

# Vocational Educators' Professional Learning Activities and Workplace Affordances

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## *Abstract*

This paper presents insights from a recent study in which 17 instructors in an institute for post-secondary vocational education were interviewed regarding their professional learning activities. More specifically, the study focused on the prompt for learning, the topic of learning, the level of reflection involved, and the extent of self-directedness of the learning activities. The findings show that instructor learning is for a large part focused on developing skills in teaching their specific subject matter, is often prompted by events in the workplace, is not self-directed, and is mostly accompanied by action-oriented reflection. The paper seeks to explain these findings by discussing the nature of learning required to master teaching in an institute of vocational education, using Ellström's (2011) theory of adaptive and developmental learning. Implications for further research and practice are discussed.

## **1. Introduction**

In vocational and trades education, the role of instructor is becoming increasingly complex. Student populations are more culturally diverse, industry standards are changing, and the role of the instructor is expanding (Darwin, 2007). In order to support instructors in meeting these changing requirements, vocational institutions have traditionally invested in funding course and conference attendance. However, for decades, studies have suggested that professional development (PD) organized as an activity separate from work, typically yields limited impact on the professional performance of the PD participants (Baldwin & Ford, 1988; Blume et al., 2010). In a comprehensive review of the literature on PD, Webster-Wright (2009) asserts the limited impact of traditional PD practices can be partially explained by those practices not aligning with what the literature has come to know about how professionals learn at work. Research on professional learning shows that such learning is deeply embedded in practice (Schön, 1983) and informed by the way people within and outside of the organization conduct and understand their work (Bound, 2011; Engeström, 2011; Lave & Wenger, 1991). Bound's (2011) study illustrates that workplace performance is not only determined by what participants learned in the PD setting but also by the practices that have

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historically developed in the institution through the organizational culture. Therefore, the impact of PD offerings cannot be understood in isolation from the workplace context. While the study of workplace learning has gained momentum in the past 20 years (Billett, 2011), a number of authors have called for studies into workplace learning in specific sectors and professions (Manuti, et al., 2015; Tynjälä, 2008). Studies of vocational educators' professional learning specifically, are limited. A 2015 search of peer reviewed publications in the educational research database ERIC using "professional development" AND "vocational education" as descriptors revealed only 187 publications between 1977 and 2013. The majority of these publications focus on student learning in practica and work placements. Most of the other publications describe PD programs for vocational educators and their evaluation. Few studies actually describe the professional learning of vocational educators as it occurs through every day work.

This paper aims to partially address this void by describing the professional learning activities of vocational educators in three different departments of an institute for vocational education. In the absence of research on vocational educators' professional learning, our study is informed by three strands of separately developing bodies of knowledge: research into K-12 teacher learning, insights derived from studies into workplace learning of professionals in general, and research into the professional development of university teachers.

## **2. Professional learning**

Given what we know about the limited impact of courses and training programs, and given the need for continuous instructor learning, a greater understanding of professional learning is required (Webster-Wright, 2009). Until recently, a distinction was made between formal and informal types of learning (Marsick & Watkins, 1990). Formal learning is typically associated with learning in settings that are explicitly organized for learning: such as courses and workshops, whereas the term informal learning was used to describe learning that happens outside of such settings (Eraut, 2004; Hoekstra et al., 2009b). While the exploration of learning outside of formal contexts has expanded researchers' insight into the type of learning that might happen during work (e.g. Eraut, 2004), Billett (2002) convincingly argues that the distinction between formal and informal learning is unhelpful. Instead, Billett (2002) proposes that at work, learning comes about through participation in work-related activities, whether these activities are formally structured for learning or not. *Professional learning activities*, consequently, refer to the activities through which professional learning occurs. Most conceptualizations of learning imply a relatively lasting change in behaviour or capacity for behaviour (Shuell, 1986). The capacity for behaviour refers to the knowledge, skills, and/or attitudes that, should circumstances allow, enable the learner to demonstrate certain behaviour (Stes et al., 2010). The present study, therefore, defines professional learning as undertaking activities that lead to improved professional behaviour or the capacity to behave in improved ways (Opfer & Pedder, 2011). What then are the types of expertise and behaviours required to fulfil the role of instructors?

### *2.1 Aspects of the role of instructor*

Many categorizations of aspects of the teacher job exist (e.g. Shulman, 1987; Verloop, Van Driel & Meijer, 2001). Shulman (1986) described *content*, or subject matter, and *pedagogy* as two generally accepted aspects of the instructor role. In the context of vocational education, the instructor is an experienced professional or trades person, who masters the subject matter *content* s/he is supposed to teach. *Pedagogy* refers to knowledge of student learning processes and teaching strategies that support those

processes. However, Shulman identified *pedagogical content knowledge* (PCK) as the missing paradigm (Van Driel, Verloop, & De Vos, 1998). Shulman (1986) explains:

Within the category of pedagogical content knowledge I include, for the most regularly taught topics in one's subject area, the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations—in a word, the ways of representing and formulating the subject that make it comprehensible to others. [...] Pedagogical content knowledge also includes an understanding of what makes the learning of specific topics easy or difficult: the conceptions and preconceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons. (p. 9)

In the role of instructors, PCK is used in tasks such as curriculum development, formulating learning outcomes, the use of teaching technology to support student learning, establishing the pacing of content throughout the semester, and creation of student assessments. In addition to expertise in *content*, *pedagogy*, and PCK, an instructor needs to be able to display interpersonal teacher behaviour (den Brok, et al. 2004) which includes behaviours needed to manage the classroom (Woofolk-Hoy & Weinstein, 2006). Finally, the instructor role involves participation in wider organizational processes, such as departmental meetings, serving on committees and councils, and ancillary tasks such as arranging job placements, fixing or maintaining lab equipment, arranging a guest speaker series, Open House activities, or supporting students in skills competitions. The next sections provide insights into the type of learning that is required to master these aspects of the role of instructor.

