

## **Diversity in coherence: A description of three programs**

This is the accepted version, accepted for publication in Journal of Teacher Education see

<https://doi.org/10.1177/0022487117737305> for the published version

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Research reported in this paper from the “Coherence and Assignment Practices in Teacher Education” study is funded by a grant from the Norwegian Research Council (Grant #212289).

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### **Diversity in Coherence: Strengths and Opportunities of Three Programs**

Although teacher education is critical to developing a quality teaching force, researchers have expressed concerns regarding program quality in the United States (US; e.g., Cochran-Smith, Piazza, & Power, 2013) and internationally (e.g., Bamfield, 2014; Moon, 2016). Teacher education programs are plagued by fragmentation within program coursework and between theory and practice. Particularly concerning is the persistent challenge of connecting teacher education coursework to the work teacher candidates will be doing in classrooms (Hammerness, 2013; Hoban, 2005; Weston & Henderson, 2015). Bain and Moje (2012) referred to the various actors in teacher education as “disconnected continents,” (p.62) underlining the lack of connection between colleges of arts and science, schools of education, and K-13 classrooms. Globally, researchers continue to underscore the importance of increasing coherence in teacher education (Darling-Hammond et al., 2017; Bamfield, 2014; Conway & Munthe, 2015; Hansén, Eklund, & Sjöberg, 2015; Moon, 2016). Even in countries known for strong teacher education programs, policymakers and educators are focusing upon strengthening the links between theory and practice (Darling-Hammond et al., 2017; Hansén et al., 2015).

Coherent educational programs positively impact learners’ outcomes at elementary (e.g., Timperley, 2005), secondary (e.g., Fortus & Krajcik, 2012), and higher educational level (e.g., McQuillan, Welch, & Barnatt, 2012). Uninterrupted learning and the transfer of concepts from one subject to another enhance secondary school learners’ skills to transfer the learning outcomes to other contexts (Geraedts, Boersma, & Eijkelhof, 2006). In teacher education, this idea may underscore the need for concepts learned during pedagogy courses to be linked to methods courses and vice versa. Strong linkages between these courses could enhance transfer of these concepts to practice.

In Norway, Smeby and Heggen (2014) studied preparation for teachers, nurses, and social workers, and found that these students' perception of coherence between their field placement and their coursework had a significant impact on their acquisition of theoretical knowledge and skills at the end of their education programs. Teacher candidates assessed the coherence in their educational program lower than the nurses and social workers. Smeby and Heggen (2014) speculated that connections between courses and between teaching, school placement, and future work are too loose in teacher education. In the US, Bain and Moje (2012) claimed that a lack of coherence in teacher education may result in fragmented knowledge and skills. In their study of 28 teacher education programs in New York City, Boyd, Grossman, Lankford, Loeb, and Wyckoff (2009) emphasized the necessity of linkages between campus courses and candidates' work after graduation. They found that candidates who had opportunities to practice what they would be doing in their first year after graduation were more effective in enhancing their pupils' achievement gains during their first year in teaching.

Building upon this work, scholars in teacher education have argued that programs need tight coherence and integration among courses as well as between courses and field placement (e.g., Anderson & Stillman, 2013; Darling-Hammond, 2014; Hoban, 2005; Samaras, Frank, Williams, Christopher, & Rodick, 2016). In strong teacher education programs, courses intersect and build upon each other with the presented ideas and knowledge being interwoven with teacher candidates' work during their field placement.

Although strong teacher education programs vary in their structural and conceptual formats (Kennedy, 1991; Scannell, 2002), quality teacher education needs a coherent conceptual orientation connecting its elements (e.g., subject matter, pedagogy, practice; Hansén et al., 2015) to help candidates construct an integrated notion of teaching and education (Bain & Moje, 2012; Kennedy, 2006). Yet, empirical studies focusing upon

candidates' perceptions of program coherence are limited (Grossman, Hammerness, McDonald, & Ronfeldt, 2008). When investigating coherence, the candidates' perceptions must be included (e.g., Broad, Stewart Rose, Lopez, & Baxan, 2013; Hatlevik, 2014). Students' experience and learning often differ dramatically from what teachers plan and intend not only from their curriculum design but also from the teachers' perspectives about what happened in the classrooms. For this reason, scholars have argued that examining students' perspectives on their learning is critical to help address the differences across these arenas (Clift & Brady, 2005) and to account for the distinctions between the "intended" and the "enacted" or "received" curriculum (Apple, 1971; Goodlad, 1984). Drawing on this substantial research, we argue that surveying candidates allows us to view specific learning experiences and experiences across a program through their eyes. As Massy (2003) argued, "Departments should view learning through the lens of the student's entire educational experience" (p. 3). Our analysis delves into coherence from the candidates' perspective. We define *coherence* within teacher education programs as a process (Bateman, Taylor, Janik, & Logan, 2008) in which all courses within a program are aligned in terms of content and build sequentially on one another based on a clear vision of good teaching. We particularly investigate the two research questions:

To what extent do candidates perceive their teacher education program as coherent?

To what extent do candidates' perceptions of program coherence differ across three programs?

By investigating candidates' perceptions of program coherence, we add an important perspective to the existing knowledge base on program coherence in teacher education programs. We present findings from three programs, allowing for comparative analyses of how program coherence is not only perceived but also shaped within various programs.

