Digital Competence and Ways of Thinking and Practising in Swedish Teacher Education

Experiences by teachers with a foreign teaching degree

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Abstract

The Swedish government recognises foreign academic education and the professional qualifications of its immigrants by allocating resources to programmes that bridge the gap between immigrants’ education and the specific requirements for work in Sweden. The context of inquiry for this thesis is teachers with a foreign teaching degree, who come from 57 countries or regions and are studying at four Swedish universities. They attend a bridging programme called “Further Education for Foreign Teachers” (in Swedish, *Utländska Lärarens Vidareutbildning*). The purpose of this thesis is to study the unfamiliar ways of thinking and practising teachers with a foreign teaching degree encounter in Swedish teacher education, emphasising digital competence. Five different theoretical frameworks and models are used in this thesis: ways of thinking and practising, redefined transformative learning, the framework of Technological Pedagogical Content Knowledge (TPACK), the European Digital Competence Frameworks for Citizens (DigComp 2.1), and the Digital Competence of Educators framework (DigCompEdu). A convergent mixed methods research design was applied; the combined datasets consisted of: (a) a web survey to which 228 teachers responded; (b) five focus groups each consisting of 25 teachers; (c) nine individual interviews; (d) 30 reflective texts written by 15 teachers. Findings show that the participants are not a homogenous group and cannot be treated as such. The common ground is that they are foreign-born teachers who have all immigrated to Sweden. The diversity covers a range, from being quite familiar to being unfamiliar with the Swedish educational context. This thesis reveals the diversity of their digital competence, as they score from foundational proficiency levels to highly specialised ones in TPACK as well as in the European framework DigComp 2.1. Furthermore, their expressed digital competence is found within all role descriptors in the European framework for the digital competence of educators DigCompEdu, from newcomer to pioneer. Diversity was found in teaching philosophy, the role of a teacher, view of the students, how learning occurs, and finally, comprehension of the relationship between education and society. Moreover, the findings highlight that some ways of thinking and practising were unfamiliar to the participants, such as teaching and learning methods, new learning environments, examination practices, further, the communication between teachers and students. Unfamiliarity was also found regarding the extent to which society demands digital competence in the curricula. The participants expressed that their roles as teachers in a new country were unfamiliar and took time to get used to. Therefore, placement supervisors were found to be of great importance for the development of teachers’ digital competence, as they function as mediators and model what it is to be a teacher in Sweden. The analysis shows that all teachers, not only teachers with a migrant background, need digital competence at an advanced level to develop digital competence among students. Thus, educators must identify unfamiliar ways of thinking and practising, plan for authentic competence development, and address the diversity in digital competence. This thesis contributes to empirical findings, developing tools and models to assist teacher educators to change monocultural teaching to an inclusive practice in which diversity is integrated.

Keywords: digital competence, teachers with a foreign teaching degree, teacher education, ways of thinking and practising, transformative learning.
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Abstract

The Swedish government recognises and values foreign academic education and the professional qualifications of its immigrants by allocating resources to programmes that bridge the gap between immigrants’ education and the specific requirements for work in Sweden. These programmes are individually adapted for teachers, physicians, nurses, pharmacists, psychologists, social workers, lawyers, engineers, and other professionals. The context of inquiry for this thesis is teachers with a foreign teaching degree, who come from 57 countries or regions and are studying at four Swedish universities. They attend a bridging programme called “Further Education for Foreign Teachers” (in Swedish, Utländska Lärares Vidareutbildning).

The purpose of this thesis is to study the unfamiliar ways of thinking and practising teachers with a foreign teaching degree encounter in Swedish teacher education, emphasising digital competence. With this knowledge, we can understand how education can better support diverse groups pedagogically, make the cultural embeddedness of Swedish teacher education more transparent, and plan for authentic competence development. Digital competence is central in Sweden and is part of the teacher education curriculum. Hence, the investigation of what digital competence teachers with a background of migration have is central in this thesis.

Five different theoretical frameworks and models are used in this thesis: ways of thinking and practising, redefined transformative learning, the framework of Technological Pedagogical Content Knowledge (TPACK), the European Digital Competence Framework for Citizens (DigComp 2.1), and the Digital Competence of Educators framework (DigCompEdu). A convergent mixed methods research design was applied; the combined datasets consisted of: (a) a web survey to which 228 teachers responded; (b) five focus groups with altogether 25 teachers; (c) nine individual interviews; (d) 30 reflective texts written by 15 teachers.
Findings show that the participants are not a homogenous group and cannot be treated as such. The common ground is that they are foreign-born teachers who have all immigrated to Sweden. The diversity covers a range, from being quite familiar to being unfamiliar with the Swedish educational context. This thesis reveals the diversity of their digital competence, as they score from foundational proficiency levels to highly specialised ones in TPACK as well as in the European framework DigComp 2.1. Furthermore, their expressed digital competence is found within all role descriptors in the European framework for the digital competence of educators DigCompEdu, from newcomer to pioneer.

Diversity was found in teaching philosophy, understanding of the role of a teacher, view of the students, knowledge of how learning occurs, and finally, comprehension of the relationship between education and society. Moreover, the findings highlight that some ways of thinking and practising were unfamiliar to the participants, such as teaching and learning methods, examination practices, roles and expectations from society, further, the communication between teachers and students. This has implications for how digital technologies are used for teaching and learning. Unfamiliarity was also found regarding both the extent to which society demands digital competence in the curricula and teaching and learning with new pedagogical methods and environments. The participants expressed that their roles as teachers in a new country were unfamiliar and took time to get used to. Therefore, placement supervisors were found to be of great importance for the development of teachers’ digital competence, as they function as mediators and model what it is to be a teacher in Sweden. The analysis shows that all teachers, not only teachers with a migrant background, need digital competence at an advanced level to develop digital competence among students. Thus, educators must identify unfamiliar ways of thinking and practising, plan for authentic competence development, and address the diversity in digital competence. This thesis contributes to empirical findings, developing tools and models to assist teacher educators to change monocultural teaching to an inclusive practice in which diversity is integrated.

**Keywords:** digital competence, teachers with a foreign teaching degree, teacher education, ways of thinking and practising, transformative learning
Sammanfattning

Den svenska regeringen godkänner och tar vara på utländsk akademisk utbildning och utländska yrkeskvalifikationer genom att tilldela resurser till program som överbrygger klyftan mellan den tidigare utbildningen och de specifika kraven för arbetet i Sverige. Dessa program är individuellt anpassade för lärare, läkare, sjuksköterskor, farmaceuter, psykologer, socialarbetare, advokater, ingenjörer och andra yrkesverksamma. I denna avhandling undersöks lärare med en utländsk lärarexamen, som kommer från 57 länder eller regioner. De studerar ett kompletterande program, ”Utländska lärares vidareutbildning” vid fyra svenska lärarutbildningar.

Syftet med avhandlingen är att försöka förstå vilka nya sätt att tänka och praktisera lärare med en utländsk lärarexamen möter i den svenska lärarutbildningen, detta med fokus på digital kompetens. Denna kunskap synliggör det sätt att tänka och praktisera som finns inom svensk lärarutbildning. I och med detta finns en möjlighet att kritisera reflekteras över, samt analysera vilken undervisning som kan tänkas passa i en kulturellt heterogen studentgrupp. I Sverige är digital kompetens centrat för lärare och inskrivet i läroplanerna, varför lärare med utländsk examen och vilken kompetens de har är av central betydelse i avhandlingen.

Fem olika teoretiska ramverk och modeller används i avhandlingen; ways of thinking and practising, redefined transformative learning, Technology Pedagogy and Content Knowledge (TPACK), samt the European Digital Competence Framework for Citizens (DigComp 2.1), och Digital Competence of Educators framework (DigCompEdu). Forskningsdesignen som tillämpas är ”convergent mixed methods” vilken kombinerar datainsamling och analys från: (a) webbaserad enkät där 228 lärare responderat; (b) fem fokusgrupper med 25 lärare; (c) nio individuella intervjuer; (d) 30 reflektiva texter skrivna av 15 lärare.
Resultaten visar hur viktigt det är att komma ihåg att lärarna med en utländsk lärarexamen inte är en homogen grupp utan mycket varierad, med det gemensamt att de är lärare som kommer från andra länder. Mångfalden täcker hela spektrat från att vara familjär till att känna sig främmande i den svenska utbildningskontexten. Denna avhandling ger en nyancerad bild av lärarnas digitala kompetens. Lärarna har allt från låg till hög kompetens i TPACK, samt en grundläggande kompetens till en högst specialiserad, från nybörjare till pionjär i relation till de Europeiska ramverken.


Nyckelord: digital kompetens, lärare med utländsk lärarexamen, lärarutbildning, ways of thinking and practising, transformative learning
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1. Introduction

This thesis concerns teachers with a foreign teaching degree who have come from 57 countries or regions, their digital competence, and what they experience as unfamiliar during their study at a complementary programme in Swedish teacher education. This chapter begins with a generalised introduction to digitalisation in Swedish information society. There will then be an overview of teachers with immigrant backgrounds in a Swedish bridging programme, and a description of the research problem, aims and questions. For a more transparent reading, there is an overview of the articles in this thesis, thereafter previous research.

1.1 Research Context

1.1.1 Digitalisation in Sweden

According to the Organisation for Economic Co-operation and Development (OECD), Sweden is among the top ten countries in the world in digital transformation (2018). Furthermore, individual use of digital technologies is significant, and the internet is heavily used (Davidsson & Thoresson, 2017). The current vision for digitalisation by Swedish politicians is the following: The current National Digitalisation Strategy for the School System (Digitalisation Commission, 2017) emphasises that the modernisation of Sweden starts in school, with a focus on developing digital competence. The governmental National Digital Strategy and reports connected to it stating that digital competence includes the ability to keep up with digital technologies to obtain and retain employment, which makes digital competence important to incorporate in every citizen’s education (Ministry of Enterprise and Innovation, 2011; Digitalisation Commission, 2014). In sum, an information society needs an educational system that is part of society’s modernisation, and citizens must
obtain digital competence for their current and future employment. Sweden has become a society with a growing immigrant population, many of whom will enter a digitised labour market.

Within education, a digitalisation strategy implies that all teachers must be digitally competent and incorporate digital technologies in their pedagogy. According to The Higher Education Ordinance (Ministry of Education and Research, 2014a), being digitally competent is required for student teachers, who must demonstrate digital competence, use it critically in teaching and learning, and consider the role of the digital environment in a pedagogical occupation.

Digital competence is also a requirement in the national curricula (The National Agency for Education: Curriculum for the upper secondary school, 2013; Curriculum for the compulsory school, preschool class and school-age educare, 2018; Curriculum for the Preschool, 2019). Hence, teachers with a foreign teaching degree are expected to meet the requirements to become digitally competent when they work in the Swedish school system. With this in mind, it is important for teacher education to guarantee that student teachers fulfil national requirements. However, teacher education in Sweden has been criticised for not providing student teachers (all candidates, not just immigrants) appropriate training in how to use digital technologies in teaching and learning. For example, municipalities in Sweden have complained about newly educated teachers’ lack of digital competence. Teacher education must be synchronised with society’s technological development (Digitalisation Commission, 2014, p.166, 206).
1.1.2 Teachers with a Foreign Teaching Degree in Swedish Teacher Education

*Teachers with a migrant background: a clarification of the term.*

The terms used in this thesis to describe the participants are “migrant teacher”, “teachers with a migration background”, and “teachers with a foreign teaching degree”. The words “migrant” or “immigrant teacher” are used, for example, in research articles (Bense, 2016; Collins & Reid, 2012; Donlevy, Mejerkord, & Rajania, 2016; Peeler, 2015) and dissertations (Asmus, 2015; Edwards, 2014). These terms are also used in a project, collaborating with the bridging programme that is studied in this thesis (Proyer et al., 2019) and international ones, such as in Ireland (mie.ie, 2019).

In a research review concerning international teacher mobility and migration, Bense (2016) offers examples of terms, such as “immigrant teacher”, “migrant teacher”, “internationally mobile teachers”, “internationally trained/educated teachers”, “overseas-trained teachers”, “foreign-trained teachers”, “minority immigrant teachers”, “non-native teachers”, “global teachers”, and “overseas-born teachers”. Bense uses the term “migrant teachers” throughout the research review. According to Marom (2017), the term “overseas-trained” teachers is used in England, and “internationally trained teachers” is used among researchers in Australia and Canada.

Not all migrants in Sweden have a background of forced migration, therefore, refugee is not an appropriate term. The titles “internationally trained” or “overseas-trained teachers” are also used in other studies; however, they may be misinterpreted to imply that the individuals’ education was oriented toward international work. According to a personal communication from Susanna Malm, the National Coordinator for the bridging program for teachers with a foreign teaching degree (2019), the experience is that teachers are locally trained in their countries to be teachers in that specific country, not educated to be teachers in other countries, termed international teachers. Moreover, there are many reasons why migrant teachers come to Sweden, such as work, marriage, family, education, refugee status, et cetera. The common ground is that they are teachers with a background of migration.
Swedish teacher education

In Europe, and the Nordic countries, international guidelines such as the Professional Qualifications Directive define how countries should organise educational systems to recognise foreign education and professional qualifications (Council of Europe, 1997; 2010; Nordic Council of Ministers, 2017; Malm, 2019). In accordance with this, the Swedish government wishes to integrate this labour force, qualified teachers, into teacher education programmes to align their competencies with Swedish requirements (Ministry of Education and Research in Sweden, 2011; 2014b; 2016).

Teaching is a regulated profession in Sweden, and to gain permanent employment, certification is required. Teachers who hold foreign teaching degrees are eligible to study at six Swedish universities as part of the government initiative Further Education for Foreign Teachers (Utländska Lärares Vidareutbildning). The initiative, which began in 2007 as a government mandate, is a bridging programme that offers supplementary education for migrant teachers who wish to become qualified to teach in Swedish schools. Other bridging programmes receive resources from the Swedish government, including for physicians, dentists, nurses, pharmacists, physiotherapists, psychologists, economists, system scientists, biomedical analysts, social workers, architects, lawyers, and engineers; however, this thesis is focused on teachers.

The initiative aims to utilise the competence of teachers with migrant backgrounds and provide them with increased opportunities for employment in Swedish schools. This population consists of graduates with university teaching degrees from 90 countries (Malm, 2019). Table 1 shows the numbers of applicants and teachers admitted to the bridging programme in all six universities, reported to the Ministry of Education and Research in Sweden by the National Coordinator at Stockholm University (Cornelius & Bredäng, 2011; Stockholm University, 2017; Malm & Åström, 2019). Altogether, more than 4300 teachers with a foreign teaching degree have been admitted to the bridging programme for teachers between 2008 and 2018.
Table 1. Number of applicants and admitted teachers to the bridging programme

<table>
<thead>
<tr>
<th>Year</th>
<th>Applicants</th>
<th>Admitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>285</td>
<td>202</td>
</tr>
<tr>
<td>2009</td>
<td>574</td>
<td>347</td>
</tr>
<tr>
<td>2010</td>
<td>480</td>
<td>304</td>
</tr>
<tr>
<td>2011</td>
<td>607</td>
<td>320</td>
</tr>
<tr>
<td>2012</td>
<td>543</td>
<td>358</td>
</tr>
<tr>
<td>2013</td>
<td>510</td>
<td>366</td>
</tr>
<tr>
<td>2014</td>
<td>643</td>
<td>433</td>
</tr>
<tr>
<td>2015</td>
<td>770</td>
<td>438</td>
</tr>
<tr>
<td>2016</td>
<td>922</td>
<td>494</td>
</tr>
<tr>
<td>2017</td>
<td>828</td>
<td>461</td>
</tr>
<tr>
<td>2018</td>
<td>1010</td>
<td>577</td>
</tr>
<tr>
<td>In sum</td>
<td>7172</td>
<td>4300</td>
</tr>
</tbody>
</table>

The Swedish National Agency for Education and the Swedish Council for Higher Education collaborate in assessing foreign education. When gaps between the Swedish and the foreign teacher education are discovered, supplementary education takes place within Swedish teacher education programmes.

A national steering group was formed in 2007, with participants from all six universities, which collaborates and ensures that quality is achieved. Furthermore, the collaboration is sometimes extended to the Swedish National Agency for Education, the Swedish Council for Higher Education, and teacher unions. To be eligible for the programme, teachers with migrant backgrounds must show a teaching diploma from a country outside Sweden. Additionally, they must have proficiency in the Swedish language equivalent to upper secondary school (Cornelius & Bredänge, 2011).

Migrant teachers have varying lengths of education and teaching experience; however, when they attend the bridging programme, they also become student teachers because they study within ordinary teacher education programmes. They are training for both pre-service and professional development at the same time. When teachers attend the education programme, an individual supplemental study plan with a maximum of 120 ECTS, higher education credits, is designed, which includes subject studies and subject didactics, educational
science for teaching professions, and study school as a pedagogical and didactic environment. Study guidance and study planning is individual and follows the teacher through the entire educational programme.

The teachers study existing courses in ordinary teacher education programmes, according to the individual study plan. In addition, they study one specific course called “To be a Teacher in Sweden” (Att bli lärare i Sverige), worth 22.5 ECTS credits, designed for the governmental initiative. This joint introductory course is intended to improve the Swedish language, orally and in academic writing. Additionally, they study the Swedish educational system, including values, national regulations and requirements, and the grading system. Lastly, they put theoretical knowledge to practical use during a placement period.

Even if the teacher education curricula appear superficially similar, differences exist depending on history, tradition, culture, and political motives. Hence, teachers with a foreign teaching degree receive support during their studies to identify competencies they already have, modifications needed for their new teacher role, or skills they feel a need to add. Further, there may be some skills not needed in the new environment. Supporting the identification of competence and working with it is something discovered through years of experience educating teachers with a foreign teaching degree (Cornelius & Bredänge, 2011).

Socialization is essential to developing a teacher’s professional identity, incorporating prior education as a student in preschool, compulsory, and upper secondary school, and as a student teacher, as well as the individual and collective experiences he or she acquired while working as a teacher (Bredänge, 2003). A bridging programme supports teachers with this process, to help them become familiar with the new educational context. This is, of course, the same kind of support and process a Swedish teacher studying a bridging programme in another country also needs. There are bridging programmes in, for example, Canada, Ireland, Australia, Germany, and England to support teachers with a migrant background to meet the requirements in each country.