## 2.2 Professional learning activities

Literature on workplace learning in general and teacher learning specifically has generated a number of typologies and categorizations of professional learning activities (Eraut, 2004; Hoekstra et al., 2009a; Kwakman, 2003; Lohman & Woolf, 2001). This section highlights two such overviews in order to provide insight into the wide range of activities through which professional learning may occur. Eraut's (2011) typology of early career learning distinguishes between three types of early career learning:

- 1) "Work processes with learning as a by-product" including activities such as problem solving and trying things out and tackling challenging tasks and roles. It also includes participation in group processes and working alongside others.
- 2) "Learning actions located within work or learning processes" including asking questions, listening to others, reflecting, and learning from mistakes.
- 3) "Learning processes at or near the workplace" including being mentored, job shadowing, independently searching for information, being supervised, and short courses (Eraut, 2011, p. 187).

Eraut's typology illustrates the spectrum of activities associated with professional learning, which transcends the artificial boundaries drawn by the distinction between formal and informal learning (Eraut, 2004; Billett, 2002). To further illustrate how professional learning activities of vocational educators might be described, we draw on Hoekstra and Crocker (2015) who have aimed to describe the professional learning activities of vocational educators. Drawing on literature on K-12 teacher learning, workplace learning, and post-secondary teacher learning, they identified four main categories of professional learning activities: 1) Learning by experimenting, 2) Learning by getting ideas from others (through collaboration

with peers and in interaction with students), 3) Learning through reflection, and 4) Learning by doing (Hoekstra & Crocker, 2015, p. 4). Similar to Meirink (2009), Hoekstra and Crocker found that learning episodes, as reported by the instructors, often involved a combination of activities from different categories. For instance, hearing about a new teaching strategy (category 2), occurred together with trying it out in class (category 1) and reflecting on the outcome (category 3). The present study aims to further understand what and how instructors learn by studying how learning activities are combined in instructors' learning episodes.

### *2.3 Instructor professional learning: what kind of learning is actually required?*

The present study is not aimed at evaluating the quality of professional learning. Yet, we aim to develop recommendations to improve instructor professional learning as it happens at work. This begs the question: What kind of learning is required for instructors to master the actions that make them good at their job? To answer this question we turn to Ellström's (2011) adaptation of cognitive action theory. Building on Rasmussen (1986) and Frese and Zapf (1994) Ellström distinguishes between four levels of action: 1) skill-based or routinized action, 2) rule-based action, 3) knowledge based action and, 4) reflective action. These four levels of action differ in the extent to which they require mental effort or "connected cognitive and emotional processes involved in the planning, monitoring or evaluation of action" (Ellström, 2011, p. 110). For the purpose of this paper, the most important notion in Ellström's theory is that mastering different levels of action requires different types of learning; Mastery of skill-based and rule-based action requires *adaptive* learning, while mastery of knowledge-based and reflective action requires *developmental* learning. Since instructors need to be able to perform actions at all four levels identified by Ellström, we would expect that both adaptive and developmental learning are required to master the role of instructor.

Both workplace learning and teacher learning literature stress the need for reflective practice as part of ongoing professional learning (Amundson & Wilson 2012; Brookfield 1995; Hoekstra & Korthagen, 2011; Van Woerkom & Croon, 2008; Zeichner & Liu, 2010). While reflection can occur individually, reflection can be greatly enhanced through incorporating student feedback, peer feedback (Hubball et al., 2005; Millis, 2006), and ideas from others (e.g., reading books) into the reflective process (Day, 1999). In their studies on teacher learning, Mansvelder-Longayroux et al. (2007) and Hoekstra et al. (2009a) discriminated between meaning-oriented and action-oriented reflection. Action-oriented teachers focused on improving their own performance, and on what works (or does not) in the classroom. Only a small percentage of teachers reported meaning-oriented reflection, aimed at understanding student learning and establishing the reasons behind alternative responses. While action-oriented reflection may aid the instructor in rule-based and knowledge-based action, developmental learning requires meaning-oriented reflection.

### *2.4 Self-directed learning*

Diverse bodies of literature also point to self-directed and self-regulated learning as a learning process to strive for (Cochran-Smith & Lytle, 1999; Ellinger, 2004; Endedijk, et al. 2012). The concept of self-directed learning originates in adult learning literature. Knowles (1975), for instance, describes self-directed learning as a: "process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (1975, p. 18). Self-

directed learning has been linked to self-efficacy and the development of self-regulation, mastery, and competence (Bandura, 1995). Van Eekelen, Boshuizen and Vermunt (2005) studied self-regulation in higher education teacher learning and concluded that accomplished higher education teachers might not necessarily regulate their own learning process, per se. Rather professors engage in a process of regulating their own work-improvement processes. Van Eekelen et al. therefore expand their definition of self-regulated teacher learning to: “independently directing the process of *improving teaching and/or* attaining learning goals” (2005, p. 467); the expansion of their definition being italicized. Because self-directed learning has been identified as desirable for teacher learning, we investigate the extent to which vocational instructors engage in self-directed learning. The Research question addressed in this paper is: What learning activities do instructors in three different programs typically engage in? Sub-questions include:

- a. What prompts these learning activities?
- b. What topics do instructors learn about?
- c. What level of reflection is involved?
- d. To what extent are the learning activities part of a self-directed learning process?

