

## 5. Learning experiences of primary student teachers in a geography programme

## Abstract

This study aims to provide insight into learning experiences reported by first-year primary student teachers in a geography course. This course focused on the development of pedagogical content knowledge (PCK) for the subject of geography. Learning experiences were measured by means of learner reports. The course aimed to develop primary student teachers' PCK for the subject of geography (substantive and syntactic knowledge), but the student teachers in the sample reported relatively little learning of geographic facts, concepts, principles and skills (substantive knowledge). However, the student teachers did report having learned about how to teach geography (syntactic knowledge). The learning experiences they described only incidentally reflected geographic thinking or making connections between educational principles and geography. More domain-specific pedagogies and more time devoted to subject methodology may be needed to develop into teachers of primary geography.

### Keywords:

primary teacher education, geography, learner report, learning experiences, pedagogical content knowledge

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## **5.1. Introduction**

This study focuses on the learning experiences of student teachers in a course designed to develop their pedagogical content knowledge (PCK) of geography. The development of student teachers' PCK is the subject of many studies (Jo & Bednarz, 2014; Nilsson, 2008; Martin, 2008b; Dolan, Waldron, Pike, & Greenwood, 2015). In PCK research, however, little is reported about what student teachers themselves think they have learned. Therefore, the purpose of this study is to gain insight into what first-year primary student teachers believe they have learned while participating in an experimental geography course.

### **Students' perspectives**

Insight into students' learning experiences provides valuable information about how students perceive and learn from an implemented curriculum and educational practice (Thijs & Van den Akker, 2009). So to improve classroom processes and instruction, it is important to listen to students as learners to discover how they interpret their learning experiences (Levin & Wadmany, 2006; Cook-Sather, 2002; Cushman, 2014; McIntyre, Pedder, & Rudduck, 2005).

How learners' perspectives can inform our understanding of effective educational practice is the subject of multiple studies (Cushman, 2014; McIntyre, Pedder, & Rudduck, 2005). The focus of many studies is to involve students in the design of education. In the context of implementing new technologies into the classroom Levin and Wadmany (2006) argue that the implementation is incomplete if the students' voices have not been heard. They cite Shuell (1996), who claims that ultimately it is not the intent of the teacher but the students' perceptions and behaviours that determine the impact of teaching on student learning. Van Kesteren (1993) emphasizes the student role in assessment and states that one type of knowledge in particular cannot be assessed adequately by any objective method, nor by any person other than the concerned student, namely self-knowledge. Self-knowledge in the context of this study can be defined as the knowledge or understanding of one's own capabilities to learn about teaching geography.

With respect to geography and geography teaching, there are several studies that report on the perceptions of students and student teachers regarding the subject of geography and the teaching of the subject (Hopwood, 2009; Catling, 2002; Morley, 2012; Bent, Bakx, & Den Brok, 2014; Waldron, et al., 2009; Dolan, Waldron, Pike, & Greenwood, 2015; Martin, 2008a; Preston, 2014). However, in these studies, we find little attention devoted to students' personal learning experiences, particularly those related to educational settings. However, we contend that such a focus might reveal how student teachers can actually learn to teach primary geography.

### Learning to teach geography

In regards to teaching a subject such as geography in primary education, a solid knowledge base is necessary (Bransford, Brown, & Cocking, 2003). However, recent findings (Bednarz, Heffron, & Huynh, 2013; Blankman, Van der Schee, Volman, & Boogaard, 2015; Ofsted, 2011; Bell, 2005) suggest that student teachers lack sufficient content knowledge of geography. Moreover, it is also argued that even if their knowledge of geography would be at a sufficient level, it still would not guarantee the successful teaching of the subject because content knowledge has to be reworked before it can be taught effectively (Lambert, 2009b).

Therefore, an important aim of teacher education programmes is to develop student teachers' PCK. The concept of PCK was introduced by Shulman (1986; 1987) and is defined as the synthesis of all knowledge needed to be an effective teacher (Gess-Newsome, 1999). PCK then requires the transformation of pedagogical and content knowledge into a unique form, "the only form of knowledge that impacts teaching" (Gess-Newsome, 1999, p. 10). PCK enables teachers to use particular teaching procedures (how), with particular content (what), for a particular reason (why) (Loughran, Berry, & Mulhall, 2012).

