

Supervision of Apprentices in Semiskilled Trades: Program Stipulations and Workplace Realities

Supervision d'apprentis en métier semi-spécialisé: prescriptions de programme et réalité des stages

Supervisión de los aprendices de oficio semi-especializado: prescripciones de programa y realidad de las formaciones prácticas

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Résumé de l'article

La recherche effectuée vise à décrire l'environnement social entourant la période d'entrée en emploi d'élèves inscrits à la nouvelle Formation menant à un métier semi-spécialisé (FMS), en oeuvre au Québec depuis 2007. Les jeunes visés par la FMS ont tous entre 15 et 17 ans. Ils sont considérés plus à risque de développer une lésion professionnelle que les travailleurs plus âgés. Dans une perspective de prévention, les auteurs proposent de mettre à plat l'écart entre le cadre prescrit de supervision en entreprise des élèves inscrits à la FMS et la dynamique sociale réelle lors de leur accueil et intégration en milieu de travail, suivant un cadre d'analyse ergonomique de l'activité. Les résultats présentés sont issus d'une recherche intervention visant à intégrer la prévention des lésions professionnelles au programme de formation. Les résultats montrent que les conditions d'accueil et de parrainage sont bien différentes de ce qui est prescrit dans le programme de formation. Les stagiaires sont tous dans des situations très différentes, selon le contexte de leur entreprise de stage et le métier choisi. Bien souvent l'élève est entouré de plusieurs pairs significatifs et pas seulement du superviseur désigné. Cela dit, l'accessibilité aux ressources n'est pas toujours immédiate et les jeunes peuvent rencontrer certaines difficultés à obtenir de l'aide. Au regard de ces résultats, le modèle du binôme superviseur – apprenti proposé dans ce programme devrait être revu pour maximiser l'utilisation des ressources et favoriser l'apprentissage lié à la préservation de la santé. Les entreprises doivent se questionner sur les conditions d'accueil et d'intégration sécuritaire et compétente qu'elles offrent aux élèves qu'elles acceptent de former.

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Supervision of Apprentices in Semiskilled Trades: Program Stipulations and Workplace Realities

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The article focuses on discrepancies between institutional stipulations for apprenticeship placement conditions in the Quebec Training for a Semiskilled Trade (TST) program in contrast to socio-environmental realities encountered by students in the workplace. An intervention research study was held in order to integrate Occupational Health and Safety concerns into the training program. The methodological frame used data triangulation, including document analysis, teacher and student interviews and workplace observation. Contrary to program stipulations, most students were guided by several coworkers during apprenticeships. Insufficient access to resources, however, has led to young workers encountering difficulties in getting assistance when needed. The traditional supervisor-apprentice partnership would be best revised to maximize the use of all valuable on-site resources and ensure students develop skills to stay healthy at work.

KEYWORDS: young workers, Occupational Health and Safety (OHS), vocational training, social learning environments, ergonomics intervention

Introduction

The ergonomics intervention study associated with this article emerges at a particular socio-political juncture in Quebec that led to a request for an ergonomic intervention.¹ On one hand, for the last 10 years, society has been witnessing consistent efforts aimed at preventing workplace injury among young workers

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(CSST, 2003: 36), who are proportionately more prone to be injured at work (Breslin *et al.*, 2007). In addition, the Quebec Ministry for Education, Recreation and Sports (MELS)² has recently set major curricular reform in motion, leading to a diversification in educational paths, partly to provide better opportunities for students with particular needs such as those who risk dropping out or not being successful at secondary school (MELS, 2008).

In 2007, the Training for a Semiskilled Trade³ (TST) program was implemented within the various Quebec School Boards for this very purpose. TST is a vocational education program aimed at adolescents between the ages of 15 and 18 and who experience a moderate level of difficulty with regular school programs. It aims to prepare students for immediate entry into the work force in a semiskilled trade of their choosing (Laberge *et al.*, 2010). This program boasts some particularities which distinguish it from other such vocational education programs worldwide. Students must have successfully completed primary school (up to 6th grade), however, they must have failed the regular school program in both Grades 7 and 8 in order to be eligible to enrol. At the very early stages, there is no affiliation with a vocational training domain; trades are selected during the first month under career guidance as part of the program's workplace readiness classes. In class, students who have selected different semiskilled trades will learn alongside each other. Over the first year of training, students divide their time each week between remedial classes, workplace readiness courses (in a classroom environment) and learning a trade through a "hands-on" internship. Irrespective of the chosen trade, all programs are comprised of 375 hours of work experience. After only a few short years, this program was classified as an "innovative practice" by the member nations at the Conférence des ministres de l'Éducation ayant le français en partage⁴ (CONFEMEN, 2010).

The Ministry's (MELS) desire to include OHS prevention as a fundamental part of this new training program led to an ergonomics intervention study. The mandate concerned the training program overall and not the individual situations encountered by students during internships. In the ergonomics field, current theoretical knowledge linking on-the-job learning and OHS ramifications predominantly stems from studies pertaining separately to specific trades (St-Vincent, Lortie and Tellier, 1989; Chatigny and Vézina, 1995; Cloutier *et al.*, 2002; Chassaing, 2004; Monfort, 2006; Ouellet and Vézina, 2008 and 2009), which reinforced the need for a new study with a multi-trade OHS approach. Hence, for this present study to expand on existing research, recommendations were intended to apply to a multitude of trades. Methods were designed to answer multiple needs expressed by the various stakeholders, Education Ministry delegates, management and union representatives from the educational institutions and OHS prevention specialists. The choice to combine qualitative

and quantitative methods, and the use of numerical data to describe qualitative factors, allowed for the documenting of a wide range of work experience contexts to gain a consensus among partners before moving ahead (Messing *et al.*, 2005). Furthermore, this method proved an original and complementary way to present certain data that has previously been presented as purely qualitative. The article forms part of the intervention in that it reports on discrepancies between the institutional supervisory guidelines and actual supervisory practices observed during internships. This, in turn, allowed for the elaboration of a set of OHS training and learning recommendations and tools which consider realities experienced in the workplace and, more specifically, the highly diverse internship experiences from one workplace or job to another.