### **3. Methodology**

Due to the exploratory nature of the study, and the need to study activities within context, the study follows a multiple case study design, which facilitates inquiry into processes and relationships and acknowledgement of situational complexity (Cousin, 2009, 131-132). Stake (2006) asserted that individual cases become more comprehensible when they are compared and contrasted to similar cases in a multiple case study approach. In the present study we compare and contrast the learning activities of instructors from three different departments.

#### *3.1 Recruitment and ethics*

A research ethics proposal was drafted and approved to ensure compliance with Canada’s Tri-Council Policy Framework for research involving human subjects. Upon receiving this approval, department chairs of four faculties of an institute for vocational education were informed about the study. Three program chairs from three different faculties volunteered their program for inclusion in this study. The three programs represented technical education, health and social services education, and business education respectively. Instructors within each program were recruited to participate in the study, and were requested to fill out an informed consent form. From those instructors who volunteered, we first identified all those instructors who were qualified in the specific trade/profession taught in the program. From those qualified, we aimed to randomly select five from average size departments (20-40 instructors) and eight instructors from large departments (>40 instructors) to participate in an interview. In one department only four instructors volunteered to participate. Each of these four instructors was interviewed. One member of this department, who chose not to participate, explained the lack of interest from this department by referring to high workload, and a general preference in the department not to be the first to try out new things.

#### *3.2 Description of sample*

To protect the identity of our research participants, we describe our sample in general terms, rather than in a table with participant characteristics. Seventeen instructors participated in this study, eight from a technical education department, five from a department in health and social services, and four from a

department teaching a business area. Seven of the participants were males, 10 were females. Two participants were in their twenties, five in their thirties, two in their forties, five in their fifties, and three over sixty. Older participants did not necessarily have more teaching experience, as the college typically hires instructors who have been working in the trade/profession for a considerable amount of time, before becoming an instructor. All but two participants had a minimum of six years industry experience, with six participants reporting over 20 years of industry experience before becoming an instructor. Nine participants interviewed had less than five years of teaching experience, of which six had started teaching less than two years ago. Another six participants had 6 to 15 years of teaching experience, with two having over 15 years of teaching experience.

### *3.3 Data collection*

A semi-structured interview guide was developed based on questions used in digital logs to study learning activities (Meirink et al., 2009) and interview questions used to study five workplace conditions (Imants et al., 2013; Hoekstra et al., 2009b). The present paper only reports on the analysis of the learning activities. Participants were invited to one-on-one interviews by e-mail and were also given a copy of the interview guide prior to the interviews. The questions on the interview guide were intended to elicit rich anecdotes about recent learning episodes (see also Van Eekelen, et al., 2005). Instructors were asked: (1) What prompted the learning? (2) What were their intended goals? (3) How did they attempt to achieve these goals? (4) What was the outcome? and (5) How did they feel as a result of this outcome? Additionally, instructors were asked to reflect upon possible influences on their professional learning including: their experiences prior to becoming an instructor; their beliefs about the role of an instructor; and factors that enable or constrain their learning. A complete listing of the questions asked during the interviews can be found in Appendix A. Please note that the present paper only reports on the analysis of the learning activities. Interviews were conducted and audio recorded in mutually agreeable locations, and transcribed verbatim by students from a Captioning and Court Reporting program.

### *3.3 Data Analysis*

To analyze the data we used a qualitative analysis software program NVivo. For the purpose of the present paper we focused first on selecting interview excerpts that contained a relay of a sequence of events and activities culminating in a learning outcome: a change in knowledge, skills, attitude or behaviour. We labeled these excerpts learning episodes. As we read and reread these learning episodes we identified sub-categories that captured the relevant characteristics of the events and anecdotes (Merriam, 2009, p. 205). In framing the categories the research team endeavored to: be responsive to the purpose of the study, and construct categories that were informative, and conceptually congruent with concepts discussed in the literature review (Merriam, pp.185-186). In doing so, we started to suspect that the topic and learning outcome were somehow related to the type of events that prompted the learning episode. In addition, we were wondering whether the level of reflection was related to the prompt or the topic for learning. We then created a summary matrix summarizing for each learning episode: the prompt, the topic, the activities, the level of reflection, and whether or not colleagues were involved. Based on these summaries we identified six types of prompts and five types of topics of learning. We then went back and coded each learning episode by sub codes for prompts and topic. Example rows of the resulting matrix can be found in Appendix B. The next section illustrates and describes each sub code in more detail.

#### 4. Findings

The following sections answer the research question and the related sub questions. The central question was: What learning activities do instructors in three different programs typically engage in? Sub questions included:

- a. What prompts these learning activities?
- b. What topics do instructors learn about?
- c. What level of reflection is involved?
- d. To what extent are the learning activities part of a self-directed learning process?

##### 4.1 What prompted instructor professional learning?

A total of 58 episodes of learning were reported by 17 instructors, ranging from one to eight learning episodes per instructor. A learning episode refers to a sequence of events and activities culminating in a learning outcome: a change in knowledge, skills, attitude or behaviour. In our analysis we identified four external prompts and two internal prompts for learning.

##### 4.1.1 External prompts for learning

1) *The Instructor faces a novel situation or task.* Fourteen of the learning episodes reported were prompted by a change in the instructor's assigned tasks. Often these prompts included getting assigned new tasks, such as teaching (a course) for the first time, or becoming a course coordinator. For instance, River<sup>2</sup>, a new instructor in the technical education department recalls:

...when I first came here, it was just almost trial by fire. I went into the class. I sat in on other instructors' classes. I watched what they did. And for the most part, I -- you know, I started copying the guys I liked the most, like, Okay. He did this. He did this. I'd break down their lectures in point form and deliver them as verbatim, almost word for word.

