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Conceptual Framework for Analyzing Qualities in Teacher Education: Looking at Features of Teacher Education from an International Perspective

Abstract
Around the world, policy discussions of teacher education in relationship to teacher quality have tended to focus more closely around debates about the nature of teacher preparation and the need for teachers to possess advanced degrees or certification. The field is in need of an array of indicators, we argue in this article—a set of powerful, well-researched indicators that can be applied to large public universities as well as small regional colleges. These indicators need to be relevant for teacher certification across a variety of age-ranges and developmental stages. In this article, we report on a growing conversation about ways of linking theory and practice in teacher education, and efforts on the part of researchers to identify key features of powerful teacher education, analyzing teacher education programs in Finland, Norway, Chile, Cuba and the US. We propose that quality teacher education is designed around a clear and shared vision of good teaching; it is coherent in that it links theory with practice and offers opportunities to learn that are aligned with the vision of good teaching; and it offers opportunities to enact teaching. While these features are supported for the most part by growing consensus in the literature, there is also an emerging empirical base that provides support for the value of them, as suggested from these analyses.

Keywords: teacher education, teacher preparation, quality indicators, comparative research

Sammendrag
Over hele verden har politiske diskusjoner om lærerutdanning og dens rolle for lærerkvalitet en tendens til å fokusere på debatter om lærerutdanningens karakter og behovet for avanserte sertifiseringsordninger for lærere. Vi argumenterer i denne artikkelen for at feltet har behov for et utvalg indikatorer—en rekke sterke, forskningsbaserte indikatorer som kan brukes både på store offentlige universiteter, samt små regionale høyskoler. Disse indikatorene må være relevante for lærersertifisering på tvers av alders- og utviklingsstadier. I denne artikkelen knytter vi oss til en pågående samtale om måter å koble teori og praksis i lærerutdanningen, og andre forskeres arbeid med å identifisere slike kvalitetsindikatorer for lærerutdanning, ved å analysere lærerutdanningsprogram i Finland, Norge, Chile, Cuba og USA. Vi foreslår at lærerutdanning blir designet rundt en klar og felles visjon om god undervisning; den er koherent ved at den kobler teori og praksis og gir muligheter til å lære som er på linje med programmets visjon for god undervisning; og den gir muligheter til å praktisere undervisning. Det er økende enighet i forskningslitteraturen om disse tegnene på kvalitet, og våre analyser viser at det også er et gryende empirisk grunnlag som gir støtte til verdien av dem.

Nøkkelord: lærerutdanning, kvalitetsindikatorer, komparativ forskning

Introduction

Around the world, teacher education is seen as a means of ensuring and improving teaching quality, yet a review of policies across 25 countries reveals consistent concerns about preparing teachers and the nature of teacher preparation (OECD, 2005). In order to address these concerns, researchers in many countries have invested in examining the features of strong teacher preparation. Present research suggests that one key feature of strong teacher education programs is *coherence* (Darling-Hammond, 1999, 2006; Grossman, Hammerness, McDonald, & Ronfeldt, 2008; Hammerness, 2006 Howey & Zimpher, 1989; Korthagen, Kessels, Koster, Lagerwerf, & Wubbles, 2001). Coherent programs are purposefully designed and provide a well-structured set of learning experiences. In coherent programs, core ideas and learning opportunities—both in course work and in clinical work—are aligned (Darling-Hammond, 1999, 2006; Grossman et al., 2008). Finally, coherent programs appear better able to address the gap between theory and practice (Korthagen et al., 2001; Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2009). Yet, while there has been some initial research on coherence in teacher education, we still know very little about the features of programs that may contribute to coherence or how these features might look in different international contexts.

As part of a cross-cultural analytical framework designed to examine teacher education in different countries, this article reports from an ongoing study (Coherence and Assignments in Teacher Education, CATE[i]) targeted to analyze program features and ways of linking theory and practice within teacher education programs that contribute to coherence in programs in Finland, Norway, Chile, Cuba, and the United States. We especially focus on the preparation of teachers in language, arts and mathematics, which are key subject areas for student learning. This article sketches out the instruments and analytical framework used when analyzing program coherence in the CATE study, and reports on initial findings, drawing on observation data and survey data. Indeed, case studies from strong programs have, for example, revealed that *substantive*, rather than structural, features influence teacher learning most (Darling-Hammond, 2000, 2006; see also Kennedy, 1998). In turn, large-scale research studies examining different teacher education programs have begun exploring more closely some of those key features such as the type and nature of coursework and clinical practice; the linkages between fieldwork and university coursework; the presence of opportunities to enact the work of real classroom teaching; and the nature of the program's vision of good teaching (Boyd & Grossman et al., 2006; Grossman et al., 2008; Feiman-Nemser, Tamir, & Hammerness, 2014).The review of studies suggests that the field is in need of an array of indicators—a set of powerful, well-researched indicators. Such indicators need to be applicable to a range of programs from large public universities to small regional colleges, as well as from university-based

programs to 'alternative' programs and to more 'hybrid' programs. And these indicators need to be relevant for teacher certification across a variety of age-ranges and developmental stages. Given the considerable spread and range of teacher education program contexts, articulating a set of robust and versatile indicators of strong teacher education becomes especially important.