## Coherence

Almost thirty years ago, many programs in the US and Europe implemented reforms particularly focused upon building coherence (Darling-Hammond, Hammerness, Grossman, Rust, & Shulman, 2005; Buchmann & Floden, 1991; Clarà, 2015; Holmes Group, 1986; Smeby & Heggen, 2014; Tatto, 1996). Nevertheless, obtaining a mutual understanding of the concept of coherence is not a simple task. Buchmann and Floden (1991) described coherence in teacher education as connectedness, suggesting “consistency and accord among elements” (p. 67) while warning that an “overly coherent” program might leave little room for candidates to incorporate or connect new experiences and complex or contrasting ideas. They argued that “desirable program coherence is found where students can build connections among various areas of knowledge and skill, but where loose ends remain, inviting a reweaving of beliefs and ties to the unknown” (p. 71). Thus, educators should refrain from exposing their candidates to unconnected ideas and practices (Darling-Hammond et al., 2005; Buchmann & Floden, 1991) while leaving room for exploration as candidates, through reflection, will create coherence within initially incoherent information (Clarà, 2015). Similarly, Tatto (1996) stressed the importance of ensuring that teacher educators retain autonomy within a well-designed coherent program.

In addition to arguments for maintaining autonomy, scholars have stated that a shared vision among those working with candidates at the university, schools, and across these contexts is underlying and essential to coherence (Grossman et al., 2008; Darling-Hammond, 2014; Fullan & Quinn, 2015; Tatto, 1996). Course and clinical experiences should reflect this shared vision, and the educational program should be organized accordingly. Based on their study of eight university departments in Quebec, Bateman et al. (2008) found coherence to be a dynamic and socially constructed process. Similarly, Gagné, Dumont, Brunet, and Boucher (2013) observed that coherence in their program was enhanced when educators started to

think collectively about what their candidates would need, instead of focusing on their personal wishes. Presenting a clear and shared vision to candidates can improve their sense of program coherence. Nevertheless, coherence should not be perceived as an end goal, but rather as a process (Honig & Hatch, 2004; Nixon, 1991), and various authors have put forward their own distinctions between types of coherence (cf. Fortus & Krajcik, 2012; Muller, 2009; Smeby & Heggen, 2014).

Describing one teacher education program's effort to become more coherent over four years, Hammerness (2006) drew upon Feiman-Nemser's (1990) distinction between *conceptual* and *structural* coherence, acknowledging that these two often blur. Conceptual coherence refers to the connections, or the lack thereof, of the content within a program. It reflects the deliberate efforts to connect foundational ideas with classroom practice. Through conceptual coherence, candidates will construct meaningful connections between key program ideas (Ummels, Kamp, Kroon, & Boersma, 2015).

Structural coherence pertains to the construction of an integrated experience for candidates. It focuses on the structure of the program, its organization, and how the program's parts are structurally connected, for example, whether courses build sequentially on one another. To achieve structural coherence, courses and field placements are aligned around a vision underlying the educational program (i.e., a vision of learning and teaching in the case of teacher education programs; Hammerness, 2006). This type of coherence closely relates to what Smeby and Heggen (2014) called "program coherence" (p.73), referring to the relationship between the elements in the curriculum as well as the connection between course-based experiences and field placement experiences. Although we acknowledge the relevance of candidates' prior knowledge and previous experiences (what Muller [2009, p216], called "contextual coherence") as well as the importance of a longitudinal perspective, examining

the impact of teacher education beyond the educational years, we focus on coherence during teacher preparation and particularly on campus.

As mentioned, we define *program coherence* as a process (Bateman et al., 2008) in which all courses within a teacher education program are aligned in terms of content (cf. conceptual coherence) and build sequentially on one another based on a clear vision of good teaching (cf. structural coherence). This definition focuses on the degree to which university courses are coherent within and across courses (e.g., reflecting consistent views about teaching and learning). We assert that university courses and field experiences should be coherent with, for example, candidates trying out, during their fieldwork, teaching strategies they learned about at the university.

### **Why Focus on Coherence?**

When candidates have aligned experiences, they can build upon their existing knowledge base and integrate new knowledge and interpretations (cf. Clarà, 2015). Research has shown that coherence is relevant for candidates to make sense of complex ideas and demands (e.g., Hatlevik, 2014; O'Neill, Donnelly, & Fitzmaurice, 2014; Honig & Hatch, 2004). Rogers (2011), for example, found that lack of coherence in the program results in candidates' uncertainty regarding what kind of teacher they are expected to become. Candidates must experience coherence in their program if they are to overcome difficulties in integrating theory and practice (e.g., Weston & Henderson, 2015), experience their program as a whole instead of as "disconnected continents" (Bain & Moje, 2012, p. 62), and find their professional identity (Rogers, 2011).

To ensure candidates can benefit from the coherence within a program and perceive the existing links, the program should clearly communicate, to faculty and students, its purpose and how its sequence and structure contributes to that vision of teaching (O'Neill et al., 2014). Yet, coherence is not only achieved through a consistent curriculum or careful

correspondence across various contexts (e.g., between the university and the practice school). Rather, it also emerges from candidates' understanding of the content, their trust in being able to reach the set goals, and their perception that the content is both meaningful and relevant for their future professional work (Hatlevik, 2014). It is therefore of utmost importance for teacher educators to understand their candidates' experiences regarding program coherence. We therefore believe it is important to include candidates' perceptions in research on educational programs and particularly when focusing on the coherence of educational programs (cf. Canrinus, Bergem, Klette, & Hammerness, 2017; Grossman et al., 2008; Rogers, 2011).

