

From Teacher Education to Teachers' Work: The Knowledge of Students

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Abstract: *In order to teach, what do teachers need to know about their students? At some point, teachers must apply the fundamental educational and developmental psychological knowledge about students learned mostly in teacher education programs to the reality of a classroom. Yet, what is it about students that then informs their daily practice? This research studies Quebec (Canada) teachers' points of view on what they know about students. Data were collected from 25 interviews and four focus groups with teachers from elementary and high schools. The data have been analyzed through NVivo software using thematic content analysis. The analysis highlights teachers' knowledge about their students and its content. Precisely, this paper will discuss one of our research questions: what specific knowledge do teachers possess about their students?*

Keywords: knowledge about students; teacher's knowledge; teacher education; teaching practice

Introduction

Teaching practice has long been considered an activity based on knowledge and skills (Tardif & Lessard, 1999), and for almost 30 years, studies on teachers' knowledge have attempted to identify a unified knowledge base for teaching (Ingersoll et al., 2014; Shulman, 1987). Shulman's categories of knowledge have influenced several generations of researchers, with one of the identified categories referring to knowledge about students and their needs.

Among Shulman's categories of knowledge, there is the pedagogical content knowledge (PCK), the subject matter knowledge (SMK), and the general pedagogical knowledge (GPK). These categories have been studied from many angles: for example, PCK has been studied by researchers mostly because many (Shulman included) assumed it was the knowledge category that encompasses all of teachers' work, especially the adaptation of the subject matter to the classroom, students, and contexts (Shulman, 1987; Cochran et al., 1993; Hashweh, 2005; Jenkins & Lou Veal, 2002, etc.). SMK has mainly been studied by researchers who were interested in what content knowledge teachers retain from their teacher education and how they put it into practice (Grossman, 1994:1995; Ball et al., 2008). Classroom management is another dimension of PCK that received a lot of research attention (Voss et al., 2011), while GPK has been the subject of a major OECD report dedicated exclusively to this category of knowledge (Guerriero et al., 2017). In other words, since teachers' knowledge and understanding of each student is fundamental to teaching, one would expect the research literature to also address that knowledge.

In this research, knowledge about students is considered central to the teachers' work, as we believe most of teachers' actions revolve around individual students. Indeed, teachers facilitate and encourage student learning daily in their practice (Tardif & Lessard, 1999). Yet, it leaves us wonder about what teachers know about their students? It may seem simple—obvious—but when we asked teachers that question, we realized it open up a vast area of ways of knowing that has been little documented in the literature. In this article, we respond to that question by presenting a analysis of teachers' knowledge about students.

Theoretical Framework

To have a clearer picture of the knowledge about students that teacher possesses, we must address certain elements. First, grounded in a cognitive perspective, the nature of knowledge can be separated into two types: declarative knowledge and procedural knowledge. The former relates to the knowledge necessary to understand the world and how things are, while the latter relates to everything one needs to know to perform a specific action (Anderson et al., 2001; Becker, 2007). Declarative knowledge can be separated into two subtypes: 1) factual knowledge, which mobilizes what one needs to know within a discipline, for example, an alphabet or numbers; and 2) conceptual knowledge, determining what one must know to understand a subject and its structure, for example, the structure of a sentence in English (Anderson et al., 2001). In short, these two types of declarative knowledge (factual and conceptual) are mobilized to better understand the world, having different implications for practice given varied contextual features and realities.

Mobilizing this theoretical framework in our study, factual knowledge is pertaining to the knowledge of students in the classroom, their characteristics, motivations, abilities, etc. In contrast, conceptual knowledge can pertain to knowledge about children and teenagers in general, grounded in and emergent from developmental theories and perspectives on learning. Considering such a grounding, the factual knowledge is most likely acquired in the classroom with “real” students, and the conceptual knowledge, mainly developed during teacher education.

Indeed, teachers’ knowledge is acquired through many sources: Shulman (1987) and Tardif and Lessard (1999) present five principal sources of teachers’ knowledge: 1) teacher education; 2) personal experiences and past education; 3) personal reading and/or research; 4) school curriculum; and 5) practice experiences. Given that grounding and as noted previously, it is our contention that conceptual knowledge is mostly acquired during teacher education and the pursuit of theoretical content courses, and then further enriched through experiences during the practicum that is part of the teacher education program. On the contrary, factual knowledge is mainly acquired through teaching and interacting with students. So, is there a way of understanding factual and conceptual knowledge as two sides of the same coin?