Geographic content or substantive knowledge (*what*) can be divided into geographic facts, geographic concepts, geographic principles and geographic skills (Gersmehl, 2008; Catling & Willy, 2009; Vankan, 2009; Van der Schee, 2000; Taylor, 2008). A geographic fact is a statement in which an object is linked to another object (e.g. many jeans are made in China). A geographic concept refers to a class of objects (China is a low income country), or a relationship between objects. A geographic principle refers to a relationship between concepts (many clothes are made in low income countries). Finally, geographic skills refer to a subject-specific way of thinking (Van der Schee, 2009; Van der Vaart, 2001) as is reflected in asking geographical questions, such as 'where' and 'why there', using geographical sources of information and applying geographical thinking.

To develop student teacher's use of particular teaching procedures (*how*), basic concepts of geography and geography teaching (Gersmehl, 2008; Catling & Willy, 2009; Haubrich, 1992; Van der Schee, 2000) can be translated into questions that student teachers can ask themselves as they prepare their geography lessons (see Figure 5.1). Such a lesson includes four core elements, as Van Gelder et al. (1972) distinguish in their didactic model: the starting situation, the goals of the lesson, the learning process and the evaluation of the lesson.

Regarding beliefs (*why*), several authors emphasize the influence of students' thinking and attitudes about the teaching and the classroom practices (Alkis, 2009; Bradbeer, Healey, & Kneale, 2004; Catling, 2004; Corney, 2000; Martin, 2005; 2008a; Lane & Coutts, 2012).

Developing these three aspects of PCK requires a step-by-step process. Findings indicate that, at the beginning of their teaching career, student teachers are often more focused on pedagogical aspects of teaching and classroom management, simply because they have to survive everyday classroom teaching (Korthagen, Loughran, & Russell, 2006). Martin (2005) came to similar conclusions but she also identified certain differences in the development of PCK between a student with a geography degree (a specialist) and a non-specialist student teacher. While the geography specialist, parallel to the growth of his teaching experience, increasingly proved being capable of incorporating his geographical knowledge into the practice of teaching, the non-specialist did not demonstrate such improved capability because of a lack of content knowledge.

| Characteristics in CTG   | Explanation  |
|--|--|
| <i>Geographic characteristics (What: substantive knowledge)</i>                                    |  |
| 1. Where is it?  | Describe what you see and where you see it, preferably using, e.g., a map, an atlas, a globe etc.                          |
| 2. Why is it there?  | Explain what you see (through the relationship between man and nature).  |
| 3. What do I see if I zoom in or out?  | At other levels of scale, you may see different things. Zooming provides a different picture.                              |
| 4. How does it change over time?   | Describe the situation in the past and/or in the future.   |
| 5. What are the consequences, advantages and disadvantages?  | The effects (or pros and cons) are viewed from different angles.   |
| <i>Instructional characteristics (How: syntactic knowledge)</i>                                    |  |
| 6. How can I start the lesson in a motivating way?   | The lesson starts in a way that challenges pupils to participate in class (using an everyday spatial problem).             |
| 7. How can I end the lesson in a way that promotes transfer? (Discuss the special and the general) | At the end of the lesson, there is a discussion about the usefulness of knowing something about the subject of the lesson. |

Figure 5.1. Characteristics of a good geography lesson in CTG

### Research context

To develop student teachers' PCK, we designed an experimental course called Consciously Teaching Geography (CTG) for first-year student teachers to take at the beginning of their training. Central to the course, which consisted of five 90-minute meetings, was a framework with characteristics of a good geography lesson (see Figure 5.1). During the meetings of the course the characteristics were applied in different contexts.

At the start of the course, activities focused on raising student teachers' awareness of their own beliefs and preconceptions about geography and the teaching of geography. Thereafter, students' concepts were discussed in the context of geography as reflected in everyday activities, such as their journey from home to school or the breakfast they ate. These 'everyday geographies' could, according to Martin (2008a), provide a suitable start-

ing point from which student teachers' competences in teaching the subject of geography can be developed. Thus, each class meeting began with an everyday spatial issue.