### **Taking a Candidate's Perspective**

Clift and Brady (2005) concluded that "the impact [on candidates] is often different from what instructors or teaching supervisors may imagine or wish" (p. 331). Raudenbush (2008) argued that, before one can investigate any effect of any instructional change, one should ensure that these changes have reached the students. Students are generally perceived as a reliable source of information (Maulana, Helms-Lorenz, & Van de Grift, 2015; Raudenbush, 2008) compared to other actors (e.g., teacher educators or program designers) when it comes to self-report data. Maulana et al. (2015) underscored how pupils have experience with their teacher throughout the year, thus going beyond the limited observations of external observers. They furthermore highlighted that pupils' perceptions of their learning environment impact their learning behaviors. Other studies in secondary education showed that pupils' perceptions of their teachers' behaviors are often more predictive of the pupils' outcomes than external observations (e.g., Seidel & Shavelson, 2007). In higher education, students' perceptions and evaluations of the offered education have become highly valued, and student evaluations are commonplace nowadays. Students' perceptions of how they are

being taught impact both their approach to the learning experience and their academic results (e.g., Prosser, Ramsden, Trigwell, & Martin, 2003; Prosser, Trigwell, Hazel, & Waterhouse, 2000).

Researchers have identified candidates' self-assessment and sense of preparedness as important means to evaluate the quality of teacher education programs (Darling-Hammond, 2006a; Kennedy, 1991). Yet, research including candidates' perceptions when investigating the coherence of teacher education programs is limited. Some small-scale, qualitative studies exist (cf. Hammerness, 2006), but large-scale studies using quantitative data are limited. In one study, Grossman et al. (2008) drew upon data from the Teacher Pathways Project in New York City, but that study focused on only the coherence between field placement and courses. Thus, we argue that candidates are a valuable and necessary source for both teacher educators and researchers to understand the extent to which teacher education programs are coherent. To facilitate candidates' individual learning processes, a teacher educator should be knowledgeable of his or her students' perceptions of the learning environment. In this regard, students' perceptions of coherence make important contributions to the construction of their knowledge base (Clarà, 2015; Honig & Hatch, 2004).

### **Method**

We draw on data from a larger international comparative study of teacher education programs, the Coherence and Assignments in Teacher Education (CATE) study, investigating the vision, coherence, and opportunities to enact practice within university-based teacher education programs (e.g., secondary teacher training) across different settings. Within the larger study, both qualitative and quantitative data have been collected from teacher educators, teacher candidates, and program directors.<sup>1</sup> Here, we present findings from the

survey data, focusing on candidates' perceptions of coherence within their teacher education programs.

### **Program Descriptions**

Our data were collected in university-based teacher education programs (secondary level) in Norway, California, and Finland. We selected these programs as they shared enough similarities (e.g., course composition and requirements, student acceptance rate, and reform efforts) but also differed in ways (e.g., size, organization of the field placement, contextual background) that made comparison interesting. Before discussing similarities and differences across the three programs, we present each of the three programs, including a summarizing table (Table 1).

**University 1.** This university (Uni1) in Norway has a medium-sized (160 enrolled candidates), one-year, university-based, post-bachelor teacher education program<sup>2</sup> which initiated major reform efforts in 2012, focusing on improving program coherence (Engelien, Eriksen, & Jakhelln, 2015). The acceptance rate is 20.5% overall, but the rate varies by subject, with lower acceptance rates in mathematics and science subjects. Accepted applicants are selected based on their grades. Candidates have three to four blocks of internships, during which they are in the school the whole period. In total, they have 480 hours of practice. The program organizes the field placement with collaborating schools, some of which have the status of university schools,<sup>3</sup> yet they do not select the mentors within the schools. Most (91%) of the candidates are Norwegians aged 25 to 30 years.

**University 2.** This university (Uni2) in California (US) has a small (72 enrolled candidates), one-year, university-based, post-bachelor program which has been undergoing reform for program coherence the longest. The process started in 1999, and the major changes were completed in 2002 (Hammerness, 2006). Approximately 20% to 40% of applicants are accepted, depending on their subject. These applicants are selected based on their grades, an

interview, a standardized entrance exam, and a recommendation letter together with an essay/narrative. During the program, candidates alternate between campus and their placement school during the same day (i.e., they have concurrent field placement). In total, candidates spend 780 hours in school. The program selects collaborating schools and mentors within schools based on these mentors' experience and teaching quality. The average age of the candidates is 27.

**University 3.** This university (Uni3) in Finland has a large (333 enrolled candidates) university-based teacher education program, combining an integrated five-year program and a one-year post-bachelor program. Finnish teacher education underwent large structural changes and redesign in the 1970s. These changes focused on creating an academic and research-oriented program and implied that all teachers would need a master's degree. From 1979 (Sahlberg, 2010), all teacher preparation programs were moved to the university. No major changes have recently been implemented (Jakku-Sihvonen & Niemi, 2006). Like Uni1, the acceptance rate depends on the subject with lower acceptance rates for mathematics and science subjects. The 20%–40% of accepted applicants are selected based on their grades and an interview. Candidates have three blocks of internships (similar to Uni1), during which they are in the school the whole period. In total, they have 540 hours of practice. In Uni3, we collected data from candidates in the year (i.e., third or fourth) during which the largest block of field placement occurred. Due to the flexibility of the program, candidates can choose how to order their subjects in the third and fourth year. The program organizes the field placement with collaborating schools, some of them being teacher training schools (lab schools). The program does not select mentors within the schools. Most candidates are Finnish (95%) and are, on average, 26 years old.