Examining teacher education in depth is critical to understanding larger policy issues about the nature of teacher preparation within different national contexts (Hudson & Zgaga, 2008), and we suggest that there is an urgent need for common conceptual frameworks and shared instruments as means to investigate quality features of teacher education. The current article reports on an analytical framework and instruments used to capture features of linking coursework and field placement and program coherence across rather different teacher education settings such as Finland, Norway, California, Chile, and Cuba. For instance, we know that connecting theory with practice is one of the long-standing challenges of preparing new teachers, yet we know little about *how* programs in different countries accomplish this or address this substantial problem of learning to teach (Feiman-Nemser et al., 2014; Hammerness, Darling-Hammond, Grossman, Rust, & Shulman, 2005a; Hammerness, 2013; Kennedy, 2006; Zeichner & Conklin, 2005). In this article, we build on this growing conversation about practice in teacher education, and upon efforts on the part of researchers to identify key features of powerful teacher education. Building on this work, we propose that quality teacher education is designed around a clear and shared *vision* of good teaching; it is *coherent* in that it links theory with practice and offers opportunities to learn that are aligned with the vision of good teaching; and it offers opportunities to *enact teaching*. In the section that follows, we describe this framework and share some of the research that supports it.

Indicators of Quality Teacher Preparation: A Framework

Vision

Over the past decade, teacher educators in the United States have begun to argue that a critical part of a strong teacher preparation program is a clearly articulated and shared vision of good teaching (Darling-Hammond, Bransford, LePage, Hammerness, & Duffy, 2005; Hammerness, 2012a, 2012b; Kennedy, 2006; Zeichner & Conklin, 2008) connected to concrete classroom practices. Feiman-Nemser (2001, p. 1017) claims that such visions of the possible are critical for new teachers' learning and more empirical research is deeply needed, she argues.

Longitudinal research on three mission-driven programs in the United States found that the *content* of the program visions differed, echoing what other researchers such as the US National Research Council have argued regarding the

considerable variation in conceptions of good teaching across US teacher preparation programs (Hammerness, 2014; see also National Research Council, 2010). The study found that graduates from programs without a vision of good teaching as a practice struggled to describe the aims of their own classroom teaching practice, and fewer planned to stay long-term in teaching. By contrast, graduates of programs with well-specified, detailed visions of teaching as a practice could envisage a longer time span for themselves as classroom teachers.

Coherence

Simply having a vision of good teaching is not enough. The vision needs to inform program design, curriculum and pedagogy, and shape what and how new teachers learn. Case studies of individual programs, and comparative studies of multiple programs, have pointed to the important role of coherence for students' learning across contexts (Darling-Hammond, 2000, 2006; Kennedy, 1998; Hammerness, 2006, 2013; NRC, 2010). In coherent programs, core ideas and learning opportunities—both course work and clinical experiences—are aligned (Darling-Hammond, 2000, 2006; Grossman et al., 2008). This also means that one should be able to identify the central ideas that undergird the program across course syllabi, reading lists, and main assignments. The Teacher Education and Learning to Teach (TELT) study, a comparative investigation of eleven different teacher education programs, found that consistency in ideas about learning, schooling and teaching had a strong influence on candidates' learning to teach (National Center for Research on Teacher Education, 1988; see also Kennedy, 1998). The "Choosing to Teach" study (Feiman-Nemser et al., 2014), found that the three programs that clearly aligned assignments, learning opportunities, and major program structure with the guiding vision, impacted on graduates' classroom teaching practices reflecting the main emphases of the program vision, even several years after their graduation.

Coherent programs may have their limits by becoming too regimented, technical, or ultimately by masking some of the persistent dilemmas and inherent contradictions of teaching and teacher education (Buchmann & Floden, l992). A program that is too closely focused and organized around a particular vision may deter candidates from expressing or developing alternative perspectives or exploring their own personal visions (Smeby & Heggen, 2014). In our framework, we conceptualize coherence as a consistent approach to teaching and learning that informs program construction both within coursework, across courses and between fieldwork and university classes. A coherent program has a set of courses that are conceptually linked; is designed to deliberately build understanding of teaching over time; and has careful alignment between university coursework and field placements.

Opportunities to Enact Practice

Yet teachers need opportunities not only to learn *about* visions of good teaching, but to actually *enact* the vision of good teaching in practice. Mary Kennedy has contended that this is one of the critical problems of learning to teach: teacher educators often promote a general vision of good teaching, but these visions are often not specified in terms of particular classroom practices (Kennedy, 2006). This has contributed to what she has termed the "problem of enactment", referring to conditions that hinder new teachers to put one's intentions and vision into practice (Kennedy, 1998). Research has identified similar patterns in different professions (including law, medicine and clergy as well as teaching), but the preparation for teachers offered less opportunities for grounding one's learning in real professional work (Grossman, Compton, Ingra, Ronfeldt, Shahan, & Williamson, 2009). A recent study of teacher preparation in New York city revealed that teachers who were given the opportunity to practice activities that were close to the work of actual classroom teaching—to study local curriculum; to listen to a child read aloud to assess her reading ability; or to examine samples of student work, for example—had a greater impact upon their students' learning as measured by standardized tests (Boyd et al., 2009). A vision of good teaching that is not translated into practice "…fails to give teachers the tools they need to develop a sustainable practice" (Kennedy, 2006, p. 211).

