

## How Often and for What Purposes Apprentices Seek Help in Workplaces: A Mobile Technology-Assisted Study

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**Abstract** In the ‘dual’ system of vocational training, working in company represents the major part of training. At the workplace, apprentices are expected to acquire the typical skills of their profession but, at the same time, to contribute to the production of the company. For this reason apprentices are expected to carry out activities on their own from early on in their training and to ask for help only when they need it. Learning to ask questions and to seek help appropriately is, therefore, an important competence for learners to acquire during vocational training, just as it is important for the company to offer the learner every opportunity to ask for help when needed. In this study, we used mobile phones to follow at a distance 19 apprentices in car mechanics at the workplace. We then analyzed a corpus of approximately 77 hours of work, in search of all questions and requests they addressed during this time. Data

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show that requests for information are twice as frequent as requests for assistance (i.e. intervention or physical help) and that all together, requests are introduced more often by more advanced apprentices than by those in the early stages of their training. These findings are linked with the facts that: a) bringing apprentices to be autonomous early in their work is a deciding factor of the philosophy of work in many of the enterprises training apprentices, b) more advanced apprentices are given more complex tasks to work on, c) more advanced apprentices work more is often undertaken in collaboration with an expert car mechanics and d) questions and requests for help are more likely to be addressed when working collaboratively than when working alone. These findings are interpreted as evidences of a natural regulation which takes place at the workplace between the learner's engagement and the workplace affordances.

**Keywords** Workplace learning · Self-regulated learning · Help-seeking behaviors · Vocational education and training · Collaborative work

### Learning through Work

Recent studies of workplace learning show that learning is shaped by two complementary processes: the learner's personal engagement, and learning affordances at the workplace (Billett 2001). Comparing vocational identity formation within such different fields as technology and transport and social services, Virtanen et al. (2008) show how education practices in these fields shape the construction of identities. Educational practices emphasizing reflection and development, for example, in the field of social services and health care, boost positive components of vocational identity, such as critical reflection, developmental orientation, personal goal attainment and identification with a particular occupational group. More teacher-led practices, such as those found in the field of technology and transport, stimulate the more negative components of identity and lead to a more negative attitude towards work. According to Festner and Gruber (2008), a wide range of organizational factors, including support from superiors and colleagues, working conditions and organizational climate all affect transfer of learning. In contrast, lack of collaboration between communities of practice functions as an obstacle to learning (Hökkä et al. 2008). At the individual level, personalities, characters and cognitions (Fenwick and Sommerville 2006; Frese and Fay 2001), the learner's interests (Hidi and Renninger 2006), together with intentions, and willingness and ability to engage in learning activities (Billett 2006) all have an impact on actors' behaviors and attitudes in a workplace, on the nature and quality of interpersonal relationships within a team and ultimately on the overall performance of a company.

#### Apprentices' Learning through Work

While they are at work within an enterprise or a company, apprentices have two parallel goals on their agenda. These comprise accomplishing the tasks given by their own supervisors, on the one hand, and that of acquiring the knowledge and

learning the skills required to become ultimately a full professional in the chosen sector, on the other. On their side, companies that have hired apprentices also have two objectives to follow at the same time. These are 1) training a newcomer in the field, and also 2) that overall goal of staying productive and competitive on the market. These two objectives may not always prove to be compatible and easy to reach simultaneously. If too much time and attention are devoted to apprentices and their learning, productivity might (temporarily) be negatively affected. On the contrary, if productivity becomes the only driving force for everybody within the enterprise, on the cost of the necessary care to be given to apprentices, their learning may remain poor. As a result of these dilemmas, learning has to be engaged in with minimal teaching and maximal autonomy on the part of the learner (Duc and De Saint Georges 2009) while opportunities to learn have to be offered by the workplace with minimal disruption and maximal effectiveness (Billett 2001; Evans et al. 2006).

Encouraging apprentices to learn as much as possible by themselves, in a context where trial and error is often not possible, emphasises for the company the importance of training them to ask all the necessary questions and to detect as accurately as possible when they really need help. On their side, the apprentices must become active learners, trying their best to receive as many opportunities to learn new things, by asking the questions whose answers they need and by finding how they can come across tasks and situations out of which they will be able to learn what they wish to learn.

In this sense, a careful study of how often, in what circumstances and to whom learners address questions or seek help from, provides good evidence of their willingness to engage in learning at the workplace. It also indicates the opportunities afforded or the barriers raised by the company by welcoming— or, on the contrary, not encouraging questions— and by answering them in a productive or unproductive way (Karabenick and Newman 2006). As Edmondson (2003) has noted, asking questions and seeking help at the workplace constitutes an interpersonally risky behavior. It can lead to shame or embarrassment, with the apprentice being judged as ignorant or incompetent or can fuel the addressee's criticism of an apprentice as negative or disruptive. At the same time, understanding when one really needs help and having the confidence to ask questions to seek information and/or support from more experienced or knowledgeable persons are essential for autonomous, self-regulated learning (Newman 1994; Zimmerman 2002) and increased professional effectiveness (Argyris and Schön 1974). Data collected mainly in academic settings have shown that both individual and environmental variables often lead students to refrain from asking questions or requesting help even if they need it (Butler 1998; Karabenick and Newman 2006; Ryan and Pintrich 1997). Comparison of attitudes towards seeking help and asking questions at school and at the workplace of apprentices engaged in dual programs shows that they are even more aware of the benefits of questions and help-requests at the workplace but are equally if not more reluctant to ask others at the workplace than at school (Gurtner and De Rocha Trindade 2008). Observations conducted in various professional sectors have identified clear evidence that gender or status issues may deter employees from seeking help, asking questions or discussing issues with more experienced male or higher status persons, except in cases where the organization's leaders succeeded in

creating an environment of high psychological safety (Edmondson 1999). Team leaders' autocratic behavior, inaccessibility or failure to acknowledge fallibility can discourage team members from adopting such risky behaviors while accessibility, self-disclosure and a positive acceptance of ignorance act as stimuli encouraging questioning and discussing of opinions with persons higher up the organization's hierarchy (Edmondson 2003).