<<<Table1>>>

**Similarities and differences.** Table 1 summarizes the features of these programs. They were selected because they all are (a) university-based teacher education programs, (b) considered to be selective, and (b) considered to be strong and effective (Darling-Hammond, 2006b). They all educate candidates to teach grades 8–13, which generally implies teaching pupils aged 12–18. All three programs resemble what Bines and Watson (1992, as cited in Tight, 2002) called “post-technocratic” programs that emphasize professional training as a shared responsibility between campus training, field placement, and collaborating teachers/practitioners (Moon, 2016; Sykes, Bird, & Kennedy, 2010). Although Uni3 emphasizes research and research methods and may seem to focus more on theory than on practice (cf. Afdal & Nerland, 2014), the composition of the three programs (e.g., the ratio between methods courses and foundation courses, the covered themes and assigned readings) is very similar. Also, all programs have invested in reform efforts albeit on different timelines. They also differ in size, selection procedures, and the organization of internships. Uni2 is located in a country where teacher education is characterized by greater diversity than the Nordic programs (Zeichner, 2016). Alternative programs, for instance, are not offered in the Nordic countries. We thus selected Uni2 to keep the type of program similar. Furthermore, we do not aim to generalize to the country level. The similarities and differences between the selected programs give us a background to explore the concept of coherence, and particularly to investigate the candidates’ perceptions of program coherence (Raudenbush, 2008). Including three programs widens our exploration and grounds our findings in a diversity of empirical evidence (Eisenhardt & Graebner, 2007; Stake, 2006).

### **Participants**

Data were collected from 269 candidates, distributed across the three programs as presented in Table 1. The candidates specialized in a variety of subjects, such as language arts, math, history, science, or a foreign language. Participation in this study was voluntary

and anonymous. A paper and pencil procedure was used, and potential identifying questions were kept to a minimum. The survey was distributed in the second half of the second semester of the programs (i.e., April–June). The conducting of the survey did not coincide with any large assessment period on campus or with the end or evaluation of the field placement period. In the Uni2 and Uni1 programs, the response rate was 100% ( $n = 72$ ) and 76% ( $n = 122$ ), respectively, as the survey was distributed at an obligatory lecture. The response rate in Uni3 was 23% ( $n = 75$ ), due to the absence of obligatory classes and the high flexibility of the program. Nearly all candidates who were present in the class when we distributed the survey returned a completed survey. Even though the overall response rate in Uni3 is low, we believe this sample is representative as their age and subject were similar to the population. Had we opted for a digital version of the survey, we might have reached different candidates, yet response rates for these types of surveys tend to be as low as 10%–25% (Sauermann & Roach, 2013). Thus, this approach would probably not have increased our sample size.

### **Instruments**

To collect our data, we used a survey constructed to investigate the candidates' perception of and possibilities to experience coherence in their teacher education (Hammerness, Klette, & Bergem, 2014). We wanted to link to previously used high-quality analytical tools and draw on items from prior surveys that were tested and validated in other settings (Grossman et al., 2008). As coherence is a rather abstract construct, the survey contained items referring to specific features of the program, for example, going more in depth into ideas presented in a previous course, or faculty being knowledgeable about what is happening in the field placement. We used those parts of the survey which addressed candidates' opportunities to connect parts of the teacher education program to each other (5 items), for example "During your entire experience with the teacher education program, how much opportunity did you have to do the following: connect ideas from one course to those in

another?” We also assessed candidates’ agreement with statements regarding coherence within the program (14 items), such as “What I learned in my courses reflects what I observed in field experiences.” These example items also reflect the inclusion of both structural coherence (the former item) and conceptual coherence (the latter item) in the survey. See Appendix A for all 19 items.

Items were rated on a four-point Likert scale ranging from 1 (none) to 4 (extensive opportunity) and 1 (strongly disagree) to 4 (strongly agree). Previous analyses showed that these 19 items tap three underlying factors: perceived coherence between courses, opportunities to connect parts of the program, and perceived coherence between field experiences and courses (Canrinus et al., 2017). As we believe all three factors are important features of program coherence and reflect our definition of coherence, integrating both conceptual and structural coherence, we do not perceive the factors to differ in their importance. Table 2 shows the internal consistency of the scales based on our present sample, gives the number of items, and an example item per scale. The internal consistency was good for all scales and ranged from .75 for the scale “perceived coherence between field experiences and courses” to .88 for the scale “perceived coherence between courses.”

<<<Table2>>>

## **Analyses**

The collected data was analyzed in several ways. Descriptive analyses were used to obtain an answer to the research question “To what extent do student teachers perceive their teacher education program as coherent?” To investigate the similarities and differences between candidates’ perceptions of program coherence across the programs, we conducted analysis of variance (ANOVA). We checked whether the variances across the programs were equal using Levene’s test. The scale “opportunities to connect parts of the program” showed different distributions of variance across the three programs ( $F = 3.33, p < .05$ ). We therefore

used Welch's *F* to compare whether there were significant differences between the programs, and the Games–Howell post hoc test to specify which programs differed from each other. For the other two scales, we used the common *F*-test combined with Bonferroni's post hoc test. To understand how the programs might improve program coherence, we explored, for each program, the items comprising the three scales.

## Results

The candidates indicated that they, on average, explored the opportunities to connect parts of the program (e.g., connect ideas from one class to another in the same course) in some depth ( $M = 3.01$ ,  $sd = .64$ , see Table 2). They furthermore agreed to statements tapping the coherence between courses and tapping the coherence between field experiences and courses just above the scale mean of 2.50 ( $M = 2.80$ ,  $sd = .56$  and  $M = 2.70$ ,  $sd = .58$ , respectively, see Table 2). This implies that they tended to agree or nearly agree with statements such as “I saw connections among ideas and concepts across program courses” and “what I learned in my courses reflects what I observed in field experiences.” This finding also indicates room for improvement within the programs as the average score on these scales reveals that there are items with which candidates did not fully agree. When presenting the similarities and differences between the three programs, we will discuss the possibilities for improvement further.

