What do students say about what they learn from work experience ? A case of French vocational education for the building industry

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Introduction

As part of the work that we do on the nature and modalities of learning in the workplace for students during their placements, we conducted an empirical research based on one conducted in Finland by A. Virtanen, P. Tynjälä et K. Collin (2009). The Finnish study examined the characteristics of learning in the workplace for training students in various professionnal fields, from the results of a questionnaire survey, designed to obtain feedback from students, teachers and professional referents (employees of the companies who supervise the interns).
We changed without distorting it, the questionnaire of our Finnish colleagues to adapt to the French students, which were of overwhelmingly masculine gender, who prepare a higher professionnal degree in two years (Brevet de Technicien Supérieur) in the field of the building industry. The students were only interviewed after their eight weeks placement, conducted at the end of the first year of their graduate study.
A review of the literature (Jourdan, 2011) concerning research on the issue of placements in the workplace shows that students are often asked to express their expectations and their level of satisfaction (e.g. Cho 2006 ; Moore and Plugge 2008 ; Tse 2010).
The study of Virtanen et al. and ours, belong to this category by collecting an assessment of experiences in placements. The particularity of our studies is the focus of the investigation into the nature and modalities of learning, exploring the influence of contextual variables on learning and comparing these with the process and nature of adult learning in the workplace. So we recall briefly in the next chapter theoretical data on adult learning.
In the Finnish study, differences in workplace learning, according to students, have emerged according to different professional fields. We limited our investigation to a single professional field by trying to see if there are differences which may have consequences of the same type. Indeed, we hypothesize that within the same professional field, the contexts of firms (size, structure, types of work performed, training of interns) and the conditions of implementation and monitoring placements by schools, affect student learning in the workplace.

Theoretical background

Learning in the workplace is generally defined as informal, related to work practice and has as a side effect a learning process (Eraut, 2004a), although as outlined Billett (2004a) and Fuller and Unwin (2002) it can be structured and include pedagogical practices. The purpose of the learning activity in the workplace focuses on the understanding of a professionnal activity and is thus distinguished from that of learning in school (Collin et Tynjälä, 2003).
Studies have also placed emphasis on the roles of the experience of employees and the contexts in which work tasks are performed, concerning the nature and modalities of learning.
Thus, learning is related to the experience and meaning developed by employees, from situations encountered in daily practice (Marsick and Watkins 1990, Weick 1995). According to Bereiter and Scardamalia (1993), learning is strongly linked to situations of everyday problem solving, met at work.

The study by Bauer and Mulder (2007), conducted among hospital nurses, focused on the possibility of producing learning experiences from the errors found in the work environment. Participatory practices in work structures and interaction between colleagues are vectors for training of employees (Billett 2002, 2004b).
Learning in the workplace can be characterized as non-formal, related to the experience and background and shared within the community of practice.

If the above elements are mainly ways of learning, there also exists data on the content of learning for employees. Eraut (2004b) proposed a typology of learning at work in eight points that Tynjälä (2008) summarized into three categories that we will now expose here. These three categories relate to the conceptual and theoretical understanding (e.g. awareness and understanding of the contexts, situations, people, risks, problems, but also academic knowledge and skills), practical skills or competence (e.g. skills to follow tasks through, teamwork, leadership, decision making, problem solving) and self-regulation skills (self-assessment, managing emotions, development of human relations, ability to learn).

Methodology

Data was collected from an online questionnaire completed by students in the classroom, in our presence. One hundred and two responses were collected from students in five schools in the suburbs of Paris.
The questionnaire highlighted information concerning what students felt they had learnt during their placement, with whom and how. They expressed their views on the development of twenty-six skills grouped into seven categories, using a Lickert type scale with five degrees. The seven groups of skills related to the trade skills, those of collaboration, communication, attitudes (confidence, independence and initiative), reflection, self-assessment and skills for learning in the workplace. The list of skills established by our Finnish colleagues from their study based on the work of the Commission of the European Communities (2005), those of Rychen and Salganik (2003) and Tynjälä, Slotte, Nieminen et al. (2006). The expression of skills needed by professionals and the description of skills in the Finnish national program of education and vocational training were also used.
We have taken these twenty-six skills, consistent with the information taken from the data of our reglemented training standards, changing the formulation (explanation of items) in order to clarify for the French students.
Students were also asked about the negative aspects that may have resulted from learning during their placement.
We also included items related to learning modalities exposed in the Finnish study from the work on approaches to learning written by Billett (2001, 2002), Collin (2002), Fuller and Unwin (2004) and Eraut (2002).