The study presented here is a technology-assisted investigation of apprentices questioning and help-seeking behaviors at the workplace. It is designed to answer the following research questions: 1) How frequently does an apprentice ask questions and request help while working at the workplace? 2) What type of help does she/he require? 3) To whom are these requests addressed? 4) What contextual factors affect the probability that a question will be asked or help sought? 5) What are the consequences of such requests on the work performed by the apprentice?

To address these questions, we used a new technique, described in section 1.2 below, which makes it possible to capture apprentices' requests synchronously, i.e. directly as they appear at the workplace, but at the same time without having to be physically present and, thereby avoiding the risk of interfering too much with the activity of the workplace in general and that of the apprentice in particular.

### Using Mobile Devices to Collect Data and Observe Interactions at Work

With their simplicity and great popularity among young students, mobile communication technologies have recently found applications in many educational projects (Chen et al. 2008). While some of these applications take place in schools, many others are situated out of school, in more informal settings (Scanlon et al. 2005). According to Mifsud (2002), mobile technology can be used as a bridge between formal and informal learning arenas; in this view m-Learning, as it is sometimes called, represents "a supplement to traditional e-Learning where mobility is an added-value for the learners" (Holzinger et al. 2005, p. 310). Mobile technology devices tend to be used for learning in two distinct ways. In many programs or studies, mobile devices are used mainly as a means through which learning material sent by the teachers is made available to the learners. Currently, this use of mobile technology is often combined with Internet communication (Rau et al. 2008), enabling students to search for additional information and material on the Internet, or to automatically record and capture their experience in the field (Fleck et al. 2002).

In other projects, handheld devices are used to communicate among learners, to share data, ideas and problems (Sharples 2002) or to work out joint solutions to a common task (Laru and Järvelä 2003, 2004; Roschelle and Pea 2002). In projects like these, the ability to collect data and to transfer it immediately to others, and the ability to receive immediate feedback from others are considered the key advantages of these devices (Roschelle and Pea 2002). They lead students to reflect much more on what they are doing than in traditional classroom activities (Vahey and Crawford 2002). According to Trifonova and Ronchetti (2004), out-of-school context discovery should be one of the main features of any general mobile learning architecture.

In the study whose findings are reported here, mobile technology was adopted as a tool allowing researchers to maintain contact with a participant during long

sessions of work and to capture sequences of actions and interactions as they take place at work. By doing so, we can determine the contexts and the conditions in which the informant chooses to ask a question, identify the persons to whom each of the requests is addressed and uncover the consequences of these requests in terms of the nature of the help received and of their autonomy at the workplace. Used in such a way, mobile technology proved much less obtrusive in the field than the continuous presence of the researcher or video camera but at the same time it was more interactive than mere sound recorders, allowing the researcher to intervene and request a specification or further details when something could not be understood. Mobile devices proved to be an effective means to collect data as an intermediate step towards the understanding of learning and of how learning works.

### Vocational Training in Switzerland

In Germany, Austria and Switzerland, the Vocational Education and Training (VET) system is mainly based on alternation between periods at school and at work, known as the “dual” track.<sup>1</sup> The responsibility for learning is shared between the school, the host company and— depending on the profession— an industry or third-party training centre. Although the current trend is a decline in numbers of student enrolments in these combined school/work programmes (a fall of 7.2% from 1990 to 2006, according to Bonoli and Ghisla 2008) in favour of general education programmes, Switzerland still has a higher proportion of students enrolled in VET dual tracks than any EU country (58.3% in 2005, according to Bonoli and Ghisla op. cit.). The VET sector in Switzerland is regulated by a Federal Act (Vocational and Professional Education and Training Act, VPETA<sup>2</sup>), enacted on December 13th 2002 and put into force in 2004. This Act divides responsibility for VET jointly between the Confederation, the Cantons and the professional associations.

VET programs generally last three or four years depending on the occupation. After completing their program, students take their Federal Diploma Examination.<sup>3</sup> In the work/school combined VET track, apprentices attend school— where “general education and vocational subjects are taught” (VPETA, Art. 16)— for 1 or 1½ days a week, while for the rest of the week they work in the company with whom they have signed an apprenticeship contract.

In the work-segment, the apprentice has the opportunity to engage in “real” activities in the chosen field, under the professional guidance of a supervisor, thus gradually acquiring the specific skills of the chosen profession and developing her/

<sup>1</sup> Some school full-time VET programmes also exist (in particular the middle schools for the commerce sector, the nursing schools, and some specialisations in the hand-craft schools), above all in the French and Italian speaking parts of Switzerland: in such cases the school-segment assume itself the role of the host company, thus providing specialised laboratories for the acquisition of the professional competences.

<sup>2</sup> The English version of the VEPTA is available at: <http://www.admin.ch/ch/e/rs/4.html>.

<sup>3</sup> The two-year VET programmes (commonly referred to as “biennial”) lead to the Federal VET Certificate. They have inherited the different programmes existing at Cantonal level which are structured to address disadvantaged profiles and groups. In 1993 another professional programme was introduced, the Federal Vocational Baccalaureate (FVB), which certifies that its holder has the prerequisites to attend any tertiary-level professional education and training programme (PET) and a university of applied sciences (*Fachhochschulen* or *Hautes écoles spécialisées*). This track includes the VET programme— with varying options— , and offers a more thorough general education.

his professional identity. The VPETA is the reference source for all the education ordinances and curricula covering nearly 250 occupations. Each ordinance details aspects such as: the subject matter definition and duration, the objectives and requirements of both the work-based and the school-based segments, the scope of course contents and their distribution across the different learning locations, qualification procedures, qualifications and titles (Cfr. VPETA, Art. 14).

This system makes it possible for three learning locations to interact and genuinely share responsibilities for apprentices' learning, guaranteeing a close correspondence between what happens at school and what the apprentice experiences at the workplace: in fact, in the curriculum or study plan— an integral part of each ordinance, together with the competence profile and the definition of the evaluation procedures— the locations involved for each topic within the curriculum are explicitly identified.