Dale recounted: "I did get switched into a new coordination; I was given a new course. So the learning happened in terms of knowledge transfer from the previous coordinator to myself."

2) *Novel content, materials, technology.* Four of the learning episodes reported were prompted by the instructor being required to use a new course pack or book, or being required to teach course content or new technology used in industry that was not part of the program before. Taylor explains how s/he was faced with teaching to a completely new course outcome:

...they needed to be taught more safety than they have in the past. And the way that the particular objective that was [...] written was that I had to evaluate them on that, which has never been done, ever. [...] I called in an [expert in the field] to teach me how to do some things.

3) *Student/peer/supervisor feedback.* Fifteen learning episodes were prompted by feedback, including 13 prompted by student feedback and two by supervisor feedback. For instance, Terry received feedback from students that made him/her realize that disruptive student behavior disadvantages other students:

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<sup>2</sup> To protect their identity instructors are referred to by unisex pseudonyms.

But then when I got student feedback [...] they were saying when other people are talking, if I don't do anything about it they are not happy about it. [...] To me it's like, Oh, they really do care, right. And I started to be more aggressive. [...] So it's hard for me to do that, but I think for the sake of the class, I have to do it, right?

4) *Formal Learning Event.* In eight learning episodes, learning was prompted by a formal learning event, such as attending a course, conference or workshop. In six of these cases, the formal learning events were either content-related or teaching-related. In the case of Jonni and Marlin, from the health sciences, and the business program respectively, the learning involved practicing a strategy for ongoing improvement, which they had learned about in their introductory teaching course. Jonni explained the strategy:

I do a lot of reflection on, like -- I actually -- for my [name of introductory teaching course], they told us to do lesson plans [these lesson plans have a space for reflections at the bottom]. I've actually done them for each one of my classes, even if it's loosely. And after every class I have stopped, you know, at some point and reviewed what worked, what didn't work, how I felt about it, those kinds of things. And, you know, I have my binder that has everything in it.

#### 4.1.2 *Instructor-prompted learning*

A number of learning episodes reported were not prompted by external events, but by the instructors themselves.

5) *Issues identified by instructor as concerning.* Fifteen of the learning episodes reported were prompted by an issue or concern that the instructor had identified in their practice. While the learning activities were not immediately prompted by feedback, a concern might have arisen when receiving similar types of feedback over time. Marlin, for instance, looked for engaging learning activities for students on the departmental shared drive, because s/he: "felt that my previous lecture, the last time I taught this class, was really boring; and so I just thought, you know, I want to find a more fun interactive way."

6) *Openness to /actively looking for new ideas and insights.* Four of the reported learning episodes were not prompted by any external events or concerns or issues faced by the instructor, but by a desire to find out how students learned best or to see if there were better ways to do things. For instance, Aiden looked for ideas online: "I'll sometimes take time once or twice a week to watch a TED Talk. [...] you can learn something just watching somebody's presentation on whatever."

#### 4.2 *What are the main areas instructors learn about?*

Half of all learning episodes (29 out of 58) reported involved pedagogical content knowledge (PCK). In their interviews the instructors related concerns regarding the scope and sequence of the learning outcomes. Other learning episodes were about supporting students when challenged by particular concepts, and finding ways to assess whether or not the students were learning the course concepts by using post-it notes to ask what students had learned in class. In other words, these learning episodes involve skills or knowledge in teaching the specific subject matter that the instructor teaches. Edson explains how s/he learns best about how students learn:

... the lab atmosphere is really good that way because you see them working on the stuff. It's a golden opportunity to address weaknesses because you can see it. The way they put circumstances together, you can see what they don't know. [...] One of the things about lab time, it's a high-pressure time. So you got to pay a lot of regard. It's really precious. [...] So that's where I learn a lot about what the students know and don't know.

The second most frequently (16/58) mentioned topic of learning was pedagogy – that is on teaching practices in general. In these episodes, the instructors shared examples of accommodating needs of specific students, experiments with innovative methods such as flipping the classroom, or simply adjusting their presentation style in order to promote student engagement. In the following excerpt Aiden related the steps s/he took to better understand the effect of different presentation styles on student learning:

... what I noticed in the classroom is, if I did something on a PowerPoint, the students kind of sat back and watched. If I did something on the whiteboard, they were writing down on their paper what I was writing on the board. So that started me down the road thinking maybe PowerPoint is not the most effective. [...] we asked a number of our students for some feedback on what their preferences were as far as PowerPoint and whiteboard-type presentations. [...] And what we ended up finding out was especially with the SMART Boards -- where we can write right onto the whiteboard over the PowerPoint slide; that's the blending of the two in that way -- is probably most preferential to most students.

Six of the 58 learning episodes were about learning new subject matter knowledge due to changes in industry. Aiden went to a conference on revised industry regulations, while Misha attended a conference where new technology now being used in industry was demonstrated. In each case, the instructor was motivated by a desire to stay current so they might provide students with up-to-date information and skills.

Instructors related three instances when their learning was connected to classroom management issues. These episodes included instances when students challenged authority, used cell phones inappropriately during class time, or talked through the lectures.

There were four instances in which instructors shared professional learning episodes related to their professional responsibilities. Drew, for instance, learned how important it was to be very careful in his/her communications with various stakeholders external to the institute.