The data was processed by determining the frequency of responses to the proposed modalities using a type of scales such as the Lickert scales and looking for correlations between variables of learning and those of contexts of placements, thanks to the Pearson test (chi-square test).

Eight open-ended questions completed the questionnaire, the results for five of them are provided in the next chapter.

Results

Before detailing the results, it is worth noting that nearly nine out of ten students said that their placement was considered a success in terms of their training. Among the explanations received, a majority of them can be grouped into three categories : the discovery of the professional field and trades on site, the acquisition of new technical knowledge and the transition from theory to practice favoring a more concrete understanding of work.

What students say they learn during their placement

Table 1 provided in Appendices summarizes the result for the twenty-six items of skills. We detail these results below.

Vocational skills

Students said, in majority, they had learnt new knowledge related to trade and had developed organizational and planning skills. Just under two out of three students feel they have consistently developed the skills that form the basis of being a clerk of works. Chi-square test on this last point highlights a correlation between the expressed opinions of students and the size of the firms (chi-square test = 8,2, p=1,5 %). Small businesses would not develop these skills as much as large companies.

They feel they have put into practice ways specific to businesses and about eighty percent of them say being able to distinguish differences between the practices of professionals and those taught in high school.

Nearly two-thirds of the students feel they have only moderately, slightly or not at all developed during their placement, skills mobilized in high school. Chi-square test on this last point highlights a link between the expressed opinions of students and schools frequented by students (chi-square test = 14,8, p = 0,5 %). We return to this result in the chapter “Discussion”.

More than half of students say their vision of their future professional field has grown, particularly with regard to design process and implementation of construction projects and for their future profession.

Only one third of students think they have been faced, significantly, with problem-solving situations.

To the open-ended question : “what did you learn in training that cannot be taught in high school ?”, one hundred and sixty propositions were grouped by category. The daily reality of practice and relationships in the workplace include forty percent of the responses.

After which was followed by the development of attitudes (initiative, teamwork, spirit of collaboration, adaptation, mutual respect for team members), the importance of failures and uncertainties experienced on the construction site, the financial management and human resources, and finally the knowledge of the process of constructing buildings.

Collaboration skills

Eighty percent of students said they understood the importance of teamwork and two-thirds said they significantly have contributed to the production in a team. Similarly, more than two-thirds said they have been able to establish many contacts fruitful to work with employees within companies.

Communication skills

More than two-thirds of students say their activities during placement enabled them to develop significantly the practice of oral communication. Half of them consider they have progressed in taking initiatives when in front of a professional and exchanging during an interview. On the other hand, the placement seems to have been favorable to the development of presentations to professionals and written communication as one in five.

When asked about the use of technical documents in their activities, three-quarters of the students reported, to have often exploited plans and to a lesser extent written contracts. In contrast, they estimated to have had little opportunity to use documents concerning the laws related to the quality, safety and rules of construction. Effectively one out of two or two out of three (depending on the types of documents) stated not to have ever used these documents during their placement. The phenomenon affects all sizes of building firms, even if it is more pronounced in small and or medium sized companies.

The coding of responses to the question asked to students on what they thought they had learnt in using these documents can identify three dominant types of learning. The first concerns the competence of reading architectural and technical plans to use the data, the second concerns the link between the documents produced and the actual implementation on site improving understanding of the construction project and finally the knowledge of the role and importance of these documents.

Attitudes (self-confidence, autonomy, decision making)

Two-thirds of students feel they significantly have more confidence at the end of placement. One in two say they have developed a lot of autonomy in the proposed work in training (40 % retained the modality : averagely) while for decision making they are a little less than one in two in this case.

Learning skills

Half of the students had a very favorable opinion of their development of learning skills in work situations and the adaptation to new situations. Students appear to have had little opportunity to exercise their creativity (one in three say to have exercised it, another third not at all or very little).

Thinking skills

Seven students in ten feel they have developed their critical thinking skills in training by having their own idea after listening to their colleagues. Just over one in three claim to have practiced a lot of reflection in action, with the help of the professional referent (third : not at all or vey little), on the other hand, more than one in two say they could reflect retroactively on their activities in the workplace.

Self-assessment skills

Less than fifty per cent of students feel they had a lot of self-assessment practice and to have shared thoughts with his professionnal referent. One in five says not to have done it or very little.