Recent studies suggest that the above findings from the United States could be valid for Norwegian teacher education programs (Hammerness, 2012a, 2012b, 2013). When asked about opportunities for practical training, Norwegian teacher educators emphasized school sites as the places that should provide such opportunities, and not the artifacts from classroom situations used as "scaffolds" in university coursework, like examples of student work; videos of classroom teaching; curriculum requirements, or other materials that were directly related to classroom teaching. Furthermore, the interviewees were skeptical towards practical teaching methods and held the belief that learning about practice should be relegated to school settings (Hammerness, 2013). This contrasts with research findings concluding that new teachers cannot learn ambitious teaching practices in school placements alone (Britzman, 1991; Feiman-Nemser & Buchmann, 1985; McDonald, 2005). Making distinctions between what is learned in university settings and school settings can reinforce the historical divide between theory and practice in teacher education (Darling-Hammond, 2014; Zeichner, 2010), and a shift towards practice requires a number of changes in teacher education curriculum and pedagogy (Grossman, Hammerness, & McDonald, 2009). This includes grounding the study of theory in the materials and artifacts of practice (Ball & Forzani, 2009) and providing opportunities for prospective teachers to see and rehearse teaching practices during university-based coursework, aligned with specific visions of good teaching (Thompson, Windschitl, & Braaten, 2013).

Operationalizing Vision, Coherence and Opportunities to Enact Practice

In our current research project "Coherence and Assignment Study in Teacher Education" (CATE), we have drawn upon *vision*, *coherence*, and *opportunities to enact practice*—as part of our conceptual framework for studying a sample of teacher education programs across five different countries. For this study, we have developed a set of dimensions that might help us identify the presence and nature of vision, coherence, and opportunities to learn to enact teaching in the programs we are studying. We use these dimensions not only to identify the degree to which these features were at work in the programs we studied—but also to start to tease apart those indicators of vision, coherence and opportunities to enact practice that need more elaboration. As part of our work to understand vision, coherence and opportunities to enact practice in the different programs, we have operationalized these indicators in the different instruments we are using (e.g., surveys, interviews, rubrics) in order to identify their presence or absence in the programs we studied.

Vision

Based upon the emerging research and empirical findings around the nature of program vision (Hammerness, 2012a, 2014), we identify a number of indicators. We first examine whether there is a clear vision of teaching that seems to inform the program as a whole. We accomplished this by looking across programs' websites, program materials, syllabi and documents, and faculty and student interviews, for the consistent presence of a vision that can be determined across these materials.

Research in Norway indicates that the degree to which the vision is *shared* across members of the program can matter (Hammerness, 2012b, 2013). Is there consistency across faculty in the program who are responsible for teaching in the program and do they all seem to agree in general about the nature of the vision (see Box 1 Indicators of Vision)? Do students know about the vision? Do they understand the vision? Moreover, we are interested in whether the vision of good teaching is elaborated and specific, and whether it is tied to real classroom practice. Do program faculty talk in detail about what the vision of good teaching looks like? Is the vision tied to real classroom teaching practice: do the faculty give examples of what the vision would look like in real classrooms, and describe strategies or practices that good teachers would use that would represent enactments of those practices?

Text Box 1. Indicators of Vision.

- Program has an explicit vision of good teaching
- Vision is elaborated and specific
- Program faculty know and understand the vision
- Students know and understand the vision
- Vision includes the articulation of specific strategies or teaching approaches that embody the vision

n the CATE study, we developed an interview guide (e.g., for faculty and program leaders) and specific survey questions in order to investigate visions at the program level. These questions included both the experiences of students in terms of their opportunities to learn about the vision of good teaching, and their view on whether their program articulated a clear vision. For the interviewees, the program leaders, for example, were asked a number of questions about program vision, such as the ideal kind of teacher to be graduating from their program, and the sharing of the vision among colleagues in the program.

Coherence

In order to understand the degree to which programs are coherent, we developed a set of indicators that drew upon earlier work on coherence (Feiman-Nemser, 1996; Grossman et al., 2008; Hammerness, 2006; Hatch & Honig, 2004; Buchmann & Floden, 1992; Tatto, 1996) (see Box 2 Indicators of Coherence). We sought indicators that would provide insight into coherence around both *ideas* and *structures*. Building upon this research, we hypothesized that one key indicator was the degree to which ideas about good teaching are consistent in programs—such that the vision of good teaching 'permeates' the program and shapes the design of the program, thus also recognized at the level of coursework and required assignments (Feiman-Nemser, 2006). In a coherent program, both faculty *and* students know and understand the overall vision of the program (Hammerness, 2006; Tatto, 1996). Finally, we anticipated that the ability of the program's courses, or classes, to communicate a shared vision of good teaching—or send contradictory messages that suggest conflicting visions of good teaching—would be a final indicator of coherence. These items probe to which extent faculty and students not only know about the vision of good teaching, but how it is recognized on a program level.