Each meeting the teacher educator modelled, step-by-step, the characteristics of a geography lesson by means of a sample lesson, by providing meta-commentary through which a translation to the student teachers' own practices takes place and by creating a connection between exemplary behaviour and theory.

### This study

The above-described CTG course, was taught by seven teacher educators to their first-year student teachers and was found to be effective in that it developed primary students' PCK, at least in the short term (Blankman, Schoonenboom, Van der Schee, Boogaard, & Volman, 2016).

The learning outcomes as perceived by the learners are the subject of this study. Insights into these experienced learning outcomes are important as they provide greater understanding of the impact of teaching on student learning. This leads to the following research questions:

1. To what extent do student teachers believe they acquired subject knowledge and skills (substantive knowledge)?
2. To what extent do student teachers believe they acquired pedagogical knowledge and skills (syntactic knowledge)?
3. To what extent do student teachers believe they acquired insight in their own subject knowledge and their pedagogical knowledge and skills (self-knowledge)?
4. To what extent do student teachers, who were taught by different teacher educators, differ in their experiences concerning acquired subject and pedagogical knowledge and skills and self-knowledge?

We answer these questions by analysing learner reports (De Groot 1978; Van Kesteren 1993), wherein student teachers articulated their learning experiences.

## 5.2. Method

### 5.2.1. Participants and data collection

Approximately 250 first-year primary student teachers at the beginning of their training participated in the CTG course. Seven teacher educators, each with his/her own teaching style, from six teacher-training institutes located in various regions of the Netherlands, each with its own *couleur locale*, conducted the course. This means that, even though the same intervention was performed at all teacher-training institutes, the implementation could have varied in detail. We choose this approach to reflect the reality of everyday

educational practice in the Netherlands, where no national curriculum for teacher education exists.

At the end of the first four meetings, the student teachers completed learner reports, and during the fifth meeting, they evaluated the programme. All in all, 1179 learner reports were available for analysis. Table 5.1 displays the distribution of the learner reports per teacher educator and per lesson. On average, approximately 80% of the student teachers were female, and the average age of the student teachers was 18,7 years.

Table 5.1. Number of learner reports per teacher educator and lesson

| Teacher Educator | Number of Learner Reports |          |          |          |          |
|------------------|---------------------------|----------|----------|----------|----------|
|                  | Total                     | Lesson 1 | Lesson 2 | Lesson 3 | Lesson 4 |
| 1                | 421                       | 111      | 91       | 109      | 110      |
| 2                | 108                       | 28       | 30       | 26       | 24       |
| 3                | 83                        | 17       | 21       | 26       | 19       |
| 4                | 213                       | 54       | 57       | 48       | 54       |
| 5                | 37                        | n.a.     | 21       | n.a.     | 16       |
| 6                | 71                        | 17       | 18       | 18       | 18       |
| 7                | 246                       | 59       | 67       | 62       | 58       |

### 5.2.2. Instrument: Learner reports

The learner report (Van Kesteren, 1993; Janssen & Rijlaarsdam, 1996; De Groot, 1978) is an open approach to measure learning effects in which students report what they have learned in an educational setting. A learner report is a form of self-report or self-evaluation whereby students are considered to be the experts on what they have learned. It is perceived as an appropriate tool for formative evaluations of educational situations (Van Kesteren, 1993). After a pilot study, we decided to use an adapted version of De Groot's (1978) original learner report. Our learner report contained four sentences for students to complete: (1) *I have learned that...*, (2) *I have learned how ...*, (3) *I have learned that I...* and (4) *I have learned how I...* (see Figure 5.2)

The first domain (*I have learned that*) addresses substantive knowledge, i.e., geographical facts and concepts and geographical principles and geographical skills. The second domain (*I have learned how*) measures syntactic knowledge, i.e., what they have learned about the way to teach geography. In the domains *I learned that I* and *I learned how I* students report on their self-knowledge regarding substantive and syntactic knowledge.

|   |                                  |
|---|----------------------------------|
| Write what you learned from the geography course today. Please be as precise and specific as possible about the things you learned. As this report is about your personal learning experiences, there are no right or wrong answers. Try to complete all phrases and write as many sentences as possible. |                                  |
| I have learned that...  | I have learned how...            |
| I have learned <u>that</u> I...   | I have learned <u>how</u> I..... |

Figure 5.2. The learner report used during the CTG course

To ensure that student teachers reported as truthfully as possible, the learner reports were completed anonymously, and it was emphasized that the reports were not intended as either a summative or a formative test but rather that the reports were part of the research project.