As mentioned above, research on teachers’ knowledge about students’ needs yet to be better researched and described in terms of what it implies. Thus, we believe this knowledge can be clarified. To do so, we divide it into three specific categories of knowledge about students: 1) knowledge of the student’s previous learning (what the students have learned in the past, and how they understand the subject matter) (Grossman, 1991; Hill et al., 2008); 2) knowledge of the individual development of the students (their abilities, motivations, ways of responding) (Roaten & Roaten, 2012; Wang & Eccles, 2012); and 3) knowledge of the socio-cultural environment of students (parents, home language, etc.) (Fortin et al., 2004). These three categories represent fundamental aspects that can influence students’ educational success, as they pertain to what students know, how they behave, and where they come from. We suggest that these three categories of knowledge about students can be understood as implying both, factual and conceptual knowledge.

Furthermore, Anderson et al. (2001) indicate that declarative knowledge (both types) can guide procedural knowledge, and thus, what teachers know may influence how they act. Based on that and for our study, we subdivided the factual and conceptual knowledge about students into six categories as shown in Table 1.

Table 1. Knowledge about students

<i>Nature</i>	<i>Categories</i>
<i>Factual</i>	Knowledge about students’ previous learning
	Knowledge of students’ individual development
	Knowledge of the socio-cultural environment of students
<i>Conceptual</i>	Knowledge about learning and learning theories
	Knowledge about developmental pathways
	Knowledge about socio-cultural environment

Our aim was to detail these categories of knowledge: would it be possible to specify them according to these two types of declarative knowledges? We will address that question further in this paper.

Methods

To examine this question, 25 Quebec teachers having around 5 years of experience were interviewed using semi-structured interviews. We conducted the semi-structured interviews to articulate teachers’ knowledge about their practices and interactions with their students (Borges, 2004). By using that, we agree that teachers act on ideas and motives that they can explain and argue (Fenstermacher & Richardson, 1994) which makes for a rich discourse about their expertise. In addition, four focus groups were conducted on teachers’ knowledge of students. The focus groups made possible to open the discussion on other questions, while it also helped promote the sharing of ideas and nuances on the subject (Baribeau & Germain, 2010). This type of data collection seemed relevant to our study since we wanted to better understand a phenomenon (knowledge about students) present in several individuals (teachers).

All participants were part of a larger longitudinal study (2014-2019). For five years, we followed (principal researchers [2] and their assistants [5]) a cohort of teachers to address the issue of professional integration and the development of knowledge over the first years of their careers. Data collection in the main study has two components: 1) the development of a professional learning community, which reunited four times a year, for the duration of the study; and 2) individual semi-structured interviews with each participant, once a year. The teachers were recruited through snowball sampling (Naderifar et al., 2017). The focus groups analyzed for this article were carried out during one of the meetings that constituted the established professional learning community. All participants of the professional learning communities also took part in the semi-structured interviews. In Table 2, we offer a summary of the teaching specialization of our participants considering each data set for this article.

Table 2. Teaching specialization of our participants

<i>Semi-structured interview (n=25)</i>				
Elementary and Kindergarten <i>n=12</i>	Physical and Health education <i>n=4</i>	High School <i>n=4</i>	General Adult Education <i>n=4</i>	Other <i>n=1</i>
<i>Four focus groups (n=21)</i>				
Elementary <i>n=7</i>	Physical and Health Education <i>n=5</i>	High School and General Adult Education <i>n=5</i>	Specialist at Elementary School and Kindergarten Teachers <i>n=4</i>	

Data Analysis

A thematic content analysis based on a mixed coding grid (Paillé & Muchielli, 2016) was pursued on both data sources, using *NVivo* software. Coding was based on “codes” created from the theoretical framework (deductively) and themes that emerged from the analysis of participants’ discourse (inductively). The questions asked in the semi-structured interviews and the ones in the focus groups were not identical but were complementary, and can be summarized as follows:

- I would like to know if the education training you received has enabled you to acquire knowledge that specifically concerns your students. If so, what are they?
- Do you feel that you know the students you teach? In practice, do you know their way of learning, their abilities and difficulties, their way of reacting, etc.?
- What do you know about your students? Their personal life? The socioeconomic environment in which they live? Their previous educational path? Their hobbies? Their interests? Etc.