Text Box 2. Indicators of Coherence.

- Vision informs the opportunities to learn in the program
- Both faculty and students are aware of and understand the vision of the program
- Students and faculty agree upon and value the vision of good teaching
- Courses communicate similar ideas about teaching and learning to students
- Courses require students to link theory and practice
- Student-teaching draws upon university coursework
- University coursework draws upon students' practical experiences in schools

Finally, in coherent programs, we hypothesized that there would be considerable opportunities to relate theory with practice—while in fragmented programs, research suggests that students experience little connection between theory and practice (Hammerness, 2006; Grossman et al., 2008). Thus, we look for whether programs require students to make explicit connections between student-teaching, fieldwork or any other practical school-based experiences, to their university coursework. Another theme was the degree to which university coursework draws upon the fieldwork students do—whether student teachers have opportunities to bring samples of real student work from their teaching and analyze it during their university courses or classes, for example (Grossman et al., 2008).

Opportunities to Enact Practice

Finally, we sought to develop a set of enactment indicators we might see, if a program was making an effort to tie candidates' learning opportunities to actual K–13 teaching practices and to the learning of pupils. What would it look like for programs to directly link to classroom practice—in terms of group work, whole class discussions, feedback to students, grounding of teaching in authentic material and real examples?

In identifying these possible indicators, we drew heavily from current conceptions of 'core practices' that attempt to identify pedagogies that teacher educators might use in helping new teachers learn in ways that are more tightly tied to real teaching practices (Ball & Forzani, 2009; Grossman, Compton et al., 2009; McDonald, Kazemi, & Kavanaugh, 2014). In recent work envisioning core practices, Grossman, Compton et al. (2009) suggested that teacher educators think about *deconstructing*, *rehearsing*, and *approximating* practices. Therefore, one of our indicators was whether or not teacher education programs provided students with opportunities to actually *enact teaching or the teacher role* (see Box 3 Indicators of Opportunities to Learn to Enact Practice). For example, a potential 'core practice' that a candidate might work on could be rehearsing the eliciting of and responding to students' ideas (Lampert et al., 2013); or perhaps practicing setting clear routines and expectations for children or manage transitions (Grossman, Hammerness et al., 2009). In addition, orchestrating a whole group classroom discussion might be another possible way to rehearse a core practice of teaching (Grossman, Hammerness et al., 2009).

Text Box 3. Indicators of Opportunities to Learn to Enact Practice

- Plan for teaching and teacher role
- Enact teaching and teacher role
- Analyze pupil learning
- Include teaching materials, artifacts and resources
- Talk about field placements and student teaching
- Take pupils perspectives
- See models of teaching
- See connection to national curriculum, contexts or local curriculum

Some of the work on learning to practice has focused upon providing opportunities for new teachers to look closely at and analyze student work for trends or patterns in learning or misconceptions, or common responses or errors (Boyd et al., 2009; Windschitl, Thompson, Braaten, & Stroupe, 2012). Furthermore, this research has included the work and practical strategies of how classroom teachers grasp and diagnose students' understanding (Boyd et al., 2009). We therefore decided to explore whether a program offered opportunities to *analyze pupil learning* as an important indicator of opportunity to enact practice.

We were also interested in the degree to which student-teachers could investigate tasks and teaching materials relevant for classroom teaching and learning—like access to lesson plans, learning materials, assignments, and problems conveying students' voice. Furthermore, this kind of 'dual ambition' is something that real teachers need to be able to do—to take the perspective and explore the interpretative schemes of the students in evaluating their own assignments, lessons and problems. In a similar vein, we expected that programs aiming at an integration of coursework and real classroom teaching would exhibit more frequent *use of authentic materials and resources*, for example the analysis and critique of classroom textbooks or the design of material to be used in their future classroom setting.

In line with our pilot study we expected that *learning to plan* lessons, units, and year-long curriculum would be included as important elements in methods courses or didactics courses (Klette & Hammerness, 2012). While such exercises may be a common way of simulating the relationship between theory and practice, they were defined as an indicator of program connection to practice. This also included *opportunities to examine local, state or national curriculum*.

Finally, we assembled elements that support *talk about student teaching* as an indicator of connections to practice. Our early pilot work suggests that these provisions were a very frequent part of the methods courses we observed (Klette & Hammerness, 2012). However, the intention to make this indicator work with another dimension, the connection of theory with practice, was not fulfilled. Talk about student teaching was encouraged but often not a subject for theoretical analysis.

The following figure—Dimensions of Theory and Practice in Teacher Education—summarizes the key indicators we used when analyzing ways the different programs might connect theory and practice.