### 5.2.3. Coding labels and interrater reliability

To analyse the learner reports, a coding scheme was developed in which we labelled student teachers' statements based on our theoretical principles of PCK. A first version of the coding scheme was refined and supplemented with example statements of the student teachers after 12 learner reports were analysed by two researchers. This cycle was repeated three times, whereupon the coding scheme was then finalized. In addition to the aspects derived from theory (Figure 5.2), for each domain, a residual category (Other) was added. Subsequently, 50 learner reports were analysed by two researchers, and based on the outcomes, additional instructions were established. When another 50 learner reports were analysed by both researchers, 100% consensus was reached. The remaining learner reports were then analysed by one researcher (Figure 5.3).

After coding and analyses, the teacher educators were asked to comment on the results, thus helping us to interpret the data from different perspectives.

### 5.2.4. Analyses

All statements made by student teachers in their learner reports were coded corresponding to one of the theoretically based categories (Figure 5.3). The number of statements students made differs, both in total and per measurement moment. The learning experiences were coded within the category the students assigned them themselves.

After coding, descriptive analyses were performed on the total of all learning reports and per teacher educator. For all variables, frequencies were calculated, as well as percentages of the student teachers who mentioned a specific aspect. In addition to this, qualitative analyses were conducted. We studied, in detail, a random selection of 50



learner reports to determine precisely what student teachers noted with respect to their substantive and syntactic knowledge. In the descriptions of the results, we use these qualitative data to clarify the quantitative outcomes.

## 5.3. Results

### 5.3.1. Acquired substantive, syntactic and self-knowledge experiences of student teachers

Table 5.2 provides a summary of the percentages – over all measurement moments – of student teachers who mentioned a specific aspect of substantive and syntactic knowledge, as well as aspects of self-knowledge about both types of knowledge (see Figure 5.3 for examples of student teacher statements). Table 5.2 also offers insight into the extent to which student teachers experienced that their PCK has evolved. In an indirect manner the results indicate strengths and weaknesses of the experimental CTG course, which was meant to stimulate student teachers PCK for the subject of geography.

*Table 5.2. Percentage of student teachers who mentioned specific aspects of PCK-development (based on 1179 learner reports)*

| Aspect   | %    |
|--|------|
| <b>Substantive knowledge</b>   |      |
| Geographic facts and concepts  | 19,0 |
| Geographic principles  | 17,4 |
| Geographic skills  | 19,0 |
| Other  | 11,7 |
| <b>Self-knowledge about substantive knowledge</b>                        |      |
| Geographic knowledge and skills  | 27,3 |
| <b>Syntactic knowledge</b>   |      |
| Start  | 10,0 |
| Learning process   | 69,2 |
| Evaluation   | 1,4  |
| Other, including statements about (the analyses) of geography text books | 18,1 |
| <b>Self-knowledge about syntactic knowledge</b>                          |      |
| Initial situation and learning goals                                     | 12,9 |
| Learning process   | 67,7 |
| Evaluation   | 2,0  |
| Other  | 41,7 |