These questions have enabled us to portray the knowledge that teachers possess about their students, according to more specific categories. We present that in the next section.

Results

In this section, we present first the content of knowledge about students, which means that we will discuss the analysis of the transcriptions of the semi-structured interviews and focus groups. After that, we will take time to address an interesting result: the remarks of the participants about teacher education and as it pertains to their knowledge about students.

The Content of Knowledge About Students

Teachers told us that they know their students’ needs and level of learning and difficulties. A few talked about the families and the culture of the students. The teachers seemed to know about many dimensions of their students’ lives, and it seems that their knowledge emerged from their teaching practice and interactions with them. It was also related to the subject matter and the grade level they were teaching at that moment.

At the elementary school level, one of the teachers noted that one of her students is very anxious, especially when she is absent:

My anxious student gave me a lot of problems. Especially when I was away, he would tell me, “*I don’t want you to be away because I know I’m going to do something stupid.*” So, he was anticipating his own nonsense! (T51¹).

This teacher knows her student and understands his state of mind when she is absent. Indeed, many interviewed teachers told us a lot about the psychological state of their students or the difficulties they experienced.

Other teachers also talked about learning in general and learning difficulties that students experienced. For example, this kindergarten teacher said:

The fun part is that by knowing a bit about reading strategies, you can already spot what strategy children are using. You know I got one that never seems to listen, he’s spaced out, he’s never looking at us, but when I show something, he’s going to do it the same way right after (T57).

By having conceptual knowledge about learning strategies and by knowing her students, this teacher was able to explain that even though this student is different from the other, he still learns by observation. Knowledge about learning theories, learning levels of students in class and the psychological states of the students (anxiety, attachment problem, etc.), seem to allow teachers to better understand the students they work with. The statements of elementary teachers seem to be consistent with theoretical groundings and key frameworks discussed in teacher education, namely social constructivism and social cognitivism as advocated by Vygotsky and Bronfenbrenner. Teachers seemed to understand these theoretical frameworks and the idea that learning, and development are intimately linked.

At the high school level, teachers discussed different topics than the elementary school and kindergarten teachers. Indeed, they seemed more interested in what motivated their students and how they are developing. It seems that high school teachers were very aware of how important developmental needs of adolescence constitute individual development and were truly concerned about it. For example, teacher 47 said that she no longer struggled when students gave her a difficult time. She mentioned that it is mainly thanks to her conceptual knowledge of the period of adolescence:

Looks like I have been able to develop a bit of a broader view of the student. I already knew, I think, from general knowledge, that a student who is rude, that it usually has nothing to do with me. It’s bigger, but sometimes you don’t remember it. Sometimes it’s hard not to feel targeted when someone is aggressive or rude, whether they’re 16 or not [...]

In short, it seems that conceptual knowledge about child and adolescent appropriate development pathways allowed teachers to better understand and adjust to their students. At times, it also seemed to allow a certain detachment from the actions of a student if inappropriate or disruptive. It is interesting that these teachers talked about that period of development more than the others. Can we assume that it is because, apart from the first years of a child’s life, that adolescent development is the time when the changes are the most significant in a person’s life (Cloutier & Drapeau 2015)?

For the specialist teachers, such as physical education teachers or arts teachers, the main concern about their students seemed to be more related to their students’ family and socio-cultural environment. These teachers made references to their students’ physical activity outside of school (T38 and 49, primary PHE), the development of fine motor skills (T52, arts), how homework is done at home (T13, resource teacher) or the language spoken at home (T22, reception class), all aspects linked to students’ family and socio-cultural environment. It also appears that all these examples are linked to how stimulating students’ home environment is. So, can it be assumed that these teachers strive to understand their students’ lives outside of school to then be able to adjust better to their needs?

In general, the results show that participants have more factual knowledge than conceptual knowledge, showing that teachers are close to the students who are in their classrooms. However, both factual and conceptual knowledge

¹ T is for “teacher” and the number following is to anonymise the name of the teacher.

of the individual development of the student have been observed; participants know what their students like, what their abilities are, and how they behave in specific contexts. Understanding of students’ prior knowledge was also observed as participants showed that they knew how their students learned and what their needs were. Knowledge of students’ socio-cultural environment was less evoked by the participants, especially from a conceptual perspective, but, as we saw, statements on that matter underline some interesting elements.