#### 4.3 Do different topics of learning have different prompts?

Table 1. Number of Learning Episodes by Topic and Type of Prompt for Learning

Type of Prompt	Topic of Learning					Total
	Pedagogy	Pedagogical Content Knowledge	Subject-Matter Content	Classroom Management	Participating in Organization	
Novel Task	1	12	1	-	-	14
Novel Content	-	4	-	-	-	4
Feedback	4	5	2	1	1	13
Formal Learning	3	-	3	-	2	8
Instructor Concern	7	5	-	2	1	15
Openness to New Ideas	1	3	-	-	-	4
<b>Total</b>	16	29	6	3	4	58

Table 1 provides a cross-tabulation of the learning episodes by topic and type of prompt. It shows that learning in the area of pedagogy was prompted both by events external to the instructor, as well as by instructors' concerns. While learning PCK was also prompted by external prompts and as well as internally. A relatively large portion of the learning activities related to PCK (12/29) was prompted by the instructor engaging in a novel task, which often involved having to teach a course they have not taught before. Another worthwhile observation is the fact that the formal learning opportunities reported either focused on teaching in general—such as the “Introduction to Teaching” course, or workshops offered at the college— or on content, such as through a Master’s degree, or attending an industry conference.

#### *4.4 Level of Reflection in Instructor Professional Learning*

In the learning episode reports we identified three levels of reflection: action-oriented, meaning-oriented, and rapid/intuitive.

##### *4.4.1 Action-Oriented Reflection*

The majority of learning episodes (38 out of 58) included reports of action-oriented reflection. Action-oriented reflection focused upon what the instructor could do better, what worked, what did not work, and what s/he might do next time. For instance, Brett explained:

Like I said, I was tearing my hair out after the first week and went home [...] my wife [...] said, like, What's not working? I said, Well these PowerPoints [...] I'm expected to use these things. I can't teach that way. And she said, Well then teach how you want to teach.

As a consequence, Brett eschewed the PowerPoints and started telling stories in class: “I know I like to get into story telling or whatever. Here's a personal experience I had with this sort of a thing here, so take a listen to this, tell me what you think.” In this report Brett did not include any reasons explaining why his/her way of presenting with PowerPoints is not working. As in the case of the majority of learning episodes reported, Brett seemed exclusively focused on the *what* and *how* of teaching. Similarly, Taylor, confronted with having to teach to a new outcome, tried a new way of combining theory and lab activities. Afterwards, s/he reflected:

I asked people out there what they needed, and I couldn't quite get the feedback that I wanted. So I went from an approach that, you know, try it this way and, you know, had to tweak a couple of things on the line, but it worked really well. We were quite pleased with the outcomes.

Again, in this example Brett focuses on what worked and what did not. S/he does not seem to have reflected on why certain strategies worked better than others.

##### *4.4.2 Meaning-Oriented Reflection*

Eleven of the learning episodes reported included a reference to why the instructor chose to proceed a certain way in their teaching. This varied from just providing one reason, to a more in-depth reflection. For instance, Terry, provided a rationale for his/her adjustments:

I have one girl in my class. She gave me feedback. She's asking me to write down more details, like step-by-step calculation on the board [...] because I think what she was saying that not everybody can

follow [along]. [...]I see value in her feedback, right. Because some people have to be able to visualize what you write on the board. They cannot hear and then they write it down.

In this instance, Terry provided a theory for why the student might have needed the instructor to write more detailed calculations: because some people have to be able to visualize; they're not able to write it down just based on an oral explanation. We have labeled this instance as meaning-oriented reflection, because the instructor provided a reason for why s/he started to include more written detail when explaining calculations.

Another example of meaning-oriented reflection occurred as a result of a collegial conversation about the relation between teaching and student learning. Dale realized that his/her students were not able to follow the textbook instructions, when they were practicing using a software program in class. Six weeks into the course Dale asked a colleague how she taught the course. The colleague had explained that she would get the students to work through exercises independently in class, which forced them to rely on the textbook. Dale reflected:

What I created -- when I found out, like, last week was they weren't going to the textbook as often. They relied on my lectures. But you can't learn from there; you've got to learn, understand, and then apply. So I -- what I'd done is created a dependency on my lectures rather than on the textbook that's there. And so I'm going to back off. It's just that I'm now, what, six weeks into the course, and I've created a trend. But had I talked to her [the colleague] earlier, had I understood how she sort of weaned them off, I might have been in better situation now.

Table 2 provides an overview of the number of instructors who reported meaning-oriented reflection by their years of teaching experience. The table shows that meaning-oriented reflection was less common amongst the beginning instructors, while the majority of the remaining instructors did in fact report meaning-oriented reflection. However, all the instructors with more than 3 years of teaching experience also reported many learning episodes which solely included action-oriented rather than meaning-oriented reflection.

*Table 2 Level of Reflection by Years of Teaching Experience*

<b>Level of Reflection</b>	<b>Years of Teaching Experience</b>		<b>Total</b>
	<b>0-2 Years</b>	<b>&gt; 3 Years</b>	
At least one Learning Episode with Meaning-Oriented Reflection	1	7	8
No Meaning-Oriented Reflection	5	4	9
<b>Total</b>	<b>6</b>	<b>11</b>	<b>17</b>

#### *4.4.3 Rapid/Intuitive Responses*

A third type of mental activity associated with the nine remaining learning episodes, was characterized by a seeming absence of any sort of deliberation. The instructor appeared to intuitively respond to a prompt. Following Eraut (2004) we called this a rapid/intuitive level of cognition. Reese, for instance, received feedback from a student, asking to do an in-class written review of the material every class. Reese responded by doing what was asked, without mentioning any reflection, and s/he started making quizzes for every class, which allowed the students to review their understanding of the course material for that

class. In another example, Hollis, was teaching a course that had just recently been revised. S/he used a colleague's PowerPoint, which contained a picture of a diagram that had a mistake in it. Running out of time, Hollis was unable to recreate the diagram, and instead needed to improvise. Hollis: "[s]o I told my students, there's a mistake in the PowerPoint, and I have a bag of candy, and if you find the mistake, I'll give you a candy." Again, in this example there is no reflection regarding alternative ways of approaching the situation.