| <b>Aspect</b>   | <b>Examples of statements</b>  |
|---|--|
| <i>Substantive knowledge (I have learned ....)</i>                          |  |
| Geographic facts and concepts   | <ul style="list-style-type: none"> <li>.. where volcanoes occur</li> <li>.. how a volcano works</li> <li>.. that China has a dessert</li> <li>.. that Flevoland (a province in the Netherlands) is a polder</li> <li>.. what chocolate is made from</li> <li>.. that Japan has a large number of volcanoes</li> </ul>  |
| Geographic principles   | <ul style="list-style-type: none"> <li>.. that cacao beans grow in a tropical climate</li> <li>.. where volcanoes occur and why they occur there</li> <li>.. why Flevoland is pumped dry</li> <li>.. that tourism also has disadvantages</li> </ul>  |
| Geographic skills   | <ul style="list-style-type: none"> <li>.. that you can zoom in and out in different ways</li> <li>.. how to use maps</li> <li>.. that it is important to examine from different perspectives</li> <li>.. how you can ask geographic questions</li> </ul>   |
| Other   | <ul style="list-style-type: none"> <li>.. that geography is an important subject</li> <li>.. how I must learn about landscapes</li> </ul>  |
| <i>Syntactic knowledge (I have learned how...)</i>                          |  |
| Start of the lesson   | <ul style="list-style-type: none"> <li>.. to use examples</li> <li>.. to start a lesson in a motivating way</li> <li>.. I can use movie images for an introduction</li> <li>.. I can formulate lesson goals</li> </ul>   |
| Learning process  | <ul style="list-style-type: none"> <li>.. I can give a good geography lesson using experiences and the news</li> <li>.. I can explain certain things about volcanoes to the students</li> <li>.. to involve students by asking questions</li> <li>.. to use the seven characteristics of a geography lesson</li> <li>.. I have to use a map or an atlas in every lesson</li> </ul> |
| Evaluation of the lesson  | <ul style="list-style-type: none"> <li>.. I should conclude a lesson</li> </ul>  |
| Other<br>(including statements about (the analyses) of geography textbooks) | <ul style="list-style-type: none"> <li>.. there are many different geography textbooks</li> <li>.. to determine whether a textbook is good/useful</li> <li>.. to examine geography textbooks in a critical way</li> <li>.. to evaluate a geography textbook based on seven characteristics</li> </ul>  |

| Aspect   | Examples of statements  |
|--|---|
| <i>Self-knowledge about substantive knowledge (I have learned that I...)</i>   |   |
| About geographic knowledge and skills  | <ul style="list-style-type: none"> <li>.. have much to learn to give a good geography lesson</li> <li>.. need subject knowledge to give a good lesson</li> <li>.. know more about geography than I thought</li> <li>.. have to ask myself <u>where</u> is it.</li> <li>.. am good at reading maps</li> </ul>        |
| <i>Self-knowledge about syntactic knowledge (I have learned how/that I...)</i> |   |
| About initial situation and learning goals                                     | <ul style="list-style-type: none"> <li>.. how I still have a hard time formulating good lesson objectives</li> <li>.. that I find it difficult to come up with a nice introduction</li> <li>.. how I can create a motivating start with a topic</li> <li>.. how I can construct good learning objectives</li> </ul> |
| About the learning process   | <ul style="list-style-type: none"> <li>.. can prepare a good geography lesson</li> <li>.. can give a good and meaningful geography lesson</li> <li>.. can apply theory to practice</li> <li>.. can teach a good geography lesson that includes all aspects</li> </ul>   |
| On the evaluation of the lesson  | <ul style="list-style-type: none"> <li>.. how important the closure is and how to do it</li> </ul>  |
| Other  | <ul style="list-style-type: none"> <li>.. that I like to collaborate while preparing a lesson</li> <li>.. that I play a key role as teacher</li> <li>.. how I can involve children well</li> <li>.. how to teach this lesson to children</li> <li>.. how I can analyse textbooks</li> </ul>                         |

Figure 5.3. Coding scheme including statements made by student teachers

### Substantive (self-) knowledge

The various aspects of substantive knowledge are relatively equally cited: approximately 17% of the students mention geographical principles, 19% cite geographical facts, concepts and skills, and 27% report about self-knowledge regarding geographical knowledge.

The geographical facts, concepts, principles and skills students report on are closely related to the topics treated in the lessons in which they participated. For example, one student reports, *I have learned how dikes and polders function* after a lesson about the Dutch landscape. Another student reports, *I have learned why many clothes are produced in China* after a lesson about globalization. Yet another comments, *I have learned how to analyse and interpret a map* after a lesson on map skills.

### Syntactic (self-) knowledge

Though student teachers report learning experiences for all aspects of PCK, the majority of their statements relate to teaching skills (*syntactic knowledge*), particularly with regard to the learning process with almost 70% of the students citing this in their learner reports. Furthermore, with regard to self-knowledge, most statements relate to the learning process (67,7%). Upon closer examination, we find that, in approximately 50% of their statements, student teachers implicitly refer to the seven characteristics of good geography teaching but rarely state them explicitly. Zooming in and out is the most frequently mentioned aspect. Other statements regarding *syntactic knowledge about the learning process* are connected to (content) aspects of geography and the use of maps and atlases.