Next, we explored the extent to which candidates from the participating teacher education programs were similar or different in their perception of the coherence of their programs. Table 2 reveals that Uni2 candidates rated all three scales highest. Uni1 candidates rated the scale “perceived coherence between courses” lowest, and Uni3 candidates rated the scale “perceived coherence between field experiences and courses” lowest. To investigate whether the observed differences were statistically significant, we ran ANOVAs. We found

significant differences between the three programs on all three scales (ranging from  $F[2,266] = 15.46, p < .001$  for “perceived coherence between field experiences and courses” to  $F[2,266] = 75.38, p < .001$  for “perceived coherence between courses”).

We discuss the post-hoc analyses for each scale separately. Each section begins with the Uni2 score, followed by a comparison between the Uni1 and Uni3 scores. Additionally, we present findings at a finer-grained level; in other words, we explore for each program the items underlying each scale. This gives useful information on which aspects underlying the scales might explain the observed differences. Moreover, it offers suggestions regarding aspects which could be used for the further development of coherence within the separate programs. Table 3 gives the mean score per item for each program. Items are grouped according to their scale.

<<<Table3>>>

### **Coherence between Courses**

Regarding the scale “perceived coherence between courses,” our results showed that, on average, Uni2 candidates reported the highest level of coherence between courses, followed by Uni3 candidates. Uni1 candidates reported the least coherence between their courses. Thus, candidates from the Uni2 program agreed significantly more with statements tapping the scale “perceived coherence between courses” compared to candidates from the Uni3 program ( $M = .61, sd = .07, p < .00$ ) and the Uni1 program ( $M = .81, sd = .07, p < .00$ ). Candidates from the Uni3 program agreed significantly more with these statements compared to candidates from the Uni1 program ( $M = .19, sd = .07, p = .01$ ).

At item level, compared to their scores on the other items, all three programs scored relatively low on the following four items: 3C “the faculty knew what was happening in my other courses”; 3E “when ideas or readings were repeated in my courses, they were elaborated/treated more deeply”; 3M “the faculty was knowledgeable about what I was

required to do in my field teaching experience”; and 3N “the faculty was knowledgeable about the quality and nature of my field teaching experiences.” These relatively low scores suggest room for improvement in faculty making sure that they know what is happening in other parts of the teacher education program. Likewise, faculty may want to think about ways of elaborating upon their ideas in courses or in lectures instead of repeating their main message.

### **Opportunities to Connect Parts of the Program**

Comparing the three programs on the opportunities the candidates reported to have to connect the parts of their teacher education program shows that Uni2 candidates expressed to experience these opportunities significantly more than Uni3 ( $M = .93$ ,  $sd = .09$ ,  $p < .00$ ) and Uni1 candidates ( $M = .81$ ,  $sd = .07$ ,  $p < .00$ ). The Uni1 candidates expressed more opportunities to connect than Uni3 candidates ( $M = .22$ ,  $sd = .08$ ,  $p < .05$ ). Thus, Uni2 candidates rated the items tapping this scale highest, followed by Uni1 candidates. Uni3 candidates reported experiencing the least opportunities to connect parts of their program.

We found that Uni2 candidates rated the opportunities mentioned in the items all significantly higher than either Uni3 or Uni1 candidates ( $p < .00$  for all items). The Uni2 candidates might nevertheless perceive even more coherence if the teacher education program would offer candidates more opportunities to connect ideas from one course to those in another (2C) as this item was rated lowest by the Uni2 candidates. The Uni3 candidates particularly rated the following two items lowest: 2E “make connections between educational theory and the actual classroom teaching you were engaged in” and 2D “trace your own trajectory of learning—reflect upon the ways your own understanding of teaching and learning was developing.” Thus, by offering candidates more of these opportunities, the Uni3 program might have their candidates experience more coherence within the teacher education program. Lastly, the Uni1 program may want to offer candidates more opportunities to

connect ideas both between courses (2B) and within courses (2C) as these two items were rated lowest by the Uni1 candidates. Considering the data, if the Uni1 program offers its candidates more of these opportunities, the students also might experience their program as more coherent.

### **Coherence between Field Experiences and Courses**

Regarding candidates' perceptions of coherence between field experiences and courses, Uni2 candidates reported significantly more coherence than both Uni3 ( $M = .48, sd = .09, p < .00$ ) and Uni1 candidates ( $M = .35, sd = .08, p < .00$ ). Thus, compared to other candidates, more Uni2 candidates agreed with statements such as: 3H "my student teaching experience allowed me to try out the theories, strategies and techniques I was learning in my classes at the teacher education program" and 3K "in my fieldwork, I observed teachers using the same theories, strategies, and techniques I was learning about in my courses at the teacher education program." Uni3 and Uni1 candidates reported an equal amount of coherence between their field experiences and courses ( $p = .30$ ).

At item level, the significantly higher rating by Uni2 candidates mainly stems from the afore mentioned items 3H 'my student teaching experience allowed me to try out the theories, strategies and techniques I was learning in my classes at the teacher education program' and 3K 'in my fieldwork I observed teachers using the same theories, strategies and techniques I was learning about in my courses at the teacher education program' which were rated significantly higher by Uni2 candidates than both Uni3 and Uni1 candidates. Nevertheless, candidates in all three programs rated item 3H relatively high and item 3K relatively low. Likewise, the item 3G-recoded "what I learned in my fieldwork was consistent with what I learned in my coursework" was rated relatively low, particularly in the Uni2 and Uni1 programs when compared to their ratings of the other items. Thus, to improve student

teachers' perceptions of coherence within their teacher education program, the programs studied here might want to improve the alignment between campus and the field placement.