According to the World Values Survey (Inglehart-Welzel, 2015), Sweden is defined as a secular, horizontal, individualistic country, where self-expression is important. Swedish teacher education is a strongly value-influenced education. Fundamental democratic values, defined by the Swedish government, are
emphasised in the national curriculum. A teacher should promote the student’s uniqueness, gender, ethnic affiliation, religion or other belief systems, sexual orientation, and student beliefs and personal standpoints. Furthermore, digital competence is important. These principles have implications for teachers’ professional belief systems (teaching philosophy), their practices, and are salient for professional development in a Swedish context. The value base is defined in the curricula, laws, and ordinances in Sweden (The National Agency for Education: Curriculum for the upper secondary school, 2013; Curriculum for the compulsory school, preschool class and school-age educare, 2018; Curriculum for the Preschool, 2019; Ministry of Education and Research, 2011; 2014a). In addition, a mission in university education is to develop the student’s ability to make independent and critical assessments, discuss with different groups, and to work independently (Ministry of Education and Research, 1992; 2014a).
1.1.3 Research Problem and Main Questions

The purpose of this thesis is to gain knowledge about what digital competence teachers with a foreign teaching degree have, who are studying teacher education at four Swedish universities. Although these teachers have a vast knowledge of pedagogy from various educational settings – in this study, 57 countries and regions – their prior ways of thinking and practising can sometimes differ and even contradict the ones they encounter within Swedish education. This thesis aims to gain knowledge about what they experience as unfamiliar, with a focus on digital competence.

Additionally, participants’ competencies in teaching and learning provide insight into digital competence and the tacit embedded ways of thinking and practising in Swedish teacher education, which can eventually be rendered more legible and explicit. Results in this thesis expand knowledge and support teacher educators in developing pedagogy that is adapted to more diverse student teacher groups.

The main research questions of this thesis are:

- What digital competence do migrant teachers possess?
- Which unfamiliar ways of thinking and practising do migrant teachers experience in Swedish teacher education?

Now, a brief review of the four articles in this thesis, their aims and research questions.
1.1.4 Research Aims and Questions for Each Study

This thesis is based on four studies that provide various perspectives on migrant teachers’ experience of what is unfamiliar in Swedish teacher education, with emphasis on their digital competence. After a short content description of the four articles, which relates to the studies with the same digit as each article, an overview of each article and its aims and questions is illustrated in Table 2. The references are listed under section 1.1.5.

**Article 1. Migrant teachers’ self-estimated digital competence – a study within Swedish teacher education.**

Digital competence is one of the central skills required of teachers in today’s digitised information society, and a requirement in the Swedish teacher education curriculum. Within Swedish teacher education, there is a lack of studies examining how migrant teachers estimate their digital competence. This article investigates how teachers with a foreign teaching degree, participating in Swedish teacher education, estimate and express their digital competence. The model of Technological Pedagogical Content Knowledge (TPACK) was used for the estimation; in addition, participants’ digital competence was analysed in relation to the levels and role descriptors in the European Digital Competence Framework for Citizens (DigComp 2.1) and the Digital Competence Framework for Educators (DigCompEdu).

**Article 2. The use of digital technologies in Swedish teacher education: experiences by migrant teachers.**

Technological development and migration are part of the globalised education, and with them comes diversity in the use of digital technologies. The purpose of this article is to understand teachers’ experience with the use of digital technologies in Swedish teacher education in relation to Illeris’ re-defined transformative learning theory (2014c). Teachers with foreign teaching degrees are also asked to evaluate the use of digital technologies in teacher education programmes in both Sweden and in their prior education. Additionally, to understand their view of how digital technologies are used, their teaching philosophy, their ideas about teaching and learning are investigated.

Based on implicit values and heritage in teaching and learning, the Swedish national curriculum can be, to some extent, insufficiently transparent for diverse student groups. This article investigates migrant teachers’ experiences with the unfamiliar ways of thinking and practising they encounter while they are taking courses in Swedish teacher education programmes. This study explores the “embeddedness” of Swedish teacher education experienced by some of the participants.

Article 4. Migrant teachers’ experiences with the use of digital technology and media during their placement period in Swedish schools.

The placement period is of utmost importance in migrant teachers’ education. During their placement, theoretical knowledge is put into practice, and it is possible to compare their prior education with their Swedish education, interlinking them. Teachers’ integration of digital competence is relevant to their teaching philosophy. Hence, the teaching placement impacts teachers’ experience of whether digital technologies are beneficial for their students. This article identifies unfamiliar ways of thinking and practising, with a focus on digital technologies, that teachers with a foreign teaching degree encounter during their placement period.
The studies in relation to each other.

Digital competence and unfamiliar ways of thinking and practising are intertwined in the studies. Studies 1 and 2 investigate participants’ current digital competence, together with the use of digital technologies in both prior teacher education and the Swedish one. During the bridging programme, teachers sometimes encounter unfamiliar ways of thinking and practising, forcing them to question and compare Swedish education to their former one. Studies 3 and 4 address this issue. Furthermore, teachers’ professional identity and transformative learning concerning digital competence can be found in Study 2. All of the studies concern teaching philosophy, as this is the foundation of how teachers think about teaching and learning. However, Studies 2 and 4 articulate that in more detail.

Researching the area of teachers with a migrant background and digital competence is important for several reasons. First, to be digitally competent is necessary for an information society; thus, it is necessary for all teachers in Sweden. Currently, there is no research on migrant teachers and digital competence in Sweden; however, Studies 1, 2, and 4 address this subject. Second, migrant teachers are often highly educated in teaching and learning and can provide rare insight into the culturally embedded ways of thinking and practising within Swedish teacher education. All four studies are related to this subject. Third, migrant teachers’ experience of what is unfamiliar to them is addressed in Studies 3 and 4. This research addresses digital competence connected to a professional teacher identity within a new educational context.
<table>
<thead>
<tr>
<th>Study/Article</th>
<th>Research aim</th>
<th>Research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Article 1:</strong> Migrant teachers’ self-estimated digital competence: A study within Swedish teacher education</td>
<td>This study aims to investigate how migrant teachers participating in Swedish teacher education estimate their TPACK and analyse their digital competence in relation to the European frameworks DigComp2.0 and DigCompEdu.</td>
<td>How do migrant teachers estimate their TPACK? How do migrant teachers express their digital competence?</td>
</tr>
<tr>
<td><strong>Article 2:</strong> The use of digital technologies in Swedish teacher education: Experiences by migrant teachers</td>
<td>This study aims to understand migrant teachers’ experience when digital technologies are used in Swedish teacher education, in relation to Illeris’ redefined transformative learning theory. Additionally, to obtain knowledge about how migrant teachers estimate the use of digital technologies in teacher education programmes, as well as their view of teaching and learning.</td>
<td>Which estimated use of digital technologies did migrant teachers experience in teacher education programmes? What view do migrant teachers have about teaching and learning? What learning, in relation to Illeris’ redefined theory of transformative learning, was identified when digital technologies were used?</td>
</tr>
<tr>
<td><strong>Article 3:</strong> Unfamiliar ways of thinking and practicing in teacher education: Experiences by migrant teachers</td>
<td>This study aims to explore and identify which unfamiliar ways of thinking and practising migrant teachers with a foreign teaching degree meet while they are taking courses in Swedish teacher education.</td>
<td>Which ways of thinking and practising within Swedish teacher education are perceived as unfamiliar by migrant teachers?</td>
</tr>
<tr>
<td><strong>Article 4:</strong> Migrant teachers’ experiences with the use of digital technology and media during their placement period in Swedish schools.</td>
<td>This study aims to identify unfamiliar ways of thinking and practising, concerning digital technology and media that migrant teachers meet during their professional development at their school placement.</td>
<td>Which unfamiliar ways of thinking and practising, related to the use of digital technology and media, do migrant teachers experience during their placement period?</td>
</tr>
</tbody>
</table>

The four studies investigate migrant teachers’ experiences from different angles to get a more diverse view of their digital competence and what is unfamiliar in the Swedish educational context.
1.1.5 List of Included Articles


1.2 Previous Research

1.2.1 Digital Competence in Teacher Education

Previous studies about digital competence in teacher education.
National and international policies and programmes are based on the idea that in a digitised society, digital competence is a key competence for all citizens, and consequently, a competence to be obtained during education. This creates demand for the whole system. Therefore, a digitised society must educate digitally competent teachers. Rizza (2011) investigated national policies in OECD countries within the field of digital technologies in teacher education. Within this area, three categories were identified: (1) a lack of relevant information, (2) developing awareness, and (3) inclusion of digital technologies at several levels. Enochsson and Rizza (2009), wrote a research review about empirical research in 11 OECD countries during 2002–2009, which identified whether and how well teacher education programmes prepare future teachers for the use of digital technologies in teaching and learning. They found that digital technology and media were not used regularly, and student teachers did not integrate technology into their teaching.

However, when digital technologies were used, various strategies were found. Strategies relating to this are usually connected to self-directed, creative, and critical learners (Bautista & Ortega-Ruiz, 2015). In a literature review containing empirical studies from 2000-2013, Røkenes and Krumsvik (2014) identified eight approaches to promote the development of digital competence in teacher education, for example, collaboration, metacognition, and student active learning. Others, like Kay (2006) found ten strategies in a literature review of 68 journal articles. Among the most widely used strategies were integrating technology in courses, using multimedia, practising technology in the field, and focusing on mentor teachers. Tondeur et al. (2012) reviewed 19 studies, finding 12 key themes for methods that prepare students for using technology in their future classrooms. The themes were divided into two parts:

1. Preparation of pre-service teachers (teacher educators as role models, reflective attitudes, collaboration, and scaffolding authentic technologies).
2. Institutional level (technology planning and leadership, staff development, access to resources, and systemic change efforts). This holistic approach helps
in integrating digital competence in teacher education (Käck & Männikkö Barbutiu, 2012).

Interestingly, according to Drent and Meelissen (2008), teacher educators who use digital technologies in learning processes are characterised by a student-oriented approach, a readiness to keep contact with others within the area of digital technology and media, and seeing the advantages of using digital technology and media.

Enochsson (2010) investigated how Swedish student teachers (in general) were prepared in 21 teacher education programmes. The integration of pedagogical digital competence was missing. The most common mode using digital technologies in the study was writing reports and communicating. Thus, there was a reported risk of supporting a traditional transfer pedagogy rather than being creative. In a more recent study (Demoskop, 2016), 1,346 Swedish student teachers (in general) were interviewed about digitalisation in teacher education. One out of ten noted that digitalisation is lacking, with almost 50% considering themselves insufficiently prepared to be able to teach with digital technologies, even though 75% considered themselves highly digitally competent. The student teachers requested improved digitalisation within teacher education and referred to virtual classrooms, web-based examinations, and lectures used to enhance student learning.

Digital competence and digital technologies as concepts.

The use of the concept of digital competence in this thesis and studies is adopted from the European Digital Competence Framework for Citizens, DigComp 2.1 (Carretero, Vuorikari, & Punie, 2017) and the European Framework for the Digital Competence of Educators, DigCompEdu (Redecker, 2017). In these frameworks, the term “digital technologies” is used as an umbrella term for all digital resources and devices, and in this thesis, it is used in the same way. Additionally, “digital competence” is the term used both in the previously mentioned frameworks and in Swedish curricula, which is why it is suitable terminology for the present thesis. The frameworks are used to define, analyse, and understand digital competence.
1.2.2 Teaching in a Diverse Cultural Context

*Previous studies on teaching in a diverse cultural context.*

Modern higher education faces challenges when national curricula, based on national values and local cultural heritage, can contradict a migrant population’s former educational systems. Monocultural teaching is common, however, homogenisation in teaching is problematic in culturally diverse education. There is a mixed picture in research about international students’ achievements and whether special support is needed from education departments. In international studies, not in the Swedish context, cultural bias has been found in various areas, for example, situations in which coursework and examinations penalise international students beyond differences in ability levels (De Vita, 2002). Ryan and Carroll (2005) discuss shocks, both cultural and academic, in which even successful students lose their knowledge about how to learn and succeed.

According to Norberg (2000), a monocultural approach is a common approach in teacher education. This homogenisation and generalisation are problematic, especially when competence to teach in diverse classrooms is required from student teachers and teachers working at schools. There is a risk in making diversity invisible or highlighting differences, but a middle path may be interaction. Sjögren (2005) mention three dimensions when teaching in intercultural settings: (a) approaches with reflexivity, mutual respect and critical thinking, (b) intercultural content knowledge that permeates education, and (c) customised working methods.

Digital technologies impacts teachers’ ideas about classroom practices, intercultural relationships, and online collaboration (Chamberlin-Quinlisk, 2013). For example, in online learning, cultural differences can influence students’ satisfaction and engagement with the organisational, technological, and pedagogical components. This emphasises the importance of creating a culturally inclusive environment (Hannon & D’Netto, 2007). As Thomas (1997) notes, it is only when cultural factors are identified and investigated that a culturally sensitive pedagogy can be developed. Consequently, learning in a diverse cultural context must be planned for, supported, and examined (Bennett, 2012; Käck et.al 2014).
Previous studies about migrant teachers in teacher education.

It can be questioned whether teacher education programmes acknowledge culturally diverse student cohorts. According to Moloney and Saltmarsh, teacher educators should be attentive to their students’ diversity, as this is expected of teachers in schools. Preferably, teacher educators should have some knowledge about the student teacher’s cultural profile to enhance their learning potential (2016). Embedded cultural assumptions about as power relations and how teaching is conducted must become more transparent for both student teachers and teacher educators (Nguyen, Terlouw, & Pilot, 2006). Previous research is mostly concerned with teacher mobility and the transition, encounter, and adjustment to new educational contexts (Bense, 2016; Collins & Reid, 2012; Cross et al., 2011; Donlevy et al., 2016; Miller, 2018; Proyer et al., 2019). Peeler (2005) found that immigrant teachers that enter the Australian educational system lack culturally specific knowledge that relates to education, but that a mentoring relationship can bridge the gap and help teachers develop their professional identity.

There is a need for research and development of adequate support programmes for migrant teachers, as they are often too brief or general (Bense, 2016; Maylor et al., 2006). The focus of this thesis is the supplementary education in the bridging programme in Swedish teacher education. There is little research on this; however, two dissertations can be mentioned. They address the period after Swedish teacher education, but do not include digital competence. Some of the challenges were related to the specific vocabulary in schools, the role as a new teacher, and whether the schools were willing to accept viewpoints from other school cultures (Bigestans, 2015; Sandlund, 2010). To create a bridging program suitable for work as a teacher, both research about the teacher education curriculum itself and actual work in the schools have to be considered (Käck, 2019).
1.2.3 Professional Development and Teaching Philosophy

Professional development and teaching philosophy.

The concept of “teaching philosophy” is used in this thesis as it is a central part of being a teacher. A teacher’s philosophy, their belief system consists of values, as well as views on how learning occurs and shapes teaching and learning practices and learning environments that a teacher uses. It affects the way teachers interact with their students, how they see themselves in their role as a teacher, and how they plan and teach (Guskey, 2002; Korthagen, 2013; Lee & Schallert, 2016; Stensmo, 1994; 2007).

The concept of professional development concerns changes in teaching beliefs and practices, the teaching philosophy. This is an aspect of continuous development for all teachers, not only migrant teachers, throughout their professional lives. However, Swedish professional development challenges these trained teachers to question, reconstruct, and interlink their beliefs and practices when encountering unfamiliar ways of thinking and practising in the Swedish educational context. What it means to be a teacher in Sweden can be quite different from being a teacher in their former country, and vice versa. It is important to develop knowledge about what migrant teachers experience as unfamiliar in education, as they are going to teach in a Swedish context. It would be the same if a Swedish teacher was studying a bridging programme in another country as well.

Migrant teachers attend pre-service training as part of their professional development. By identifying their experiences and thoughts about ways of thinking and practising, it is possible to design a transformative, diverse, and inclusive education that addresses this issue, which is beneficial for both migrant teachers and Swedish teacher education. Throughout the studies in this thesis, teaching philosophy is consistently present, even when it is not explicit. In all data collection, both quantitative and qualitative, when the teachers’ express thoughts about teaching and learning, ways of thinking and practising, roles, and how learning occurs, those are informed by their teaching philosophy.
Previous studies concerning professional development and teaching philosophy.

Guskey (2002) explained that the target of professional development is teachers’ beliefs and practices. In addition, it is only when teachers can see evidence of enhanced student learning that a significant change in their beliefs and attitudes occurs. According to Bautista and Ortega-Ruiz (2015), a considerable amount of professional development is ineffective, with limited outcomes. High-quality professional development is a long process, not just event-based, with elements of active learning, collegial sharing, feedback, and follow-up support.

Accordingly, teachers develop a personal interpretive framework during their education and work, a lens that interprets and influences their teaching practice, which can be changed by interaction. This framework influences their perception of themselves as teachers (Kelchtermans, 2009). Korthagen (2013) contended that a reflective framework for professional development consists of the environment, behaviour, competencies, beliefs, identity, and mission. Reflections are made using the framework, for example, on how identities influence one’s belief about teaching and teaching activities. Lee and Schallert (2016) stated that in understanding one’s self-as-a-teacher and teaching, a teacher must identify and coordinate one’s past, present, and future selves.

To be a teacher is an ongoing journey through life. To process, reflect on the past, present, and the future is of great value for migrant teachers. With all teachers, including migrant teachers, professional development is about change in teaching beliefs and practices, which is made by questioning and reconstructing their teacher identities. In addition, developing both digital and intercultural competence is part of the process. Byram (1997) saw intercultural competence as constituted by knowledge of others, self-critical cultural awareness, skills to interact, interpret, relate, and valuing others’ beliefs and behaviours.
Previous studies about digital competence, teaching philosophy and professional development.

Since professional development activities target teacher change, it goes deeper than just adding something. There are psychological factors connected to attitudes and confidence when digital technologies are used, which relate to teachers’ pedagogical interests. These must be considered when designing activities (Lawless & Pellegrino, 2007). Ertmer (2005) argued that teachers' pedagogical beliefs are the final frontier for the integration of digital technologies.

Factors important for considering relationships between professional development and beliefs include personal experiences that change the teacher's beliefs, experiences that have the power to build confidence and competence, and sociocultural influences and beliefs, which are continually changed by ongoing experiences. Consequently, the integration of digital technologies in teaching is influenced by one's belief system and is relevant to the discussion (Ertmer & Ottenbreit-Leftwich, 2010; Ertmer et al., 2012; Sadaf & Johnson, 2017).
2. Theoretical Framing

The studies applied a combination of theories; however, the investigation of migrant teachers’ digital competence is built on three central concepts: digital competence, transformative learning, and ways of thinking and practising. The theory connected to digital competence in Study 1 is TPACK, in which teachers with a foreign teaching degree self-estimated their digital competence. The DigComp 2.1 and DigCompEdu frameworks were used to categorise participants’ digital competence into proficiency levels and role descriptors. Study 2 used Illeris’ (2014a; b & 2017), redefined transformative learning theory to investigate which layers of identity the professional development targeted, and this was defined in relation to the use of digital technologies in Swedish teacher education. Furthermore, by using the concept of unfamiliar ways of thinking and practising in Studies 3 and 4, it was possible to identify what teachers with a foreign teaching degree found to be unknown or unfamiliar in Swedish teacher education in general (Study 3), and specifically, when digital technologies were used during their placement period (Study 4). A discussion of philosophical assumptions derived from Dewey’s (1910/1997; 1916/2004; 1938/2015; 1939/1989) pragmatism, which corroborate the integrated use of theories and converged mixed methods research design, concludes this chapter.