Cumulative Occupational Injury Risk Factors for TST Students

It would appear that specific factors engender greater risk of occupational injury among young workers. *Insufficient experience* in a given trade heightens the risk of injury. Analysis of the Ontarian provincial database of occupational injury claims by Breslin and Smith (2006) showed that the occupational injury rate is up to six times greater during the first month of employment than after one year in the same position. The authors of the study cite a lack of employee training, as well as an insufficient supervision process as possible causal factors in their findings.

Under-qualification is another factor putting youth in a vulnerable position with respect to occupational injury. Analysis of a large-scale Canadian Community Health Survey revealed that, of all youth between 15 and 24 years of age, those no longer pursuing studies and without a high-school diploma ran the greatest risk of workplace injury (Breslin, 2008). These results can be attributed to weaker social support mechanisms in the jobs these young workers occupy.

Breslin and Pole (2009) also identified links between the risk of occupational injury and *learning difficulties* among a large sample of young workers. This finding can predominantly be attributed to the high-risk job types held by the young workers in question. Youth with dyslexia run a substantially greater risk, even after adjustment for work variables. Breslin and Pole (2009) question whether the supervision and training provided to such youth is adequate for these types of workers, given their individual characteristics (e.g. memory and communication skill-sets).

TST students accrue several risk factors making them vulnerable with respect to occupational injury, underlining the importance of embracing occupational injury prevention in vocational training efforts. The hypotheses advanced in all the aforementioned research studies point to deficient social support mechanisms at work for young workers, particularly with respect to training, supervision and

peer support networks. Cohen-Scali (2008) suggests the hypothesis that youth with a history of school failure may prove more sensitive than others to a need for supportive relationships when integrating a new organization or work setting.

Learning a New Job and OHS Prevention

For a long time now, psychologists and sociologists have been describing how the social environment can support – and may even be imperative to – situated learning (Vygotski, 1934; Doise and Mugny, 1981; Lave and Wenger, 1991; Jonnaert, 2009). Particularly in relation to workplace situated learning, as for instance in vocational training programs, studies have shown how the workplace social frameworks (through formal internship supervision, plus formal and informal support roles) act as a resource in the socialization process (Cohen-Scali, 2008), in the development of work skills (Agulhon and Lechaux, 1996), and for the acquisition of experience (Mayen, 2006).

With respect to guidance for interns in vocational education contexts, Agulhon and Lechaux (1996) showed differences between prescribed versus actual supervisory models within work environments. According to the authors, vocational training supervisory models were designed mostly by the educational institution. In practice however, these models are almost non-existent. Unfortunately, it appears that vocational educators and policy makers are not entirely familiar with the operational realities involved with the supervision of apprentices in workplace settings, nor with the categories of individuals who end up guiding students once they go on-site. Cohen-Scali (2008) also distinguishes formal from informal workplace support roles, and the respective roles of each of these with regard to student work expectations and career aspirations. First and foremost, Cohen-Scali noted that official and unofficial support roles do not necessarily function concomitantly, but rather disjointly. According to the author, informal coaching acts as a means to becoming part of the work collective, and is beneficial to organizational socialization. As for the formal supervisory roles, specific impact on professional development has not been demonstrated.

Many ergonomists have also studied the process of situated learning in a workplace setting with an aim to prevent injury and enhance workers' health (St-Vincent, Lortie and Tellier, 1989; Vézina *et al.*, 1999; Chatigny, 2001; Montfort, 2006; Ouellet and Vézina, 2008) and as a means to integrate and retain newcomers in physically demanding trades (Gaudart, Delgoulet and Chassaing, 2008). Chatigny (2001) carried out two studies in distinct contexts to document the gradual development of resources, called "operational resources"⁵ (that can be spatio-temporal, human and material), whilst building on professional skills and health prevention know-how. The author noted that the provided resources were customarily spatio-temporal and material in type, while resorting to human

resources happens more informally. Chatigny (2001) also showed that in settings where material and spatio-temporal resources were deficient, the mobilization of human resources increased substantially.

Vézina (2001) developed an interesting model about work activity regulation and its determinants to better understand health and safety outcomes. This model suggests that the work activity regulation process has an impact on both health and productivity. To balance these two poles, workers need to acquire adequate adjustment strategies that account for personal and environmental realities and require a sufficient margin of manoeuvre to then deploy them. This model shows the social environment as a determining factor in the work activity regulation process and as having an impact on the worker's margin of manoeuvre (St-Vincent *et al.*, 2011). This model is useful in understanding the link between learning a new job and staying healthy at work. Thus, to maintain good health, despite the amount of risk inherent to a given job, developing a sufficient margin of manoeuvre becomes an important factor in the learning process and, in doing so, the social framework is key. According to this model, the workplace social environment encompasses two aspects: 1) organizational culture and social structures and 2) coworkers who may interact with the worker. To further develop on contributions made by the field of ergonomics in designing learning settings, this article refers more specifically to the latter of the two. Current OHS knowledge on the youth workforce leads us to believe that this empirical subject would be highly relevant to preventing workplace injury for TST students.

Objective

The objective is to describe the discrepancies between how the TST program intends for supervision to play out and the realities of how internship supervision in fact occurs on-site in the work setting. For this purpose, this article will 1) present institution-based apprenticeship supervisory guidelines, 2) identify which company staff members are most involved with apprentices in the workplace, 3) quantify access to workplace support staff during internship and 4) determine who communicates with whom and who initiates communications between interns and various staff members. The above objectives will converge to form an ergonomics diagnostic and, subsequently, lead to the proposal of training and learning recommendations and tools in order to better reconcile the institution-based program with the diverse realities observed in actual work experience contexts.

Methods

The methodological approach inspired by Guérin *et al.* (2006) and St-Vincent *et al.* (2011) enables the documentation of discrepancies between work expectations and work realities, by triangulating methods and data sources.