## Method for Capturing Interactions at Work

### Sample and Context

The sample consisted of 19 car-mechanic apprentices from two Cantons in Switzerland. All volunteered to participate in the research. The sample included apprentices from all years, the 1<sup>st</sup> to the 4<sup>th</sup> and final year of their apprenticeship (2 in the first year, 6 in the second year, 6 in the third year, and 5 in the fourth year). All but two of them worked in large garages employing at least 4 experienced car mechanics and 4 apprentices. The remaining two apprentices did their training in smaller garages, as the only apprentice, supervised by not more than two expert colleagues, including the owner of the garage.

Whatever the size of the garage, the work culture for car mechanics is one of individual work, in which each collaborator works on a specific task, mostly on a specific vehicle. From very early in their training, apprentices are socialized into this culture and given productive tasks to do by themselves (Fillietaz 2010a, b). However, this individual work does not mean that they are left alone: every co-worker present, including, in larger garages, the other apprentices, represents a potential helper, who can provide information or assistance to the learner if necessary. But to receive help, apprentices have to be proactive, to actually call somebody. In contrast to what happens at school, they cannot simply wait until the supervisor asks them something, or compare what they are currently doing to what the person sitting next to them is doing. Despite this dominant culture of individual work, there are situations and tasks for which collaboration is foreseen from the beginning, whether for training or for pragmatic reasons.

### Data Collection Method

For the collection of data, a technology-assisted method was designed that aimed to capture a random sampling of questions and help requests posted by apprentices at the workplace during their training with as little intrusion as possible into their work. This was achieved by asking volunteer participants to keep their mobile phones switched on while working at the garage and to wear headsets and a microphone. Within a one-

month period the research assistants called them randomly and maintained contact with the apprentice for approximately one hour while they continued to perform the tasks which they were currently working on. At the beginning of each session, apprentices were asked to describe as precisely as possible the job they had been assigned and the social context (i.e. whether they were working alone or in collaboration with somebody else) in which they were currently acting. At the end of each session, participants were asked if they would agree to be called once more in approximately a week. We, therefore, do not have as many sessions for each participant (see Table 1). Each session was audio recorded and fully transcribed using Transana© software. All the requests posted by the apprentices occurring during these sessions were identified and analyzed individually.

Although this approach to data gathering allows for a fair capture of what is being asked by the apprentice at the workplace and of when it occurs, it cannot produce of course a complete picture of the activity accomplished, including the conditions and the context in which it is conducted nor of the discussions held at a workplace. It is also sometimes difficult to understand whether apprentices are performing well or experiencing difficulties, unless they explicitly mention it. Moreover, it is hard to identify for what reasons the apprentices and the persons they are addressing a request have come together at that particular point in time, and whether or not they were already together. Compared to video recording or physical presence of an observer at the workplace, the method used is, however, much less intrusive, and much easier to set up. It also offers the great advantage of being more “spontaneous” than direct observation: since no explicit “rendez-vous” has to be made in advance with the workplace, this method offers much greater certainty that the job which the apprentice is dealing with during the session is ‘real’ and has not been ‘organized for the audience’ by his supervisor. Finally, in contrast to mere recording of what is being said on a voice recorder, this method offers the possibility to immediately ask for explanations if something that was said or had just happened was not self-explanatory.<sup>4</sup>

The use of this technique resulted in 74 sessions for a total of over 77 hours of transcripts. The distribution of these interactions over the four years of training is summarized in Table 1.

## Findings

The analyses carried out focus on all the requests formulated by apprentices at the workplace during the recorded sessions and addressed directly to any person involved in or with the garage.<sup>5</sup> The complete corpus collected comprises 800 requests.

### Towards a Typology of Apprentices’ Requests at Work

A large majority of the requests captured in our corpus of data take the form of questions, recognizable either by their grammatical structure or by the voice

<sup>4</sup> This was, however, done as rarely as possible to permit the sequence of responses to unfold naturally.

<sup>5</sup> Questions clearly off-task or asked directly to the interviewer are not part of the corpus.

**Table 1** Numbers and frequencies of apprentice-initiated requests collected during the sessions

Training year	Number of apprentices	Number of interviews	Total length of corpus in minutes	Total number of requests produced	On average one request every...
Year 1	2	7	405'	44	9' 12
Year 2	6	16	1025'	135	7' 36
Year 3	6	24	1577'	269	5' 51
Year 4	5	27	1622'	352	4' 36
Total	19	74	4629'	800	5' 47

intonation they are given. On the other hand, requests to get helped are also often formulated as questions, as in the following example: “Could you come and help me remove the front part? I can’t do it alone”. To understand what is really expected by the apprentice, the connotative meaning and pragmatical function of each speech act were taken into consideration in our analysis. This was done by considering: 1) the content of the request, 2) the potential comment the apprentice could make about it immediately afterwards during the call, 3) the presence of specific words in the request, and 4) or even the answer elicited by the apprentice’s speech act from the other persons around him. These aspects proved often more indicative of the nature and the purpose of a request than its grammatical form or its denotative meaning.

Based on these indicators, four broad categories of requests could be established, most of them including subcategories, for a total of 11 different types of requests. Figure 1 shows these categories and their relative sub-categories.

### *Requests for Information*

Requests for information are introduced mainly when apprentices notice that they are missing something that they should know in order to proceed with what they are supposed to do or would like to know more about. Formally, such requests often start or contain specific words such as “where”, “what”, “which” or the like. They generally are formulated in such a way that answers can be very short; the person to whom these requests are addressed<sup>6</sup> are not explicitly required to go over and look at the problem at the apprentice’s workplace.