2.1 Ways of Thinking and Practising

The theory of “ways of thinking and practising” was introduced in the ETL project, Enhancing Teaching-Learning Environments in Undergraduate Courses Project (Entwistle, 2003). In education, teaching and learning have unique traditions and practices that can be identified and referred to as ways of thinking and practising. In Figure 1, Entwistle (2003) focuses on the achieved learning quality. The top half of the figure refers to students and the lower half, the university teacher.
According to Entwistle (2003), the student’s past influences his current learning; however, this is not really assessed in the ETL-project. In the present thesis, this is an object of study – the unfamiliarity in the new educational context linked to the participants’ former studies. Even though it is teachers with a foreign teaching degree that are investigated, it is meeting with the teacher educator’s ways of thinking about teaching, the selected course material, assessments, design of learning environments they must reflect over. This is significant in how the participants approach and perceive the bridging programme.

These ways of thinking and practising can be cognitive, intuitive, performative, and tacit. Some ways of thinking and practising that students learn transcend disciplinary boundaries. When students carry out tasks, they develop a feel for some of the ways of thinking and practising that are tacit, what we
might call the current habitus. Students do not only look at the content, they look at it through the ways of thinking and practising, habits of thought and practice which can be challenged by dialogue and reflection (Kreber, 2009). Now, a couple of examples of when ways of thinking and practising are investigated in a subject. The ways of thinking and practising in biology influenced teaching and learning assessment strategies in courses at the biology department (McCune & Hounsell, 2005). Further, Eckerdal (2009) investigated novice computer programming students’ conceptual and practical learning by using ways of thinking and practising as a framework.

Even though ways of thinking and practising have strong influences on the teaching strategies and activities that teachers choose, what is learned is not only subject-specific, it can evolve into familiarity with scholarly communication within a community, meta-understanding concerning new knowledge, learning to think like a psychologist or historian, and knowing how to act as one. Teachers teach the way they were taught within a certain discipline, department, and culture (Hounsell & Anderson, 2009).

The tacit knowledge makes teaching and learning less transparent for teachers and even harder for students to comprehend (Meyer & Land, 2003). Hence, if ways of thinking and practising are understood, there is a possibility for the transformed understanding of knowledge, how people think or experience something within a discipline or more generally (Entwistle et al., 2002; McCune & Reimann, 2002). When students understand and accept the new ways, they gain tools to interpret other situations (Eatwell et al., 1998). It is the university teacher’s pedagogical task to help students understand the ways of thinking and practice, which also will have a significant pedagogical value as students put much time and effort into just understanding and interpreting current teaching models (Meyer & Land, 2003; 2005; Meyer et al., 2010).
2.1.1 Unfamiliar Ways of Thinking and Practising

Because this thesis has a population coming from 57 countries and regions who have encountered a new educational context, Swedish teacher education, this thesis introduces the concept of unfamiliar ways of thinking and practising. The teachers have learned former ways of thinking and practising, how to be and think as a teacher. Coming to Swedish education, they not only have to discover what it is to be a teacher in Sweden, which is complex, but they must also interlink and negotiate their former ways of thinking and practising with new unfamiliar ones. To use this new concept unfamiliar ways of thinking and practising makes it possible to identify what is experienced as unfamiliar in a broad way, searching for it in all the collected data. In reviewing Studies 3 and 4, the present thesis attempts to identify and understand the unfamiliar ways of thinking and practising.

At first, when considering the teachers, the concept was defined as “something that is experienced as unknown or unfamiliar in teaching and learning or in what constitutes being a teacher in a new context”. However, in a broader perspective, to be useful for other student cohorts, the definition for unfamiliar ways of thinking and practising will be “something that is experienced as unknown or unfamiliar in teaching and learning or in what constitutes a profession in a new context”. It will be possible to identify the challenges and difficulties in a new educational and professional environment when this definition is used. Teachers with foreign teaching degrees are educated as teachers, and at the same time, Swedish student teachers that experience new ways of thinking and practising in areas tailored for Swedish education.

In Studies 3 and 4, it was possible to identify the teachers’ experiences in Swedish teacher education and the placement period. When teachers with a foreign teaching degree understand or acknowledge unfamiliar ways of thinking and practising, they can begin transforming their understanding of teaching and learning and how it is understood and practised in Sweden. In addition, they can identify how these experiences may be related to their previous experiences, practice, and understanding of their role as teachers.
2.2 Transformative Learning

Transformative learning is the theory used in Study 2 to understand experiences that teachers with foreign teaching degrees had with the use of digital technologies in Swedish teacher education related to learning. It is also used for developing a model for professional development. Transformative learning is concerned with all learning that implies a change in the identity of the learner, and change is a part of life for everyone (Illeris, 2014b).

In Study 2, Illeris’ three layers of identity (2014b) that were used for categorising the teachers’ experiences were used as qualitative themes, where the teachers’ qualitatively coded experiences were placed and analysed. In addition, a regressive transformation was also identified among the teachers. Transformative learning was chosen as it targets the identity, which is something the teachers express as an important component to negotiate when moving to another country.

Illeris discusses when and how authentic competence development occurs (2014b; 2017). This theory provides a frame for understanding whether the current use of digital technologies reaches deeper layers of identity, which is where real development and transformative learning can occur. Teachers with a background of migration come to Sweden, which is, according to the OECD, a digitised society, for further education (Davidsson & Thoresson, 2017; OECD, 2018). For them, as for all teachers, their work identities are in transformation. Hence, transformative learning is a suitable theory for Study 2.

Mezirow (1978) coined the term transformative learning. He was studying women’s liberation processes in courses in which he could see changes in their self-perceptions. In the concept of transformative learning, qualitative changes are involved in the learners’ perspectives on meaning (how a person understands him or herself), mainly cognitive, or reference frames (meaning perspectives). Critical reflection is the core of transformative learning. The results of critical thinking are then implemented in practice. According to Taylor and Cranton (2012), a requirement for stimulating intercultural understanding and challenging one’s traditions is the ability to think critically about one’s own beliefs and then change, what they call “act-change-oriented” learning.
Mezirow’s definition has been criticised as narrow by Illeris, who broadened the concept (2014a; b). According to Illeris (2003; 2017), there are two basic processes of learning, the integration of external interaction (learner and the social, cultural, and material environment) and the internal psychological (acquisition and elaboration). Learning is any process that leads to permanent capacity change. There are two processes involved: (a) interaction (individual and the social and material environment), and (b) the internal elaboration and acquisition of the impulses from the process of interaction.

The acquisition process involves two sides or dimensions: the content (what is learned) and the learning incentive (motivation, emotion, volition). Illeris (2014b; 2017) emphasises that all learning is situated; the interactive dimension and social aspect of learning are important (specific situations experienced and interpreted by the learner). This situated learning forms what is learned and how the person relates to what is learned.

There is a distinction between learning as:

- addition (cumulative, when a pattern is already established),
- assimilative (new things are added to what is already known),
- change (accommodation).

There are different types of accommodation: the ordinary, in which someone understands something in a new way, accepting what is different, and the transformative, in which the learner changes their meaning, perspectives, or ways of behaviour. Accommodation as transformative learning, which takes a great deal of time and mental energy, includes cognitive, emotional, and social dimensions and changes the identity. Illeris defines transformative learning as follows: “The concept of transformative learning comprises all learning, which implies changes in the identity of the learner” (2014b, p. 40).

For Illeris, the target area of transformative learning is the identity, which includes cognitive, emotional, and social dimensions (2014a; 2014b; 2014c; 2017). The concept of identity is the experience of being a person in the world and how this person relates to and wants to be experienced by others. In Illeris’ (2014b) identity model, there are three layers (see Figure 2).
The core identity is relatively stable, the experience of being a distinct individual. The personality layer is a common target for transformative learning, with its values and habits that change with new experiences and conditions. The preference layer is not a target for transformative learning as it is not important to the identity, and the learning related to it is more what Illeris calls addition. Identity is changed by learning throughout one’s entire life. Furthermore, Illeris addresses the concept of part-identities in addition to the three layers (2014b). These are related to attitudes (national-cultural identity and religious-political identity) and practice (work, family, and everyday interest identities). Work identity is of great importance to an individual, and learning processes related to work must be understood in relation to a person’s development and identity. Motivational aspects, both internal and external, have a substantial impact on transformative learning as people do not always have the desire to transform their identities if they are not motivated to do so.

Life today is constantly changing for individuals, which makes transformative learning an important part of life (Illeris, 2014b; 2017). Illeris (2014b) points out that in current society, everyone lives in circumstances in which transformative learning can occur at any time. Moreover, in overcoming resistance to learning something, it is essential to try to understand why the resistance is there and address those issues (Illeris, 2014a). Hence, competence can be seen in different ways – as the precondition for qualification for certain areas or in

Figure 2. Illeris’ model of identity
a more general way of giving one a capacity to meet the unknown. For Illeris (2014a), competence in learning goes beyond traditional understanding; it supports the learner’s capability to function in new situations in society. It is important to note that competence in touch with societal conditions and challenges reaches into the identity. To be competent as an individual, influences the identity, consciousness, and the ability to do a thing.

Transformative learning can be defined as learning that changes the learner’s identity. A transformative practice includes several important elements: individual experience, critical reflection, dialogue/discussion, holistic orientation (cognitive, emotional, and social), awareness of context (personal and sociocultural conditions), and authentic relationships (especially between teachers and learners). Overall, this practice emphasises a learner-centred approach (Taylor, 2009). For Illeris, learning as competence development demands: (a) engagement, (b) practice/problem, and (c) reflection (2014b; 2017). When teaching a course, including practice is best and, if this is not possible, it must be problem-oriented teaching and learning. When knowledge is attempted in practice, it includes more personal involvement, and a more general understanding can develop. Moreover, authentic competence development involves transformative learning rooted in the learner’s identity. However, the transformation can be, but is not always, progressive. It can also be offensive, regressive, or defensive when it is too demanding, and the learner may feel uncertain or be overwhelmed. The result can be withdrawal, regression or resignation (Illeris, 2014b).
2.3 Digital Competence

2.3.1 Technological Pedagogical Content Knowledge (TPACK)

Study 1 focuses on the digital competence of teachers with foreign teaching degrees, and TPACK provides a holistic frame, making it possible to analyse how they estimate their knowledge in digital competence when combining technology, pedagogy, and content. The quantitative survey in this study investigates the teacher’s self-assessment of TPACK (Schmidt et al., 2009) within the framework of TPACK (Mishra & Koehler, 2006). Schmidt et al. (2009) designed the survey. However, Study 1 includes only items with the T (technology) part of the acronym (see Appendix B). As Study 1 is a converged mixed method study, it was possible to illustrate the quantitative results with qualitative quotations.

The theoretical framework is based on the concept of Pedagogical Content Knowledge (PCK) (Shulman, 1986). Shulman introduced PCK as a blend—an interplay and intersection between content and pedagogy, as those were often separated in teacher education. To teach successfully, both must be addressed at the same time. With this idea in mind, Mishra and Koehler (2006) developed a theoretical framework that incorporated technology as an important component. Technology is not context-free but is connected to content and pedagogy. The framework was called TPCK (Technological Pedagogical Content Knowledge), which includes the three main components of a learning environment and the intersection between them. Mishra and Koehler (2006) use TPCK for designing pedagogical strategies and as a lens for analysis when technology is used. In Study 1, teachers with a foreign teaching degree made a self-assessment within the area of TK, TCK, TPK and TPACK. Mishra and Koehler (2006) affirmed that true and effective integration of technology interlinks the relationship between the three main areas: technology, content, and pedagogical knowledge.

Those who criticise the TPACK model argue that it is based on insufficient definitions (Willermark, 2018). However, this is still used as a theoretical framework in several countries to specify and discuss what is required for teaching in a digital society (Willermark, 2018).
TPACK was applied in the present study because it is a well-known theoretical framework for estimating technological, pedagogical, content knowledge. However, research is lacking concerning teachers with a migrant background studying in teacher education programmes in a new country (Chai, Koh, & Tsai, 2013; Voogt et al., 2013; Wu, 2013). This thesis contributes to bridging that research gap.

![Figure 3. TPACK](Picture reproduced with the permission of the publisher, © 2012 by tpack.org)

In the TPACK framework, sub-components are defined as follows:
1. **TPACK**: the interweaving and intersection of all sub-components of TPACK are considered true technology integration.
2. **Technological Pedagogical Knowledge (TPK)**: knowing which capabilities various technologies have in teaching and learning.
3. **Technological Content Knowledge (TCK)**: knowing which technology is suitable for the subject or content.
4. **Technological Knowledge (TK)**: knowledge about the technology itself.
5. **Pedagogical Knowledge (PK)**: knowledge about teaching and learning methods, processes, and practices in general.
6. **Content Knowledge (CK)**: the subject content.
7. **Pedagogical Content Knowledge (PCK)**: teaching approaches suitable for a specific subject and learning.
In this thesis, teachers with a foreign teaching degree self-estimated competence in the areas of TK, TCK, TPK, and TPACK (see Appendix B). TPACK was used in the construction of the web survey and analysis of digital competence.
2.3.2 The European Frameworks DigComp 2.1 and DigCompEdu

The Joint Research Centre (JRC), the European Commission’s science and knowledge service, provide evidence-based scientific support to enhance the development of citizens’ digital competence. The European Digital Competence Framework for Citizens, or DigComp, is a scientific project first published in 2013, and was followed up in 2016 with DigComp 2.0, in which the terminology and conceptual model were updated to illustrate examples of its implementation at the European, national, and regional levels. DigComp 2.1 is the current version, which has expanded the initial three proficiency levels to a more fine-grained eight levels, including examples. These are connected to Bloom’s revised taxonomy (Carretero, Vuorikari, & Punie, 2017; Anderson et al., 2001), and they are used in Study 1 as an analytical tool. The proficiency levels are divided into cognitive domains or learning progress connected to active verbs, related to how autonomous a person can be when using digital technologies and complex tasks (Carretero et al., 2017). The JRC has further developed the framework with a focus on educators. DigCompEdu (Redecker, 2017) aims to enhance the development of educators’ digital competence in Europe and boost educational innovation via a common frame of reference, and based on a common language.

Study 1 uses the European frameworks DigComp 2.1 (Carretero, Vuorikari, & Punie, 2017) and DigCompEdu (Redecker, 2017) to analyse teachers’ levels of proficiency in using digital technologies in relation to Bloom’s revised taxonomy, and to discuss their levels of competence (Anderson et al., 2001). By using the general role descriptor from DigCompEdu (Redecker, 2017), it was possible to identify them as newcomers, integrators, leaders, or pioneers. These frameworks were chosen because of the scientific background, and they provide a broad frame for analysing digital competence. In Table 3, the frameworks are merged.
<table>
<thead>
<tr>
<th>Levels</th>
<th>Dig Comp 2.1</th>
<th>Complexity of tasks</th>
<th>Autonomy</th>
<th>Learning progress + active verbs</th>
<th>DigCompEdu Role descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation 1</td>
<td>Simple tasks</td>
<td>With guidance</td>
<td>Remembering Active verbs: identify, find, detect, follow, recognise, select simple, choose</td>
<td>Awareness Assimilate new information Developing basic pedagogical digital practices</td>
<td></td>
</tr>
<tr>
<td>Foundation 2</td>
<td>Simple tasks</td>
<td>Autonomy and with guidance where needed</td>
<td>Understanding Active verbs: explain, indicate, perform, illustrate, describe, select, organise, discuss, clarify, express</td>
<td>Explorer/Newcomer Explore digital technologies Encourage learners to use digital technologies</td>
<td></td>
</tr>
<tr>
<td>Intermediate 3</td>
<td>Well-defined and routine tasks, and straightforward problems</td>
<td>On my own</td>
<td>Explaining Active verbs: explain, indicate, perform, illustrate, describe, select, organise, discuss, clarify, express</td>
<td>Explorer/Newcomer Explore digital technologies Encourage learners to use digital technologies</td>
<td></td>
</tr>
<tr>
<td>Intermediate 4</td>
<td>Tasks, and well-defined and non-routine problems</td>
<td>Independent and according to my needs</td>
<td>Describing Active verbs: describe, select, organise, discuss, clarify, express</td>
<td>Explorer/Newcomer Explore digital technologies Encourage learners to use digital technologies</td>
<td></td>
</tr>
<tr>
<td>Advanced 5</td>
<td>Different tasks and problems</td>
<td>Able to guide others</td>
<td>Applying/Analysing Active verbs: respond, use, apply, operate, show, propose, carry out, share</td>
<td>Expert/Integrator Experiment in a variety of contexts, select with purpose Expand, integrate, reflect on practices</td>
<td></td>
</tr>
<tr>
<td>Advanced 6</td>
<td>Most appropriate tasks</td>
<td>Able to adapt to others in a complex context</td>
<td>Evaluating Active verbs: assess, adapt, explain, vary, change, discover</td>
<td>Expert/Integrator Experiment in a variety of contexts, select with purpose Expand, integrate, reflect on practices</td>
<td></td>
</tr>
<tr>
<td>Highly specialised 7</td>
<td>Resolve complex problems with limited solutions</td>
<td>Integrate to contribute to the professional practice and to guide others</td>
<td>Creating Active verbs: create, integrate, contribute, guide, propose</td>
<td>Pioneer/Leader Use a range of digital technologies Enhance pedagogical practices</td>
<td></td>
</tr>
<tr>
<td>Highly specialised 8</td>
<td>Resolve complex problems with many interacting factors</td>
<td>Propose new ideas and processes to the field</td>
<td>Critique and develop existing practice Experiment with highly innovative and complex digital technologies</td>
<td>Pioneer/Leader Use a range of digital technologies Enhance pedagogical practices</td>
<td></td>
</tr>
</tbody>
</table>
**Blooms revised taxonomy**

The intention of Bloom’s revised taxonomy of educational objectives is to create a framework for classifying intended learning goals that may serve as a common language for educators that crosses borders of subjects and individuals. These dimensions are expressed as verbs and nouns and are ranged in a hierarchy from the lowest (remembering) to the highest (creating). It provides assistance for educators to examine curriculum alignment and helps to develop and plan the curriculum (Anderson et al., 2001; Kratwohl, 2002).