Study Participants

In conjunction with the study's stakeholders, two schools from different school-boards and socioeconomic contexts were selected. Throughout the study period, these schools enrolled a total of 90 TST students. A sample of 31 students was selected to illustrate a variety of work scenarios (trades, workplaces). A sub-sample of nine students was selected from among this group to facilitate a more in-depth analysis of the work setting; for these students, host companies had to consent to video-recorded data collection. Two interns worked for the same company. Table 1 describes the participant profiles and their work settings; five students from the sample group of 31 withdrew from the study program during the year and did not complete the data collection process. Two girls cited health reasons (an Assistant-Groomer and a Hair Salon Assistant), while three boys left due to a lack of motivation (a Tire Installer, a Sales Clerk, and a Woodworker).

TABLE 1
Characteristics of Participants (Students) at Start of Internship

		General Sample (N = 31)		Sub-Set of Students Observed during Internship (N = 9)	
		M (N = 18)	F (N = 13)	M (N = 8)	F (N = 1)
Chosen Trades	Inventory Clerk	5	4	3	1
	Tire Installer	4	-	-	-
	Woodworker	2	-	1	-
	Cook's Assistant	2	-	1	-
	Auto Parts Clerk	2	-	-	-
	Butcher's Assistant	1	-	1	-
	Printer's Assistant	1	-	1	-
	Welder's Assistant	1	-	1	-
	Hair Salon Assistant	-	4	-	-
	Recreational Centre Attendant	-	2	-	-
	Office Clerk	-	2	-	-
	Assistant Groomer	-	1	-	-
Business Type	VSE–SME in manufacturing	1	-	1	-
	LSE in manufacturing	1	-	1	-
	VSE – SME in transportation	1	1	-	-
	Small business (other)	9	5	2	-
	Chain Store	6	4	4	1
	Service Agency	-	3	-	-

VSE: very small enterprise

M: Male

SME: small and medium-sized enterprises

F: Female

LSE: large-scale enterprise

TABLE 2
Data Collection

Methods	Sources	Data	Timeline
Preliminary Data Collection			
Document analysis	<ul style="list-style-type: none"> • Quebec Education Program • Directory of Semi-Skilled Trades • Internship Planning Guide 	<ul style="list-style-type: none"> • Skill requirements • Internship structure • OHS requirements 	<ul style="list-style-type: none"> • Beginning of study
Semi-structured interviews and informal talk	Teachers (n = 2)	<ul style="list-style-type: none"> • Internship structures • List of internship locations and assigned supervisors 	<ul style="list-style-type: none"> • Beginning of school year (semi-structured interviews) • Throughout the year (informal talk)
Systematic Data Collection			
Two rounds of semi-structured interviews	Students (n = 31 at T1 and 26 at T2)	<ul style="list-style-type: none"> • Supervisors and coworkers involved in the integration process and knowledge transfer 	<ul style="list-style-type: none"> • T1 = after 4 days of internship (average) • T2: after 44 days of internship (average)
Two rounds of video-taped observations	Students (n = 9)	<ul style="list-style-type: none"> • Access to support staff/supervision • Verbal interactions between interns and other speakers 	<ul style="list-style-type: none"> • T1 = after 12 days of internship (average) • T2 = after 46 days of internship (average)

Data Sources

The main sources used were 1) preliminary data including ministry and academic documents, as well as interviews with teachers, 2) two rounds of semi-structured individual interviews with 31 students learning twelve different jobs and, 3) two rounds of actual work observation with nine interns learning six different jobs (for a summary of the main data sources used, see Table 2).

Preliminary Data Collection on Program and Internship Structure

The study program's stipulated framework and the workplace internship structure were described based on information collected during informal meetings with teachers in charge of internships and by consulting ministry documents. An understanding of the teacher's role and needs within the internship structure and their required follow-ups with students throughout internships was achieved through semi-structured teacher interviews.

Semi-Structured Interviews with Students

Two rounds of semi-structured individual interviews were held with 31 students at the beginning of the internship (T1) and at the end of the internship (T2; n = 26). Open-ended questions were mainly used, in addition to some closed questions, in the basic interview structure. Researchers created the questions, subsequent to

the collection of preliminary data. Some questions were asked at both times (T1 and T2; e.g. injuries sustained) while other questions specifically related to one timeline within the internship context (T1 or T2). The recorded responses were transcribed in Excel. Closed questions were examined quantitatively (frequency, percentage) and open-ended questions were analyzed following a content analysis framework (Bardin, 2007).

Observation of Full Work Shifts

Observation of full internship days for nine students was performed on two occasions; near the beginning (T1) and towards the end of the internship (T2), approximately six months later. All observations were videotaped with the exception of one student during the first round. In this particular case, the company had not yet received authorization from their head office to do so. For this subject, data were collected with a paper and pen. A full day for these students is equivalent to the amount of hours in a regular school day; five hours for school A (six students) and six hours for school B (three students). Observation was interrupted during breaks, making the average analyzed footage at T1 4.8 hours and five hours at T2 (see Table 3 for duration of the observation period per participant). One subject could not be taped for a full day during the second round as a result of the company only permitting a half-day observation. The work timeline was analyzed using CAPTIV software which enables events to be time stamped (time of day, length, sequence). In T1, 42:58:42 hours of observation were analyzed, of which 4:49:00 hours were documented by pen and paper; while 41:17:29 hours were analyzed in T2. During the video transfer, a computer bug erased 2:27:49 of footage for three participants in T2.

TABLE 3
Duration of the Observation Period for Each Participant

Students	Duration of Observations (in hours)	
	T1	T2
1 = Woodworker (M)	4,7	6,0
2 = Assistant Welder (M)	5,1	1,6 ^a
3 = Printer's Assistant (M)	5,2	5,0
4 = Clothing Inventory Clerk (F)	3,9	4,4
5 = Pharmacy Inventory Clerk (M)	4,4	4,6
6 = Pharmacy Inventory Clerk (M)	4,2	4,6
7 = Appliances and E-Commerce Inventory Clerk (M)	4,8	4,4
8 = Butcher's Assistant (M)	5,2	5,3
9 = Cook's Assistant (M)	5,4	5,6
Average	4,8	5,0
Standard deviation	0,53	0,62
Total	43,0	41,3

M: Male F: Female

^a Subject 2 was excluded from the average and the standard deviation because he was not observed for a complete shift.