### **Discussion**

We investigated to what extent candidates from three teacher education programs perceived their programs as coherent and to what extent the candidates' perceptions were similar and different across these programs. Based on previous analyses (Canrinus et al., 2017), three scales of coherence were used for our investigations: "perceived coherence between courses", "opportunities to connect parts of the program", and "perceived coherence between field experiences and courses". We posed that each of the three scales is equally important for constructing a coherent teacher education program; thus, we did not differentiate between the importance of these scales. In addition to these scales, we investigated the item level of the scales more closely to explore possibilities for improvement per program. Below, we first discuss the perceived coherence at scale level before discussing the opportunities the programs might have to improve program coherence based on the item-level findings.

#### **Perceived Coherence**

Overall, across all three programs, candidates perceived their teacher education programs as reasonably coherent. Yet, opportunities for improvement remain as candidates did not fully agree to statements tapping coherence between courses or tapping coherence between courses and field experiences. This is consistent with research revealing fragmentation between campus courses and practical experiences (e.g., Samaras et al., 2016). We also observed considerable differences between programs in candidates' experiences of coherence. This resembles the findings by Grossman et al. (2008), showing that 23% of the variation in the candidates' view of coherence between field placement and campus courses

was programmatic instead of individual variation. In the following, we discuss what potential influences might underlie the differences we observed.

Uni2 students perceived their teacher education program as more coherent compared to the other two programs. This could stem from the longstanding and continuous restructuring of the program. As mentioned in the methods section, the Uni2 program has been working on coherence within their program since 1999. Even though the major changes in the program were complete in 2002 (Hammerness, 2006), the effects may very well have lasted as coherence has been established as a focus point.

Uni2 candidates reported more coherence between their courses and their field placement than the Nordic candidates. This aligns with findings from a study by Jensen, Klette, & Hammerness (submitted) using observation data. They found that candidates from the Uni2 program reported significantly more opportunities to link their experiences from their field placement to theory compared to candidates from the Uni1 or Uni3 program. Likewise, Jensen et al.'s (submitted) study supported our finding that the candidates from both Nordic programs perceived an equal extent of coherence between courses and field placement. There, candidates from the Uni1 and Uni3 program reported a similar amount of opportunities to discuss experiences from their own fieldwork in their classes.

The differences in the structure of the field placement may provide one possible explanation for our finding that Uni2 candidates reported more coherence between campus courses and the field placement. The Uni2 program has a continuous field placement throughout the program, whereas both Nordic programs have field placement in blocks (3–4 periods) throughout the year. Thus, the Uni2 candidates continuously alternate between their campus and field placement with teaching tasks every morning and classes every afternoon for the whole year, whereas Uni3 and Uni1 candidates are either fully at campus or fully at their field placement. Brouwer and Korthagen (2005) showed that candidates feel that

alternating between college-based courses and student teaching periods promotes learning. As one teacher in their study noted, “The advantage of this alternation was that you can get the questions you develop in school answered in college rather quickly. And the other way round, you can quickly put theory into practice” (p. 190).

The fact that the alternation in the Uni2 program is more rapid (i.e., candidates spend time at both their field placement and campus every week) may result in more opportunities to connect their practical experiences with what they learned at campus. Yet, Grossman et al. (2008) found that simply increasing the amount of fieldwork does not necessarily boost program coherence. The quality of coursework assignments related to field experiences and the extent to which the candidates are engaged in these assignments is more important than the amount of fieldwork (Grossman et al., 2008). This is an issue which could be addressed in future research comparing teacher education programs and the connection between students’ practical experiences and their campus courses.

The fact that the Uni1 candidates perceived relatively little coherence between their courses is relevant as continued interaction with key ideas is important for constructing understanding of teaching (Darling-Hammond et al., 2005). At the time of our data collection, the Uni1 program was still working on a full-scale redesign of the structure of the coursework and field placement. Possibly, as the restructuring of the program was still in progress, the newly crafted coherence within the program had not yet trickled down fully to the candidates (cf. Raudenbush, 2008).

The perception of the Uni3 candidates regarding all three scales measuring the coherence of the program lies in the middle of the Likert scale, between disagree and agree. This finding is somewhat surprising as scholars and evaluators have referred to the overall cohesiveness of the educational program as the factor most important for the program’s success (e.g., Jussila & Saari, 2000, as cited in Burn & Mutton, 2015) and the systematic

nature of the curriculum as a key strength of the program (Saari & Frimodig, 2009). Possibly, scholars and educators perceive the coherence but candidates do not (cf. Clift & Brady, 2005). The Uni3 program enables candidates to move flexibly through the program in their own direction and at their own pace. This may result in candidates perceiving their education as fragmented rather than coherent (Grossman, Hammerness, & McDonald, 2009; Weston & Henderson, 2015). Thus, too much flexibility may come at a cost.

Afdal and Nerland (2014) referred to the Uni3 program as “conceptually tied to the language of academic disciplines” (p.295) contrary to a connection to practice. Hansén et al. (2015) also stressed the strong linkage to academia in Finnish teacher education. In a sense, the Uni3 program resembles what Elliott (2012, p.16) called “the platonic or realistic view of teacher education.” In this view, the teacher is perceived as a rational-autonomous professional, and good practice is derived from “a theoretical understanding of educational values and principles. Good practice consists of consciously applying theory” (Elliott, 2012, p. 16). This focus on theory together with an emphasis on autonomous individuals (Hansén et al., 2015) might be reflected in the relatively low score of the Uni3 program on the coherence between field experiences and campus courses.

As Loughran (2014) asserted, teacher education is special as it “straddles schools and academia” (p. 274). This may be more easily achieved in smaller programs (i.e., Uni2 contrasting Uni3) where fewer schools are a part of the program and the lower candidate–educator ratio offers more time to support candidates in linking their practical experiences and theoretical readings. Having enough resources to maintain a close connection to collaborating schools and the mentors in them (e.g., Uni2) may also improve mutual understanding of the program vision.