Dimensions		Opportunities to…
Linkage to practice	**1**	Plan for teaching & teacher role(s)
	2	Rehearse and enact teaching & teacher role(s)
	3	Analyze pupil learning
	4	Include teaching materials, artifacts, and resources
	5	Talk about field placement / student teaching experiences
	6	Take pupil's perspective
	7	See models of teaching
	8	See connection to national, state or local context or curriculum
Linkage to theory	**9**	Learn about grand theory
	10	Learn about applied research
	11	Learn about disciplinary / subject matter theory
	12	Learn about research methods
Experience coherence	**13**	See reference to program vision
	14	See connection to other coursework

Figure 1. Dimensions of Theory and Practice in Teacher Education

Our interest was to see these indicators in concert. For instance, if we often observed opportunities to talk about student teaching, but few opportunities to connect theory with practice, we suspect that might be an important finding.

In the two sections that follow, we briefly describe our instruments and key methods for data collection; elaborate some of the early findings from this study, demonstrating some of the interesting patterns we have identified in our initial analysis. We conclude with some discussion of the direction of this work, next steps and potential implications for future research.

Methods

This study, one of the few large, comparative studies of international teacher education in existence thus far, utilizes a comparative design that examines eight programs in universities in five countries: Cuba, Chile, Finland, Norway, and the United States. We focus upon institutions that prepare teachers to teach grade levels 8–13. Participating institutions are the University of Oslo and NTNU (the University of Trondheim) in Norway; the Stanford Teacher Education Program and the teacher education program at the University of Santa Barbara in the United States; the University of Helsinki and Åbo Akademi

University in Finland; the Instituto Superior Pedagógico Enrique José Varona in Havana, Cuba; and Pontificia Universidad Católica de Chile (PUC) in Santiago.

We have chosen to examine the practices in teacher education across these contexts because while each country has made considerable investments in teacher education, they also vary in important ways. Norway is in the midst of a major reform of the teacher education pathways, and Chile is undergoing considerable revisions in policy and practice as well. Cuba, Finland and the United States are exploring new policy approaches to monitoring teacher education, but none of those countries is mounting a national campaign to change teacher preparation. This variation in contextual background and reform efforts in teacher education will make for fruitful comparisons that may shed light upon quality features in teacher preparation.

Drawing upon data that include classroom observations and a collection of related artifacts (including main assignments), program documents (such as programs of study and syllabi), interviews with program leaders and faculty, and surveys of student teachers, the aim of this project is to examine each of the eight programs in order to understand the degree to which each one is *designed around a common vision*; is *coherent*; and provides opportunities to learn to *enact teaching*. All data were collected at each site by trained research assistants, who spoke the language of instruction, and the instruments used were developed within the CATE study. Below we briefly describe the data sources, observation data and survey data, and the instruments used in this data collection.

Classroom observations in language arts and mathematics methods courses

Within each program, data were collected from the language arts and mathematics methods classes, taking into account international research on student learning that insists on studying this topic as a domain specific and not generic question. We observed the full length of the methods courses in each program within a three-week period, which consisted of approximately 6–9 hours of observations in each of the courses at each program, so the total was approximately 12 hours of observation per institution. Each observation was recorded in detailed qualitative field notes, and trained researchers were instructed to capture exact quotes and even body language and non-verbal interactions in the classes observed. Researchers also gathered key artifacts from each class, including assignments given in class, PowerPoint presentations used by the instructors, handouts, and other materials from the class.

Observation protocol: the rubric for dimensions of theory and practice in teacher education

After each observation, researchers completed an "observation rubric" that we developed for the purposes of this project. The rubric was specifically designed for this study and modeled after new developments in classroom observations

from K–12 educational research (e.g., Grossman, Loeb, Cohen, & Wyckoff, 2012; Hill, 2010). The rubric consists of a series of 8 dimensions of teacher preparation described in Text Boxes 1, 2, and 3 above, which we anticipated might be related specifically to program *coherence, in terms of linking theory and practice*, and to *opportunities to enact practice*.

Using the rubric, a more systematic scoring was made of these field notes, in order to characterize all our observation notes on a scale from 1 to 4, where 1 refers to *None*; 2 equals *Touched upon briefly*; 3 refers to *Explored in some depth*; and 4 indicates *Extensive opportunities*. We used the whole three-week observation period as the unit of analyses for this endeavor, due to our interests in the presence or absence of the dimensions as well as their degree. Would there, for example, be variations across the programs with regards to the presence or absence of the dimensions?

Surveys

Our survey was developed specifically for the purposes of this study while building on the one used in the New York City Pathway Study (Boyd et al., 2006). Most of the questions intentionally parallel the Dimensions of Theory and Practice observation rubric quite closely, so for instance, the student teachers are asked to report upon how much opportunity they had to plan for teaching; to enact teaching; to analyze samples of student work. Overall, the survey includes a set of questions about connections between the different elements in the program; about opportunities to enact teaching; about opportunities to analyze and discuss real student work; and about opportunities to reflect upon their own understanding of teaching/learning. Drawing upon models like the NYC pathways survey (Boyd et al., 2006), the students are asked to indicate how *much* opportunity on a scale from 1–4, where 1 refers to *None*; 2 equals *Touched upon briefly*; 3 refers to *Explored in some depth*; and 4 indicates *Extensive opportunities*. The 32 questions cover a range of themes related to the students' own experiences in the program. For instance, one set of question asked about opportunities to enact teaching:

(B) Thinking back now about this particular course, how much opportunity did you have to do the following?

a) Plan for teaching (develop unit plans, or lessons plans, develop instructional material)
b) Examine sample of real students' work
c) Use theory that you are reading in class, to analyze or examine your own experiences as a classroom student teacher

Survey Participants

Altogether, 139 students responded to an initial survey, and descriptive statistical analysis was conducted on these data. However, the sample of

students within each participating university was quite small due to our focus only upon language arts and mathematics course students, which made it impossible to execute any robust comparative analysis. The available 139 responses were then used as a pilot and as a basis for sharpening this instrument. Based on this piloting, we conducted a revised version of the survey and collected 412 questionnaires during the spring semester of 2014 from a larger cohort of students at four of the eight CATE-universities, which allowed us to gather data on students' reports of opportunities to learn over the course of an entire year of study.

Findings

In this section, we share early findings from our initial analysis of the observation data and rubrics, and from the student surveys. As indicated above, we expected to see an emphasis on *planning for teaching* and *talk about field placements* in our data from the observations and questionnaire. Whereas previous studies suggested that US programs tend to make weak connections to national curricula and standards (Boyd et al., 2009), Nordic programs would integrate such elements due to their long tradition for national curricula (Carlgren & Klette, 2008).

We expected to identify *frequent use of learning resources and video data from classroom teaching*, given the growing interest in these media for instructional purposes. Our data should also indicate that *teacher educators engage in modeling* that support teaching, given the tradition of teacher educators writing and examining their own pedagogy, course design, goals and practices (Valli & Price, 2000; see also Borko, Liston, & Whitcomb, 2007).

When it comes to *opportunities to take the students' perspective* and *to analyze samples of student work*, we were uncertain about what we might find. Research from Norwegian teacher training (Kvalbein, 2003; Munthe & Haug, 2009) suggests that student teachers have extensive opportunities to take the students' perspective by taking part in exercises similar to those to which their future students will be exposed. Yet, this training is seldom linked to systematic analysis of pupils' learning, nor do they equip the student teachers with diagnostic tools targeted towards such purposes. On the other hand, there is also a long tradition of teacher educators helping new teachers to learn about teaching mathematics by having student teachers and their students do similar work (e.g., Ball, 1990); and studies of opportunities in the NYC pathways study revealed opportunities in some depth in this area (Boyd et al., 2009). In the section below, we use our analysis of some of the early data from classroom observations and surveys. We discuss whether these hypotheses were confirmed—or disconfirmed—by our initial data.

Analysis of Classroom Observations and Rubrics

Our analysis of classroom observations and rubrics from six of the participating programs, suggests that student teachers in these programs do have some opportunities to connect their learning to the real work of teaching (Hammerness & Klette, 2015; Jenset, Klette, & Hammerness, in review). While these opportunities may seem relatively modest in scale, they represent some progress on earlier data that reported a lower level (i.e., Grossman, Compton et al., 2009; Boyd et al., 2009). Table 1 represents the means of all scores across six teacher education programs analyzed thus far[ii], from both methods classes (mathematics and language arts), using the scale from 1 to 4, where 1 refers to *None*; 2 equals *Touched upon briefly*; 3 refers to *Explored in some depth*; and 4 indicates *Extensive opportunities.*

Table 1.
Observation Scores of Dimensions of Opportunities to Practice in Teacher Education

Dimension	Mean score (SD)
1. Plan for teaching	1.98 (1.28)
2. Enact teaching	1.52 (1.02)
3. Analyze pupil learning	1.46 (0.98)
4. Inclusion of teaching materials	2.87 (1.24)
5. Talk about field placement	2.19 (1.17)
6. Take pupils' perspective	2.79 (1.19)
7. See models of teaching	1.67 (1.02)
8. Connection to national, state, local curriculum	2.08 (1.13)

As Table 1 suggests, students across all six programs in our initial analysis (Oslo, NTNU, Stanford, Santa Barbara, Helsinki and Åbo) had opportunities to review and examine teaching materials and learning artifacts—a pattern that confirmed our expectations. Students also had some opportunities to take the pupils' perspectives: in other words, to look at assignments, materials and tasks, from the perspective of a learner. Students had some opportunities to review and examine national, state or local curriculum; to talk about their field placements; and to plan for teaching as we had hypothesized.

At the same time, some particularly important dimensions of practice—opportunities to experience teacher educators modeling practices; opportunities to enact teaching; and to analyze pupil learning—occurred with low frequency in our observations and in some cases were absent.

Students in our observation data had fewer opportunities to witness their teacher educators modeling practices; to enact practices of teaching (i.e., orchestrate a whole class discussion, role play the development of group work); and to examine samples of student work.

It's worth noting that one limitation when zooming in on targeted weeks within the methods courses, was that interesting events probably took place before or after our observation slot. It needs to be underscored that our study compared programs that varied along many dimensions and where progression and the organization of content was not in synchrony. Although we took every effort to select similar methods courses for observation and to look for synchrony, we may have missed crucial episodes that could shed light on our main issues. At the same time, it seems useful to examine typical events taking place during the methods coursework, since this part of the programs most likely connect to real classroom practice.