Four sub-categories can be distinguished, depending on the focus of the information requested:

1. *Technical Information* requests refer to purely technical matters, related mainly to specific objects, parts of the engine, or tools, as in the following examples:

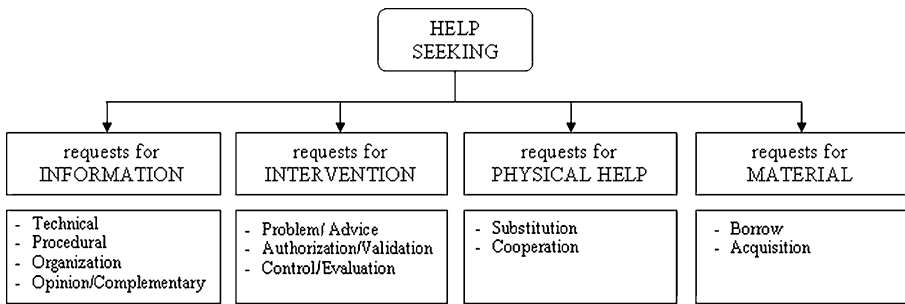
“Which tube must be replaced?”;

“How tightly should the bolt be screwed down?”<sup>7</sup>;

<sup>6</sup> In the recorded sessions, the addressees of the apprentices’ requests were either an expert car mechanic, a fellow apprentice, anybody else working in the garage or even a customer.

<sup>7</sup> Requests presented here are translated for the sake of the paper. Original requests were formulated in French, German or Italian.





**Fig. 1** A taxonomy of help-seeking requests observed at the workplace

This kind of request is generally addressed to the first person available, often a colleague working close to the apprentice.

2. *Procedural Information* requests refer to a specific step or moment in a procedure needed to start or complete an activity, how to use a particular tool properly or other such procedural matters. Apprentices know “what” they are supposed to do, but do not know exactly “how”:

“How can I do it? What tools will I need?”

3. *Organization Information* requests refer to the need for information regarding the garage and its management, the location of tools in the garage, the distribution of tasks among co-workers or the chain of tasks to be accomplished:

“If it’s all right... Shall I drive the car to the higher storey?”

4. *Opinion / complementary Information* requests, includes 1) Asking for complementary information in order to carry out the activity apprentices are accomplishing faster or better or just to increase their knowledge while observing the more expert mechanic working; 2) Asking for an opinion about what they have to do, while remaining free to follow the opinion received or not:

“And this piece of metal? What do you use this piece for?”;

“...you have already done it, haven’t you? Is there any more practical way to do it or... ?”

### *Requests for Intervention*

Requests for intervention comprised all the requests which apprentices formulated to explicitly call somebody else to come and help them decide what to do or how to do what they were supposed to do. In these situations, apprentices expect that the addressees will momentarily suspend what they are currently doing, physically move to look at the problem or situation the apprentice is facing and offer a solution, explanation or other feedback.

5. *Problem/Advice* requests: in these cases the apprentice would or should normally know how to proceed, but notices that there is a particular, unforeseen difficulty or dilemma. Generally, these requests only occur after many attempts by apprentices to solve the problem alone. Requests of this type can develop

into collaboration with the colleague addressed or sometimes the colleague performs the task himself (substitution).

“Could you come here, please... I want to show you the pipe... and the leak”;

6. *Authorization/Validation*. The apprentice asks a qualified person to give authorization to perform an activity, a decision he is not allowed to take by himself<sup>8</sup>:

“The casing was damaged... so I asked him if I could replace it”<sup>9</sup>;

7. *Control/Evaluation*. Here, the apprentice asks a more expert person to check if the task has been performed properly. In contrast to the previous category, here the request is made only after the apprentices have already accomplished the work (or a significant part of it) and they ask for approval.

“Shall we go to test it to check if all is right?”

### *Requests for Physical Help*

Requests for physical help aim at gaining the direct assistance of a colleague, a mechanic or an apprentice when performing an operation or accomplishing a task. As with the preceding category, such requests often start with words such as “could you” or “would you” or the recognition that one is unable to do something alone. This type of requests includes two subcategories:

8. *Substitution* request, when the apprentices try to obtain help since they physically cannot succeed in doing the task by themselves: they ask the colleague to take their place:

“And... I wasn’t able to do it. So I asked my colleague to screw it in... to take my place”;

9. *Cooperation* requests, when the task cannot be done by just one person, and foresees the participation of two or more people, or when it’s more convenient and less time consuming to receive physical help:

“Could you come and help me remove the front part? I can’t do it alone”;

“Could you check the lights at the front of the car while I am activating them from inside the car?”;

### *Requests for Material*

Requests for material include those formulated to obtain material to begin or continue an activity. The apprentices know what tool to use, what spare part to get

<sup>8</sup> Apprentices usually have limited margins of manoeuvre and responsibility in the garage worklife: even during simple routine activities such as the checking and maintenance which makes up a routine vehicle service, the apprentice has to seek approval to replace a damaged piece, even if she/he deems it necessary or she/he knows the procedures to be followed.

<sup>9</sup> This is the explanation given by the apprentice of why he had called his supervisor to come and see what he was doing. Exact wordings of the request was not understood by the research assistant.

but they need to interact with other car mechanics in the garage or with the storekeeper in the storehouse to obtain it. This type of requests also covers two subcategories:

10. *Material acquisition* requests. Such requests generally happen in the storehouse of the garage and concern specific material needed in order to begin or complete the task that has been assigned:

[To the storekeeper] “Could you hand me a new pair of wipers?”;

11. *Material borrow* requests. The apprentices need a tool for the task they are accomplishing and ask a colleague whether they can make use of it temporarily<sup>10</sup>:

“I asked him if he could let me use the PC to check the emissions”.