In Table 3, the main keywords at the proficiency levels and active verbs in DigComp 2.1 (Carretero et al., 2017, pp. 13, 19–43) and the general role descriptors from DigCompEdu (Redecker, 2017) are included. At the foundation of digital competence (Rankings 1–2), the cognitive domain is remembering, and one is able to solve simple tasks with or without guidance. At the intermediate level (Rankings 3–4), the cognitive domain is understanding, and a person can solve some routine, well-defined tasks independently. At an advanced level (Rankings 5–6), the cognitive domain is applying and evaluating, and one can solve various tasks and problems, being able to guide and adapt to others in a complex context.

Finally, at the highly specialised level (Rankings 7–8), creating is the cognitive domain, and one is able to resolve complex problems with limited solutions or many interacting factors, integrate to contribute to the professional practice and guide others, and propose new ideas and processes in the field (Carretero et al., 2017). The general role descriptor from DigCompEdu (Redecker, 2017) is connected and related to DigCompEdu 2.1, making it possible to categorise teachers as newcomers, integrators, leaders, or pioneers.
2.4 Philosophical Assumptions

The philosophical tradition that on which this thesis is based is pragmatism, more specifically, the Dewey brand of pragmatism (Dewey, 1910/1997; 1916/2004; 1938/2015; 1939/1989), and how this view interlinks theoretical and methodological approaches. An overview can be seen in Figure 4.

Within Dewey’s brand of pragmatism, there is a non-dualistic view of the world in which both single and multiple realities coexist and can be investigated at the same time. Hence, pragmatism does not require a specific method; neither does it exclude others (Biesta & Burbules, 2003; Dewey, 1916/2004; Feilzer, 2010; Mitchell, 2018; Morgan, 2014; Thayer, 1982). This pluralistic orientation that enhances various perspectives stands well in line with this study’s chosen convergent research design that uses both quantitative and qualitative data collections, and is additionally mixed, as in Studies 1, 2, and 3, for the possibility of capturing multiple realities.

According to Dewey, humans are always in touch with reality, and this reality reveals itself as a result of activities (Biesta & Burbules, 2003; Dewey, 1916/2004). Dewey's theory of knowledge emphasises experience and action,
framed by transactionalism. In this transactional approach, knowledge manifests itself when humans transact with and respond to changes in the environment. Humans acquire knowledge or learn something about the relationship between actions and their consequences when problems are solved in an active, experimental, and reflective way (Biasta & Burbules, 2003; Dewey, 1910/1997; 1916/2004; Morgan, 2014). Experience, reflection, and problem-oriented learning are part of human development and change (Dewey, 1916/2004; 1938/2015). Within pragmatism, we can talk about change and transformation; correspondingly, in transformative learning, it is authentic competence development that changes and transform the identity. Furthermore, in ways of thinking and practising, it is a transformed internal view. There will be a transformed understanding of knowledge and how others experience something when students understand the ways of thinking and practising (Entwistle et al., 2002; McCune & Reimann, 2002; Meyer & Land, 2003). Additionally, students gain tools to interpret other situations (Eatwell et al., 1998) and to interpret current teaching (Meyer & Land 2003, 2005; Meyer et al., 2010).

According to Dewey, humans live in an ever-changing world; society is continually changing (Biasta & Burbules, 2003; Dewey, 1916/2004; 1939/1989). In Dewey’s mind, educational settings are social institutions where learners learn how to live life through experiences and social interaction, not simply by their subject and content knowledge. Educational institutions are a type of community life where knowledge and habits form and should reflect human development required by society (Dewey, 1916/2004; 1938/2015). This is also the case within the theory of transformative learning. According to Illeris (2014; 2017), identity is the target for transformative learning, which changes through learning during one’s entire life because the world is in constant change. Transformative learning is thinking critically about one’s own beliefs and then changing and acting, change-oriented learning in which the learner changes his or her meaning, perspectives, or ways of behaviour. (Mezirov, 1978; Illeris, 2014; 2017).

For Dewey, education should not be about the acquisition of a pre-determined set of skills, but rather it should help individuals use their skills in a reflective, critical, and autonomous way (Biasta & Burbules, 2003; Dewey, 1916/2004; 1938/2015). Illeris shares this view, arguing that including practice or problem-oriented teaching and learning is best (2014; 2017). For Illeris (2014a),
competence learning supports the learner's capability to function in new situations in society. A student is social, develops knowledge through sharing, and takes part in society. According to Dewey (1916), this process is both psychological, with motivation as an important aspect, and sociological. Pragmatism has a strong emphasis on problem-solving and critical thinking (Dewey, 1910/1997; 1938/2015). Emphasis is placed on learning by doing – hands-on projects, expeditionary learning, and experiential learning (Biesta & Burbules, 2003; Dewey, 1916/2004; 1938/2015).

The aim of the European frameworks is to provide evidence-based scientific support to enhance the development of citizens’ digital competence. This is what pragmatism is about – science and evidence from practice that is usable (Biesta & Burbules, 2003). As Mezirov (1978) puts it, the results of critical thinking should then be implemented in practice. For the present thesis, it is important to have this relationship between what society needs and what the individual needs, where the educators decide what is workable in their environment. Within pragmatism, scientific theories are useful for predicting and understanding phenomena, but not for giving true descriptions, as the truth is not fixed – it changes when problems change (Biesta & Burbules, 2003; Feilzer, 2010). In this sense, the research questions asked in this thesis are targeted to understand, interpret, and categorise what migrant teachers experience as unfamiliar. From Dewey’s pragmatic point of view, the results from research are not to be generalised; the world and its problems are too complex, changeable, and situated (Biesta & Burbules, 2003; Dewey, 1939/1989; Feilzer, 2010; Thayer, 1982).

Within pragmatism, research contributions give educators the possibility to think critically about the results and how to use them in their situated learning environment. The value of the research is dependent upon how effectively it can explain a problem, as well as if it works in practice (Biesta & Burbules, 2003; Dewey, 1910/1997; 1916/2004). This relates to situated learning, as it is important in transformative learning (Illeris, 2014; 2017). From the perspective of ways of thinking and practising, there are unique traditions and practices that have to be considered in learning (Hounsell & Anderson, 2009; Kreber, 2009).

The findings in this thesis are not meant to be generalised but to give interested educators and others the opportunity to reflect, analyse, and enhance their understanding and use of the results and models.
3. Methodology

In this chapter, there is a description of the combined application of methods. First, there will be an explanation of the convergent mixed methods research used in this thesis, and an explanation of the study population. This is followed by descriptions of data collection, with its quantitative part, a web survey and its qualitative parts, focus groups, individual interviews, reflective texts, and open-ended answers from the survey. Further, the analysis is described in more general terms, followed by its application in each study. Ethical considerations related to the studies’ reliability and validity are then introduced. Last, the limitations of the studies are presented.

3.1 Convergent Mixed Methods Research

Convergent mixed methods research frames this thesis as a research strategy in the research process, including data collection, analysis, and interpretation of the results to give the thesis a more nuanced and better understanding of migrant teachers’ experiences in Swedish teacher education. Furthermore, convergent mixed method research provides an opportunity to validate and triangulate the data collection and results and synthesise the analyses of both quantitative and qualitative results, gaining a more in-depth understanding of the material by seeing it from multiple perspectives.

It is important to note that mixed methods research is not different data collection, in contrast to multi-methods research. It is the integration of the various results and analysis that makes it mixed methods research. This research design contributes to additional knowledge, exceeding what qualitative and quantitative can demonstrate alone (Creswell & Plano Clark, 2011; 2017; Venkatesh et al., 2013). Despite a growing interest in mixed methods, it is still not widely adopted in higher education research. However, mixed methods
can maximise and minimise the limitations of quantitative and qualitative methods (Griffin & Museus, 2011).

According to Creswell (2015), there are three basic types of mixed methods research: (a) explanatory sequential mixed methods research in which quantitative methods are used first, then qualitative to explain the quantitative, (b) exploratory sequential mixed methods research in which a researcher explores to understand the unknown research problem using qualitative methods, then builds and uses the quantitative design, and (c) convergent mixed methods research using both quantitative and qualitative methods at the same time, then merging the two sets of data analysis for comparison.

**Figure 5. A Convergent Parallel Design (Creswell, 2015. p.56)**

This study used convergent mixed methods research, with a defined research problem and datasets that validated each other. In this study, convergent mixed methods research was used with both quantitative (web survey) and qualitative data (individual and focus group interviews, reflective texts, and open-ended answers), as a single method, would have been insufficient to understand the migrant teachers’ experiences.

The mixed methods research question asks if the results and analysis from each collection support or confirm the other. Yet different data collection methods have their advantages and disadvantages. In quantitative research, it is possible to include a larger group of people. However, a personal perspective is lacking. In qualitative research, there is an understanding of people’s thoughts and in-depth experiences. However, there is a limitation when it comes to the generalisation of the results.

In mixed methods research, both strengths and views can be combined (Creswell, 2015; Plano, Clark, & Ivankova, 2016).
The three spheres – quantitative, qualitative, and mixed – are present in this study. In the quantitative portion, the teachers responded to the same thematic areas (demographic background, digital competence, teaching philosophy, and ways of thinking and practising) as in the qualitative part. However, the numeric data examined and answered questions about “how many”. The qualitative portion explored their experiences with those themes. In the mixed sphere, the qualitative codes and quotations gave life to the quantitative numbers, made them visible, and gave them a face. Thus, it was easier to understand what the teachers meant by ticking different boxes in the survey. On the other hand, the numeric data showed the frequency of the coded segments the teachers expressed within the thematic areas.

3.2 Participants of the Study

The population in this study consisted of all migrant teachers actively enrolled in the programme during 2014, meaning 465 individuals were invited for the web survey, of which 228 responded. Furthermore, nine individuals participated in the interviews and 25 teachers did so in the focus groups. All participants had a foreign teaching degree requiring at least two years at the university level. Fifteen migrant teachers submitted personal reflective texts. The delimitation was to include only the actively enrolled migrant teachers at the participating Swedish teaching institutions, not those who were on a study break or had finished their studies.

Six Swedish universities were involved in the program for migrant teachers, but only four of them participated in this study. Two universities were unable to participate due to low numbers of migrant teachers or time constraints. For confidentiality, the participating universities are identified as University A, University B, University C, and University D. In total, the migrant teachers came from 57 countries and regions, 54 countries represented in the web survey and an additional three from the qualitative data collections. For more background data about the teachers with a foreign teaching degree, see Table 4.
**Table 4. Background data of teachers with a foreign teaching degree**

<table>
<thead>
<tr>
<th>Teachers</th>
<th>Data collection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
</tbody>
</table>
Survey: $N = 228$ (out of 465) 49%: 12% male and 88% female 
Individual interviews: $N = 9$: male $n = 3$ and female $n = 6$ 
Focus groups: $N = 5$ groups; $N = 25$ teachers, male $n = 4$ and female $n = 21$ 
Reflective texts (30 texts): $N = 15$ teachers, male $n = 3$ and female $n = 12$ |
| **Years of age** | Quantitative: 
- 25-31 years, $n = 36$ 
- 32-38 years, $n = 80$ 
- 39-45 years, $n = 56$ 
- more than 45 years, $n = 50$ 
Qualitative: the same span |
| **Years of former teacher education** | Quantitative: 
- 2 years, $n = 36$ 
- 3-4 years, $n = 96$ 
- more than 5 years, $n = 79$ 
- graduate, $n = 8$ 
Qualitative: the same span |
| **Specialisations** | Quantitative: 
- Upper secondary school, $n = 129$ 
- Secondary school, $n = 110$ 
- Middle school, $n = 79$ 
- Primary school, $n = 51$ 
- Preschool, $n = 18$ 
- Special education, $n = 8$ 
- Recreation centre, $n = 1$ 
- Other types of specializations, $n = 25$ 
Qualitative: the same, except recreation centre $n = 0$ |
| **Subject areas** | Quantitative data: social science, nature science, language, mathematics, art, music, special education, preschool, gymnastics and sports and health, recreation centres, country-specific |
| Qualitative data: social science, nature science, special education, gymnastics, sports and health, language (English, French, Russian, some native), literature, mathematics, art, music, computers and technology, psychology, country-specific |
3.3 Data Collection

Convergent mixed methods research involves analysing different data collections, then merging the results of the analysis (Creswell, 2015). A combination of four data collection methods was applied to provide richer material: a web survey, individual interviews, focus group interviews, and participant reflective texts. The author contacted the national director for the programme and the administration at each university. The university administrators provided the respondents’ email addresses, and the author was able to send email to them. The migrant teachers received information about the study through these emails and from the web survey.

Each of the four Swedish universities was represented in the survey and the individual interviews. While it was not possible to gather a focus group at University D, each of the other universities were represented with focus groups. The reflective texts were collected at University A. All data collection was conducted during the spring semester of 2014. The quantitative and qualitative data were collected at the same time, before the analysis. Because there were four universities involved, the reflective texts were collected concurrently with the survey and interviews.

A summary of the data collection can be seen in Table 5, after which each of the data collection methods is described. All data collection covered the following themes: ways of thinking and practising, digital competence, and teaching philosophy.
### Table 5. Summary of data collection activities

<table>
<thead>
<tr>
<th>Data collection</th>
<th>Former teacher education in:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Survey</strong></td>
<td>Algeria, Argentina, Azerbaijan, Bangladesh, Belarus, Belgium, Bosnia and Herzegovina, Brazil,</td>
</tr>
<tr>
<td></td>
<td>Bulgaria, Canada, Central America, Chile, China, Costa Rica, Cuba, Egypt, Ethiopia, Finland,</td>
</tr>
<tr>
<td></td>
<td>Georgia, Germany, Greece, Hungary, India, Iraq, Iran, Japan, Jordan, Kenya, Kosovo, Kurdistan,</td>
</tr>
<tr>
<td></td>
<td>Latvia, Lebanon, Lithuania, Mongolia, Netherlands, Nicaragua, Pakistan, Palestine, Philippines,</td>
</tr>
<tr>
<td></td>
<td>Poland, Romania, Russia, Serbia, Spain, South Africa, Syria, Taiwan, Thailand, Turkey, Ukraine,</td>
</tr>
<tr>
<td></td>
<td>USA, Uzbekistan, Yugoslavia, Zambia</td>
</tr>
<tr>
<td><strong>Individual interviews</strong></td>
<td>Hungary, Latvia, Canada, Nicaragua, Palestine, Philippines, Russia, Serbia, South Africa</td>
</tr>
<tr>
<td></td>
<td>Belarussia, Bulgaria, China, Estonia, Hungary, India, Iraq, Iran, Latvia, Mongolia, Peru,</td>
</tr>
<tr>
<td></td>
<td>Poland, Philippines, Russia, Ukraine</td>
</tr>
<tr>
<td><strong>Focus groups</strong></td>
<td>Balkans, Bangladesh, China, Germany, Hungary, Iraq, Iran, Kurdistan, Latvia, Lebanon, Serbia,</td>
</tr>
<tr>
<td></td>
<td>Ukraine</td>
</tr>
<tr>
<td><strong>Reflective texts</strong> (30 texts)</td>
<td>University A (all)</td>
</tr>
<tr>
<td></td>
<td>Balkans, Bangladesh, China, Germany, Hungary, Iran, Kurdistan, Latvia, Lebanon, Serbia,</td>
</tr>
<tr>
<td></td>
<td>Ukraine</td>
</tr>
<tr>
<td><strong>In sum</strong></td>
<td>Continents:</td>
</tr>
<tr>
<td></td>
<td>Asia n = 107</td>
</tr>
<tr>
<td></td>
<td>Europe (not Sweden) n = 95</td>
</tr>
<tr>
<td></td>
<td>South America n = 12</td>
</tr>
<tr>
<td></td>
<td>Africa n = 8</td>
</tr>
<tr>
<td></td>
<td>North America n = 3</td>
</tr>
</tbody>
</table>

*Notes.* Value $N =$ Total number of respondents, value $n =$ number of respondents in a case.
3.3.1 Quantitative Data Collection

Web survey

Quantitative data collection was carried out via a web survey. Before the survey was administered to the teachers with a foreign teaching degree, experts revised and commented on the survey. The group of experts was comprised of two teachers with a foreign teaching degree, the national leader for the students with a foreign teaching degree programme, an expert on students with a foreign teaching degree, a dean from a mandatory school, two researchers at the Department of Computer and Systems Sciences – Stockholm University, my supervisors, and students with a foreign teaching degree who had already finished the programme. After this feedback, the survey was refined and finally distributed to the teachers. Information about the survey was distributed in several ways (via management systems, letters, email, several in-person meetings, seminars, and lectures).

The web survey targeted all 465 actively enrolled migrant teachers at Universities A, B, C, and D in the Further Education for Foreign Teachers programme, and obtained responses from 228 (49%) of the solicited teachers. The web survey was sent through an online system at Stockholm University called “Survey & Report”, which made it possible to ensure confidentiality. The survey consisted of 68 items divided into four themes: demographic background \((n = 9)\), teaching philosophy \((n = 23 \text{ Likert-type scale and one open-ended question})\), unfamiliar ways of thinking and practising \((n = 3 \text{ open-ended questions})\), and digital competence \((n = 28 \text{ Likert-type scale } n = 4 \text{ estimation of } \%\). The items were operationalised through a Likert-type scale of 5 points (Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree).

The respondents answered such open-ended questions connected to the experiences of unfamiliar ways of thinking and practising and thinking in Swedish teacher education and if something has been problematic or experienced as unfamiliar compared to the former teacher education. As mentioned, the survey included both closed and open-ended questions. One part of the survey included items from the TPACK survey, developed by Schmidt et al. (2009) (see Appendix A). Permission was received to use the TPACK survey by Professor Matthew J. Koehler from Michigan State University. The TPACK survey investigates the teachers’ self-estimated knowledge (Schmidt et al., 2009).
within the framework of TPACK (Mishra & Koehler, 2006). The items used only included the T (technology), not P (pedagogy) or C (content). Some modifications were made among the TPACK items used. Items 30-33 and 43-46 were divided into subjects, such as mathematics and social science. However, in the web survey, they were changed to “my subject/specialisation”. Items 55 and 57 (see Appendix B) in the survey were divided into two questions each, since the migrant teachers compared their former teacher education to the Swedish one. Items 40 and 56 were excluded because they related to courses and other professions outside teacher education.

3.3.2 Qualitative Data Collection

A request for participation in the qualitative data collection was included in the web survey and the email to all 465 teachers. 34 of the respondents participated voluntarily in interviews, including nine individual interviews and five focus groups. Moreover, 15 teachers submitted personal reflections in the form of 30 reflective texts. Open-ended answers in the web survey were also part of the qualitative collection.