We should add that for the questionnaire we have organized the survey so that it is intended to capture and ask about experiences over the course of the entire year. In this way, and across the study, we zoom in on a sample of weeks within the program's methods courses and panorama over the courses covering the entire year.

Survey Data

Our survey data examine opportunities for student teachers over the entire course, and in the program as a whole. The survey was conducted at the end of the year. We examined groups of items from the survey in order to explore more carefully differences in opportunities to enact practice and opportunities to experience coherence and the program vision. We used data from the 412 respondents (in total) from the four programs surveyed for this round. This includes Stanford, Oslo, Varona and PUC, programs with large enough student samples to compare. The survey consists of 32 items, 13 of which (items 1A–1J + 1O–1Q on the survey) were used to explore the opportunities to enact practice, and 19 (items 2A–3N on the survey) were used to explore the perceived and experienced coherence and vision (see Appendix A. Reports of Opportunities to Learn on the Survey, by Program).

Opportunities to enact practice and connect to the real work of teaching

At an overall level, *most* opportunities (highest mean values) were reported by all students on the following items: discussing experiences from student teaching in their university classes; plan for teaching; examine national curriculum/standards/guidelines; and examine actual teaching materials. Students reported *some* opportunities to do the following: practice or rehearse something they planned to do in their K–12 classroom; experience their teacher educator modelling; and examine samples of K–12 student work. We found that students reported the *least* opportunities (or lowest mean values) to do the following: analyze students' learning; and examine transcripts of real K–12 classroom talk or student discussions.

We also looked for differences and similarities on these items between programs. We found a few similarities. For instance, across the programs, we

found that the students reported a similar amount of opportunity to "Practice or rehearse something you planned to do in your K–12 classroom" (*Welch F* [3,403] = 1.40, p = .24); mean scores ranged from 2.53 for the PUC students to 2.83 for the Stanford students (see Appendix A). In other words, students seemed to agree—across these four programs—that their teacher education program offered them *some* opportunities to practice or rehearse something they planned to do in teaching in a real classroom.

However, we also found some marked differences between programs. For instance, on items addressing student teachers' opportunities to enact practice or items connected to the real work of teaching, students in the Stanford program tended to report the most opportunities (see Appendix A). For instance, compared with the other three programs, Stanford students scored significantly higher on eight of eleven items representing practice opportunities.

Vision and Coherence

We found more similarities across programs on items about relative coherence of learning experiences and program vision than on the above practice items. Overall, students in the four programs also felt that their programs "articulated a clear vision of teaching and learning" and that the courses in their programs "seemed to be intended to build an understanding over time". And, across all four of the programs surveyed, students reported *some* opportunities to "try out the theories, strategies and techniques I was learning in my classes at the teacher education program"—in fact this item was given the highest score among all the questions they were asked. On the other hand, students did not always feel that they had opportunities in their fieldwork to observe "teachers using the same theories, strategies and techniques I was learning about in my courses at the teacher education program". They also felt less strongly that their fieldwork was "consistent with what [they] learned in their coursework"—suggesting that while the vision may be clear within the coursework and experiences at the university, the degree of consistency around the program vision may be weaker between the school sites and the university program.

Comparison of the four programs revealed fewer differences compared to the enactment of practice items. One finding that stood out was that students from the Oslo program reported less coherence than students in the other three programs, and on several key items measuring coherence, they reported significantly lower opportunities (Canrinus, Bergem, Klette, & Hammerness, 2015). For instance, they were less likely to agree that they "saw connections among ideas, and concepts across program courses"; or that "the faculty made explicit references to other courses". Given that the Oslo program is in the midst of a major revision of the curriculum and program design, this kind of finding makes sense and we expect that a second survey would likely reveal an increase in coherence once the reform is more fully in place.

Findings Confirmed Across Sources of Data

Furthermore, these initial findings seem to hold up across our analysis of the classroom observations and of the student surveys—in other words, across both sources of data (Jenset et al., in review). For instance, in terms of using and analyzing real teaching materials, on the survey students reported "explored in some depth" on these opportunities as did our classroom observations. In terms of planning for teaching, the survey data suggested extensive opportunities, while the observational data suggested some opportunities. And across both sources we found that student teachers have somewhat fewer opportunities to analyze pupil learning and to enact teaching, but still, perhaps more opportunities than we might have expected. Furthermore, the survey captures a longer period of time, while the observations are more targeted to a specific time period, so each data contributes to a different 'perspective' of opportunities. However, the end of the year survey confirmed most findings from the observation data. In fact, we found no opportunities that differed dramatically across the observations and surveys. We have found no instances when we saw few or no opportunities provided by the methods courses, while student reports on the year end survey suggested many opportunities. Seeing some variation between opportunities that are "touched upon" and "explored in some depth" seems reasonable, and to some degree expected, given the timing and nature of our data collections.