### Frequency of the Various Types of Requests

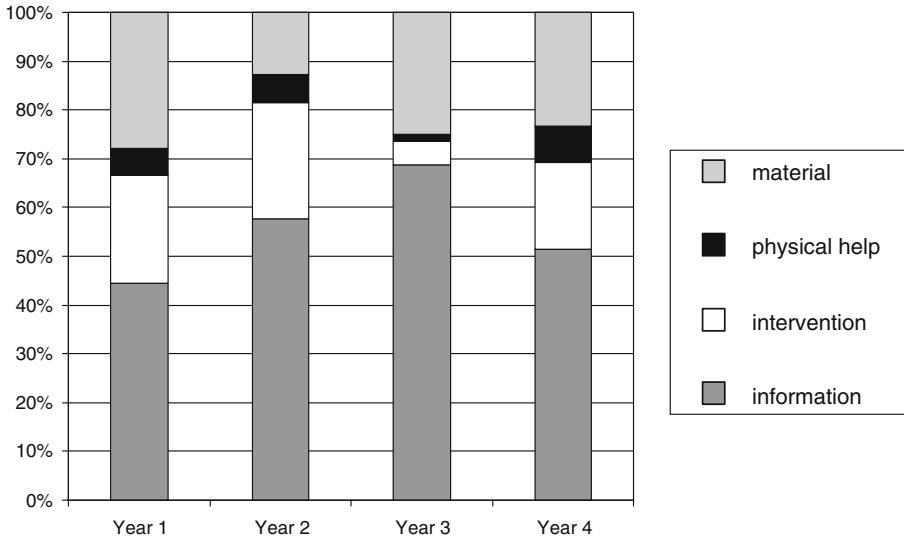
Given that the calls providing the data comprised approximately 77 hours of work, the 800 requests detected through this technique represent a mean of one request every 5'47". However, there were very large differences in the frequencies found both for the same apprentice in different sessions and among different apprentices. The results ranged from zero requests in a full one-hour session (for one third-year apprentice in one of the sessions) to 30 requests in 66 minutes (by a fourth-year apprentice), which represents an average of almost one request every two minutes.

Overall, the frequencies of requests regularly increases from year 1 to year 4 of the training (see last column of Table 1); in other words, more advanced apprentices tend to produce more requests than their “younger” peers. Indeed, apprentices in their last year of training posted almost exactly twice as many requests than those in the initial year of training. Why this happens will become clearer after consideration of the type of requests they formulated and of the social context in which they happen.

Although a complete analysis of the distribution of the various types of requests made by apprentices at the workplace could be conducted at the level of the subcategories too, the analysis performed here is limited to the main categories (i.e. Information, Intervention, Physical and Material) (see Fig. 2).

In all four years of the training, the most frequent instances are ‘Information requests’. They represented even two thirds of the requests posted by apprentices in the third year of their training and more than half of the requests formulated by apprentices in year 2 and 4. Requests for ‘physical help’ are the least frequently observed ones in each year of training. This can be seen as first evidence that being able to work individually and autonomously is given much importance in garages. Requests for an ‘intervention’ are more frequent in the beginning years of training (years 1 and 2) than in the later ones (years 3 and 4). Note, however, that taken together requests for ‘intervention’ and requests for ‘physical help’, the two types of requests which aim at bringing or keeping the addressee of the request to work with the requester are proportionally almost as frequent in the last year of training (year 4)

<sup>10</sup> Although everyone working in the garage has a personal toolbox with all the frequently used tools, some specific or very expensive tools are shared by all the mechanics.



**Fig. 2** Proportions of the different types of requests captured in the sessions

than in year 1 and more frequent than in year 3 and that overall they represent less than a quarter of all the apprentices requests.

#### Frequency of Requests, Types of Jobs Accomplished and Working Mode

The next step is to try to understand the relations that exist between the type of requests posted by apprentices at the workplace, the nature of the activities performed, the social context in which they are accomplished and the persons to whom these requests are addressed. In this way, we hope to capture how affordances and engagement may interact and how this interaction develops over the years of training at the workplace.

#### *Impact of the Social Configuration of Work on Apprentices' Requests at Work*

As already mentioned, training apprentices to learn to work autonomously is an important objective in many occupational sectors. Autonomy at work is presented as a main goal to be pursued in almost all the official ordinances regulating the Swiss vocational education and training system as well as by supervisors in companies (Duc and De Saint Georges 2009). Our observations show that it is also widely adopted in practice. Using the situation in which we found the apprentice at the start of the calls as a first indicator, we observe that apprentices were working alone in the majority of the cases. However, the picture is sharper in some of the training years than in others. By the time we called them, 4<sup>th</sup> year apprentices were working with a colleague (another apprentice or an expert car mechanic) in one over 3 interviews, 3<sup>rd</sup> year apprentices in one over 5 interviews, while apprentices in their first year of training were only collaborating with another person by the time we called them in one over 7 interviews. The examination of the work situation of apprentices when they actually asked a question or posted a request, appropriately complements this

picture (see Table 2). From Year 2 onwards, requests were made more often while working collaboratively than they were when apprentices worked alone.

This finding confirms that the social configuration of employment within which apprentices are required to work affects their opportunities to ask questions and receive answers. This must be understood together with the observation that the frequency of requests rises over the years of training as indeed did the opportunities to work collaboratively. More advanced apprentices not only engage more actively in asking questions and requesting help than their younger counterparts, but it is also clear that the work configurations in which they are involved in the later years of training provide more affordances to engage in questioning and information seeking.

There is another indicator which confirms this positive development in the affordances offered to apprentices as their expertise grows. It also explains why more advanced apprentices tend to work collaboratively more often than beginners. This indicator comes from analysis of the nature of the activities performed by the apprentices at the moments when they asked for help. Car maintenance and the preparation of a car for the regular technical controls required by law are the main activities of every garage. Our observations confirm that apprentices perform these activities from the beginning of their training. It can be seen, however, that more complex and less frequent tasks, such as troubleshooting, are rarely performed by apprentices in their first two years of training. In the first half of their training, less than 3% of the requests were indeed formulated while engaged in such tasks. In the second half of the training, troubleshooting becomes a more frequent activity, reaching 8% for Year 3 and 4. Although not huge, this development, combined with the observations made earlier, confirms that workplaces tend to provide advanced apprentices with more opportunities than beginners to ask questions and to request help.