Focus groups
These semi-structured focus group interviews included five groups altogether with 25 participants. They participated voluntarily by the interview request sent via the web survey. They could tick a box or write directly to the interviewer by mail. The focus groups met at the participants’ universities and lasted between 40 and 70 minutes. The interviews were digitally recorded and transcribed verbatim. Before the interview began, the participants were informed and shown the themes of the interview. They were informed that the interviewer might ask clarifying questions during the interviews. The participants came from different countries, and they had the possibility to discuss and reflect on the themes from very different viewpoints and backgrounds. It was possible to discuss both how they experienced Swedish teacher education and their digital competence compared to their former teacher education, and they could also listen and reflect on what others in the group said, comparing responses from different perspectives. According to Wibeck (2010), there are three elements that are important in a focus group interview: (1) it is a data collection technique, (2) data is gathered through group interaction, and (3)
the content is decided by the researcher. Further, a group discussion is arranged by a researcher, which has a structured content focus. Bryman (2012) addressed focus group design in the same way. There are several participants who are questioned within a defined topic in a focused interview in which the participants are selected because they are known to be involved in a particular situation. This is the definition used in this study. In this thesis, all focus groups included themes of digital competence, unfamiliar ways of thinking and practising, and teaching philosophy. Focus groups can be the only method used or they can support other research methods to provide more evidence, and is a useful method when experiences are investigated. In a focus group, students can share and compare their experiences, which reveals a variety of data as opposed to individual interviews. The participants have an opportunity to clarify and explore their understanding of phenomena (Cousin, 2009). This is suitable for teachers with a foreign teaching degree who experience the same education but from very different points of view.

_Individual interviews_

Flexible, semi-structured interviews were conducted and guided by the thematic inventory (Bryman, 2012). Nine migrant teachers were interviewed. The procedure was the same as for the focus groups. The interviews were conducted at the participants’ universities and lasted between 40 and 70 minutes. They were digitally recorded and later transcribed verbatim. As an introduction, they were shown the interview themes. In this study, the individual and focus group interviews supplemented each other, the individual with more in-depth responses and the focus groups with broader perspectives.

_Reflective texts_

Reflective texts were submitted voluntarily to the researcher via the Learning Management System (Mondo) or sent by email. A total of 30 reflective texts were collected from 15 of the teachers attending the course entitled “To be a Teacher in Sweden” (22.5 credits) at University A. As a course assignment, students were asked to reflect on their teaching role and teaching in comparison to their former teacher education and work. This allowed the participants to formulate in their own words the experiences, understanding, and insights they developed during their study in Sweden.
Open-ended answers in the web survey

In the survey, the 228 participant teachers could answer with their own words. This part of the data was treated and analysed in the same way as the other qualitative parts. The respondents answered open-ended questions related to unfamiliar encountered practises, during their studies in Swedish teacher education and if something has been experienced as problematic or unknown compared to your former teacher education. Further, if digital technologies were used differently in Swedish education compared to their former one.
3.4 Data Analysis

In all studies, a convergent mixed methods research design was used; therefore, the analytic procedure that Creswell and Plano Clark (2011) suggested for representing, interpreting, and validating data and results was followed (see Table 6). According to Creswell (2015), it is not necessary for all studies to be mixed, as it is difficult to fit all methods and analyses into each article. It is possible to merge the results in another text, such as in a compilation. Study 1 and 2 are mixed, Study 3 uses both quantitative and qualitative data without mixed analysis, and Study 4 is qualitative. However, as a whole, the frame of the research design within this thesis is mixed (see Table 6).

Quantitative analysis
Data were transferred to the quantitative software program SPSS (version 24) and Excel (2013). Cronbach’s alpha, mean, standard deviation, and percentage were analysed. The survey contributed quantitative background data to the thematic areas, as well as results from open-ended questions. In Studies 2 and 3, statistical self-estimations were made. In addition, a descriptive analysis was conducted. In Study 1, teachers self-estimated their digital competence in TPACK, which was analysed with Cronbach’s alpha, mean, and std. deviation. In Study 2, the teachers estimated the use of digital technologies in former teacher education as well as the Swedish one. This was shown in percentages and numbers.

Qualitative analysis
All qualitative data (focus groups, individual interviews, reflective texts, and open-ended answers from the web survey) were transferred into MAXQDA, version 12 and Pro Analytics, a qualitative data analysis software, for further processing and analysis. In this software, the qualitative data was read several times, and content analysis was made. Emerging categories were found, and units of meaning for similarities and differences were identified, grouped, and labelled. Main themes, categories, and subcategories were derived from the data (see each article).

Study 1: Content analysis was conducted, in which the coded segments were grouped and labelled according to the levels of proficiency in DigComp 2.1 (Carretero et al., 2017), as were the teachers’ digital competencies, according to the role of descriptors in DigCompEdu (Redecker, 2017). By using the general role descriptor from DigCompEdu (Redecker, 2017), it was possible to
analyse whether the teachers were newcomers, integrators, leaders, or pioneers.

Study 2: The qualitative data were read several times to develop an overview and understanding of the material. The segments were coded into categories, and quotations were chosen based on their representativeness. The segments were coded into categories based on Illeris’ (2014b) model of identity: (a) core identity, (b) the personality layer, and (c) the preference layer.

Study 3: A qualitative content analysis was conducted in which the transcribed material was read several times to develop an overall understanding. The main categories were then identified, emerging from ways of thinking and practising experienced by the migrant teachers. Further, categories concerning unfamiliar ways of thinking and practising were identified. The material was divided into main themes according to the spoken content. In addition, the evidence, qualitative themes, and categories were presented in the form of a descriptive analysis.

Study 4: A thematic content analysis was conducted. All material was read several times to develop an overall understanding, and emerging categories were noted based on the research questions. Units of meaning for similarities and differences were identified, grouped, and labelled. Further, the segments were coded into main categories and subcategories with what was unfamiliar in the use of digital technology and media. The relationships between the categories provided a fuller explanation of the unfamiliarity of the use of digital technology and media for the migrant teachers. Quotations representative of the categories were chosen.

Mixed analysis
Data results and analysis were mixed and converged to gain a more nuanced view of the respondents’ experiences. Subsequently, qualitative data appropriate for quantification were identified, as were quantitative data appropriate for qualification. Quantitative results were displayed together with qualitative results to add more information to each result group. In the mixed presentation, the results were presented in various ways: in some cases, quantitative results were reported first, and then the qualitative, followed by a comparison (Studies 2 and 3); in others, a side-by-side comparison was displayed in tables (Study 3). Other ways of displaying mixed results were adding numbers and frequency to the qualitative categories, or using a convergent mixed methods
table containing qualitative quotations exemplifying the self-estimated TPK, TPC, TK, and TPACK (see Study 1). In Study 2, the quantitative data from the web survey were analysed using SPSS, version 24, and Excel 2013. In addition, a descriptive analysis was conducted in relation to the estimated use of digital technologies.

Further, a qualitative categorisation was developed from migrant teachers’ estimation the use of digital technologies. Three qualitative categories of use were found and enumerated: (1) more use in Swedish teacher education (n = 172), (2) the same use in both countries (n = 56), and (3) more use in prior teacher education (n = 12). Altogether, there were 240 qualitatively coded segments (see Article 2). The relationships between the categories provided a fuller explanation of the findings. In sum, the mixed analysis quantified some of the qualitative data. In addition, it made the quantitative data more transparent by displaying qualitative quotations connected to them.

In Table 6, the analytical procedure is summarised. Next, ethical considerations, reliability, validity, and trustworthiness are visualised and explained.
Table 6. Data and six steps in the analysing procedure

<table>
<thead>
<tr>
<th>Data procedures</th>
<th>Quantitative</th>
<th>Qualitative</th>
<th>Convergent mixed methods analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prepared</td>
<td>The data from Survey &amp; Report were transferred as Excel documents into SPSS.</td>
<td>All interviews were transcribed verbatim. Open-ended answers were transferred from the survey Excel sheet to Word. Reflective texts were formatted to Word.</td>
<td>Both sets were independently analysed. Decisions - which parts of the two data sets were appropriate for comparison.</td>
</tr>
<tr>
<td>2. Explored</td>
<td>The data were visually inspected, and a descriptive analysis was conducted. Studies 1 and 2</td>
<td>The data were read several times to get an overview. Memos were written in the margins. Studies 1, 2, 3 and 4</td>
<td>Inspection of the mixed data to get an overview. Studies 1 and 2</td>
</tr>
<tr>
<td>3. Analysed</td>
<td>Transferred to SPSS (version 24) and Excel (2013). Cronbach’s alpha, Mean, Std. Deviation and Percentage</td>
<td>Transferred to MAXQDA version 12 and Pro analytics. Coded, grouped into themes and categories.</td>
<td>The qualitative data was quantified in MAXQDA. Studies 1 and 2</td>
</tr>
<tr>
<td>4. Represented</td>
<td>The results were provided in tables and figures connected to descriptive analysis.</td>
<td>The themes, categories and subcategories were represented in discussions, tables and figures.</td>
<td>Quantified qualitative data repr. in tables or text — qualitative quotations connected to quantitative results in tables or texts. Studies 1 and 2</td>
</tr>
<tr>
<td>5. Interpreted</td>
<td>The results were interpreted and explained with respect to the research questions and related to prior literature and theories. Studies 1 and 2</td>
<td>The results were compared to theories, literature and discussed in relation to the research questions. Studies 1, 2, 3 and 4</td>
<td>Interpretation of the combined results in relation to the research questions was made. Studies 1 and 2</td>
</tr>
<tr>
<td>6. Validated and interpreted</td>
<td>Validity and reliability - compared to past use of the instrument Study 1 Internal validity and reliability statistics were checked in SPSS. Studies 1 and 2</td>
<td>Validation through triangulation. Studies 1, 2, 3 and 4</td>
<td>Validation through triangulation. Studies 1, 2, 3 and 4</td>
</tr>
</tbody>
</table>
3.5 Ethical Considerations

The Swedish Research Council states that the main concepts of ethical concern in research are professional secrecy (not to discuss individual respondents with unauthorised people), anonymising or de-identifying respondents, and confidentiality (Hermerén, 2017). Each of these conditions are met in this study. Participants were guaranteed confidentiality and integrity through informed consent, which was obtained at the beginning of the web survey and the start of the qualitative data collection.

All migrant teachers contacted to take part were informed of the study’s purpose and that participation was voluntary. The web survey was sent via an online system, which made it possible to ensure confidentiality. At the end of the web survey, migrant teachers could tick a box and enter their email, permitting the researcher to contact them for an interview. To ensure the de-identifying of the answers, this data was immediately separated from the dataset before the analysis was conducted. Furthermore, migrant teachers were informed that participation would not affect their grades, and they could withdraw from the study at any time. The same information was included in the letter of consent that the teachers signed during the interviews, both individual and focus groups (see Appendix C).

My background as a teacher educator for the “To Be a Teacher in Sweden” course for several semesters, starting in Spring 2008, had to be considered during the research. I had to think about acting as a researcher during the data collection and analyses, not a teacher educator. For professional secrecy, it was important not to discuss individual respondents with people who might recognise them. In addition, respondents were de-identified when discussed or written about to preserve confidentiality and integrity. On the other hand, I had first-hand knowledge about the population from teaching this course some years earlier.
3.6 Reliability, Validity and Trustworthiness

In quantitative studies, reliability and validity are discussed and analysed. Within qualitative studies, this relates to trustworthiness.

Reliability and validity

The internal reliability statistics for the survey were checked in SPSS and tested through Cronbach’s alpha. With parts of the survey (TPACK), it was possible to validate and check reliability with a comparison to past use of the instrument, and it had similar values. Cronbach’s alpha in this study ranged from 0.89 to 0.90. The reliability of the scores in Schmidt et al. (2009) ranged between 0.78 and 0.93. Moreover, the indices of TPK and TK show almost the same standard deviation, meaning that teachers with a foreign teaching degree present a high degree of individual differences within these areas.

There were sufficient respondents to obtain reliable results. It was not necessary to exclude outlying profiles because they did not affect the outcome. Furthermore, there were no significant differences between the universities in the results reported for each university, respectively or collectively. Another question to ask is: Did the survey fit the target population? There was a variation in answers on the Likert scale from 1 to 5; therefore, the survey was not too easy or too difficult. Overall, out of 465 teachers, 228 respondents (49%) answered the survey. The teachers who answered the survey covered the entire spectrum of teachers involved in the programme concerning gender, age, subjects, specialisation, etc., therefore, they may be deemed representative. Nevertheless, the survey was only offered in Swedish. Additionally, there may have been lack of interest in the subject of digital competence.

Although the survey could be answered using mobile phones, computers, iPads, etc., it may be difficult to use the devices and answer the questions, especially in a language that is not one’s first language. In addition to language and technological difficulties, it was an extensive survey. Although there was a risk of bias in the response rate and to the validity and reliability, due to language difficulties and the length of the digital survey, the qualitative methods complement and corroborate the results of the web survey.
One additional point should be noted regarding individual reliability. The survey items provide self-estimates of the participants' skills (TPACK), so it may be teachers’ self-confidence rather than actual knowledge in practice that was measured (Lawless & Pellegrino, 2007; Willermark, 2018), since participants could underestimate or overestimate their level of competence. Broad items (like in the TPACK-survey) can lead to higher self-estimate ratings than more detailed ones, and individuals tend to have a general sense of their strengths and weaknesses, yet not a detailed one (Ackerman, Beier, & Bowen, 2002; Lawless & Pellegrino, 2007). The strength of using several methods, as in this thesis, is that validation through triangulation may decrease bias. In this thesis, the data, results, and analysis strengthen each other.

**Trustworthiness**

Within qualitative studies, trustworthiness must be discussed as there are no instruments or ways of measuring validity or reliability. There are four aspects of trustworthiness to take into consideration (Bryman, 2012).

1. *Credibility*, which concerns the truth of the findings. This can be solved by triangulations. In this thesis, several theories, data collections methods, and convergent mixed methods were applied to strengthen credibility.

2. *Transferability* concerns whether the findings are applicable in other contexts. In this case, it is the models and tools provided in the research contribution that can be transferable, as the results depend on the population and the ways of thinking and practising currently in use in education. Convergent mixed methods may also increase transferability.

3. *Confirmability* concerns the neutrality and absence of bias based on the researcher in findings. Substantial quantities of data lower the risk of bias. In addition, convergent mixed methods analysis is helpful when the qualitative results are highlighted by quantitative results and vice versa. My relationship with migrant teachers consists of teaching them for several semesters (since 2008). Tacit knowledge about the participants, being a practitioner, and then investigating them is an act of balance, and requires always being aware of the previous role. It is both an advantage and disadvantage: the participants opened up due to their familiarity with me; however, I had to retain some distance.

4. *Dependability* concerns whether the study can be repeated with consistent results. Again, if a new study is conducted, it would probably be a consistent result because the material covers teachers from 57 countries and regions, yet, only to a certain extent, as it has been several years since the data collection was conducted.
3.7 Limitations

The research has the following limitations: First, the findings are to be used in accordance with the philosophies of pragmatism and transformative learning. Hence, all research is situated and must be tried out in a real-world context to see its value. Furthermore, the empirical value is to exemplify what is taking place at the time of the data collection in a Swedish context with migrant teachers. In another context, for example, two different countries, the findings would differ. Further, the results will differ in time and place. Hence, the findings are not suitable for generalisation. Last, society is constantly changing, and so is the educational setting. What is a suitable digital competence today will soon change. Knowing this, it is the models rather than the empirical data that can be used in the long-term.
4. Results of the Studies

This thesis aims to develop more knowledge about digital competence, as well as unfamiliar ways of thinking and practising that migrant teachers experience in Swedish teacher education. Four studies provide insights about migrant teachers from different angles. The first study focused on the digital competence of migrant teachers using TPACK, DigComp 2.1, and DigCompEdu. The second study concerned the use of digital technologies in Swedish teacher education connected to transformative learning. Study 3 identified unfamiliar ways of thinking and practising to understand what migrant teachers experience in Swedish teacher education. The last study investigates the placement period and use of digital technologies.

Study 1: Self-estimated Digital Competence, Levels and Role Descriptors

Migrant Teachers’ Self-estimated Digital Competence – A Study within Swedish Teacher Education, is a study aimed to investigate how migrant teachers participating in Swedish teacher education estimate their TPACK (Schmidt et al., 2009). This is followed by an analysis of their digital competence in relation to DigComp 2.1 (Carretero et al., 2017) and DigCompEdu (Redecker, 2017). The results come from both qualitative (interviews, focus groups, reflective texts, open-ended answers from the survey), and quantitative (web survey) collections. The research questions are: (1) How do migrant teachers estimate their TPACK? (2) How do migrant teachers express their digital competence?
The findings highlight that migrant teachers’ digital competence is diverse, ranging from very low to very high in TPACK, from a foundational proficiency level to a highly specialised level in DigComp 2.1; responses are found in every role descriptor from DigCompEdu (Redecker, 2017).

Quantitative findings show a diverse picture of migrant teachers’ self-estimated TPACK. In summary, \( n = 14 \) to 43 migrant teachers strongly disagreed or disagreed that they possessed digital competence. Furthermore, \( n = 35 \) to 71 of them neither agreed nor disagreed, expressing an uncertainty related to their digital competence. Finally, \( n = 96 \) to 159 of the migrant teachers estimated themselves as knowledgeable or very knowledgeable.

Some examples of the results: Migrant teachers disagreed with the statement that the teacher education programme has caused them to think more deeply about how technology may influence their teaching approaches (Item 36), thinking critically about how to use technology in the classroom (Item 37), and providing leadership in helping others to use technology in a pedagogical way (Item 41). Furthermore, they disagreed with Items 43–46, knowing about teaching lessons that appropriately combine the subject or specialisations, technologies, and teaching approaches. On the other hand, migrant teachers agreed or strongly agreed with keeping up with digital technologies (Item 3), learning technology (Item 2), and having the skills to use it (Item 6). They also agreed that knowing what technology is was suitable for the content (Items 30–33) and the subject and specialisations.

Within the qualitative findings, the European framework was used to categorise digital competence. Migrant teachers were found at all levels and role descriptors. The foundational digital competence level (DigComp Ranking 1-2) is termed the newcomer. Some migrant teachers expressed little or no digital competence but were greatly aware that it is fundamental in an information society. Others described themselves as being digitally illiterate, yet were also unaware of its importance. Reasons expressed for being a newcomer include: digital technologies were unimportant, where they lived before lacked technical infrastructure, a diverse society with a gap between rich and poor, location (city and countryside), war, or some digital technologies were forbidden to use in education. Not all newcomers were positive about the use of digital technologies, considering them overrated and time-consuming.
In sum, it was perceived as a challenge to use digital technologies, an obstacle to overcome. There are various sub-groups within the newcomers as well. Some had a low level of digital competence but were used to the ways of teaching and learning practiced in Sweden, while others struggled, feeling lost with both digital technologies and teaching in a collaborative, self-directed way.