### **Potential Approaches to Improve Coherence**

Given these findings, how might a program strengthen coherence? We noticed that all candidates reported relatively low agreement with the same items of the scale “perceived coherence between courses.” These items mainly referred to faculty being knowledgeable about other courses and the candidates’ field placements. This latter point is in line with the relatively low overall score of the scale tapping the coherence between courses and the field placement. There, too, all candidates reported relatively low agreement with the same items. These low-rated items related to opportunities to experiment with concepts introduced on campus and to consistency in what was learned in the two learning arenas (i.e., field placement and campus). This supports the idea that, to improve coherence in teacher education programs, teacher educators both at universities and in schools could improve their collaboration and their understanding of what is happening in each other’s contexts, together constituting the teacher education program.

Creating a shared vision on learning and teaching between teacher educators may also be important, especially to develop some common understanding across faculty not only about each other’s courses but also about the larger purpose of the program (Assaf, Garza, & Battle, 2010; Feiman-Nemser, Tamir & Hammerness, 2014; Tatto, 1996). Assaf et al. (2010) studied teacher educators’ perspectives on multicultural education and how these perspectives influenced the coherence of the teacher education program. Their findings showed that teacher educators had a variety of perspectives and practices related to educating candidates about multiculturalism. They stressed that it is important that teacher educators work together to align their beliefs and practices without losing their own personal understandings and perspectives (cf. Buchmann & Floden, 1991; Tatto, 1996) in the process of scaffolding program coherence. Thus, interaction and communication (cf. O’Neill et al., 2014) are important in creating coherence between courses.

Studies have shown that relationships between teachers/faculty are relevant for the quality of and changes within education (e.g., Coburn, Russell, Kaufman, & Stein, 2012; Daly, 2010). Collaboration in teaching and exchange of information between teacher educators could very well be related to the coherence of the curriculum of the teacher education program. Russell, McPherson, and Martin (2001) referred to candidates' comments that their classes either felt repetitious or that they would receive contradictory information in programs characterized by a lack of communication between teacher educators. Additionally, Russell and colleagues (2001) noted that teacher educators can set an example of collaboration between instructors, illustrating how candidates might collaborate in their future teaching positions.

Finally, enhancing the collaboration between the various stakeholders within and across teacher education may be a critical strategy (cf. Canrinus et al., 2017). At the same time, different educational locations (e.g., campus and field placement) may offer complementary knowledge and perspectives, and we observed a certain division of labor in Uni3, yet not in Uni2 or Uni3. Still, educating candidates was a responsibility shared by both schools and the university in all programs, and we would suggest maintaining both theory and practice within teacher education. Our findings indicate that concurrent practice strengthens the linkage between theory and practice as well as program coherence, but the question of how alternative routes might provide different models of coherence cannot be answered by our data as the Nordic programs do not offer such programs. Future research could be designed to investigate this question further. Yet, if candidates are unable to recognize in their courses at campus what they observe during field experiences, and if they are unable to observe during their field placement the things they have learned about in their courses, candidates may not have the optimal learning opportunity as modelling is an important way of learning and acquiring expertise.

## Conclusion

Over a decade ago, Darling-Hammond et al. (2005) called for more research on the coherence of teacher education programs. Although some scholars acted upon this call (e.g., Assaf et al., 2010; Samaras et al., 2016), research investigating coherence empirically is still limited. Based upon our empirical investigation, we contribute to the field of teacher education program coherence, adding to the more theoretical and conceptual studies advocating coherence (e.g., Muller, 2009; Weston & Henderson, 2015). Whereas others often have studied a single teacher education program (e.g., Hammerness, 2006; Bain & Moje, 2012), our study included three programs, offering us the opportunity to study coherence across and between programs. We investigated program coherence in a relatively broad sense, including coherence between campus courses and field placement as well as between campus courses, whereas other scholars have mainly focused on the former (e.g., Samaras et al., 2016). Additionally, we investigated program coherence through the lens of the candidates (Massy, 2003), something which few studies have done.

Our study may be used as a stepping stone or illustration for other scholars investigating coherence conceptually or within their own program. This study is part of a larger international project, and others outside the project have shown interest in the survey and investigating the coherence in their program (e.g., Goh & Canrinus, submitted). The survey used may be perceived as a potential instrument for development and improvement in teacher education in various countries. In this regard, we have taken a first step by addressing for each program presented those items offering opportunities for improvement. Taking a longitudinal perspective in investigating the construction of coherence within a teacher education program as a next step will then offer a fruitful opportunity to understand and dive into the various interactions at play in ensuring candidates experience a coherent educational program.

Our findings show that teacher education programs may differ in the extent to which they are perceived as coherent by the candidates attending these programs. We also find that programs may be strong in some parts of coherence (e.g., coherence between courses) and less so in other aspects (e.g., coherence between field placement and campus courses). From our findings, it becomes clear that an important aspect of potential improvement of program coherence lies within communication and collaboration between the various stakeholders within teacher education programs.

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## Footnotes

<sup>1</sup>For more information about the overall project, we refer to Klette & Hammerness (2016) and Hammerness & Klette (2015).

<sup>2</sup>Uni1 candidates are also allowed to enter the program if they obtained 180 credits with 60 credits in their subject (1 credit equals 25–30 hours of studying), which is similar to the minimum credits necessary to obtain a bachelor's degree.

<sup>3</sup>University schools have a stronger relationship with the university and resemble the Finnish teacher training (lab) schools (see Uni3).