*Impact of Apprentices' Requests on the Social Configurations of Work*

Having examined the social configuration within which requests for help and questions mainly occur, it is also interesting to see what happens to these requests and whether they change the work configuration, bringing collaboration into a working alone situation or splitting work previously carried out collaboratively. Fortunately for the apprentices, all requests for intervention or direct physical help are followed sooner or later by the expected outcome, whether directly from the person addressed or from somebody else at the workplace. In contrast to this, requests for information rarely changed the social configuration of work. The

**Table 2** Percentages of requests according to the social configuration of work

Training year	Requests introduced while	
	Working alone	Collaboratively
Year 1	79.16	20.84
Year 2	33.33	66.67
Year 3	43.39	56.61
Year 4	37.95	62.05

majority of the requests for information made while working alone saw apprentices continuing their work alone after receiving the answer (87.56%), while only 3% of the requests made while working collaboratively changed the work configuration into a “work alone” situation after the question had been answered. No meaningful development over the years of training can be noted for consequences of requests. For each year of training, the proportion of changes in the work configuration after a request remained within 5% of the mean values given above.

### Whom is Asked for Help or Questions in the Workplace

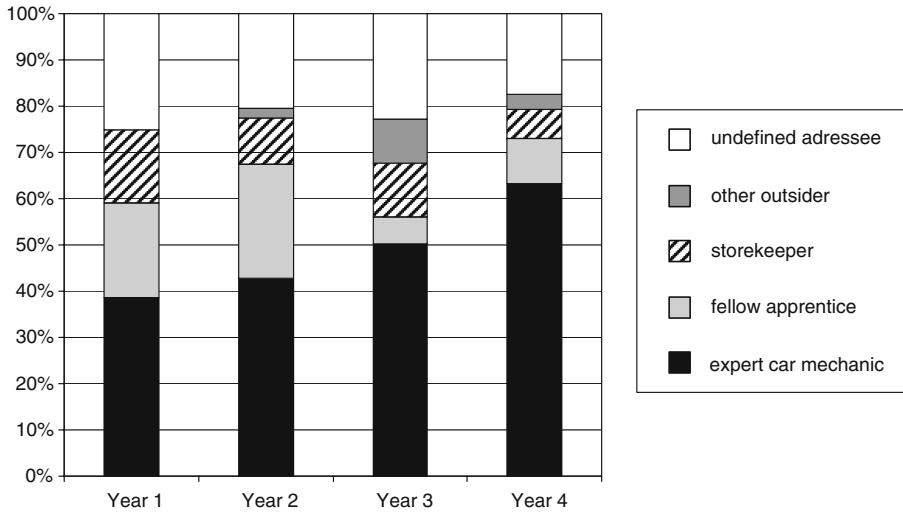
The technique used to collect data makes it sometimes not possible to identify the addressee, especially when several people are simultaneously involved in an interaction. For this reason nearly 20% of the cases had to be classified as “undefined addressee”. Nevertheless, because it makes possible to question the apprentice back anytime, the technique can provide more elaborate information than a mere voice recording of what is being said. Data clearly show (see Fig. 3) that while less than half of the questions and help-requests are addressed to an expert car mechanic during the first two years of the apprenticeship, this proportion continuously raises over the years to come close to two-thirds of the requests in the last year of training.<sup>11</sup> On the contrary, requests addressed to another apprentice are proportionally more frequent during the first two years of the training than during the next two years.

### Apprentices’ Learning Assistance in the Workplace

Workplaces are engineered principally so that they can contribute to the production cycle in which companies are involved. Unlike schools, they do not have learning as their main aim. But the fact that learning occurs within workplaces is now rarely denied and it is often used as an argument to justify the inclusion of practice, internship or workplace experiences in many curricula or training programs (Billett 2008). Since traditional models of how learning takes place do not apply very well to these contexts, new models have been proposed, often inspired by Vygotsky (1978), Collins et al. (1989), Rogoff (1990) or Lave and Wenger (1991). We now know that learning at the workplace is a contextually and socio-culturally shaped process (Etelepälto 2008), conditioned by both the personal engagement of the learner and by the affordances offered by the workplace (Billett 2001).

Because of the difficulty of being able to observe and capture data as these events occur, researchers studying workplace learning often rely on second hand data, asking the actors themselves, apprentices, beginners or experts, to report on what happened or to evaluate the changes they notice as their knowledge or skills improve. To overcome this limitation, increasingly researchers use direct, synchronous methods to capture “on the spot” evidence of learning and to observe “in vivo” the context, situation, social and cultural organization of the arena in which learning

<sup>11</sup> The two apprentices working in small garages were left aside for this analysis because the only persons they can talk to in such structures were expert car mechanics.



**Fig. 3** Proportions of the different types of addressees to whom the requests captured in the interactive sessions are addressed

occurs. In this study, we used portable mobile phones, left switched on and carried by the apprentices throughout their work, in order to collect data on the nature and conditions of the work they had to perform as well as on the questions they asked and the help they received at the workplace. This technique proved useful and reliable since, unlike other recording techniques, mobile phones allow the researcher to interact with the learner directly and to ask for more details whenever something is not clear, but without being too intrusive or interfering too much with the working context.

From the beginning of their training period, apprentices are granted a large measure of autonomy at the workplace (Duc and De Saint Georges 2009; Filliettaz 2010b). Although they are informed that they should carry out tasks as far as possible by themselves, apprentices are also supposed to ask questions and to request help whenever they have doubts or do not know exactly how to perform an operation. However, although potential helpers are generally available, asking questions and requesting help remain risky behaviors (Edmondson 2003). Our data clearly confirm that apprentices in the earlier years of their training ask fewer questions and introduce fewer requests than apprentices in the later years of training. Furthermore, when they post a request, it is addressed to a fellow apprentice more than twice as often as what is done by more advanced apprentices. This observation is in line with Edmondson (1999), who had noticed that the status of the potential addressee often is a critical point in deciding whether or not to ask for help. Our findings indicate, however, that it is not so much the status of the addressee per se but the perceived difference between the status of both actors which is the determinant factor. Knowing that they are reaching the end of their apprenticeship seemingly gives the apprentice more power and confidence to engage in an interaction with an expert car mechanic than was the case at the beginning of his training. The raising proportion of requests for information along the years of training also attests the apprentices growing engagement over the years (Billett

2001). When posting a request for information, as we defined them, apprentices are not unable to go on in performing the job they have undertaken. If they introduce a request of that order, it is because they want to learn or understand something they don't know yet, not because they want the job to be done quickly.