At the intermediate digital competence level (DigComp Ranking 3-4), explorers had a growing insight and awareness that digital technologies are something beneficial, relevant, and necessary. Digital technologies were viewed as something good but new, having not been used in their former educational setting. Other digital technologies mentioned were presentations, sending email, writing texts, looking at websites, surfing the internet to find pictures, and hardware, such as laptops and smartphones. However, the focus was still on the migrant teachers individually; strategies for student learning were not mentioned. Migrant teachers expressed a lack of self-confidence about using digital technologies.

Those who have obtained the advanced digital competence level (DigComp Ranking 5-6), described as experts or integrators, move from a focus on how to use digital technologies, toward a more pedagogical focus. Digital technologies were considered to support the process of teaching and learning. The results show that migrant teachers applied digital technologies for pedagogical documentation, activities and learning, guided others in a complex context (making the learning transparent for both students and parents), and facilitated assessment, feedback, and examination (using a learning management system). Also mentioned is that students with special needs can use digital technologies to analyse, scaffold, and to solve tasks and learning problems cognitively and emotionally.

Finally, at the highly specialised digital competence level (DigComp Ranking 7-8), we find the pioneers and leaders. Migrant teachers at this level can create, resolve complex problems, and contribute to professional practice. Moreover, they expressed a well-developed awareness of the use of digital technologies. When they compared the integration of digital technology and its development in their former education to the Swedish one, it was used more in their former education and schools. At this level, they are interested and active in developing their own and their students’ digital competence. Furthermore, they see themselves as guides to help their students use digital technologies.
Study 2: The Use of Digital Technologies in Swedish Teacher Education

The use of digital technologies in Swedish teacher education: experiences by migrant teachers. This study aimed to understand migrant teachers’ experiences when digital technologies were used in Swedish teacher education in relation to Illeris’ redefined transformative learning. In addition, migrant teachers estimated the use of digital technologies in their former education as well as their Swedish one. The results originate from both qualitative (interviews, focus groups, reflective texts, and open-ended answers from the survey) and quantitative (web survey) collections. The research questions are: (1) Which estimated use of digital technologies did migrant teachers experience in teacher education programmes? (2) What view do migrant teachers have about teaching and learning? (3) What learning in relation to Illeris’ redefined theory of transformative learning was identified when digital technologies were used?

Migrant teachers estimated the percentage of their teacher educators and placement supervisors in Sweden and their former countries who combined content, digital technologies, and teaching strategies in their teaching. Findings showed that the use of digital technologies was estimated as higher in Sweden, both in teacher education ($n = 82$) and among placement supervisors ($n = 50$) in comparison with their former teacher education ($n = 13$), as well as among their placement supervisors ($n = 12$). However, there were migrant teachers who thought that digital technologies were used more often in their prior education.

Findings show a variety of teaching philosophies – who one is as a teacher, perspective on students, how learning occurs, and the relationship between education and society. Other findings were related to digital technologies, learning, and identity by using Illeris’ redefined transformative learning (2014b). Identity is the target area for transformative learning (cognitive, emotional, and social). The three layers of identity were used for categorising migrant teachers’ experiences: a) The core identity, b) the personality layer, and c) the preference layer. Regressive transformative learning is also discussed.
a) The centre of the identity has a stable core, a sense of being an individual. Teachers with a foreign teaching degree come to Sweden for many different reasons, such as war, work, or relationships, yet what they have in common is that they are in a huge transition, changing cultures and language. Some teachers used digital technologies to process and understand their identities in the Swedish context compared to their former country.

b) Unfamiliarity in the personality layer is comprised of values, behaviour, and patterns of collaboration. The teachers used digital technology as a tool to gain knowledge and compare concepts to understand the foundation of teaching and learning in Sweden in relation to themselves as teachers. For some, both the digital technologies and the challenge of shifting pedagogical perspectives felt unfamiliar. The ordinary accommodations, understanding, and accepting new ways was not enough for some. Hence, transformative accommodation, changing both the perspectives and ways of behaviour, was expressed. Within the new learning context, new patterns of collaboration followed. As part of their studies, digital communication and socialisation were unfamiliar, especially in the teacher educator-migrant teacher relationship. Digital technologies were generally recognised as an aid in their studies, with accessibility to lectures, peer support, and writing and communicating with others.

c) The preference layer of the identity concerns what an individual prefers, such as routines, etc., and learning as addition or assimilation is common. Here the teachers express usage of digital technologies for information, administration, etc., which does not demand deeper processing or identity change from the user. The administrative digitalisation within Swedish teacher education and the ways information is distributed were experienced as unfamiliar but not problematic, rather the opposite, as tools that made studying easier.

Negativity or scepticism regarding the use of digital technologies can occur when learning goes against what a migrant teacher wants or considers important (Illeris, 2014b; 2017). Digital technologies were seen as negative influences on learning and a waste of time. Furthermore, regressive transformative learning was evident when teachers identified themselves as digitally illiterate, and at the same time, lacked sufficient training from Swedish teacher education. It was stressful for them when both technologies and the pedagogy were unfamiliar.
Study 3: Unfamiliar Ways of Thinking and Practising in Teacher Education

Unfamiliar ways of thinking and practising in teacher education: experiences by migrant teachers. This study investigated and identified unfamiliar ways of thinking and practising in Swedish teacher education. The focus of the study is on the qualitative results (from interviews, focus groups, and reflective texts). The survey contributed with demographic data as well as qualitative results from open-ended questions. The research question is: Which ways of thinking and practising within Swedish teacher education are perceived as unfamiliar by migrant teachers? The results highlight the cultural embeddedness of Swedish teacher education and demonstrate how migrant students struggle with unfamiliar teaching and learning methods, epistemological understanding, examination practices, and the roles and expectations from society or between teachers and students. In the analysis, a number of themes and categories were identified (see Table 7).

Table 7. Summary of themes and qualitative categories

<table>
<thead>
<tr>
<th>Main Theme</th>
<th>Categories WTP</th>
<th>Categories Unfamiliar WTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Society and education</td>
<td>Understanding society and its impact on education</td>
<td>The societal impact on teacher education&lt;br&gt;Content, knowledge, and competencies specific to teachers’ work in Sweden</td>
</tr>
<tr>
<td>Teachers and students</td>
<td>Expectations of relationships and roles</td>
<td>Being a teacher-student in another country&lt;br&gt;Expectations of the relationships and roles of teacher educators and migrant teachers</td>
</tr>
<tr>
<td>Teaching and learning</td>
<td>Ways of gaining knowledge</td>
<td>Different kinds of knowledge&lt;br&gt;Student-centred, self-directed learning&lt;br&gt;Group-work, social learning</td>
</tr>
<tr>
<td></td>
<td>Course literature</td>
<td>The number of books and articles&lt;br&gt;Critical reflection&lt;br&gt;Theory and practice</td>
</tr>
<tr>
<td>Examination/assessment/feedback</td>
<td></td>
<td>Blended examinations&lt;br&gt;Process vs results&lt;br&gt;Individual reflections&lt;br&gt;Examination in groups&lt;br&gt;Language, time and support</td>
</tr>
<tr>
<td>New learning environments</td>
<td>Use of group environments</td>
<td>Digital, blended environments</td>
</tr>
</tbody>
</table>
The first theme, *society and education*, is related to understanding society’s impact on teacher education. The Swedish system, norms, and values were sometimes contrasting to their previous norms and values, and that took time to process. The teachers said they had to fit their understanding of education into a broader framework to see what was expected from them as student teachers or teachers, including specific knowledge connected to teachers’ work in Sweden. Some talked about transformed teacher identity.

The second theme contains the *expectations of relationships and roles*. Although migrant teachers are educated teachers, they must evaluate what it is to be a student teacher in Swedish teacher education compared to their former teacher education. The unfamiliar role and relation to the teacher educator took time and energy to understand as it appeared to be culturally determined. In addition, the focus and responsibility resting on the individual student and not on the teacher educator was frustrating for some.

The third theme relates to unfamiliar *teaching and learning* methods, epistemological understanding of learning, and different ways of acquiring knowledge, for example, independent, student-centred, self-directed learning, group work, and social learning. There was some criticism directed toward these ways of educating, and more teacher-centred teaching was preferred by some of the migrant teachers. Some participants were critical of the amount and use of course literature compared to their former teacher education. To them, critical reflection and questioning the literature or what the teacher educator taught was unfamiliar. Some migrant teachers said they were forced to adapt to the teacher educators’ conclusions in their prior education; otherwise, it could lead to lower grades. On the contrary, in Sweden, if the student teacher does not write critically in their reflections, they receive a lower grade. The examination practices of blended examinations (oral, technology-based, and group examinations) during the course, feedback methods, and promoting the process and formative assessment (not only the result and summative parts) were also perceived as unfamiliar. In terms of language, they requested more time and support during the examinations and more opportunities to develop the specific teacher work language in Swedish. Additionally, some of the learning environments and group environments (digital and blended) were new and took time to adjust to.
Study 4: The Use of Digital Technologies during the Placement Period

Migrant teachers' experiences with the use of digital technology and media during their placement period in Swedish schools. The placement period is of great importance to migrant teachers. This is a place where they can see teaching and learning in practice, which can be quite a challenge if the new learning environment is unfamiliar. For this reason, it was important to investigate how migrant teachers experienced the use of digital technologies during their placement period and how they related that use to their digital competence. The results of migrant teachers’ experiences with digital technology and media during their placement period using the theoretical concept of “unfamiliar ways of thinking and practising” were captured by a qualitative study, using five focus groups and nine individual interviews, including a total of 34 participants studying at four Swedish teacher education programmes. The research question is: Which unfamiliar ways of thinking and practising, related to the use of digital technology and media, do migrant teachers experience during their placement period?

The main findings in this study indicate that the placement supervisor is of great importance (see Article 4), being a role model for the improvement of migrant teachers’ digital competence. Unfamiliar ways of thinking and practising were found in the area of demands for digital competence in the curricula, as well as in teaching and learning through new pedagogical methods and environments. Their role as teachers in a new country was also unfamiliar. A summary of the results can be seen in Table 8.

Table 8. Summary of qualitative categories

<table>
<thead>
<tr>
<th>WTP - Category</th>
<th>Unfamiliar WTP - Subcategory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Society and digital competence</td>
<td>Curricula and digital competence</td>
</tr>
<tr>
<td>The role of a teacher and the placement supervisor</td>
<td>To be a teacher in a new country</td>
</tr>
<tr>
<td></td>
<td>The placement supervisors use of digital technology and media</td>
</tr>
<tr>
<td>Teaching and learning</td>
<td>New ways of teaching, pedagogical methods</td>
</tr>
<tr>
<td></td>
<td>Use of digital, blended environments</td>
</tr>
<tr>
<td></td>
<td>Use of group environments, settings, rooms</td>
</tr>
</tbody>
</table>
The first main category with subcategories is directed toward society itself and the demands of digital competence. It was unfamiliar to some that digital competence was mandated in curricula, laws, and ordinances. Reasons for the unfamiliarity were lack of infrastructure, money, or restrictions on the use of digital technologies for citizens in their former place of education. In some cases, methods other than digital technologies were preferred, such as writing by hand. This was connected to the teachers’ beliefs, attitudes, and practices.

The second main category relates to the role of the teacher and the placement supervisor. Migrant teachers expressed how frightening a new school environment could be. They reported that some of their questions were answered, and fears diminished during the placement period. Consequently, the importance of the placement supervisor cannot be underestimated. According to the results, they act as a mediator and helpful guide, bridging the old and the new. Furthermore, they function as role models when digital technologies are used in teaching and learning. These results carry important implications for migrant teachers’ digital competence development. The placement supervisor could be of great importance in improving the understanding of digital technologies during their professional development. However, the opposite also occurred when placement supervisors were unmotivated and had little digital competence. For migrant teachers who reported that they were digitally illiterate, this can be a significant problem when attending the Swedish school system.

The third main category deals with ways of thinking and practising concerning teaching and learning. Based on the results, participants experienced unfamiliarity of new ways of teaching and environments. Teachers with a foreign teaching degree discussed what it was like to teach in a Swedish context using digital technologies. However, there was variation in what was unfamiliar. It could be the pedagogical methods in use, digital technologies, or both. Some expressed a positive attitude toward the use of digital technologies. In contrast, the opposite attitude also existed. It is important to note that teachers feel the need to decide for themselves whether they want to integrate new ways of teaching and learning into their teaching beliefs and practices. It is during their placement period that digital competence can be developed in an authentic learning environment. Different teaching and learning methods were unfamiliar, such as working in groups and using group environments. A huge change was from teacher-centred to student-centred teaching. This has an impact on the use of digital technologies as well, since there is a strong focus on social
learning using digitally blended environments. Those teachers expressed that digital technologies are a common part of being a teacher in Sweden. Hence, a common request was more education about how to use digital technologies in relation to teaching and learning.
5. Research Contributions

This chapter presents the cross-study contributions of this thesis and a summary of the results. First, some conclusions regarding professional development. Second, a presentation of a figure that includes digital competence, which can be used as an analytical tool in research or developmental work when working in diverse groups. Third, a theoretical and methodological contribution on how to develop from monocultural to diverse teaching and learning is proposed as a cycle of diversity and inclusion. The last contribution is based upon the theoretical concept of unfamiliar ways of thinking and practising, and further, digital competence.

5.1 Cross-Study Findings and Contributions

This thesis has contributed to a diverse picture of digital competence and unfamiliar ways of thinking and practising experienced by migrant teachers. Migrant teachers in this thesis show digital competence at all proficiency levels (Carretero et al., 2017), role descriptors (Redecker, 2017), and all parts of TPACK (Mishra & Koehler, 2006) (see Studies 1 and 2). A summary of the findings can be seen in Table 9.
### Table 9. A summary of the findings

<table>
<thead>
<tr>
<th>Studies</th>
<th>Research aim</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Study 1</strong></td>
<td>This study aims to investigate how migrant teachers participating in Swedish teacher education estimate their TPACK and analyse their digital competence in relation to the European frameworks DigComp2.0 and DigCompEdu.</td>
<td>This study found that migrant teachers’ digital competence is diverse, scoring from both low to high in TPACK, as well in DigComp 2.1, from a foundation proficiency level to a highly specialised one. Further, their expressed digital competence was found within all role descriptors in DigCompEdu, from newcomer to pioneer.</td>
</tr>
<tr>
<td><strong>Study 2</strong></td>
<td>This study aims to understand migrant teachers’ experience when digital technologies are used in Swedish teacher education, in relation to Illeris’ redefined transformative learning theory. Additionally to develop knowledge about how migrant teachers estimate the use of digital technologies in teacher education programmes, as well as their view of teaching and learning.</td>
<td>This study found that some of the learning when digital technologies were used, reached the core identity and personality layer, and required learning as change, transformative learning. Diversity was found in teaching philosophy, the view of the role as a teacher, the students, how learning occurs, and the relationship between education and society. The use of digital technologies was estimated as higher in Sweden than in their former education, both in teacher education and among the placement supervisors, in comparison with their former teacher education. However, some thought that digital technologies were used more often and more effectively in their former teacher education.</td>
</tr>
<tr>
<td><strong>Study 3</strong></td>
<td>This study aims to explore and identify which unfamiliar ways of thinking and practising migrant teachers with a foreign teaching degree meet while they are taking courses in Swedish teacher education.</td>
<td>This study highlights the cultural embeddedness of Swedish teacher education. The teachers express unfamiliar teaching and learning methods, epistemological understanding, examination practices and the roles and expectations from society or between teachers and students.</td>
</tr>
<tr>
<td><strong>Study 4</strong></td>
<td>This study aims to identify unfamiliar ways of thinking and practising, concerning digital technology and media that migrant teachers meet during their professional development at their school placement.</td>
<td>This study found that the placement supervisor is of great importance for the improvement of the teachers’ digital competence. Unfamiliar was how society demands digital competence in the curriculum, in teaching and learning with new pedagogical methods and environments. Their role as a teacher in a new country was also unfamiliar.</td>
</tr>
</tbody>
</table>
Two overarching research questions in this thesis.

RQ 1. What digital competence do migrant teachers possess?
This question was answered in Studies 1, 2, and 4. In Study 1, migrant teachers self-estimated their TPACK, scoring from low to high. There were $n = 14$ to 43 migrant teachers that thought they had low digital competence, $n = 35$ to 71 of them expressed an uncertainty related to their digital competence. However, those migrant teachers that estimated themselves to be digitally competent were $n = 96$ to 159. The spread was confirmed in the European frameworks. In DigComp 2.1, they were found in all levels, from proficiency to highly specialised, and in DigCompEdu, they were classified as everything from newcomers to pioneers. Some answers to their digital competence levels were found in Study 2. They estimated the use of digital technologies higher in Swedish teacher education and among the placement supervisors in comparison with their prior education. However, some thought that use was more frequent and more effective in their prior education. The newcomers had low digital competence due to a lack of technical infrastructure, war, a gap between rich and poor, location (city or countryside), or prohibitions on some technology in education. Other reasons were that teaching and learning without digital technology was preferred. Related to the use of digital technologies was self-confidence or the lack of it, which some teachers expressed. At higher levels, digital technologies were considered to help, and the teachers expressed a use more directed toward the students, not themselves. In the highest levels, they focused on student learning and enhancing their digital competence, further developing the use of digital technologies in a more advanced way. Teachers at the middle or higher levels used digital technologies to understand their identity as a teacher in a new country. Study 4 shows that even if migrant teachers have digital competence, they still benefit from supervisors who help them with why, how, and what digital technologies can be used in the new environment. This is connected to the teachers’ beliefs, attitudes, and practices when digital technologies are used.
RQ 2. Which unfamiliar ways of thinking and practising do migrant teachers experience in Swedish teacher education?