Many students mention aspects related to the learning process in all four sections of the learner report but make no statements regarding substantive knowledge. Their writings are, for the most part, rather superficial. Two examples are:

*I have learned how to gain the attention of the children.*

*I have learned how to create a good lesson.*

A few students (less than 10%), however, demonstrate having gained some deeper understanding. Some examples:

*I have learned that I must start close to home to keep it understandable for children.*

*I have learned how to deliver a good geography lesson and what steps must be taken. Also, I have learned that it is important for all age groups to begin near home and ask whether a particular event can happen here, and why.*

*I have learned that I can apply this lesson to other topics, such as the fabrication of jeans.*

While the first student demonstrates some understanding about the use of everyday geographical examples, the second student (implicitly) makes a connection to the characteristics *where*, *zooming* (can it happen here) and *why there* and the third student demonstrates awareness that the knowledge can be applied to other situations.

Little is reported on the start of the lesson, with only 10% of the students mentioning this aspect. Much the same is true for their self-knowledge about this aspect, as approximately 13% discuss it in their writings. However, the least reported aspect of syntactic knowledge is the evaluation of the lesson (1.4%). Student teachers also exhibit little evidence of self-knowledge regarding this aspect (2%).

Finally, more than 40% of the students report on other aspects of syntactic self-knowledge, such as the insights they gained regarding their knowledge about geography textbooks.

### 5.3.2. Differences between teacher educators

The overall results show that a high percentage of the student teachers reported on (self-) knowledge about the learning process, while a low percentage reported on the evaluation of the lesson. When we separated the learner report statements by teacher educator, however, we found major differences in the type of PCK-aspects students indicated (see Table 5.3). More than 80% of the students who were taught by teacher educators 1 and 2 reported knowledge of the learning process, while 50% or fewer of the students taught by teacher educators 3, 5 and 6 did so. In these groups, (teacher educators 3, 5 and 6), a relatively high percentage of students reported learning experiences related to geographical facts, concepts and principles.

Table 5.3. Percentage of student teachers who mentioned a particular aspect per teacher educator

| Aspect  | Mean | Teacher educator* |      |      |      |      |      |      |
|---|------|-------------------|------|------|------|------|------|------|
|   |      | 1                 | 2    | 3    | 4    | 5    | 6    | 7    |
| <b>Substantive knowledge</b>                      |      |                   |      |      |      |      |      |      |
| Geographic facts and concepts                     | 19,0 | 8,3               | 4,6  | 36,1 | 14,1 | 37,8 | 42,3 | 32,5 |
| Geographic principles                             | 17,4 | 8,6               | 6,5  | 50,6 | 5,6  | 48,6 | 49,3 | 22,4 |
| Geographic skills                                 | 19,0 | 21,6              | 21,3 | 2,4  | 8,9  | 18,9 | 18,3 | 28,0 |
| Other   | 11,7 | 7,8               | 7,4  | 6,0  | 22,1 | 13,5 | 29,6 | 7,7  |
| <b>Self-knowledge about substantive knowledge</b> |      |                   |      |      |      |      |      |      |
| Geographic skills and knowledge                   | 27,3 | 30,2              | 17,6 | 10,8 | 16,9 | 18,9 | 40,8 | 38,6 |
| <b>Syntactic knowledge</b>                        |      |                   |      |      |      |      |      |      |
| Start   | 10,0 | 2,9               | 17,6 | 22,9 | 18,3 | 2,7  | 15,5 | 6,9  |
| Learning process                                  | 69,2 | 86,0              | 84,3 | 50,6 | 69,5 | 48,6 | 31,0 | 54,1 |
| Evaluation  | 1,4  | 0                 | 2,8  | 0    | 4,2  | 0    | 0    | 1,6  |
| Other   | 18,1 | 12,6              | 18,5 | 10,8 | 25,4 | 21,6 | 25,4 | 20,7 |
| <b>Self-knowledge about syntactic knowledge</b>   |      |                   |      |      |      |      |      |      |
| Start   | 12,9 | 4,8               | 23,1 | 31,3 | 24,4 | 2,7  | 14,1 | 7,3  |
| Learning process                                  | 67,7 | 77,9              | 75,9 | 71,1 | 62,9 | 73,0 | 62,0 | 50,4 |
| Evaluation  | 2,0  | 1,9               | 1,9  | 2,4  | 3,3  | 2,7  | 0    | 1,2  |
| Other   | 41,7 | 37,8              | 40,7 | 45,8 | 39,0 | 37,8 | 54,9 | 45,9 |