An analysis of the context in which requests are posted also give clear evidence that workplace such as garages allow apprentices more and more opportunities to ask questions and to introduce requests as they advance in their training. First, the higher frequency of collaborative work recorded in the sessions run with more advanced apprentices makes it easier for them to ask questions and to receive direct answers from the partner involved in the collaboration. Second, giving the fact that this partner is more and more often an expert car mechanic rather than another apprentice, the possibility to receive informed answers is increased, which makes the interest of asking questions even larger. Finally, the fact that more advanced apprentices are given a chance to work on more complex and seldom seen tasks than apprentices in their first years of training, often in collaboration with or under the supervision of an expert car mechanic, also contributes to make asking questions and requesting explanations more relevant for them. Furthermore, while routine tasks, such as car maintenance for instance, are attributed by the constructor a precise time to be carried out, thus allowing less flexibility to ask questions and discuss issues, more complex tasks like trouble-shooting cannot be so precisely timed; taking time to consider several possibilities before operating may at the end save time rather than cost time, a result which is welcome by the whole enterprise. To summarise, studying how often and when apprentices ask questions and request help at the workplace gives opportunities to examine the way learners' engagement and the workplace affordance mutually regulate each other in workplace learning. This was done, in the present paper, at the aggregate level. Going down to the individual level, i.e. looking at how a particular workplace react to the behavior and attitudes of a particular apprentice was beyond the scope of the present study but would definitely be worth doing. We suspect, however, that the principles detected in our study would stay true, that the learner's engagement and the workplace affordances will remain synchronized the way we observed it and that only the rhythm in which the whole process unfolds should change from individual to individual and from workplace to workplace.

Initially characterized as a dependant act, revealing lack of understanding or slow-wittedness, asking questions and requesting help is now characterized as a proactive and mastery-oriented activity (Newman 1994) in which motivated and able students engage when facing a problem (Zimmerman 2002). Our data show that in the course of their apprenticeship, apprentices learn to become more and more efficient with their requests and that workplaces do have many possibilities to adapt to and even encourage this evolution. Since, according to apprentices involved in the dual track system, seeking help in the enterprise contributes more to their own learning than doing it at school (Gurtner and De Rocha Trindade 2008), workplace trainers should be encouraged to stimulate apprentices questions and requests. Many enterprises remain nevertheless scarred to hire apprentices because of the time they may possibly have to spend assisting the apprentices and answering their questions (Wolter et al. 2006). Our observations show however that less than a quarter of the requests posted by apprentices asked the trainers to intervene and to provide them with direct help. Perhaps data like these can make trainers at the workplace better



aware of the importance of letting apprentices ask questions and of answering their requests while, simultaneously, reduce their fears that these behaviors might have negative effects on the accomplishment of their own work.

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## References

- Argyris, C., & Schön, D. A. (1974). *Theory in Practice: Increasing Professional Effectiveness* (1st ed.). San Francisco: Jossey-Bass Publishers.
- Billett, S. (2001). Learning through work: Workplace affordances and individual engagement. *Journal of workplace learning*, *13*, 209–214.
- Billett, S. (2006). Relational interdependence between social and individual agency in work and working life. *Mind, Culture and Activity*, *13*, 53–67.
- Billett, S. (2008). Emerging perspectives on workplace learning. In S. Billett, C. Harteis, & A. Eteläpelto (Eds.), *Emerging perspectives of workplace learning* (pp. 1–15). Rotterdam: Sense Publishers.
- Bonoli, L., & Ghisla, G. (2008). I sistemi formativi nei paesi di riferimento: Austria, Francia, Germania, Italia, Regno Unito e Svizzera. In G. Ghisla, L. Bonoli, & M. Loi (Eds.), *Economia della formazione professionale* (pp. 3–64). Novara: UTET.
- Butler, R. (1998). Determinants of help seeking: Relations between perceived reasons for classroom help-avoidance and help-seeking behaviors in an experimental context. *Journal of Educational Psychology*, *90*, 630–643.
- Chen, G. D., Chang, C. K., & Wang, C. Y. (2008). Ubiquitous learning website: Scaffold learners by mobile devices with information-aware techniques. *Computers & Education*, *50*, 77–90.
- Collins, A., Brown, J. S., & Newman, S. E. (1989). Cognitive apprenticeship: Teaching the crafts of reading, writing, and mathematics. In L. B. Resnick (Ed.), *Knowing, learning, and instruction: Essays in honor of Robert Glaser* (pp. 453–494). Hillsdale: Lawrence Erlbaum Associates.
- Duc, B., & De Saint Georges, I. (2009). Développer l'autonomie dans un dispositif de formation professionnelle initiale: les ressources de l'interaction. *Bulletin suisse de linguistique appliquée*, *90*, 99–124.
- Edmondson, A. C. (2003). Managing the Risk of Learning: Psychological Safety in Work Teams. In M. West (Ed.), *International Handbook of Organizational Teamwork* (pp. 255–276). London: Blackwell.
- Edmondson, A. C. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, *44*, 350–383.
- Eteläpelto, A. (2008). Perspectives, prospects and progress in work-related learning. In S. Billett, C. Harteis, & A. Eteläpelto (Eds.), *Emerging perspectives of workplace learning* (pp. 233–247). Rotterdam: Sense Publishers.
- Evans, K., Hodkinson, P., Rainbird, H., & Unwin, L. (2006). *Improving workplace learning*. London: Routledge.
- Fenwick, T., & Sommerville, M. (2006). Work, subjectivity and learning: Prospects and issues. In S. Billett, T. Fenwick, & M. Sommerville (Eds.), *Work subjectivity and learning. Understanding learning through worklife* (pp. 247–265). Dordrecht: Springer.
- Festner, D., & Gruber, H. (2008). Conditions of work environments in fostering transfer of learning. In S. Billett, C. Harteis, & A. Eteläpelto (Eds.), *Emerging perspectives of workplace learning* (pp. 215–231). Rotterdam: Sense Publishers.
- Fillietaz, L. (2010a). Dropping out of apprenticeship programs: evidence from the Swiss vocational education system and methodological perspectives for research. *International Journal of Training Research*, *8*(2), 141–153.
- Fillietaz, L. (2010b). Guidance as an interactional accomplishment: Practice-based learning within the Swiss VET system. In S. Billett (Ed.), *Learning through practice: Models, traditions, orientations and approaches* (pp. 156–179). London: Springer.
- Fleck, M., Frid, M., Kindberg, T., O'Brien-Strain, E., Rajani, R., & Spasojevic, M. (2002). From informing to remembering: ubiquitous systems in interactive museums. *Pervasive Computing*, *1*(2), 13–21.