Cross-tabulation of level of reflection by type of prompt (Table 2 in Appendix 3), or topic (Table 3 in Appendix 3) of the learning episode did not reveal any apparent relationships between level of reflection and prompt or topic.

#### *4.5 Extent of Self-Directed Learning*

The fourth sub question focused on the extent to which the instructors engaged in self-directed learning. In other words, to what extent did instructors "take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (Knowles, 1975, p. 18). First of all, we already established that the majority of learning episodes (39 out of 58) were prompted by events external to the instructors. In addition, none of the instructors reported having formulated a learning-goal for themselves. Given these findings, a simple conclusion would be that the learning of the instructors in our sample was not self-directed. However, at times, faced with having to teach a new course, or confronted with a new task, instructors would pro-actively seek out learning opportunities to prepare themselves, albeit without formulating a learning goal other than "learning how to teach". As previously mentioned, River, for instance, started sitting in other instructors' classes in preparation of teaching the same course content.

While the majority of the learning episodes could be characterized as problem-solving, or preparing for a new course or task, there were three instructors, one in each department, who used a method for continuous improvement of teaching. They reported to take notes on how classes went, and then used these notes to improve their lesson plans for next time. Two of these instructors reported that they had learned to take notes to improve lesson plans during the introduction to teaching course offered at the institute. In sum, while none of the reported learning episodes comes close to resembling self-directed learning as defined by Knowles (1975), some of the learning episodes reported could be characterized as a self-directed process for improving teaching practice.

### **5. Discussion**

Our study reveals a picture of instructor professional learning that is very much driven by instructors' work itself. It thus confirms that learning at work happens as a result of participating in work activities (Billett, 2004; Eraut, 2004). Below, we will first briefly discuss our findings as they relate to our four sub questions regarding prompt, topic, self-directedness and level of reflection. We then discuss how our findings support Ellström's theory of adaptive and reflective learning. The section continues with implications for research and practice followed by some concluding remarks.

#### *5.1 Instructor Professional Learning: Topic, Prompt and Self-Directedness*

The majority of the 58 learning episodes reported were prompted by novel tasks, feedback, or instructor concerns about their work. In addition, even when the learning was prompted by the instructor, its

regulation did not follow a process of self-directed learning as described by Knowles (1975). In this respect, our findings are very similar to those of Van Eekelen et al. (2005), who studied professional learning of university teachers in the Netherlands. Van Eekelen et al. described that many of the learning episodes they studied were triggered by an external prompt, but then taken up by the instructor for further problem solving, while the teacher could also have chosen to ignore the external prompt. They therefore described such regulation processes as non-linear and regulated by both external events and the teachers' own response to those events.

However, while Van Eekelen, et al. (2005) focused on the *process* of learning, our study added insight by also considering the *topic* of learning. Our findings revealed that half of the reported learning episodes involved learning how to teach a specific area of the subject matter, or what Shulman (1986) coined pedagogical content knowledge (PCK). Considering that our research participants themselves chose the learning episodes they wished to report, the high volume of episodes that reported learning PCK could mean that PCK is front and centre in instructors' minds. Unsurprisingly, learning PCK was mostly prompted by having to teach a course the instructor had not taught before, or by having to teach new content, which was only recently added to the curriculum. It is in these situations where the instructors found themselves at a disadvantage, unable to anticipate the ways in which students will interact with the subject matter, the misconceptions they might have, the parts they might struggle with the most, and the explanations that help most students learn. The data revealed that faced with having to teach a course they hadn't taught before, instructors relied on their colleagues in the department for advice, shared materials, and benefited from the opportunity to observe colleagues teach. Some also relied on student feedback to inform their teaching, but to a lesser extent. These findings show that instructor professional learning is not only *informed by* both the environment and the individual's own subjectivities (Billett, 2011; Hoekstra et al., 2009b), but also *regulated* by work events and the individual instructor's response those events (see also Van Eekelen, 2005; Sambrook, 2005).

## *5.2 Instructor Professional Learning: More adaptive than developmental learning*

Similar to the findings of Mansvelder-Longayroux et al. (2007), Hoekstra et al. (2009a), and Hoekstra & Crocker (2015), our study revealed a prevalence of action-oriented reflection accompanying instructors' learning episodes. Some learning episodes could even be characterized as mere imitation or improvisation seemingly void of any type of conscious reflection. While meaning-oriented reflection is considered desirable in teacher learning (Cochran-Smith & Lytle, 1999; Mansvelder-Longayroux et al. 2007) the prevalence of action-oriented reflection could be explained by considering Ellström's (2011) levels of action, especially the levels of action required in immediate classroom teaching.

### *5.2.1 Mastering Teaching Skills and Strategies through Adaptive Learning*

As Ellström (2011) explains, skill-based or routine action is guided by implicit knowledge: the actor does not require conscious reflection on the situation in order to perform the required action. In the context of teaching, routine action has been described as "immediate behaviour", which "is characteristic of a good deal of teacher behaviour" (Korthagen, 2010, p101). Rule-based action, on the other hand, requires some conscious control, and allows the actor to handle familiar situations. In the context of teaching, one could think of such routine tasks as lesson planning and marking as examples of rule-based action. In a study on expert teacher routines Leinhardt (1983) speculates that these routines exist so as to allow the teacher to free up their attention to "focus on the important features of the material and the information from the students about how the lesson is progressing" (p. 27). Her study also shows that the absence of such

routines causes a novice teacher and her students to use up a lot of classroom time to establish workable procedures for student tasks.