In the last paragraphs, we focused on highlighting the content knowledge about students evoked in the interviews and focus groups. We have also tried to better understand the factual and conceptual “nature” of that knowledge. That work shows that knowledge about students is vast and diverse, and that it is closely linked to the needs of the teachers in their work, related to the subject matter they teach and their level of teaching. But what is this knowledge specifically?

Specific Categories of Knowledge About Students

We previously presented a theoretical framework with a subdivision of factual and conceptual knowledge about students. Our analysis has allowed us to further specify 13 categories of knowledge about students (Table 3).

Table 3. Specific categories of knowledge about students

<i>Nature</i>	<i>Categories</i>	<i>Specific categories of knowledge</i>
<i>Factual</i>	Knowledge about student’s previous learning	1. Knowledge of capacities and needs (levels of learning) 2. Knowledge of the difficulties of certain students or of the group
	Knowledge of individual development of the students	3. Knowledge of behaviour patterns 4. Knowledge of physical capacities and psychological state of mind 5. Knowledge of interests and motivations
	Knowledge of the socio-cultural environment of students	6. Knowledge of socioeconomic background 7. Knowledge of the cultural environment 8. Knowledge of the family environment
<i>Conceptual</i>	Knowledge about learning	9. Knowledge of the program and the progression of learning 10. Knowledge of learning needs 11. Knowledge of students with disabilities and learning or adjustment difficulties
	Knowledge about developmental pathways	12. Knowledge of child and adolescent development
	Knowledge about socio-cultural environment	13. Knowledge of socio-cultural environment

Categories set in Table 3, allowed us to be more specific considering the knowledge categories that seem most important to teacher’s effective school practices. Can we suppose that maybe it is showing that teachers consider factual knowledge more enlightening than conceptual knowledge? However, conceptual knowledge, especially about learning, has been discussed a lot with the participants: progression of learning, learning through school years and adjustments difficulties seems to be very relevant for them. So why do they evoke and discuss conceptual knowledge less frequently? It may be because of the way questions were asked, but to address that, we think that discussing teachers’ remarks about their educational training could be insightful.

Teacher education and Knowledge About Students

Teachers readily discussed their teacher education and knowledge gained from it and were willing to criticize it. In fact, 16 of the 25 participants in the semi-structured interviews and teachers in three of the four focus groups offered their opinions about their training programs. They especially criticized the deficiencies of knowledge about students, or how it was presented.

More specifically, the teachers would have liked to acquire knowledge on the following aspects: gifted pupils (T11); autism spectrum disorders (T32); anxiety disorders (T44); ethnocultural diversity (T13); general adult education (T14) and the 4-year-old kindergarten program in Quebec (T57). When teachers talk about the gaps in their training, we can see that teachers refer to their work with the students because it is from this work that they identify the gaps. For example, teacher 14 mentioned that “[...] *due to the fact that I teach in adult education, but that it was not mentioned in my education training, it is sure there is a lag.*” In Quebec (Canada), we don’t have a training program specifically for adult education. Instead, many of those called specialist teachers were formed through the secondary school teacher education program. The same kind of comment was made by teacher 57 when she talked about her training in kindergarten-elementary education yet teaching in kindergarten with 4 years old children².

Thus, the participants expressed criticisms of their training which was not tailored enough to the developmental needs of the children they eventually taught. In fact, six teachers and the teachers in the focus group of primary school specialists pointed out that the main shortcoming in the courses relating to the students is that the knowledge transmitted is little or not concrete, and that it did not prepare them in terms of how to intervene effectively with students.

In contrast, teacher 21 underlined the relationship to knowledge and usefulness of knowledge acquired during training. After a few years in practice, this teacher noticed that her training might have been more meaningful than initially anticipated. She realized that the knowledge imparted to her through teacher education was useful in the end, as it allowed her to analyze and examine situations and choose appropriate interventions. Her reflection suggests an integrated and professional vision of teaching, with elements relating to the analysis of situations that are reminiscent of the pedagogical reasoning and action of which Shulman (1987) speaks.