Analysis

Staff-Members Involved in Supervision and Support Roles

Students answered the following question during the first interview: Do you have a colleague(s) at work who was specifically given the task of showing you how to do your job? Subsequent to reading the responses, they were sorted into four categories.

- 1) A colleague was officially given this task. In this case, the response was categorized according to whether this person was a superior or a coworker in a similar position within the company.
- 2) A colleague unofficially assumed this role.
- 3) Several people were identified in support roles.
- 4) No one was identified.

During the second interview, they answered the following question: Which person/people showed you the tasks for which you are responsible and from whom did you learn how to do your job? Staff members who were identified were then listed.

Need for and Access to Supportive or Guiding Colleagues

The video recordings assisted in the calculation of the time spent looking or waiting for a colleague's assistance when an issue arose during the work day. This is often a stressful or insecure situation according to students met in semi-structured interviews. The code "seeking help" was recorded when the intern 1) interrupted their task to go find someone or 2) was waiting for direction on what to do in between tasks. The frequency and ratio of time spent in these situations was calculated at the beginning and end of the internship. For the subject who was not filmed during T1, the pen and paper method was used to track time markers.

Communications between Interns and Staff Members

The camcorder used for filming was equipped with a high-quality audio recording system. All verbal communication and body language cues between two or multiple participants were coded. For the purpose of this article, two-person work-related conversations involving interns were analyzed in greater depth. Any retained content was cut into units of communication defined by conversations without breaks over one minute in duration, and pertaining to a single topic. Each unit was coded by labelling the speaker and the person with whom they engaged. This was done in such a way as to be able to identify different workplace communications between involved parties, specifically the frequency and direction of such communications (see Table 4 for speaker categories). This was followed by a quantitative analysis (percentage, distribution). A content analysis of the communications is discussed in a complementary paper as part of the same doctoral thesis (Laberge, 2011: chap. 6).

TABLE 4
Categories of Colleagues in Interaction with Interns

Designated Internship Supervisor	Person responsible for the intern overall in the workplace and the main liaison with the school. One student switched supervisors between T1 and T2 (Student 7).
Official or Unofficial Mentor	A person who is officially or unofficially asked to demonstrate the job to the novice. For two students, this person changed between T1 and T2 (Students 1 and 9). Two students had no mentors (3 and 4) as their supervisors assumed the role.
Coworkers / same line of work	Any coworkers with no authority over the student and in the same line of work as the intern. They may be equally specialized or at a superior level (e.g. a butcher and a butcher's assistant).
Coworkers / diff. line of work	Any coworkers whose line of work varies from that of the intern (e.g. a waiter and a cook's assistant).
Management Staff	Anyone with authority over the intern besides the designated workplace internship supervisor.

Note: These categories were based on informal and formal information provided by teachers, internship supervisors and students.

Results

Program Supervision Stipulations

Internships are supervised by a *teacher* who is responsible for facilitating classroom reflection sessions and making periodic visits to internship locations. The teacher assesses the internship's success or failure, based on the achievement of stipulated MELS' competencies (Laberge *et al.*, 2010). This assessment is based on information communicated by the student during classroom sessions and in consultation with the *workplace internship supervisor*. The MELS internship structure guidelines requires host companies to assign a person within the workplace to be responsible for 1) orientation, acclimatization and social integration and 2) the transmission of professional expertise. The teacher considers this supervisor as the main resource in providing student with a learning experience, as well as the principal source of information in terms of tracking the student's progress during their workplace internship.

There are no specific OHS requirements geared towards workplace internship supervisors within the guidelines. However, teachers have few guidelines for assessing the achievement of OHS-related competencies. Essentially, they must assess whether students have learned to follow OHS rules specific to their job.

The Reality of Workplace Internship Supervision

At the beginning of the internship, less than half of the 31 students were able to spontaneously identify a workplace internship supervisor, supposedly assigned to demonstrate their tasks (41.9%) (Table 5). For three students, their supervisors were a hierarchical superior and for ten others, a co-worker responsible for

TABLE 5
Colleagues Assigned at Commencement
of Internship to Demonstrate the Job
(N = 31)

	N	%
A colleague was officially assigned:	13	41,9
• A hierarchical superior	3	9,7
• A co-worker	10	32,3
A co-worker seems to take it upon himself	6	19,4
Several people were involved	7	22,6
No one was assigned	5	16,1

TABLE 6
Number of Colleagues Reported
to Have Participated in the Internship
Training Process by T2 (N = 26)

	N
One colleague identified	2
Two colleagues identified	5
Three colleagues identified	7
Four colleagues identified	6
Five or +	6

tasks similar to theirs. Almost one quarter of students said they were guided by various people and almost 20% believed that the colleague responsible for them was not officially assigned to them. Finally, 16% of students believed that no one specifically assumed the role.

Table 6 illustrates the number of colleagues involved in the training process throughout the internship, as identified by the interns themselves in retrospect (during T2). The majority of students were able to name several people; between three and four people on average. Only two interns identified a single person: one in a very small business (a restaurant) and the other in an isolated department of a retail chain (pharmacy cosmetics department).

Need for and Access to Supportive or Guiding Colleagues

Interns often find themselves at a standstill during shifts. A high percentage of the time, tasks are interrupted and interns are looking or waiting for a colleague's assistance. This may reveal either limited availability of or access to colleagues, difficulty in seeking out assistance, or the interns' own personal hesitation in approaching people (not wanting to bother them or have instructions repeated). The following graphs illustrate the percentage of time (Figure 1) and number of times (Figure 2) during T1 and T2 work shifts that interns found themselves in such situations. There is great inconsistency between the different interns and according to the time at which this scenario occurred (T1 or T2). Students 1 and 8 set themselves apart from the others due to the fact that seeking help or waiting for help takes up little or no time, both at T1 and T2. For student 6, the percentage of time increases between T1 and T2 (from 5 to 16%); whereas for all other students, the percentage of time decreases over time. Thus, the absence of supportive colleagues is experienced more heavily in the early part of the internship and more emphasis on support is necessary during this stage. We conclude, that

FIGURE 1

Percentage of time during a shift spent seeking help, at a standstill or waiting for new instruction