How then, does an instructor come to master skill-based and rule-based teacher actions? According to Ellström “Adaptive learning ... entails a learning process in which the learning subject ‘moves’ from a reflective or knowledge-based level of action to levels of action founded on experience-based, implicit knowledge” (Ellström, 2011, p. 111). However, Ellström also remarks that routine actions could be acquired through “imitation and trial and error” (p.111). Dunn and Shriener (1999) adopted the term “deliberate practice” to describe a process whereby teachers develop expert behaviours, much like a pianist practices for a performance. Deliberate practice can be considered as a more intentional and systematic form of learning through trial and error, and it can result in a repertoire of “tried and true” teaching behaviours and strategies. Adaptive learning thus consists of repetition, imitation, and trial and error. Because the instructor is developing a repertoire of teaching behaviours and practices, we hypothesize that adaptive learning is characterized either by rapid/intuitive modes of reflection or more deliberate action-oriented reflection: While trying out and practicing teaching behaviours and strategies, instructors keep what works, and think about how to change what does not work.

In sum, instructors’ need to master “a good deal” (Korthagen, 2010, p. 101) of teaching behaviours at the level of skill-based and rule-based action. Yet, the instructors in our study only received two weeks of formal training in teaching. Consequently, the adaptive learning required to master teaching routines and strategies necessarily happens while instructors are already teaching full-time. We speculate that the great need for adaptive learning accounts for the pervasiveness of action-oriented reflection in our data.

### *5.2.2 Mastering knowledge-based and reflective action through developmental learning*

In addition to establishing teaching routines and strategies, instructors’ job also calls for the ability to act based on knowledge, and to act reflectively through a process of developmental learning. Ellström: “[t]he process of developmental learning is based on our ability to question established practices, to break our way out of routinized actions (‘unlearn’), and to develop new patterns of thought and action through processes of reflection and problem solving” (2011, p. 112). Our findings showed that eight out of the 17 instructors reported meaning-oriented reflection. The fact that meaning-oriented reflection was far less common amongst the beginning instructors suggests that adaptive learning might take priority at the start of the teaching career. Once instructors have mastered initial skills and strategies that there might be room for further reflection on routinized action and patterns of thought.

### *5.3 Implications for research*

Drawing on insights from both workplace learning and teacher learning literature has proven worthwhile in the study of instructor learning in the context of post-secondary vocational education. Further studies might continue drawing together insights from the various fields to better understand the complexities of workplace learning in different contexts (Manuti, et al. 2015). Our analysis of instructors’ learning episodes shows how embedded learning is in instructors’ daily work practices, and supported through collegiality and sharing of materials. Further studies could focus more specifically on studying how departmental practices support or hinder instructor professional learning. To further understand differences in quality and impact of instructor learning, longitudinal studies might identify to what extent instructors’ learning activities have a lasting impact in their teaching practice and student learning. In addition, further studies could focus more specifically on levels of reflection embedded in instructor learning, by employing alternative methods such as journals or digital logs (Meirink, et al., 2009; Van Eekelen, 2005).

#### *5.4 Implications for practice*

Our findings paint a picture of instructor learning, which—in the absence of any systematic professional development program beyond the first year of teaching—is primarily concerned with developing teaching skills and strategies that enable students to master specialized subject matter. In learning to teach their subjects, instructors in Canadian post-secondary vocational education might be at a double disadvantage compared to their counterparts in primary and secondary schools. Firstly, because they haven't received any training related to teaching their specific subject matter. Secondly, because their subjects are so specialized that there might not be any professional groups that concern themselves with best-practices in teaching their specific subject matter. To better support instructor professional learning in the first years of their career, we advocate for the creation of formal teacher training and mentorship for instructors in vocational education, taught by teacher educators who are both industry professionals and experienced instructors in vocational education. Permanent employment at the institute could be made contingent upon a three year staged induction process, during which the instructors participate in a formal training program. This program would include some instructional time, but would mostly involve extensive on-the-job guidance, mentorship, classroom observations by peers and teachers educators, accompanied with debriefing, culminating in the compilation and evaluation of a teaching dossier. The teaching dossier would require frequently solicited student feedback, and written reflections on that feedback. In addition, for experienced instructors, learning at work could also be more systematically supported. It is clear that a great deal of learning is required by instructors when having to teach content for the first time. Program chairs could support this by creating opportunities for peer learning, and mentorship. Experienced course coordinators could be encouraged to create communities of practice for instructors teaching the same course. Time could be scheduled for the collaborative creation and revision of course materials and assessments. Portions of staff meetings could involve discussion of best practices in teaching specific industry standards and practices. Training for departmental leadership could also be augmented with knowledge about and strategies for supporting instructor professional learning.

#### *5.5 Conclusion*

Given what we know about the limited impact of courses and training programs, and given the need for continuous instructor learning, a greater understanding of instructor professional learning is required. The present study contributes to this understanding by showing how instructor learning is embedded in and supported by workplace processes. It also shows how a large part of instructor learning is focused on mastery of the skills and knowledge required to teach the specific industry practices of their profession/trade. In the absence of formal training in this area, instructors rely on each other and on trial and error. More can and should be done to support instructors in this area of their professional learning.

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## Appendix 1 Interview guide

1. Can you tell me a bit about yourself and your role here at Prairie College?
2. Could you share and elaborate on four or five concrete examples of situations/experiences/activities where you were learning as an instructor? Where, when and how did this come about?

