely, Mechanical Engineering and the workshop session have porous boundaries. They share the same competency framework and many common material objects and concepts. We have seen that several institutional and cultural factors make it possible to explain these classification differences between the three learning contexts. Some historical reasons can explain these differences, in particular a persistent in-depth debate concerning the role of general teaching in vocational training courses. The identity of the French teaching still seems very focused on content originating from major cultural institutions, with certain reluctance of teachers and more generally the institution to build in more professional issues and support. The organisation and architecture of the establishment (dating back to the seventies/eighties) are also very unfavourable for collaborative work with other disciplines.

Moreover, we have been able to outline a comparative approach of the three *learning milieux*. It shows that the French and Mechanical Engineering lessons are organised in a very similar manner in terms of space and time, typical of general disciplinary lessons, allowing the students very little opportunities for moving around, and imposing a fast pace to the activities which must not exceed one hour. Conversely, the workshop space is much more open (students can go from one place to another, although they must stay within certain limits) and the pace of the activities is also far slower. Moreover, the students do not hesitate to take advantage of this spatial and temporal leeway to interact and talk about everything and anything other than the work to be carried out. This is undoubtedly a feature of school workshops, which differentiate them very markedly from other learning contexts which take place in classrooms.

**Table 3.** Synthetic comparison between the 3 learning contexts.

	<b>French</b>	<b>Mechanical Engineering</b>	<b>Workshop</b>
<b>Knowledge classification</b>	Same teaching programme for all the Professional specialities. No or little contact with the other disciplines.  <i>Strong classification</i>	Common reference base. Numerous references between the knowledge and the objects studied in the two contexts. Collaborative work between teachers  <i>Weak classification between these two learning contexts</i>	
<b>Organisation of space / Freedom of movement</b>	Classrooms (similar to other general subject)  Students seated and stationary	Classrooms (similar to other general subject)  Students seated and stationary	Technical hall (several common points with real garage, but also important didactical specificities)  Workstations (1 per pair of students).  Students can move between several places.
<b>Duration of session</b>	1 hour	1 hour	7½ hours
<b>Elements of the learning milieu</b>	Short Film, instructions sheet (with several free fields), inscriptions/ projections on the board	Contacteur, projected 2D/3D views; paper 2D drawing, instructions sheet (with few sections to fill)	Car, spare parts, tools, Practical Work sheet (goal, stages, resources), Car repair manual
<b>Preferred Semiotic method</b>	Written (reading, understanding and writing texts)	Visual (perceive different material components, studying their mechanical connections)	Gestural (disassemble and assemble different mechanical parts)
<b>Didactic dynamic</b>	Teacher often ask students to produce ideas, make presentations and to be able to make some corrections both written and oral.  Frequent teacher interventions to calm students who often heckle  Pace of work quite closely linked to the productivity of the students  <i>Oscillation between weak and strong framing</i>	Tight control of students' perception and reasoning by the teacher (little initiative left open to the students)  Tight control of the work rhythm. <i>Strong framing</i>	Pairs work autonomously. Work progress depends a great deal on the students.  Teacher constantly asked to help.  Teacher helps occasionally when the delay becomes too big.  <i>Weak direct framing by the teacher (most of the time)</i>  <i>Indirect framing through the Practical Work sheet</i>

But beyond these superficial similarities, this work also shows subtler discontinuities between the French lessons and the Mechanical Engineering lessons. The *learning milieux* do not have the same end in the two cases: in the first, it aims at making the students work on written documents (reading/writing), with images only serving to help with reading. In the second, on the contrary, the visual and graphic methods are central and writing is only a secondary tool. In addition to this first difference, which can be described as epistemic (the objects to study are different), there is another more

pedagogical difference. In French, there between periods of weak framing allowing the students to express their ideas) and others when the framing is much greater (regaining control of the class). In Mechanical Engineering, the teacher opted for an extremely tight framing from start to finish.

From the epistemic and pedagogical viewpoints, the workshop sessions stand out clearly from the other two: it did not involve studying texts or technical systems but to learn how to repair vehicles (dismantling, replacing, and assembly). It was also seen how the direct control of the students' activity by the teacher was necessarily much plus looser than the other two contexts but that, at the same time, he was controlling the session more indirectly by means of structuring the activity on the Practical Work sheet.

Lastly, this analysis compared with three learning contexts shows that the transitions that the students have to make when they switch from one lesson to another, made up of ruptures and very subtle continuities, are relatively complex. The problem is that they generally receive very little help to identify these ruptures and continuities, due to a lack of pedagogical collaboration between the teachers of different disciplines. However, there must be many possibilities for collaboration to help the students.