Overall, it seems that the teachers demonstrate a large breadth of knowledge of their students. The knowledge described is dependent on the students themselves, their needs, and the resources available in the school. Moreover, it depends on the context of teaching, the level at which they teach, and even the subject matter. Fundamentally, this shows that knowledge about students is situational, specific to the teaching context, and is, therefore, firmly rooted in practice.

Discussion

The results show that teachers generally know much about their students in their classrooms, and about students’ needs in general. They seem to learn about them mostly by being with them. But what do these analyses tell us about the broader question of teacher knowledge? Four observations can be made:

1. Teachers’ knowledge of students covers a wide range of dimensions, ranging from students’ abilities, interests and needs to their difficulties, behaviours, family, and socioeconomic and cultural backgrounds. Knowledge of students is made up of various factual and conceptual contents that allow teachers to better understand and interact with them.
2. The factual and conceptual knowledge appear strongly contextualized: it is not a general, theoretical, and abstract knowledge, but rather closely dependent on the subject matter taught and level of teaching.
3. Our results also hint at the central role of knowledge about students for all teachers irrespective of their specialization. It seems that knowing your students is important to better understand and interact with them and to support their learning. Can we suppose that such knowledge is essential to teachers’ work in the classroom, especially now as we talk about inclusive education and the need to be able to adapt better to student needs?
4. Finally, our results portray 13 specific categories of content knowledge about students. Even though those categories are contextualized and specific to the teachers in our study, they make evident the vast knowledge teachers have and develop over time of their students, some of which should be addressed better and at a more profound level in teacher education programs.

² The 4 years old kindergarten program is new (2019-2020), and it has not yet been integrated in the teacher education training. Teacher 57 has a university degree in elementary and kindergarten (5-year-old) teaching. For more information: <https://www.quebec.ca/en/education/preschool-elementary-and-secondary-schools/kindergarten>

These results seem to indicate that teaching knowledge is highly specific to the context of work of teachers, which is new, as most research has focused mainly on typologies of general teacher knowledge that is applicable to all teachers (Altet, 2001:2004; Cochran et al., 1993; Shulman, 1987; Tardif & Lessard, 1999). Accordingly, our study makes at least two contributions: first, it suggests that all teachers need to know their students, and second, that all teachers are naturally engaged in this process. In short, teachers are keen to know their students better, because they seem to perceive that this knowledge is at the heart of their professional activity. Also, it shows that teachers are preoccupied with the development and wellbeing of their students. Given some critiques raised by the teachers in this study about their teacher education, our study has implications for administrators of teacher education programs. The study points to current deficiencies in the transmission of knowledge about students in these programs. Our study also has implications for the teaching practice as it provides insights into what teachers know about their students and continue to learn as they teach, suggesting that the development of ways of knowing we outlined is a lifelong developmental process.

Conclusion

In this article, we presented a study of teachers' knowledge about students which we see as crucial as those ways of knowing have too often been relegated to the background of teacher education programs and teachers' everyday practices. We think that this kind of knowledge is essential to effective teaching, and should be studied in more detail.

Yet, this study relies on a small sample teachers and teaching experiences and hence, we cannot generalize our results to all teachers. It is also located in Quebec, especially in the large urban center of Montreal which has a unique student population. Finally, a thematic analysis can be tricky considering interpretations made of the data, but we have been cautious in our approach, staying close to the words of the participants and implicit meanings even though translation did pose some challenges. However, we believe that the semi-structured interviews and focus groups are extremely rich and rooted in teaching practice. When teachers talk about their work, they mobilize what they know and show practical awareness, grounded in and emergent from their teaching experiences (Borges, 2004). Teachers act on ideas and motives that they are generally able to explain and argue about (Fenstermacher & Richardson, 1994). Considering that only a few authors studied knowledge about students specifically, we think that our conclusions are relevant and can lead to other interesting questions. For example, in other research studies, we have tried to respond to two other questions: how do teachers learn about their students? And how do they use that knowledge in their practice? Other issues could also be addressed. For instance, what is the role of that knowledge in the development of a positive relationship between teachers and students or on the impact of that knowledge base on student learning? We may even envision that knowledge about students should and is at the centre of any effective teaching practice.

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