Negative aspects may result from learning situations in training

Eighty per cent of students reject the idea to having created the habit of not respecting the rules of safety or quality procedures and almost all consider not to have avoided taking responsibility. Two-thirds say they do not find (or very few) disadvantages in the professional sector of their training in practicing their future profession.

Learning modalities

With whom do students say they have learnt ?

Even if from the students point of view, the professional referent is a primary interlocutor for learning for almost two-thirds of the cases, we can also estime that members of the productive workforce and colleagues also significantly participate in their training.
Nearly one student in three considers that he could have benefitted from a more professionally guided work situation. This need is also felt both in large companies as in small and medium companies. Three categories of explanations have been advanced by the students involved : a lack of availability of the professional referent, a lack of guidance on specific and complex activities for which the student lacks experience or knowledge and a divergence between the types and conditions of activities in the workplace and the training received in high school.

What do they say about how they have learnt ?

Students responded using a scale of Lickert type with three terms (often, sometimes and never). The table 2, provided in the Appendices summarizes the results. Just over three-quarters of the students feel that they have often proceeded in asking for help and advice. In contrast, less than a quarter say they often worked closely with a professional while being guided and monitored. Consistent with this, six out of ten students often feel they have conducted their work independently. Four in ten say they have often proceeded by trial and error, the others from time to time.

Correlation between age, previous experience of paid work and learning

Nearly two-thirds of the French students questioned have already experienced work as an employee. This proportion is respected for all age groups encountered (eighteen to twenty-three years). We have not found a correlation between age, previous work experience and the learning outcomes, using chi-square test.

Discussion

It is necessary to remain cautious about the results, they are based on the opinions of students gathered through a questionnaire. The memory of a good or bad placement can remotely change the complex analysis of “learning” that usually a student is not demanded to reflect upon in such a manner. However it can be assumed that part of the authentic experience of the interns appears in these results. Students were concentrated in answering the questionnaire and took time to answer questions. An exchange with them, after the seizure of their answers, revealed a keen interest in participating in the survey that they perceived as an opportunity to take stock of their two months placement.

For the French students, the types of learning in placement were not necesseraly developed in a similar way as found in Finland and the nuances with the results of the Finnish students are noticeable.
The Finnish students expressed that they had reached a high level of learning for most of the skills, emphasising, however, the importance of gaining self-confidence, autonomy and decision making, professional skills, collaboration and learning abilities over those of communication and reflection. However, the analysis related to different professional fields showed significant differences and put into perspective the overall results.

Comparing the responses of French students with data from adult learning in the workplace shows similarities and differences. A part of learning took place in an informal way in practice as is the case for employees. The immersion of students in the workplace exposes them, at least in part, to working and learning conditions of employees. We do not know how the professional referent or the employees were involved in the design and implementation of specific learning situations approaching pedagogical practices.
Understanding the value of teamwork and establishing fruitful contacts with the work community, was regarded by students as significantly important in their placement, which rejoins the development of adult learning through participatory practices described by Billett (2002, 2004b).
This result corroborated by other studies, for example that of Tse (2010) conducted with undergraduate university training in hospitality and tourism. This study shows, through content analysis of their placement reports that students feel they have learnt a lot from their colleagues, putting this learning vehicle as the most important. For the author, relationships with the colleagues are probably perceived as the work experience itself in this professionnal field, and students with no experience are dependent on their colleagues for the help they need. The emotional side of the relationship from the data is reported by the author, as the important role of management.
Conversely, two-thirds of students do not seem to have had any opportunity or few to learn by solving problems that Bereiter and Scardamalia (1993) have considered as an important factor in learning in the workplace. Learning from the errors found while in the work environment, studied by Bauer and Mulder (2007), has apparently been experimented by fewer than one in two students. The method did not allow to explore the conditions under which such learning took place for students who have proceeded by trial and error. There should be a future study to analyze these conditions to clarify integrated learning or the difficulties met.

We note that more than half of students say they have conducted their work independently while asking for help and advice. In addition, the opinions about the quality of supervision are nuanced and almost a third of students felt it would have been helpful to have received more guidelines. They mentioned a deficit in guiding self-assessment and a lack of advice related to their future profession. The specific case of construction sites may partly explain this situation. The professional referents are very busy professionals and need to manage a lot of problems on a daily basis hence their availability is diminished. Presumably, the significant development of autonomy mentioned by more than one student out of two is more the result of this situation rather than a real pedagogical strategy thought out by the professionnal referent. We can also hypothesize, in the professional field of the building industry, the pedagogical intervention of the professional referent could be somewhat limited, it occurred in the “heat of the moment” without being planned. As in Finland, the French students learned alone and shared with the community work.