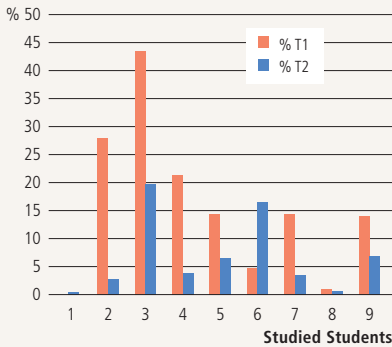
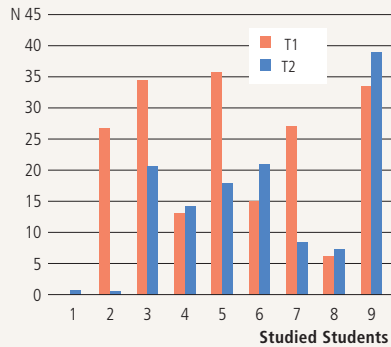


FIGURE 2

Number of time during a shift that the intern was seeking help, at a standstill or waiting for new instruction



for three students (2, 3, and 4), this situation comprised more than 20% during T1 and reached 43% for student 3; nearly 26 minutes within the hour.

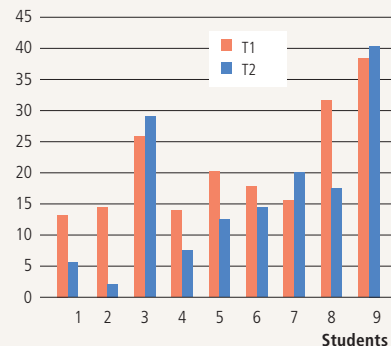
On the other hand, Figure 2 demonstrates that these periods of waiting or looking for assistance decreases in frequency for all students between T1 and T2, except for students 4 and 9. The uncertain periods prove very frequent for some students; specifically five students who found themselves in this situation more than 25 times per day. This demonstrates the need for a person to be close by and reachable, in order for tasks to be performed without interruption. It is equally important to note that several interns continued to seek assistance even towards the end of their internship. Student 6 sought assistance more often during T2 than at T1 (both duration and frequency). These results are due to particular circumstances at T2. A large-scale reorganization of merchandise placement was underway due to seasonal inventory changes. The student had to constantly verify the placement of new products with the person in charge of the reorganization process.

Interactions between Interns and their Colleagues

Overall, 932 interactions took place between the nine interns and other staff members during T1 (average: 104 interactions per intern) and 740 interactions during T2 (average: 93 interactions per intern⁶) (see Figure 3).

FIGURE 3

Average number of work-related interactions per hour between interns and other staff at start (T1) and end (T2) of internship



Three out of nine interns had a greater amount of interaction during the second observation period. At this point in time, work orders for the printer’s assistant (Student 3) had grown in complexity, production volume was unusually heavy for the inventory clerk (Student 7) and the cook’s assistant’s (Student 9) tasks required greater coordination and teamwork. Results for this variable are hence quite divergent and very closely linked to the specific work contexts.

Figures 4 and 5 tabulate communicative exchanges within the workplace sorted by employee type during T1 and T2. All interns participated in exchanges with a variety of workers and were not limited to the prescribed supervisor-apprentice one-to-one relationship. The majority of interactions involved the intern and 1) the assigned supervisor, 2) an unofficial mentor or 3) a colleague in the same line of work.

It is clear that very few apprentices experience the supervisory model put forth by the school program in which the majority of interactions would take place solely between an apprentice and their designated supervisor. Only two students responded well to the school-prescribed supervisory model at both T1

FIGURE 4

Proportion of work-related interactions at start of internship (T1) sorted by employee type (N=932)

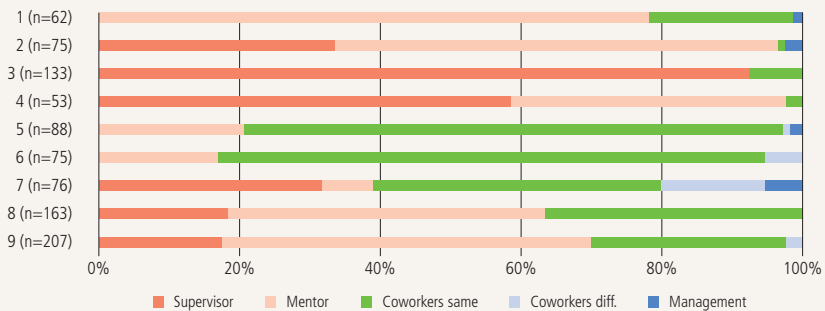
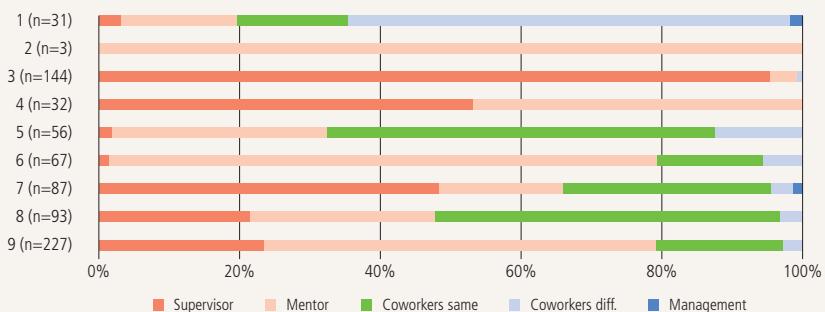
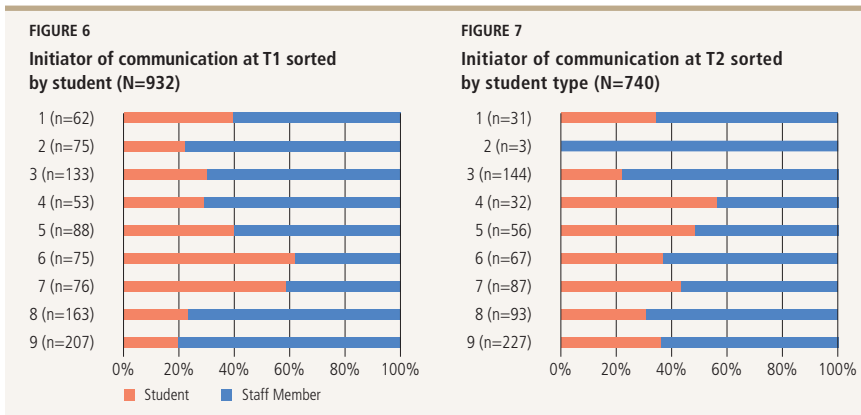