Think of:

- learning by doing,
- learning by getting feedback
- reflecting on your own or with colleagues
- learning by collaborating with colleagues,
- learning by trying out new things in your classroom,
- learning by attending professional development events

For each individual learning situation, use the following unpacking questions:

- What prompted the activity?
- What was the ideal end goal?
- What did you do to achieve this?
- What did others do?
- What was the outcome?
- What were your thoughts and feelings throughout this learning episode?

3. Which types of the learning activities you mentioned would you say you do most often and which ones do you prefer?

The following questions are about how your professional learning is influenced by your immediate work environment.

4. How is the way you learn influenced by performance planning and assessment?
  - How are you required to plan and assess your performance?
  - Does it help you plan your learning?
  - Do you set learning goals for yourself?
5. In your work there are some teaching and curriculum aspects in your control and some are controlled by colleagues, or completely out of your control. How does this control/lack thereof influence your learning?
  - Are there things that you wish you had more control over?
  - Are there things you wish you had less control over?
6. Do you and your colleagues have the same norms/standards/goals for teaching and student learning? Please provide an example of a norm/goal you and your colleagues share and one where you think differently than your colleagues.
  - Would you say your goals for student learning and those of your colleagues mostly overlap or do mostly have different norms/goals?
7. How is your learning influenced by collaboration?
  - Do you collaborate with colleagues in your department?
  - Do you collaborate with people outside your department?
  - What do you collaborate on? What do you do on your own?
8. Do you have reflective discussions with colleagues about teaching and student learning?
  - What kinds of issues do you discuss?
9. What kinds of support does your department and your institute offer you for professional development?
  - Does your professional association require you to participate in continuing education?
10. How does your chair encourage professional development?
11. How is the way you prefer to learn related to 1) who you are as a person? 2) what you believe your role is as an instructor, 3) how your department functions, 4) your trade/profession?

## Appendix 2 Examples of Learning episodes Reported in the Interviews

Note: for the purpose of this paper we chose to include those learning episodes that provide the widest possible variety of topics and prompts.

Participant Number and Pseudonym	Paragraph Number#	Topic <sup>1</sup>	Prompt <sup>2</sup>	Activities	Level of Reflection	Learning outcome	Discussed learning/issue with others?	Used ideas from the following sources
1128/ Edson	317-333	P	FL	practices using a technique to get to know students, learned during introductory teaching course	action-oriented	expanded repertoire of instructional techniques	no	intro to teaching course
1136/ Aiden	114-119	P	ON	watching online presentations	action-oriented	gain ideas on how to present information to listeners	no	sources on internet
1144/ Brett	116-147	P	C	gets frustrated with own lack of ability to engage students, observes colleagues, asks students for feedback, tries out alternative strategies	action-oriented	learns to use new instructional techniques	colleagues	
1150/ Cory	31-49	PCK	NT	observing students responses during one-on-one instruction, watching students work through labs together	meaning-oriented	learning about how students learn certain course concepts	no	
1212/ Taylor	57-60	PCK	NC	needed to teach completely new course material that was not part of the program before, went to learn from expert, tried an approach in class, asked students for feedback, decided it was a success tweaked it a bit	action-oriented	included novel content and activities in course	yes, industry	
1215/ Misha	97-107	C	FL	attend conference, learn how new machine used out in industry works, request department purchases machine for students	action-oriented	gained knowledge about machine	colleagues	External industry reps
1218/ Reese	36-104	P	C & FL	wanted students to be more prepared for class, attended workshop on flipped classroom, experimented with new teaching strategy	meaning-oriented	insight: students might need an orientation to new teaching strategies	reflected with colleague afterwards	workshop on flipped classroom
1225/ Drew	126-132	OP	F	receives heated responses to email s/he wrote, gets coaching by supervisor	action-oriented	learned to be careful with phrasing of emails	supervisor	
1341/ Terry	166-173	CM	F	got student feedback, complaining about other students' behaviour, asked colleague for advice on addressing classroom disruption	action-oriented	Learned a strategy to address classroom disruption directly	colleagues	

A total of 58 learning episodes were reported by 17 instructors, ranging from one to eight learning episodes per instructor.

<sup>1</sup>Topic codes are as follows: P = Pedagogy, PCK = Pedagogical Content Knowledge, C = Content, CM = Classroom Management and Interpersonal Teaching Behaviour, OP = Participation in the Organization

<sup>2</sup>Codes for Prompts for Learning are as follows: F= upon receiving Feedback, FL= upon attending Formal Learning event, C = instructor has a Concern and wants to improve an area of practice, NT= New Task (e.g. having to teaching a course s/he hasn't taught before), NC = Having to teach completely new Content that wasn't part of the program before, ON= Openness to /actively looking for new ideas

**Appendix 3**

*Table 2. Level of Reflection by Type of Prompt*

<b>Type of Prompt</b>	<b>Level of Reflection</b>			<b>Total</b>
	Meaning Oriented	Action-Oriented	Rapid/Intuitive	
Novel Task	5	7	2	14
Novel Content	1	3	-	4
Feedback	1	8	4	13
Formal Learning	-	8	-	8
Instructor Concern	4	9	2	15
Openness to New Ideas	-	3	1	4
<b>Total</b>	11	38	9	58

*Table 3. Level of Reflection by Topic of Learning*

<b>Topic of Learning</b>	<b>Level of Reflection</b>			<b>Total</b>
	Meaning Oriented	Action-Oriented	Rapid/Intuitive	
Pedagogy	4	11	1	16
Pedagogical Content Knowledge	6	16	7	29
Content	-	5	-	6
Classroom Management	-	2	1	8
Participation in Organization	1	3	-	4
<b>Total</b>	11	38	9	58