Regarding what is learnt during placement that cannot be taught at school, Finnish and French students logically favoured, firstly, the practice in the workplace. The Finnish students give higher priority to technical skills while the French students put more importance upon human relationships, attitudes, dysfunctions and uncertainties. We need to analyse the influence of professional fields and levels of education. For example, the context of a building site generates a lot of unexpected events that need to be dealt with and imposes good capacities in teamwork due to the vast numbers of contributors.
The effect related to the size of companies on the development of more or less basic vocational skills can be explained by the fact that large firms undertake building projects mobilizing greater technical expertise than those of smaller firms working on smaller building

projects. However, it is necessary to remain cautious because the analysis of the students responses based on the type of firms shows that differences are not always favorable to large firms and the chi-square test is conclusive in just one single item. Some feedback from different placement experiences tempers this effect. Indeed, on complex building sites managed by large companies, students have difficulties in understanding the project, often perform repetitive tasks, trained by stressed and often not available professional referents. We can add that the position of interns in the companies which determines the activities and learning is not the same for all students. In large companies, the students were more frequently in a position to help clerks of works than in small and medium companies. Conversely, in small and medium firms the interns were often in a position to help foremen. This is explained, in particular, by the stucture and organization of companies and their relation to supervision on building sites. These differences are related to the size of firms and type of building they produce. Furthermore, the interns were more frequently in the position of workmen, at a certain point in their placement, if they were in either a small or medium company.

Note finally, as a specific effect of the professional field, the major concern of the students for compliance with safety regulations on building sites, like the results of Moore and Plugge's study (2008) in the same professional sector in United States.

A brief analysis of practices in the concerned secondary schools reveals differences in the plan for monitoring the placements and for collaboration between teachers and professionals. These elements can provide an avenue to explain the correlation between the secondary schools and skills developed whithin them and practised during the placements. The distinction between the activities in the workplace and those of the secondary schools was greatly highlighted by the French students. This information must be put into context related to the relative lack of use of the students skills learnt while at school and their application during their placement. We can think that a "shock" of both worlds took place, generating for the students an awareness of the differences between a more theoretical training on the one hand and a practical experience on the other. This observation raises the question of the relationship between practical knowledge and academic knowledge during placement experiences. Eames and Bell (2005), in a study of students placements in the second year of science and technology university in New Zealand, (in the context of cooperative education) reported that the students say they had learnt more when the placement was integrated with the university course. The students had perceived the two learning environments that make up the university and workplaces as very different but in contrast to Hughes' study (1998), these differences did not create barriers to learning. The synchronization between theoretical learning and practice have, among others, constituted conducive factors to learning. The feedback on the implementation and monitoring of the French students placements, corresponding in the level of training of technicians in the building industry, shows a difficulty between the partners to negotiate a real training plan for the students during their placement.

Conclusion

This study provides pieces of information as to the nature and modalities of workplace learning. Solely based on students perceptions, it does not ensure, in the manner of assessment tests, if the learning reported by students is real. The results allow to obtain instead a picture specifying the greater or lesser exposure of students to situations likely to promote learning. They reveal trends, possible gaps and can provide potential leads to improve existing plans.

The differences between our study and that of Virtanen et al. can be compared with those seen in various studies (such as those reported in the chapter "Introduction") that explore the expectations and satisfaction levels of students about their placement. The professional and academic contexts are probably the cause by variables they represent. We have highlighted some of the effects of context in the case of placements in the building industry. In Finland, Virtanen et al. found differences in learning according to professional fields. This can be explained, among others, by cultural differences of firms related to the history of professional fields, types and constraints of the activity, modes of work organization, to changes and to the place reserved for training. The influence of the connection between schools or university institutions and companies to set up placements is also in question. As our Finnish colleagues, we can ask about the issue of equal opportunities for students to learning during their placement.

Several extensions of studies are possible. One would first test the hypothesis that there are types of placements defined by student profiles and configurations related to firms and educational institutions. A second, could explore what students actually learn during placement and under what specific learning conditions. A different method from that used in the present study is needed to conduct a such an exploration that has not been undertaken, to our knowledge. The method of investigation should allow to have access to students experiences related to their placement and could lead, for example, to assessments of before and after placements.

The literature review to which we referred shows a consensus about the relevance of placements, but the issue of acquisitions during these placements and their precise role is unresolved. Is it primarily a personal experience, generating character transformations, a discovery of the workplace, real situations vocationally formative, or a mixture of these options ? A better understanding of what is learnt during placement could help to answer this question which creates a challenge for the placements and how they should evolve.