FIGURE 5

Proportion of work-related interactions at end of internship (T2) sorted by employee type (N=740)



and T2 (Students 3 and 4), wherein both cases were businesses with very few employees working during internship hours. In contrast, three students had absolutely no contact with their designated supervisor during the work shift in T1 (Students 1, 5 and 6) while four interns had either a single interaction or no contact at all with their designated supervisor during T2 (1, 2, 5 et 6). Nonetheless, interns are generally supported and monitored by an official or unofficial mentor or by various other colleagues who play the prevailing role. Once again, a highly diverse range of scenarios were noted among the various interns, depending on the time of observation and the specific work context for each person.



Figures 6 and 7 illustrate the proportion of interactions initiated by students in relation to those initiated by any other member of the workforce. In all, the nine interns initiated 33% and 36% respectively of all work-related communication with various members of staff in T1 and T2. They can hence be considered to be relatively active in their interactions with those around them. The four students working as inventory clerks in retail stores seem to approach colleagues the most frequently, predominantly to ask where merchandise should be placed. This observation remained consistent during T2 and can be explained by the fact that these students were not placed in full-time internships, carried out tasks wherein they exercised no decisional leeway with respect to product placement and dealt with frequent inventory location changes related to stock flow.

Figures 8 and 9 show variations in interactions sorted by speaker category. Interactions with formally designated support staff (supervisors or mentors) are most frequent, while apprentices are more likely to initiate interactions with non-designated support staff, perhaps due to being more comfortable conversing casually with a person who holds no formal supervisory role.

FIGURE 8

Initiators of communication at T1 for nine-student sample, sorted by employee type (N=932 interactions)

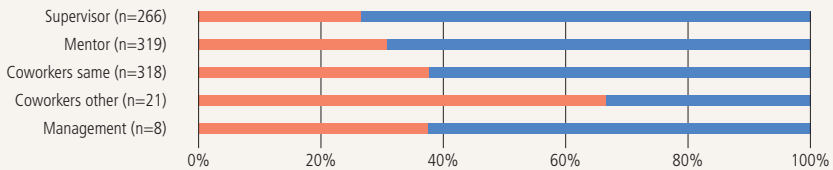
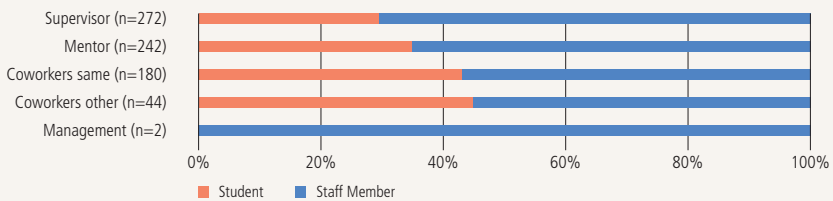


FIGURE 9

Initiators of communication at T2 for nine-student sample, sorted by employee type (N=740 interactions)



Discussion

Study findings indicate a substantial difference between how training institutions perceive internship supervision and the actual supervisory frameworks observed at internship sites. This point should be utilized to develop workplace injury prevention tools for the TST. The institutions' guidelines with respect to OHS training remain unspecific. OHS guidelines, rather than being centred on the teaching/learning mechanisms via supervisory roles, focus on the desired outcome, that being the observance of occupational health and safety rules. Guidelines would therefore seem to be based on postulates that contradict the overall constructivist premise which initially led to the program being created. Hence, the OHS performance criteria present in almost all TST trade programs that states one must "observe OHS rules" presumes that to be competent in OHS one must follow the rules, and that by the same token, the better one follows rules, the more competent a worker becomes. In constructivist theory, however, a body of knowledge lies neither in the object being learned (i.e. the OHS guidelines), nor in the subject who teaches (i.e. the master, coach, guide, etc.), but somewhere in the interactions between student and teacher (Jonnaert, 2006). In such cases, knowing the OHS rule does not suffice, but rather having the ability to modulate it to fit the circumstances. As workers face multiple OHS risks, rather than a single risk, and that work is geared, after all, towards the efficient production of goods and services, it would seem appropriate to approach OHS as part of a dynamic work activity regulation model.

Vézina's model of work activity regulation shows how the regulation process is dependent upon 1) conditions and means offered by the workplace, 2) tasks and

work demands and 3) social environment (Vézina, 2001). Workers select their path of action and strategies considering all the aforementioned parts within the work system. Ouellet and Vézina (2008) studied the know-how acquired by experienced workers in a pork abattoir wherein they defined an efficient skill as a person's ability to apply a set of knowledge to his/her work operations that allows the worker to meet an objective aimed at both production needs and protecting one's health and that of others. Ouellet and Vézina (2008, 2009) demonstrated that this know-how could be passed down from experienced practitioners to others, but also required experimentation to be fully acquired. Herein, the work conditions become learning conditions. The research shows that the pluralistic and decentralized nature of apprentice supervision is a key learning condition in most cases. It would be beneficial to measure whether or not greater access to experienced worker know-how and increased on-the-spot feedback for work acts carried out during practicum might encourage the development of an efficient skill-set.