- Frese, M., & Fay, D. (2001). Personal initiative (PI): An active performance concept for work in the 21<sup>st</sup> century. In B. M. Staw & R. M. Sutton (Eds.), *Research in organization behavior* (Vol. 23, pp. 133–187). Amsterdam: Elsevier.
- Gurtner, J.-L., & De Rocha Trindade, B. (2008). *Contrasting attitudes towards help-seeking at vocational school and at the workplace*. Paper presented at the 4th EARLI SIG 14 Learning and Professional Development Conference, University of Jyväskylä, Finland, August 27–29, 2008.
- Hidi, S., & Renninger, K. A. (2006). The Four-phase model of interest development. *Educational Psychologist*, *41*, 111–127.
- Hökkä, P., Rasku-Puttonen, H., & Eteläpelto, A. (2008). Teacher educators' workplace learning. In S. Billett, C. Harteis, & A. Eteläpelto (Eds.), *Emerging perspectives of workplace learning* (pp. 51–65). Rotterdam: Sense Publishers.
- Holzinger, A., Nischelwitzer, A., & Meisenberg, M. (2005). Mobile Phones as a challenge for m-Learning: Examples for mobile interactive learning objects (MILOs). Proceedings of the 3rd International Conference on Pervasive Computing and Communications Workshops (pp. 307–311). doi:10.1109/PERCOMW.2005.5.
- Karabenick, S. A., & Newman, R. S. (Eds.). (2006). *Help Seeking in Academic Settings: Goals, Groups, and Contexts*. Mahwah: Lawrence Erlbaum Associates.
- Laru, J., & Järvelä, S. (2003). Applying wireless technology for coordinating collaboration in distributed university teachers' team. In B. Wasson, R. Baggetun, U. Hoppe, & S. Ludvigsen (Eds.), *International Conference on Computer Supported Collaborative Learning CSCL2003 Community Events Communication and Interaction* (pp. 77–79). Bergen: InterMedia.
- Laru, J., & Järvelä, S. (2004). Scaffolding different learning activities with mobile tools in three everyday contexts. In P. Gerjets, P. A. Kirschner, J. Elen, & R. Joiner (Eds.), *Instructional design for effective and enjoyable computer-supported learning*. Proceedings of the EARLI SIGs Instructional Design and Learning and Instruction with Computers (pp.11–21). Tübingen: Knowledge Media Research Center.
- Lave, J., & Wenger, E. (1991). *Situated learning. Legitimate peripheral participation*. Cambridge: Cambridge University Press.
- Mifsud, L. (2002). *Alternative Learning Arenas— Pedagogical Challenges to Mobile Learning Technology in Education*. Proceedings. IEEE International Workshop on Wireless and Mobile Technologies in Education, 112–116. doi:10.1109/WMTE.2002.1039231.
- Newman, R. S. (1994). Adaptive help-seeking: A strategy of self-regulated learning. In D. Schunk & B. Zimmerman (Eds.), *Self-regulation of learning and performance: Issues and educational applications* (pp. 283–301). Hillsdale: Erlbaum.
- Rau, P.-L. P., Gao, Q., & Wu, L.-M. (2008). Using mobile communication technology in high school education: Motivation, pressure, and learning performance. *Computers & Education*, *50*, 1–22.
- Rogoff, B. (1990). *Apprenticeship in thinking*. New York: Oxford University Press.
- Roschelle, J., & Pea, R. (2002). A walk on the WILD side: How wireless handhelds may change computer-supported collaborative learning. *International Journal of Cognition and Technology*, *1*, 145–168.
- Ryan, A. M., & Pintrich, P. (1997). "Should I Ask for Help?" The Role of Motivation and Attitudes in Adolescents' Help Seeking in Math Class. *Journal of Educational Psychology*, *89*, 329–341.
- Scanlon, E., Jones, A., & Waycott, J. (2005). Mobiles technologies: prospects for their use in learning in informal science settings. <http://jjme.open.ac.uk/2005/25/scanlon-2005-25-paper.html>. Accessed 08 April 2008.
- Sharples, M. (2002). Disruptive Devices: Mobile Technology for Conversational Learning. *International Journal of Continuing Engineering Education and Life Long Learning*, *12*(5/6), 504–520.
- Trifonova, A., & Ronchetti, M. (2004). A general architecture to support mobility in learning. In *Fourth IEEE international conference on advanced learning technologies (ICALT'04)*, (pp. 26–30).
- Vahey, P., & Crawford, V. (2002). Palm education pioneers program: Final evaluation report. Retrieved April, 2, 2008 from: <http://www.palmgrants.sri.com/findings.html>.
- Virtanen, A., Tynjälä, P., & Stenström, M.-L. (2008). Field-specific educational practices as a source for students' vocational identity formation. In S. Billett, C. Harteis, & A. Eteläpelto (Eds.), *Emerging perspectives of workplace learning* (pp. 19–34). Rotterdam: Sense Publishers.
- Vygotsky, L. (1978). *Mind in society*. Cambridge: Harvard University Press.
- Wolter, S. C., Mühlemann, S., & Schweri, J. (2006). Why some firms train apprentices and many others do not. *German Economic Review*, *7*, 249–264. Article first published online, doi:10.1111/j.1468-0475.2006.00155.x.
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, *41*, 64–70.

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