Table 1

*Program and Participant Descriptives*

	Uni1	Uni2	Uni3
Location	University	University	University
Goal pupils (grade levels)	8–13	8–13	8–13
Last large reform	2011	1999–2002	1970s
Reform focus	Coherence	Coherence	Master's degree
Length of program	1 year	1 year	1 year/5 years
Admission requirements	Grades	<ul style="list-style-type: none"> <li>• Grades</li> <li>• Interview</li> <li>• Standardized entrance exam</li> <li>• Recommendation letter</li> <li>• Essay/narrative</li> </ul>	<ul style="list-style-type: none"> <li>• Grades</li> <li>• Interview</li> <li>• Entrance exam (on subject matter)</li> </ul>
Acceptance rate (in %)	20.5	20–40	20–40
Amount of practice (in hours)	480	780	540
Structure of practice	2–4 blocks	Concurrent	3 blocks

Qualifies for a master's degree	No	Yes	Yes
Enrolled candidates	160	72	333
Average age	29	27	26
Ethnicity	91% Norwegian	Unknown	95% Finnish
Participation in present study	122	72	75
% male participants	42	35	32

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Table 2

*Scale Descriptives and Mean Scores per Program (Standard Deviations Between Brackets)*

	#items	Cronbach's alpha	Uni1	Uni2	Uni3	Total	<i>F</i> (2,266)	<i>Welch F</i>
Perceived coherence between courses	10	.88	2.53(.46)	3.34(.42)	2.72(.45)	2.80(.56)	75.38*	
Opportunities to connect parts of the program	5	.82	2.88(.52)	3.59(.45)	2.67(.60)	3.01(.64)		73.45*
Perceived coherence between field experiences and courses	4	.75	2.64(.54)	2.99(.52)	2.51(.58)	2.70(.58)		15.46*
Total	19	.92						

\*  $p < .000$

Table 3

*Item Mean per Program (Standard Deviation Between Brackets)*

Scale	Item	Program		
		Uni1	Uni2	Uni3
Perceived coherence between courses	3A	2.87(.74)	3.73(.48)	2.69(.60)
	3B	2.79(.76)	3.55(.58)	2.61(.66)
	3C	2.24(.90)	3.13(.71)	2.39(.77)
	3D	3.06(.59)	3.54(.63)	2.85(.65)
	3E	2.32(.69)	2.94(.77)	2.65(.65)
	3F	2.63(.72)	3.63(.52)	3.07(.62)
	3J	2.58(.80)	3.66(.61)	2.78(.77)
	3L	2.38(.76)	3.20(.67)	2.68(.86)
	3M	2.17(.71)	3.18(.81)	2.91(.77)
	3N	2.23(.72)	2.83(.82)	2.60(.89)
Opportunities to connect parts of the program	2A	2.91(.85)	3.82(.46)	2.93(.75)
	2B	2.82(.70)	3.47(.67)	2.83(.77)
	2C	2.76(.72)	3.29(.78)	2.68(.76)
	2D	2.89(.84)	3.83(.50)	2.54(.89)
	2E	3.02(.75)	3.58(.63)	2.36(.85)
Perceived coherence between field experiences and courses	3G-recoded	2.37(.80)	2.65(.72)	2.62(.84)
	3H	2.94(.71)	3.54(.58)	2.61(.70)
	3I	2.81(.71)	2.94(.67)	2.48(.69)
	3K	2.43(.77)	2.80(.83)	2.31(.76)

\*  $p < .000$

## Appendix A

## Survey Items Related to Program Coherence

2. During your entire experience with the teacher education program, how much opportunity did you have to do the following?

*Please mark one answer on each row*

	None	Touched on it briefly	Explored in some depth	Extensive Opportunity
<b>a.</b> Learn about the vision of good teaching that your teacher education program promotes	1	2	3	4
<b>b.</b> Connect ideas from one class to another in the same course	1	2	3	4
<b>c.</b> Connect ideas from one course to those in another	1	2	3	4
<b>d.</b> Trace your own trajectory of learning—reflect upon the ways your own understanding of teaching and learning was developing	1	2	3	4
<b>e.</b> Make connections between educational theory and the actual classroom teaching you were engaged in	1	2	3	4

3. In thinking about your teacher education program *so far*, how much do you agree or disagree with the following statements?

*Please mark one answer on each row*

	Strongly Disagree	Disagree	Agree	Strongly Agree
<b>a.</b> The program articulated a clear vision of teaching and learning	1	2	3	4
<b>b.</b> I heard similar views about teaching and learning across the program courses	1	2	3	4
<b>c.</b> The faculty knew what was happening in my other courses (i.e., assignments, readings, key ideas)	1	2	3	4

<b>d.</b> My courses within the teacher education program seemed to be intended to build an understanding over time	1	2	3	4
<b>e.</b> When ideas or readings were repeated in my courses, they were elaborated/treated more deeply	1	2	3	4
<b>f.</b> I saw connections among ideas and concepts across program courses	1	2	3	4
<b>g.</b> What I learned in my fieldwork conflicted with what I learned in my coursework	1	2	3	4
<b>h.</b> My student teaching experience allowed me to try out the theories, strategies, and techniques I was learning in my classes at the teacher education program	1	2	3	4
<b>i.</b> What I learned in my courses reflects what I observed in field experiences	1	2	3	4
<b>j.</b> The faculty was knowledgeable about the program as a whole	1	2	3	4
<b>k.</b> In my fieldwork, I observed teachers using the same theories, strategies, and techniques I was learning about in my courses at the teacher education program	1	2	3	4
<b>l.</b> The faculty made explicit references to other courses	1	2	3	4
<b>m.</b> The faculty was knowledgeable about what I was required to do in my field teaching experience	1	2	3	4
<b>n.</b> The faculty was knowledgeable about the quality and nature of my field teaching experiences	1	2	3	4