In addition, Agulhon and Lechaux (1996) explain how tutoring/mentoring models, in the way they are often viewed by vocational training institutions, do not occur particularly organically in the workplace. Vocational education policy-makers believed that the tutor/mentor concept could be transferred from a scholarly setting to an occupational setting regardless of the context. As teachers in vocational institutions follow the progression of apprenticeships from a distance, they are basing their ideas of intern supervision on a mistaken paradigm. In this present study, only half of the students could identify an officially-delegated supervisor, while teachers, on the other hand, viewed this person as a key player. In reality, observations confirm that students are guided by a range of colleagues with different degrees of involvement, and this differs once again from one setting to another. An internship supervisor was unquestionably designated in all observed cases, although he or she was not always apparent or viewed as such by the apprentices themselves. With chosen supervisors not always being production workers, they are not always best placed to transmit know-how related to the practicing of the trade itself. According to observed data, a colleague who works in day-to-day operations is often asked to take on the responsibility of showing work skills to novices. For the purpose of this study, these individuals, when present, have been labelled as official or unofficial "mentors". Although this person constitutes a significant influence (numerous interactions) for the student, they do not constitute a major player for the teacher responsible in drawing up the internship evaluation or in monitoring the internship as it progresses.

Furthermore, interns appear to be more comfortable initiating an exchange with colleagues who do not play an official supervisory role. Only a quarter of supervisor-intern interactions (supervisor designated by teacher) were initiated

by the student, being equally true as much at the start as at the end of the internship. Tanggaard (2005) showed that assigned instructors (supervisors) do not always constitute the most valuable resource for apprentices and that apprentices prefer to build their own network within which to learn. They seek out “informal mentors” that better suit their learning needs, personality or who are easiest to emulate. Tanggaard points out that “(...), the instruction processes that are considered meaningful from the point of view of the apprentices are not necessarily those that are pedagogically structured or those with learning as the intentional goal” (Tanggaard, 2005). The author suggests, however, that “informal mentors” come into play predominantly as access to the formally-assigned supervisor is limited, a reality that was also observed for several students in this present study.

It appears possible that having several staff contributing to intern training is advantageous to the learning process. Vézina *et al.* (1999) noted that workers considered as “experts” in knife-sharpening among a group of industrial butchers did not all use the same method. Benefiting from a range of methods from a range of expert workers could prove a valuable resource for apprentices. Cloutier *et al.* (2002) also discussed the benefits of learning from workers of varying ages and levels of experiences, for diversity in both training content and training strategies.

Certain complications may arise from adopting a pluralistic and decentralized model for apprenticeship supervision. Gaudart, Delgoulet and Chassaing (2008) noted that workplace training is comprised largely of incidental learning, which may involve simply observing experienced workers, taking initiative by questioning others, or adapting existing methods into one’s own way of working via experimentation. Incidental training practices stem as much from the side of the instructor as from the learner (multitude of players and multitude of knowledge transfer strategies). For these researchers, there is a danger in heavily prescribing to a proactive learning model in that the responsibility for success or failure of the system would fall upon the individuals, whereas there are commonly hidden organizational issues that are perpetuated and which do not favour optimal human resource development.

Wandberg and Kammeyer-Mueller (2000) studied proactive behaviour as part of the organizational socialization process, wherein a newcomer acquires organizational knowledge and develops relationships that encourage skill development. Having carried out a three-wave longitudinal study on job-seekers attempting to enter the job market (in all, 118 participants took part throughout the three waves), they described proactive behaviour as the seeking of information and feedback, relationship building and positive framing with respect to the organization. Just as Gaudart, Delgoulet and Chassaing (2008),

this study effectively demonstrates that proactive behaviour appears less dependent upon an individual's personality than on the job characteristics, especially in reference to opportunities to interact with coworkers and the level of trade specialization (the greater the job specialization, the more proactive the socialization becomes). Trades observed in the present study are of low-specialization in nature, and opportunities for interaction vary greatly from one setting to another. In such a case, proactive learning requirements for young workers should be kept to a minimum and the focus should remain on providing favourable learning conditions, specifically when it comes to the social aspects of learning environments.

Scope and Limitations

The awareness of key elements that make up the workplace social environment allows us to grasp the actual context within which useful health protection know-how might be shared. Through this study, it is abundantly clear that apprenticeship experiences are wide-ranging and highly contextual. However, a general portrait of conditions that affect all students can be drawn: they all benefited from access to a variety of coaching resources in the workplace; they were found at a standstill where no help was available; and they are on the receiving end of communications more often than they initiate them. On this matter, a plausible explanation is that young workers prefer to wait for a colleague to freely offer assistance rather than risk disturbing them. Having outlined the discrepancies between the institutional expectations and actual workplace realities will allow for a better structuring of the apprenticeship monitoring process, in particular with respect to bringing teachers closer to other key players in the workplace setting and in planning and structuring mentorship roles for young workers (i.e. supplying information on the learning and integration process for youth in the workplace, offering tips on knowledge transfer, negotiating optimal knowledge-transfer conditions with the assigned supervisor). A range of tools have been developed to help students better identify workplace coaching resources, to help businesses optimize learning conditions and to help teachers and institutions in monitoring students during internships.

To avoid study bias due to camera placement, only work-related communications were analyzed. Greater emphasis and further documentation of the socialization process would be useful, due to the probable impact upon student success or failure rates in job integration overall. Such analysis might provide useful insight into networking strategies that students or teams utilize to aid in the learning process (Ching-yee Tsang, 2008). In addition, this study focused predominantly on verbal communication between individuals in the work setting and apprentices. Several researchers have shown that knowledge transfer

among manual tradespeople is not limited to verbal interaction (i.e. observation, demonstration) (Vézina *et al.*, 1999; Cloutier *et al.*, 2002; Gaudart, Delgoulet and Chassaing, 2008; Ouellet and Vézina, 2009). Analysis of non-verbal interaction would prove useful in future studies.

Conclusion

For over twenty years, ergonomists have been striving to enrich our understanding of models for training newcomers within the work environment. This research paper strives more specifically to enrich our understanding of social learning environments, particularly with respect to apprenticeship supervision, and some of the surrounding elements (institutional guidelines, official mentor designation, distribution of available human resources). The traditional institution-based model of a supervisor-apprentice partnership would best be revised to maximize the use of all available on-site resources and ensure students develop skills to stay healthy at work. However, given the pluralistic, incidental and circumstantial nature of the supervision process, this also raises the question of what conditions should be put in place to avoid the pitfalls of haphazard learning situations. The results bring to light the importance of establishing flexible guidelines and training programs that take the reality of the workplace setting and the diversity of internship contexts into account. Ergonomists, educators and company human resource managers would surely benefit from combining their expertise to develop harmonious and sustainable integration-to-work settings to deal with health and safety issues for young workers.