This research question is answered in Studies 2, 3, and 4. In Study 2, there was great diversity found in teaching philosophy and the view of the teacher role, the students, how learning occurs, and the relationship between education and society. This unfamiliarity implies how digital technologies are used. Some of the learning when digital technologies were used reached the identity and personality layer, which is part of transformative learning. Digital competence and the use of digital technology has a deeper dimension than the technology itself, and there must be room for discussion about how this use impacts the teacher role and epistemological questions. Study 3 highlights the cultural embeddedness of Swedish teacher education, and the teachers expressed that they met unfamiliar teaching and learning methods, examination practices, and roles and expectations. Connected to this is digital competence. Some migrant teachers are familiar with the Swedish context, yet unfamiliar with digital technologies. For others, it may be the opposite. Study 4 also showed that a placement supervisor is a key person in all of this. The supervisor is of great importance for the improvement of the teachers’ digital competence and can be a mediator of the unfamiliar context. The experiences and understandings of migrant teachers when encountering the Swedish educational system should be understood as part of their professional development. Since this is the case, a figure that shows this process is shown in the next section.
5.1.1 Professional Development

A central contribution of this thesis is the process of professional development that includes the interlinking the familiar (old) and the unfamiliar (new) into a new transformed professional identity. Some migrant teachers used digital technologies to process their teaching philosophy (Study 2). This implies that teacher education can benefit from digital technologies in reaching the personality layer of the learner (Illeris, 2014b). It is important to note that results show their diverse needs related to the demands of digital competence detailed in Swedish national curricula (The National Agency for Education: Curriculum for the upper secondary school, 2013; Curriculum for the compulsory school, preschool class and school-age educare, 2018; Curriculum for the Preschool, 2019) and in the Higher Education Ordinance (Ministry of Education and Research, 2014a). Competence, awareness and motivation to use digital technologies differ (Studies 1, 2, and 4). An overview can be seen in Figure 6.

![Figure 6. The process of professional development](image)

The relationships between identities, as student teachers and then as teachers working in society, were seamless in the participants’ former countries. Ways of thinking and practising in the prior teacher education and schools were familiar, with a teaching philosophy that changed with the professional development they were accustomed to. According to Kelchtermans (2009), teachers develop a personal interpretative framework, a lens, during their study and practice, which guides the interpretations of the teaching practices they meet.
This lens is constantly modified through meaningful interaction. Professional development is related to changes in teaching beliefs and practices and is part of continuous development for all teachers, not only migrant teachers, during their entire professional lives (Studies 2 and 4). The literature shows that teachers’ integration of digital competence is related to teaching philosophy and confidence (Sadaf & Johnson, 2017; Lawless & Pellegrino, 2007) and is seen as the final frontier for the integration of digital technology (Ertmer, 2005). This implies that all professional development should aim to target teachers’ views of teaching and to learn more deeply when it comes to progression, while avoiding regressive transformative learning.

Moving to Sweden and attending Swedish education is an unknown environment, and reflections on the pros and cons of the unfamiliarity occur (Studies 3 and 4). All learning is situated, interpreted by learners according to earlier experiences (Illeris, 2014b; 2017). Migrant teachers are supported in their professional development by letting both integrations of external interaction and internal psychological elaboration occur and be processed, both the ordinary accommodation (understanding something in a new way and accepting what is different) and the transformative accommodation (including cognitive, emotional, and social dimensions) (Illeris, 2014a; 2014b; 2014c; 2017). In Swedish education, they reconstruct their beliefs and practices in a new educational context.

Migrant teachers expressed that pre-service training is of utmost importance and gives a deep insight into teaching and learning with digital technologies, the teacher role, etc. (Study 4). This is in line with Taylor’s core elements that guide a transformative practice: individual experience, critical reflection, dialogue/discussion, awareness of context, and authentic relationships (2009). When given the time and opportunity to reflect over the old and new in their education and with the support from the placement supervisor, they merge their insights. The point is not to turn teachers with a foreign teaching degree into Swedish teachers, but to support them and to interlink the former and the Swedish teacher education. This will result in a new teacher identity, in which the teachers feel comfortable in a new teaching and learning environment.
5.1.2 A Tool for Analysis of Student Groups

The findings of this inquiry suggest a great variety in the digital competence of the participants, as well as in what is understood as unfamiliar ways of thinking and practising. This implies that the identification of individual variation is vital for successful teaching and learning. A tool for identification has therefore been developed within this thesis to support teacher educators.

Migrant teachers in this thesis show digital competence at all proficiency levels in the DigComp 2.1 (Carretero et al., 2017), and are found in all role descriptors in DigCompEdu (Redecker, 2017). In addition, they show a high degree of diversity in TPACK (Mishra & Koehler, 2006; Schmidt et al., 2009) (see Study 1). The empirical contributions from all four studies are converged in Figure 6. Educators and others can use this contribution when they discuss, plan, and develop their teaching and learning in diverse groups with digital competence in mind.

The tool is not restricted to a Swedish context; on the contrary, what is defined as unfamiliar or being digitally competent is situated in the educational context, differing over time and depending on the current diverse group. Figure 6 includes four examples of teachers described as cases drawn from the empirical results from all studies. Studies 3 and 4 investigate the unfamiliarity. Studies 1, 2, and 4 are concerned with digital competence. Study 4 merges both themes.

Teachers with a foreign teaching degree are not a homogenous group; there is a huge variation in levels of digital competence and whether they are familiar or unfamiliar with the ways of thinking and practising in the new context. When meeting a new diverse student group that needs digital competence in their profession, it is of interest to investigate what digital competence they already have and whether they are familiar with the current ways of thinking and practising in education to individualise and design the education to be suitable for each student teacher and groups of students.

The four examples of teachers A, B, C, and D are described in cases to synthesize and exemplify the findings in Studies 1–4. In this figure, teachers are placed in the corners; however, in the findings, they exist on all points in the figure.
Student teacher A is an individual with high digital competence, as well as being familiar with ways of thinking and practising within Swedish teacher education. Teacher A scored high when estimating knowledge in TPACK, meaning that this person knows how to integrate technology, pedagogy and content knowledge. Furthermore, teacher A has highly specialised digital competence in DigComp 2.1, with role descriptors of pioneer and leader, DigCompEdu. In comparing the integration of digital technologies in Sweden and the former country, this teacher reports that technology was used more or at the same level in the former country. The teaching and learning are familiar, as are the epistemological understanding, methods, examination practices and assessments.
Student teacher B has high digital competence but finds ways of thinking and practising within Swedish teacher education unfamiliar. This implies that the ways of thinking and practising when using digital technologies are not in line with the ways in which teacher B usually performs. Teacher B must grasp the ways of thinking and practising in Swedish education but benefits from a high level of digital competence. The placement period and the placement supervisor can make the new ways of teaching and blended environments transparent for teacher B. It is not the digital competence that creates problems; rather the opposite, digital competence is a strength and an aid to understanding how teaching and learning work in the new environment.

Student teacher C is familiar with the Swedish ways of thinking and practising, but has low self-estimated digital competence, and reports being almost digitally illiterate. It is easy for teacher C to grasp the ways of thinking and practising and how the pedagogy functions in a Swedish context. This helps with understanding how digital technologies are used in Swedish education. However, it takes a great deal of time and effort to develop digital competence. The placement supervisor has a key role in acting as a model, inspiring and challenging teacher C to use digital technologies and helps with motivation towards developing digital competence.

Student teacher D has a troublesome situation, having expressed low digital competence, and is also unfamiliar with the ways of thinking and practising. Teacher D scored low when estimating knowledge in TPACK, meaning that this person lacks knowledge about how to integrate technology, pedagogy, and content. Teacher D has a foundational digital competence in DigComp, with the role descriptor of a newcomer. It is important to note that the findings show split awareness, as this teacher labels herself as digitally illiterate or having little digital competence but is highly aware of the importance of it in an information society and wants to know more. In contrast, teacher D may also be unaware of the importance of digital competence, finding digital technologies not needed or overrated in education. Teacher D expressed that the placement period and the placement supervisor are of utmost importance in understanding Swedish teaching and learning, including the use of digital technologies.
These examples demonstrate the complexity of the student teacher population and the issues of teacher education. Educators face challenges in teacher education to address the needs of each student teacher. However, by identifying the individuals, it is easier to plan for accurate teaching and learning strategies.

A proposed procedure for applying the tool:

1. Investigate digital competence in relation to the situated educational context. What digital competencies do the student teachers need in their teaching profession? What do the ordinances, curricula, and society demand of them? Be detailed in the specific areas; broad items will give a higher estimated competence level than specific ones, and it is important to have the correct information in order to design the correct education.

2. Investigate unfamiliar ways of thinking and practising. What areas are unfamiliar to the current student teacher group? It can be any number of issues, for example, society, teacher education, individual perspectives on roles, how to be a teacher, or teaching and learning. All of this has a significant impact on performance and can be designed to minimise the thresholds and enhance understanding and learning within the educational context for the individual student teacher.

3. Blend the results and analyse what teaching and learning suit the current student group. It is possible to have a high level of digital competence, but feel lost in the ways of thinking and practising related to the pedagogy. A student teacher can also feel comfortable with the ways of thinking and practising pedagogically, yet not know how to use digital technologies. Another student teacher can feel lost in both the digital world and unfamiliar ways of thinking and practising. Depending on the student cohort, it can differ – one student teacher cohort can all lean in the same direction, type A, B, C, or D. However, the teachers in this thesis covered all the types in Figure 6.
5.1.3 A Process Model – A Cycle of Diversity and Inclusion

Based on the findings in relation to the theories used in this thesis, a process model was developed as an aid for teacher educators to change monocultural teaching to an inclusive practice where diversity is integrated. This steps in the new process model can be seen in Figure 8.

- Step 1: Identify unfamiliar ways of thinking
- Step 2: Reflect over current ways of thinking and practising
- Step 3: Create solutions and strategies
- Step 4: Plan for transformative learning
- Step 5: New teaching and learning strategies
- Step 1 to 5 all over again regularly

**Figure 8.** A process model, a cycle of diversity and inclusion
A proposed procedure for applying the steps in the cycle of diversity and inclusion:

**Step 1: Identify unfamiliar ways of thinking.** First, recognise that the unique traditions and practices, the ways of thinking and practising that influence teaching strategies and activities, are often tacit knowledge in a certain discipline, department, or culture. The current student cohort expresses what they experience as unfamiliar in the new educational context. The use of both quantitative and qualitative methods is important when gathering information. Sometimes anonymity helps begin the flow of information. However, using different types of interviews yields more in-depth knowledge of what is unfamiliar and produces the best results. The unfamiliar ways of thinking and practising can address various levels, for example, the individual level, group level, or institutional level.

**Step 2: Reflect on current ways of thinking and practising (in courses, programmes, and department).** When the unfamiliar ways of thinking and practising are identified, self-reflection about the current education is beneficial, sound and can contribute to the development of quality. In questioning the current monocultural ways of thinking and practising and learning from it, education can improve. Is the foundation of the current ways of thinking and practising based on research and experience? Why and how are the current ways of thinking and practising used, and what are the results? Is there new research that can shed light over teaching and learning? Are there other ways of thinking and practising that are more suitable? What can Swedish education learn from the pedagogical expertise of trained teachers from different countries?

**Step 3: Create practical solutions, strategies that make current ways of thinking and practising more transparent for the students.** Depending upon the migrant teacher's experiences, creating practical solutions is the next step. For example, create open educational resources that explain and make the current teaching and learning more transparent. Open up media centres that can support student teachers, have discussions about learning by forming habits when digital technologies are trained; start mentoring programmes. If it is the digital environment that is unfamiliar, it is not only the use of digital technologies that need attention but also the unfamiliar teaching and learning strategies.
Step 4: Plan for authentic competence development, transformative learning.
Plan competence development in a transformative way, a practice or problem-oriented teaching and learning related to the real world. This is a change- and learner-oriented learning approach that includes individual experiences and critical reflection in dialogue and discussion with others. Further, it is a holistic orientation (cognitive, emotional, and social). Competence development requires (a) engagement, (b) practice/problem, and (c) reflection (Illeris, 2014b; 2017). Doing this will help the student teachers to process the knowledge more deeply, reaching into the preference layer of the identity. Their professional background as teachers helps them process the value of new ways of thinking and practising, including the use of digital technologies, adding them to their teaching and learning strategies.

Step 5: New teaching and learning strategies suitable for the targeted student cohort. Now that there is a body of knowledge about what the student cohort experiences as unfamiliar, it is time to teach with the new changes that step 1-5 have identified.

Step 1 to 5 all over again regularly. It is important to assess regularly since the student group changes. The society also changes, as does education with it. Therefore, Steps 1 to 5 should be repeated on a regular basis.
5.2 Theoretical Contributions

5.2.1 Unfamiliar Ways of Thinking and Practising

As a theoretical and methodological contribution, a new concept, “unfamiliar ways of thinking and practising” was introduced in addition to the theory of ways of thinking and practising (Entwistle, 2003). This is defined in this study as: “Something that is experienced as unknown, or unfamiliar in teaching and learning or in what constitutes being a teacher in a new context”. To be useful in other educational settings and student cohorts, the definition should be “something that is experienced as unknown or unfamiliar in teaching and learning or in what constitutes a profession (for example, a physician, dentist, lawyer, and engineer) in a new context”.

Teachers with a foreign teaching degree are trained as teachers, yet at the same time are student teachers learning ways of thinking and practising in areas tailored for Swedish education. Their prior knowledge and conceptions, how they approached learning and perceived the previous learning environment impacts how they experience the new environment. Furthermore, using this concept in a theoretical and methodological framework makes it possible to identify what is not known by a specific student cohort in a specific teaching and learning environment, and helping teacher educators to adapt their teaching. The teacher educators in Sweden have their ways of thinking and practising that impact what and how they expect teachers with a foreign teaching degree to learn; how they select, present and assess the course material; and how they design the teaching and learning environment. These, often tacit ways of thinking and practising can be of various kinds – cognitive, performative, social – and transcend the disciplinary boundaries. The participants did address the unfamiliarity at different levels, including an example (a) the individual level, individual aspects of the teacher identity, (b) the group level, learning in social environments or working together in teacher groups, (c) society, understanding their teacher role in a broader perspective. Figure 9 gives an overview of possible outcomes when the teacher with a foreign teaching degree interlinks the unfamiliar with prior knowledge.
Teachers with a foreign teaching degree expressed different approaches when experiencing the unfamiliar. Digital competence is used as an example of the unfamiliar, but the same outcomes could be applied to other experiences. Some accepted and adapted the new, the unfamiliar. However, there were three different responses to this: (a) positive, digital competence is something good in an information society; (b) neutral, digital competence is just something a teacher must agree to have; (c) reluctant, digital competence is overrated and unnecessary but is something a teacher has to achieve anyway. Another possible outcome is rejection. Digital competence is not something good and it is overrated in teaching and learning, therefore the old ways of teaching and learning should be used in the future profession. Lastly, there is a transformation that changes the identity of the teacher. Digital competence becomes part of a teacher’s teaching philosophy.
5.2.2 Digital Competence

Digital competence is of importance in an information society, and by using TPACK, DigComp 2.1, and DigCompEdu, it becomes possible to compare self-estimated results within a broader framework. However, a contribution in this thesis is to consider intercultural diversity when TPACK and the other frameworks are used. If digital competence is investigated in diverse groups, a broad set of methods is good to use, otherwise, the results can be misleading. Further, using the redefined transformative learning theory by Illeris provides information on how to target the identified digital competence and unfamiliar ways of thinking and practising in authentic competence development. Digital technologies could be used more directly to target the core identity and the personality layer. Joining these frameworks with the redefined transformative learning can be a fruitful combination for further development and research.

The results show a similar picture to that of former research (Enochsson, 2009; Demoskop, 2016). Teacher education uses digital technologies, yet somehow loses to teach about the learning part connected to it. In all studies, teachers with a migrant background asked for more education on how to use digital technologies in teaching and learning. Since teacher education uses digital technologies, it is interesting to wonder whether the primary focus is about technology, while the learning part is more tacit knowledge. Discussions about how students learn with digital technology must be more transparent and emphasised.

Further, the placement supervisor and the placement period are crucial to enhance digital competence. Research shows that bridging programmes are often too short and general (Bense, 2016), and the teachers with migrant backgrounds must reflect over their past, present, and future work. The placement periods and the opportunity to meet others in the same situation is important. Digital technologies and enhancing digital competence can support this need.

The theoretical and methodological contributions are tools for analysis of student cohorts (see 5.1.2), investigating what they find unfamiliar and familiar, and levels of digital competence. This concept of unfamiliar ways of thinking and practising revealed that it is not only the digital technologies that can be something new but also the teaching and learning connected to it. Moreover, even if some have low digital competence, some are highly motivated and...
others had recent use of digital technologies. This is of importance when professional development is created and planned and has to be considered. Further, some teachers with migrant backgrounds are highly digitally competent, and their experiences can support further development of integrating digital technologies in teacher education, but only when recognised.

The other theoretical and methodological contributions are a cycle of diversity and inclusion (see 5.1.3). Digital competence among student teachers may be identified, and teacher educators have the possibility to reflect over current teaching and learning, and solutions based on digital technologies can be created. When planning for transformative learning, it is important to include digital competence as a goal, teach with the new insights, and use digital technologies.
6. Concluding Discussion

This chapter will discuss and draw some conclusions concerning the overall research questions, the research methods, and implications for Swedish teacher education. Lastly, further research is suggested.

6.1 A New Educational Context

Today, higher education includes a growing number of students from other countries. However, monocultural teaching and learning are still common even though a diverse and inclusive education would be more beneficial for students with a migrant background. This is not just a concern for Sweden, but other countries as well. If a Swedish teacher studies in a bridging programme outside of Sweden, there will be unfamiliar ways of thinking and practising to deal with during the education. To identify these is one way of improving teaching and learning strategies. This is important because, in international studies, cultural bias has been found in coursework assignments and examinations, for example, which penalise international students beyond the differences in ability levels (De Vita, 2002). In addition, Moloney and Saltmarsh make the point that teacher education must be attentive to the diversity of students since it is expected of teachers in schools (2016).

Coming to Sweden and experiencing new learning contexts can be a huge transition for teachers with a migrant background. In addition, digital competence is demanded in the curricula, not only for teachers themselves to use in their teaching, but also to enhance the students’ digital competence in schools as well. Therefore, it was important to investigate what digital competencies teachers with a migrant background have, as well as which unfamiliar ways of thinking and practising they experience in Swedish teacher education. The
application of a mixed methods strategy enabled the investigation of digital competence and unfamiliar ways of thinking and practising from various perspectives. There was a huge variety of digital competence and how digital technologies were used. This was the case for both unfamiliar ways of thinking and practising and digital technologies.

6.2 Cultural Embeddedness, Frameworks, and Research

It was obvious that cultural embeddedness in relation to teaching philosophies had to be considered during the analysis. Individual ways of thinking and practising in teaching originated in teaching beliefs formed in another educational context. When respondents answered broad questions, it was based on their teaching philosophies, which varied significantly from an epistemological point of view (Käck et al., 2018b). The “yes” answer to the question of whether a teacher knows how to teach with digital technologies had very different explanations. It may have been the ability to present in various ways, from a teacher-centred view, or it included the competence to teach using student-centred collaborative strategies. Since the quantitative parts did not provide answers about the embedded backgrounds, the qualitative methods helped to shed light on this issue. It was possible to identify a teacher’s pedagogical background via interviews and other sources (Käck et al., 2014; 2018a). Those diverse responses with a foundation in teaching philosophy are worth considering in professional development (Ertmer & Ottenbreit-Leftwich, 2010; Ertmer et al., 2012; Sadaf & Johnson, 2017).