\* Seven teacher educators taught the course. Each worked at a teacher training institute in a different region of the Netherlands, with the exception of teacher educators 5 and 6, who worked at the same institute.

The teacher educators were asked to comment on the results as reported in Table 5.3. Teacher educators 1 and 2 placed greater emphasis on teaching methods than on the

content, although they integrated the substantive examples (e.g. volcanoes, globalization) in their lessons following the seven characteristics of good geography teaching. Teacher educator 3 explicitly focused on formulating learning goals, which explains the rather high percentage of students who reported on the aspect 'start' (syntactic knowledge). Teacher educator 5 mentioned that he conducted the course within the context of the theme 'Dutch landscape', a subject that was also tested on an exam by the student teachers. This may have caused a stronger focus in his group of students on geographical facts, concepts and principles.

## 5.4. Conclusion and discussion

This study is about teaching a specific subject, in this case geography, an issue for which little research has been conducted to date (Berry & Van Driel, 2013). We designed a course, *Consciously Teaching Geography*, focusing on the development of student teachers' PCK. Using student reflections, as recorded in learner reports, we investigated what the approximately 250 student teachers themselves reported about their learning experiences in the CTG course, more specifically we asked them to complete four sentences related to two main aspects of PCK: substantive (*what*) and syntactic knowledge (*how*). Both were also elements that were emphasized throughout the course and integrated into the lessons.

The completed learner reports provide valuable information on how student teachers experience the CTG course and the implemented curriculum. They reveal that what students mainly learned from the course were the elements related to the learning process (syntactic knowledge/ *how*), i.e. the elements of a lesson in which they learn primary school pupils geography. Although substantive knowledge was integrated into the course, the student teachers did not seem to realize this.

We also found differences between students taught by different teacher educators. For example, in classes where there was stronger emphasis on content knowledge and where this knowledge was assessed, students reported more substantive knowledge. This can be explained by the fact that the intervention (the CTG course) was implemented within several teacher-training institutes, each with their own *colour locale*, and was conducted by seven teacher educators, each with their own teaching style. This means, as stated earlier, that even though the same intervention has been implemented in all teacher-training institutes, the implementation may vary in detail, and the way in which the course is conducted may influence what student teachers report about the course.

We used an open form of the learner report (Van Kesteren, 1993). A further refinement of the instrument might provide deeper insights. It would be particularly interesting to obtain more insight into the third element of the PCK beliefs (*why*). In the learner report we used it in this study, we didn't explicitly invite students to make notes about this aspect.

What this study reveals (despite its limitations) is that at the beginning of their teaching career, student teachers are more focused on pedagogical aspects of teaching and classroom management than on subject-based learning. Moreover, they hardly seem to be aware of links between subject content and subject pedagogy. This may be because they have to survive everyday classroom teaching.

Another reason may be the reduction of subject-specific teaching hours, after the introduction of competency-based education (Blankman, Van der Schee, Volman, & Boogaard, 2015). Dolan et al. (2015) conclude that to ensure student teachers reach a level where they integrate subject knowledge and pedagogical knowledge, more domain-specific pedagogies and more time devoted to subject methodology are needed rather than more time spent on generic teaching skills. This enables them, as Martin (2008b) suggests, to develop themselves from learners of geography to teachers of primary geography and that is what this programme proposed.

As the period during which the student teachers could practice in the CTG course was short, no large effect was expected (Hattie, 2009). Further research should examine whether the described method (the CTG course) combined with increased practise in different contexts leads to primary student teachers' greater understanding of geographical concepts and their ability to integrate these concepts into their lessons, whereby they develop into teachers of primary geography.