Notes

- 1 This article was written as part of a doctoral thesis.
- 2 Official French name for the ministry is “Ministère de l’Éducation, du Loisir et du Sport”, hence the use of the acronym MELS, which will be retained throughout this article.
- 3 In the original French, the program is named “Formation menant à un métier semi-spécialisé” (FMS).
- 4 An international political group of interest aimed at education ministers operating within francophone populations.
- 5 In French : *ressources opératoires*.
- 6 Subject 2 was not observed over a full shift and hence excluded from the average.

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SUMMARY

Supervision of Apprentices in Semiskilled Trades: Program Stipulations and Workplace Realities

An ergonomics intervention research study was carried out with an aim to prevent workplace injury for students enrolled in the Training for a Semiskilled Trade (TST) vocational program, which was recently instituted in Quebec, Canada. The article lays out certain discrepancies between the institution-prescribed parameters for TST intern supervision and workplace realities, in order to best determine the foundations upon which workplace injury prevention programs might be based. With this goal in mind, the article outlines some aspects of the social setting encountered upon entering the workforce, specifically communications with colleagues and access to guidance and support in the workplace. Methods were based on analysis of ministerial and institutional training documentation and a two-wave data collection protocol comprising individual interviews with interns and observation of work situations to document the orientation and training process. Results showed that workplace supervisory conditions are rather different from what is described in the training program documentation. Several students, contrary to program specifications, find themselves in incidental work situations involving supervising colleagues who have unofficially elected or accidentally taken on such roles. Access to supervision and guidance is not always promptly provided, meaning young workers are left without structured help and support. Furthermore, apprentices find themselves in an incredibly diverse range of contexts and settings. Hence, it should be deemed essential to develop flexible teaching and learning tools which can apply or be adapted to a variety of contexts. The training program's traditional supervisor-apprentice partnership model would be best revised to maximize the use of all valuable on-site resources and ensure students develop skills to stay healthy at work.

KEYWORDS: young workers, Occupational Health and Safety (OHS), vocational training, social learning environments, ergonomics intervention

RÉSUMÉ

Supervision d'apprentis en métier semi-spécialisé: prescriptions de programme et réalité des stages

La recherche effectuée vise à décrire l'environnement social entourant la période d'entrée en emploi d'élèves inscrits à la nouvelle Formation menant à un métier semi-spécialisé (FMS), en œuvre au Québec depuis 2007. Les jeunes visés par la FMS ont tous entre 15 et 17 ans. Ils sont considérés plus à risque de développer une lésion professionnelle que les travailleurs plus âgés. Dans une perspective de prévention, les auteurs proposent de mettre à plat l'écart entre le cadre prescrit de supervision en entreprise des élèves inscrits à la FMS et la dynamique sociale réelle lors de leur accueil et intégration en milieu de travail, suivant un cadre d'analyse ergonomique de l'activité. Les résultats présentés sont issus d'une recherche intervention visant à intégrer la prévention des lésions professionnelles au programme de formation. Les

résultats montrent que les conditions d'accueil et de parrainage sont bien différentes de ce qui est prescrit dans le programme de formation. Les stagiaires sont tous dans des situations très différentes, selon le contexte de leur entreprise de stage et le métier choisi. Bien souvent l'élève est entouré de plusieurs pairs significatifs et pas seulement du superviseur désigné. Cela dit, l'accessibilité aux ressources n'est pas toujours immédiate et les jeunes peuvent rencontrer certaines difficultés à obtenir de l'aide. Au regard de ces résultats, le modèle du binôme superviseur – apprenti proposé dans ce programme devrait être revu pour maximiser l'utilisation des ressources et favoriser l'apprentissage lié à la préservation de la santé. Les entreprises doivent se questionner sur les conditions d'accueil et d'intégration sécuritaire et compétente qu'elles offrent aux élèves qu'elles acceptent de former.

MOTS-CLÉS: santé et sécurité du travail (SST), jeunes travailleurs, difficultés d'apprentissage, encadrement et conditions d'apprentissage, intervention en ergonomie

RESUMEN

Supervisión de los aprendices de oficio semi-especializado: prescripciones de programa y realidad de las formaciones prácticas

La investigación efectuada apunta a describir el contexto social que envuelve el periodo de entrada en el trabajo de los alumnos inscritos a la nueva "Formación de oficio semi-especializado" (FOS), implantada en Quebec en 2007. Los jóvenes a quienes se dirige la FOS tienen 15 a 17 años y son considerados más a riesgo de desarrollar una lesión profesional que los trabajadores de mayor edad. Desde una perspectiva de prevención, los autores proponen disminuir la distancia entre el cuadro prescrito de supervisión en empresa de los alumnos inscritos a la FOS y la dinámica social real al momento de la acogida y de la integración en el medio de trabajo, según un cuadro de análisis ergonómico de la actividad. Los resultados presentados provienen de una investigación-intervención cuyo objetivo era de integrar la prevención de lesiones profesionales al programa de formación. Los resultados muestran que las condiciones de acogida y de patrocinio son bastante diferentes de lo que es prescrito en el programa de formación. Los aprendices son expuestos a situaciones muy diferentes, según el contexto de su empresa que los recibe para la práctica y el oficio escogido. Muy seguido, el aprendiz está rodeado de varios compañeros significativos y no solamente del supervisor designado. Pero la accesibilidad a los recursos no siempre es inmediata y los jóvenes pueden encontrar ciertas dificultades para obtener ayuda. A la vista de estos resultados, el modelo del binomio supervisor – aprendiz propuesto en ese programa debería ser revisado para maximizar la utilización de recursos y favorecer el aprendizaje ligado a la preservación de la salud. Las empresas deben cuestionarse sobre las condiciones de acogida y de integración segura y competente que ellas ofrecen a los alumnos aceptados en formación.

PALABRAS CLAVES: salud y seguridad ocupacional (SSO), jóvenes trabajadores, dificultades de aprendizaje, marco de supervisión, condiciones de aprendizaje, intervención en ergonomía