Connected to this issue were difficulties within the frameworks and taxonomies since they and use of them can be culturally embedded. Without the right knowledge, there is a risk of underestimating performances during assessment and examinations. Furthermore, a discussion could be initiated concerning the need for an intercultural TPACK. When using this well-thought-of model for analysing and discussing digital competence, it is important to consider the model in a holistic way and how different ways of thinking and practising, based on the teaching philosophy, impact (1) the pedagogy (P), (2) the content (C), and (3) the use of technologies (T).
In general, frameworks and models can be good tools and help when analysing teachers’ knowledge, but there are limitations, and, as with most things, they should be used carefully. There is a difference between the level at which an individual teacher is placed and what the educational context allows this teacher to do, write, express, or act on. Coming to a new educational context, the unfamiliarity and the requirements must be discussed and highlighted for student teacher groups. The bridging programmes in various countries may help the student teachers with the unfamiliarity, but only if this is recognised.

6.3 Implications for Swedish Teacher Education

In this thesis, it was possible to identify a diversity both in the unfamiliar use of digital technologies and unfamiliar ways of thinking and practising, which need to be addressed in Swedish teacher education. When appropriate, change monocultural to more diverse and inclusive teaching and learning. Investigating teachers with a foreign teaching degree can lead to more in-depth information on how Swedish teacher education approaches digital competence, and what can be done further to support them. This has an impact on assessments and examinations, for equality and inclusion.

Another finding is the span between being digitally illiterate and being a teacher in digital technologies; differentiation must be considered to meet migrant teachers’ (and all student teachers’) needs in further development. The importance of awareness with intercultural experiences in mind, when designing teaching and learning, cannot be underestimated. This is also true during the placement period. There are both unfamiliar ways of thinking and practising related to pedagogy and in the use of digital technology and media. Moreover, it seems that the placement supervisors have a central role in the migrant teacher's development of digital competence. The importance of placement supervisors that are digitally competent must be emphasised for both the student teachers’ future work, as well as future students in schools. In addition to that, findings show that the huge span in digital competence has to be addressed with a more individualised competence development within this area. The important input teachers with migrant backgrounds bring into
Swedish teacher education should be taken into account. Together, teacher educators and student teachers’ experiences can develop teacher education into a more inclusive learning environment and develop digital competence (Käck, 2012).

While there is extensive empirical material that forms the foundation for this thesis, the findings should be treated carefully. It is important to avoid labelling, creating a distance from “otherness”. In addition, the voices and experiences from teachers with a migrant background must be respected. They have the same rights as every other student group to express themselves and be heard. Teacher education can develop education with diverse groups in mind. So should the plan for genuine competence development, which is the goal for transformative learning. This also has implications in a broader global sense, when working together by crossing national borders. Digital technologies are the carrier, which can make this possible.

Developmental areas where digital technologies could be an aid for teachers when they interlink and reflect over the past, present, and future could be:

a) Society’s impact on education.
b) The teacher role in relation to society and education.
c) Expectations of relationships and roles.
d) Content, knowledge, and competencies specific to teachers’ work in Sweden.
e) Epistemological questions, social learning, examination practices, and blended learning.

Knowledge of what is unfamiliar can be made more transparent by using digital technologies. At the same time, digital competence can be enhanced. Digital simulations and digital portfolios can be developed specifically for migrant teachers, following them during their study time, with assignments that are constructed in a way that identity issues are dealt with and where online mentors can follow the migrant teachers within and after the bridging programme has taken place. Moreover, groups of teachers with migrant backgrounds can meet regularly using a videoconference system to discuss their specific experiences and help each other. There are many options to develop digital support. Further development, for both teacher educators and the student cohort, may be the result.
The implication is to use tools and models in, for example, course planning. When identified, there is also the possibility to improve sensitivity to diverse student cohorts and enhance equality for students. Generalisation is not the goal of this thesis; rather, it is an encouragement for teacher educators to identify the situatedness of teacher education with respect to various periods and pedagogies that are visible in the national education requirements. These findings and the way of identifying the unfamiliarity in teaching and practising is also applicable in other countries.
6.4 Future Research

It is important to further validate the tools and models that have been developed as a result of contributions in this thesis. Their application must be tested, and eventually, further modifications are necessary to improve them. Another concern is to dig deeper into each categorisation in the articles. Each theme or categorisation would benefit from further research. For example, there were quite a lot of participants that complained about the way in which course literature was used in Swedish teacher education compared with their prior teacher education. According to the participants, there is a risk for more superficial learning when so much literature must be read. Are we forcing student teachers to read more at a surface level rather than concentrating on deep learning strategies? On the other hand, to search within literature and get the information wanted is also a strategy. Further research within this area is of concern.

Another possible area of investigation is whether the unfamiliar blended examination practices impact teachers with migrant backgrounds negatively, for example, with lower grades, compared to Swedish student teachers. Furthermore, the placement supervisor was an extremely important person for the participants. More research concerning the relationship between the supervisor's use of digital technologies and the student teacher would be interesting, because this is the place where the teacher with a migrant background becomes familiar with ways of thinking and practising as a professional, translating their teaching philosophy to a Swedish context. Another issue is gender. There was some data in this thesis, however, gender is such an important area that it deserves research focusing more deeply on this subject than the data from this investigation.

There are other bridging programmes supported by the Swedish government, including for physicians, dentists, nurses, pharmacists, physiotherapists, psychologists, economists, system scientists, biomedical analysts, social workers, architects, lawyers, and engineers. Digital competence is also important in other bridging programmes. The present study’s results are related to unfamiliar ways of thinking and practising experienced by these other professionals, and can also be a fruitful research area, adding knowledge about professional development in general and also the relationship between professional development and digital competence.
Some individuals working with the other bridging programmes have mentioned that they want to see more research concerning education, since this is lacking. Some said that it had been a learning experience and adjustment for them at the Swedish institutions. This is because professionals from other countries have other expectations of teaching and learning than Swedish university teachers are accustomed to. For example, group work and feedback from peers, not being told the right answer by the university teacher, the university teacher wanting the participants to critically reflect and come up with an answer in the group, etc. Other research areas were suggested by their practice, for example, the roles of the professional and the patient. After private communication that took place in May and June 2019, many similarities were revealed between bridging programmes and unfamiliar ways of thinking and practising. Further research would be beneficial.
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Appendices

Appendix A: Survey

Appendix B: TPACK Items

Appendix C: Informed consent for interviews
Appendix A: Survey

To those who are an active student within the ULV-Project!

Thank you for your participation in the survey named

"Teaching philosophy and digital competence – designing for teaching and learning".

You can fill in the survey via your computer or a mobile device, i.e. a smartphone.

Read through the information below and fill in the web survey.

From the information letter:

Annika Käck is my name and I am a PhD Student at the Department of Computer and Systems Sciences at Stockholm University. At this time I am a university educator, but have experience as a special education pedagogue, high school teacher, teacher for adult learning, educated ULV-teacher, mentor for teaching students, professor of education and other areas at the university level, as well as experience working in research and development projects having to do with pedagogy and didactics which are often connected to digital competence. I have worked for ten years within teacher education and the university.

"Teaching philosophy and digital competence – designing for teaching and learning" is my thesis project which aims to increase understanding for how a pedagogic perspective and usage of information technology in education are connected, as well as give an international perspective on teacher education.

Within the ULV-Project, there is a selection of teachers from many different areas in the world which provides a unique opportunity to research how you perceive your teaching role, your students and how they learn. In addition, it is important to research which knowledge is perceived as unfamiliar or problematic, whether it has to do with the university education you yourself are undergoing or your viewpoint on teaching and learning as it pertains to the Swedish school. The purpose of which is to gain perspective on how we can design an education which is tailored to many at Stockholm University related to your own experiences as a teachers. Ideally, I would like as many as possible to participate in order to include as many areas and teaching traditions possible.

Your participation in the survey is not mandatory and you can choose to stop your participation whenever you wish. All the information collected is completely anonymous, and you will not be named or in any other way be identified personally. The only information that will be given is whether you are a male or female and from which country and continent you are. Your decision whether or not to participate does not influence the grade/score you receive at Stockholm University.

The material will be used for the described thesis project at Stockholm University. The thesis project will be presented at the Department of Computer and Systems Sciences, Stockholm University.

Further information will be provided by the following.

Annika Käck

Educational developer and PhD student

Department of Computer and Systems Sciences

Stockholm University, DSV, Forum 100, 164 40 Kista

08-162043 annika.kack@su.se

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The survey is comprised of four parts. Click on the icon "Next page" to go further.

Part A: Background information
Part B: Teaching philosophy
Part C: Troublesome, unfamiliar knowledge
Part D: Digital competence

1. Gender
   - Female
   - Male

2. Age
   - 18-24
   - 25-31
   - 32-38
   - 39-45
   - 45+

3. Continent or continents in which you attended teacher education (not Sweden)
   - Africa
   - Asia
   - Europe
   - North America
   - South America
   - Pacific
   - Australia

4. Country/countries in which you attended teacher education (not Sweden)

5. Academic Course Track/Specialization in your teacher education (not Sweden).
   - Preschool
   - Middle School
   - Youth Recreation Center
   - Special Education
   - High School
   - Other, specify
   - Primary School
   - Secondary School

6. Subject/Specialization. You may tick more than one box.
   - Preschool
   - Language
   - Nature Science
   - Youth Recreation Center
   - Social Science
   - Art/Music/Aesthetic subjects
   - Special Education
   - Mathematics
   - Physical Training
   - Other

7. Number of years in Teacher Education
   - 1-2
   - 3-4
   - 5+
   - Graduate studies

8. Amount of years in which you have worked as a teacher in the country you studied to be a teacher
   - 0
   - 1-2
   - 3-4
   - 5+

9. Amount of years where you worked as a teacher in Sweden
   - 0
   - 1-2
   - 3-4
   - 5+
10. Part B. Teaching philosophy

By teaching philosophy we mean which viewpoint you as a teacher have about:

# your role as a teacher
# the students
# which skills are important + how students learn
# which role education has in society

<table>
<thead>
<tr>
<th>Students shall be active, decide what and how they shall learn</th>
<th>Strongly Agree</th>
<th>Neither agree nor disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education shall be directed by the teacher</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I see myself as an intermediary of facts and information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students learn the most when schools emphasize hard work, respect and discipline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am mainly a mentor who helps the students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students are passive and must be controlled so that learning can occur</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching shall be adapted individually to each student</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am mainly a subject expert who shall give the students subject competence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The students need to be motivated to want to learn something</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I must train the students' social skills</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The individual school and society outside shall have a close working relationship</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education shall be the same in all schools and not vary between different teachers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students are responsible and independent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I shall train the students to be independent individuals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching shall relate to life outside of school</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students learn most when they work together</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching shall build on students' earlier experiences</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I must create an encouraging atmosphere which promotes the students' development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching shall be aligned with the students' understanding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I shall take care of and cherish the students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The focus shall be on the teaching process and not the end product</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information technology must be integrated in teaching</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would rather work in a team than alone</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

https://sunet.artologik.net/su/admin/
11. Which teaching method do you think is best so that a student shall learn something? Choose a favorite method!

12. Part C. Troublesome, unfamiliar knowledge

It is your own experience of what you feel is unfamiliar which is important. Questions are open-ended and there is no right or wrong answer as you interpret the questions below!

-Which unfamiliar ways of thinking and practicing have you met during your ULV-studies at the university as well as in practice/work in the Swedish preschool/school?

-Has something been problematic or experienced as alien/different? (Compare with your earlier education and work as a teacher.)

13. Is IT used in a different way in Swedish education compared with the country in which you studied your teacher education? Motivate your answer.

14. What does one need to change in the Swedish school to get better study results? What reflections do you have?
15. Part D. Digital competence and IT (Information Technology)
Digital competence and IT (information technology) is a broad concept and can mean many different things. The questions below are based on information technology and pedagogy. (With information technology we mean all that has to do with the digital world, i.e. computers, tablets, mobile phones, programs, apps, the web, digital teaching aids, digital teaching environments, etc.)

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Neither Agree or Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I know how to solve my own technical problems.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I can learn technology easily.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I keep up with important new technologies.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I frequently play around the technology.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I know about a lot of different technologies.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I have the technical skills I need to use technology.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I know about technologies that I can use for understanding and doing my subject/specializations.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I can choose technologies that enhance the teaching approaches for a lesson.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I can choose technologies that enhance students’ learning for a lesson.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>My teacher education program has caused me to think more deeply about how technology could influence the teaching approaches I use in my classroom.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I am thinking critically about how to use technology in my classroom.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I can adapt the use of the technologies that I am learning about to different teaching activities.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I can provide leadership in helping others to coordinate the use of content, technologies and teaching approaches at my school and/or district.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I can choose technologies that enhance the content for a lesson.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I can teach lessons that appropriately combine my subject/specializations, technologies and teaching approaches.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I am able to assess when, what, why and how IT can be used for teaching and learning.</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>I read about research and development connected to IT and learning.</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
16. Usage of IT in teacher education

Click on the alternative which you most identify with

<table>
<thead>
<tr>
<th>25% or less</th>
<th>26%</th>
<th>51%</th>
<th>76%-100%</th>
</tr>
</thead>
</table>

Estimate what percentage of your university teachers in the country where you studied your teacher education (not Sweden) who have combined teaching content, IT and teaching strategies.

Estimate what percentage of your university teachers in ULV-education who have combined teaching content, IT and teaching strategies.

Estimate what percentage of those teachers you met during your VFU/internship in the country where you studied your teacher education (not Sweden), who have combined teaching content, IT and teaching strategies in their teaching with students.

Estimate what percentage of the teachers you met in your VFU/internship here in Sweden, who have combined teaching content, IT and teaching strategies in their teaching with students.

17. The most important thing about using IT in education is that:

Click on the alternative with which you most identify

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Neither agree nor disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

students shall be able to collect and organize information

students shall be able to create new skills through analyzing information

students shall be able to receive administrative information (schedule, lecture plans, attendance, etc.)

students shall be able to use digital media to produce and create

students shall be able to critically review and evaluate information

students shall be able to communicate and collaborate

students shall recognize risks and possibilities with the net

students shall be able to apply what they have learned

students shall be able to do digital presentations

students shall be media savvy

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18. Would you like to be interviewed? If yes, send an email to Annika Käck annika.kack@su.se

- Yes
- No
To those who are an active student within the ULV-Project!

Thank you for your participation in the survey named

“Teaching philosophy and digital competence – designing for teaching and learning”.

You can fill in the survey via your computer or a mobile device, i.e. a smartphone.

Read through the information below and fill in the web survey.
Appendix B Items in TPACK

TPACK Items from Schmidt et al. (2009) questionnaire

<table>
<thead>
<tr>
<th>Item</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>TK Item 1</td>
<td>I know how to solve my own technical problems.</td>
</tr>
<tr>
<td>TK Item 2</td>
<td>I can learn technology easily.</td>
</tr>
<tr>
<td>TK Item 3</td>
<td>I keep up with important new technologies.</td>
</tr>
<tr>
<td>TK Item 4</td>
<td>I frequently play around the technology.</td>
</tr>
<tr>
<td>TK Item 5</td>
<td>I know about a lot of different technologies.</td>
</tr>
<tr>
<td>TK Item 6</td>
<td>I have the technical skills I need to use technology.</td>
</tr>
<tr>
<td>TCK Item 30-33</td>
<td>I know about technologies that I can use for understanding and doing my subject/specializations.</td>
</tr>
<tr>
<td>TPK Item 34</td>
<td>I can choose technologies that enhance the teaching approaches for a lesson.</td>
</tr>
<tr>
<td>TPK Item 35</td>
<td>I can choose technologies that enhance students' learning for a lesson.</td>
</tr>
<tr>
<td>TPK Item 36</td>
<td>My teacher education program has caused me to think more deeply about how technology could influence the teaching approaches I use in my classroom.</td>
</tr>
<tr>
<td>TPK Item 37</td>
<td>I am thinking critically about how to use technology in my classroom.</td>
</tr>
<tr>
<td>TPK Item 38</td>
<td>I can adapt the use of the technologies that I am learning about to different teaching activities.</td>
</tr>
<tr>
<td>TPK Item 39</td>
<td>I can select technologies to use in my classroom that enhance what I teach, how I teach and what students learn.</td>
</tr>
<tr>
<td>TPK Item 41</td>
<td>I can provide leadership in helping others to coordinate the use of content, technologies and teaching approaches at my school and/or district.</td>
</tr>
<tr>
<td>TPK Item 42</td>
<td>I can choose technologies that enhance the content for a lesson.</td>
</tr>
<tr>
<td>TPACK Item 43-46</td>
<td>I can teach lessons that appropriately combine my subject/specializations, technologies and teaching approaches.</td>
</tr>
<tr>
<td>Models of TPACK 55 a</td>
<td>Estimate what percentage of your university teachers, in the country where you studied your teacher education (not Sweden), who have combined teaching content, IT and teaching strategies.</td>
</tr>
<tr>
<td>Models of TPACK 55 b</td>
<td>Estimate what percentage of your university teachers, in the Swedish teacher education, who have combined teaching content, IT and teaching strategies.</td>
</tr>
<tr>
<td>Models of TPACK 57 a</td>
<td>Estimate what percentage of those teachers you met during your practice/internship, in the country where you studied your teacher education (not Sweden), who have combined teaching content, IT and teaching strategies in their teaching with students.</td>
</tr>
<tr>
<td>Models of TPACK 57 b</td>
<td>Estimate what percentage of those teachers you met during your practice/internship, here in Sweden, who have combined teaching content, IT and teaching strategies in their teaching with students.</td>
</tr>
</tbody>
</table>
Appendix C: Informed consent for interviews

Annika Käck,
Educational developer
Department of Computer and Systems Sciences

Informed consent

This study aims to increase understanding about the relationship between pedagogy and Information technology (IT), as well as intercultural teacher education.

Participation is voluntary and you can stop your participation whenever you wish. Your eventual consent allows me to use the information you provide during an interview. The material will be used for my thesis at Stockholm University. All collected information is treated completely anonymously and you as a person will not be named or otherwise identified. Your decision to participate or not will not affect your grade.

The interview conducted may be used in the research study.

Date   Signature

Printed name

Additional information may be obtained from Annika Käck, annika.kack@su.se
Supervisors are Uno Fors, uno@dsv.su.se and Sirkku Männikkö Barbutiu, sirkku@dsv.su.se
Department of Computer and Systems Sciences, DSV