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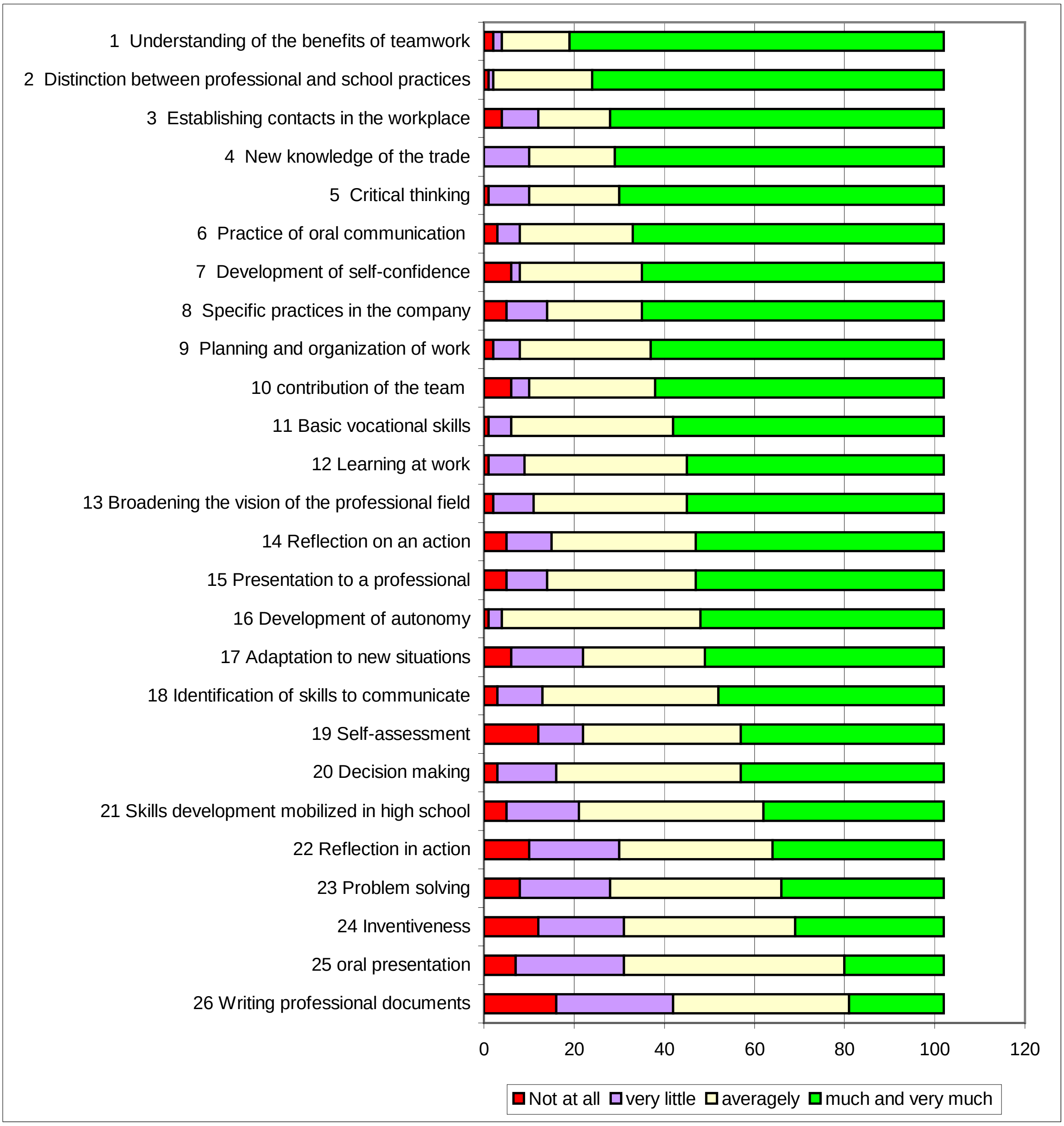
Appendices

Table 1 Results of the opinions of students for learning items



Groups of skills

Vocational skills : 2 – 4 – 8 – 9 – 11 – 13 – 21 – 23
Collaboration skills : 1 – 3 – 10
Communication skills : 6 – 15 – 18 – 25 – 26
Learning skills : 12 – 17 – 24
Thinking skills : 5 – 14 – 22
Self-assessment skills : 19
Independence : 7 – 16 – 20

Table 2 Modalities of learning