For example, successful training requires the students to be able to see very small links between the theoretical knowledge learned in Mechanical Engineering and the technical operations carried out in the workshop. In other terms, it is preferable to have understood how a car is assembled and how it operates in order to know how to repair it). But the great difficulty is that the students must be able to associate knowledge focused on the explanation of technical phenomena using theoretical models with material objects and practical gestures. The transition is certainly too difficult for the students to undertake alone successfully. A more specific task between Mechanical Engineering and workshop teachers to help students i.e. it would be interesting to how these theoretical lessons could be reused in the workshop.

Another example concerns the possible liens between the workshop and the French lesson. The previous analyses showed that the students struggled to read and interpret the documentation technique in the workshop (RTA) which articulates in a complex manner several semiotic registers (texts, tables, lists, diagrams, photos,...). The students also have to mobilise such complex multi-mode written documents in French, when they work using a newspaper, a magazine or an encyclopaedia. The teachers of the two subjects have little awareness of this common point but collaboration would be possible to make students work on the skill of decrypting documents of this type.

## 6. Bibliography

- BEACH, K. (1999): Consequential transitions: a sociocultural expedition beyond transfer in education, *Review of Research in Education*, 24, pp. 101–139.
- BELHADJIN, A., & Lopez, M. (2010) : Littérature et langue en LP. Quels enjeux pour quels élèves?, *11e rencontres des chercheurs en didactique des littératures*, pp. 14–18, (Genève).
- BERSTEIN, B. (1996): *Pedagogy, symbolic control and identity. Theory, Research, Critique* (London, Taylor and Francis).
- BILLET, S. (2006): Relational Interdependence between social and individual agency in work and working life. *Mind, Culture, and Activity*, 13, 1, pp. 53–69.

- BONNERY, S. (2007): *Comprendre l'échec scolaire. Élèves en difficultés et dispositifs pédagogiques* (Paris, La dispute).
- BROUSSEAU, G. (1986). Fondements et méthodes de la recherche en didactique des mathématiques, *Recherche En Didactique Des Mathématiques*, 7,2, pp. 33-115.
- CHARLOT, B. (1999): *Le rapport au savoir en milieu populaire. Une recherche dans les lycées professionnels de banlieue* (Paris: Anthropos).
- DE SAINT-GEORGES, I. (2008): La multimodalité et ses ressources pour l'enseignement –apprentissage, in L. FILLIETTAZ, I. DE SAINT-GEORGES, & B. DUC (Eds.), *Vos mains sont intelligentes. Interactions en formation professionnelle*, 117, pp. 117–158, (Genève, cahier des la section suisse des sciences de l'éducation)
- Eraut, M. (2004). Transfer of knowledge between education and workplace settings, in H. RAINBIRD, A. FULLER, & A. MUNRO (Eds.), *Workplace learning in context*, pp. 201–221 (London, Routledge).
- JELLAB, A. (2008): *Sociologie du lycée professionnel. L'expérience des élèves et des enseignants dans une institution en mutation* (Toulouse, Presses Universitaires du Mirail).
- JORGENSEN, C.H. (2008): School and workplace as learning environments in vocational education and training, In V. AARKROG & C. H. JORGENSEN (Eds.), *Divergence and convergence in education and work*, pp. 171–195 (Bern: Peter Lang).
- LAMBERT, P. (2014): Sociolinguistique et éducation. Une approche ethnographique. Dossier d'habilitation à diriger des recherches, Université Stendhal-Grenoble 3.
- LEMBRÉ, S. (2016): *Histoire de l'enseignement technique* (Paris: La découverte).
- LÓPEZ, M. (2010): Enseigner le français en lycée professionnel : quels changements dans le métier ?, *Le français aujourd'hui*, 171, 4, pp. 49–60.
- PALHETA, U. (2012): *La domination scolaire. Sociologie de l'enseignement professionnel et de son public* (Paris, P.U.F).
- PELPEL, P., & TROGER, V. (1993): *Histoire de l'enseignement technique* (Paris, Hachette).
- SENSEVY, G. (2007): Des catégories pour décrire et comprendre l'action didactique, in G. SENSEVY & A. MERCIER (Eds.), *Agir ensemble : Eléments de théorisation de l'action conjointe du professeur et des élèves*, pp. 13–49 (Rennes, Presses Universitaires de Rennes)
- SENSTRÖM, M.-L., & TYNJÄLÄ, P. (2009): *Towards integration of work and learning. Strategy for connectivity and transformation* (New York, Springer).
- TROGER, V. (2002): Vocational training in French schools: the fragile State-employer alliance, in CEDEFOP (Ed.), *Towards a history of vocational education and training (VET) in Europe in a comparative perspective, first international conference*, pp. 66–74 (Florence).