Two particular findings which stood out in the observation data—fewer opportunities to enact teaching and analyze pupil learning—were confirmed to some degree by the survey data. While the survey data suggests touching upon opportunities to enact teaching—more than our observation data revealed, it was still quite not as frequent as some of the other opportunities we documented. Our survey data also revealed even fewer opportunities to examine student work and/ or analyze student learning.

Discussion

Given an increased concern in teacher education over the last decades, and the efforts to ground teacher education more closely in the real work of teaching, it is noteworthy that in this initial analysis we do find connections to classroom practice and actual teaching materials in the programs participating in this study, given earlier research findings (Darling-Hammond et al., 2005; Kennedy, 1999; Niemi & Kohonen, 1995). We find that programs are providing a number of opportunities for student teachers to read and analyze and make connections to national curriculum, and to artifacts of teaching, for instance, and these appear to be among the more frequent means by which teacher education is offering opportunities to ground the learning of pre-service teachers in the real work of teaching. This is an especially interesting finding given the rarity of these

opportunities as revealed by prior studies (Boyd et al., 2008, 2009). Of course, one may question the importance of using the element of national curriculum as indicator of connection to practice since such a link may be structured in rather different ways. These are aspects that we will be investigating in more detail as we move past these initial analyses.

The finding that student teachers in these programs have opportunities to plan for teaching (i.e., to develop lesson plans) and to discuss their fieldwork experiences, confirms our hypotheses that this type of linkage to practice is well established across the teacher training programs. Given the relative time that classroom teachers do spend developing and adjusting curriculum (OECD, 2014), these do seem to reflect some opportunities to do the 'real work' of teaching. At the same time, it would be interesting to explore what these opportunities look like in the different programs, and the degree to which these experiences are connected to learning theory, subject matter theory, or other ways of supporting curricular decision-making—we plan to unpack these opportunities in more depth as we continue our work.

While many of the initial findings from the surveys, corroborated by our observational data, confirm our initial hypotheses (such as opportunities to plan and to talk about field placements), this cross-case study suggests some modest developments in the field of teacher preparation. We had anticipated a number of opportunities to examine or make connections to national curriculum, standards or local curriculum given the central role these materials play in both Scandinavia and the US (in light of the introduction of a national curriculum)—and both our surveys and observational data suggest some depth to these opportunities.

However, our data suggest that there are some aspects of the real practice of teaching which student teachers still encounter less frequently. Our data suggest student teachers have fewer opportunities to rehearse, role play or simulate teaching practices or the teaching role. Although earlier research has found such opportunities even rarer (Boyd et al., 2009, 2008), and this international study may suggest that in more recent years, programs are offering somewhat more opportunities in this area—this appears to remain an area for further work.

We were especially interested in the finding of fewer opportunities to analyze student work, given the very important role this plays in teaching. While in some programs there were courses on assessment or evaluation, we were still surprised that we saw few instances of these opportunities in methods courses—ostensibly a natural site to look at student work and learning in one's discipline. Furthermore, the year-end survey confirmed this finding. This particular area is worth diving into in more depth and we expect to look into this finding more carefully.

Of course, in this initial analysis of data, we cannot determine the *quality* of the opportunity—we can only examine the patterns of opportunities that appear. For instance, providing opportunities to talk about student teaching does not

necessarily mean that students are benefiting from connections to theory, to reflect upon and make decisions about further impact on practice, for instance. Nor does having opportunities to analyze pupil learning, mean that prospective teachers are truly developing the abilities to identify student strengths, learning needs, fragile understandings, nor to appreciate marked growth and emerging expertise and knowledge. As we continue to push this analysis we will be examining these kinds of opportunities in detailed qualitative analyses, to help shed light upon the *quality* of opportunity and the depth of connection to theory and cognition.

In some areas, these findings point to some potential imbalances around the connections to teaching practice and to opportunities to enact the work of teaching. Across our sources thus far, we saw more opportunities to plan for teaching, to examine curriculum, and to talk about student teaching—all fairly typical activities in teacher preparation (Darling-Hammond et al., 2005; Hauge, 1994; Klette & Hammerness, 2012). Yet, opportunities to actually enact classroom strategies or specific elements of teaching, were fewer across our data sources in this initial analysis, perhaps suggesting some progress beyond earlier studies of novice teacher preparation (Grossman, Compton et al., 2009), but it is difficult to determine whether this is an improvement over earlier years in teacher education.

The initial data from these programs are encouraging in demonstrating that students felt that they had opportunities to learn about the programs' vision of good teaching; to connect ideas from one class to another; and to experience coursework that was intended to build understanding over time. In much of the literature on teacher education, the need for a common vision and greater coherence has been a persistent problem, even while scholars increasingly recognize their role and importance for students. Our international findings seem to suggest the possibility of a fairly explicit and integrated vision in the programs we studied, and some curricular alignment around those visions—although our findings also indicate less coherence between school sites and university experiences.

Implications

One value of reports on the relative 'degree of opportunity' is that they can give insight into the overall patterns across and within the programs studied (Hammerness & Klette, 2015). These overall patterns might help raise interesting questions about the relative emphasis on different kinds of opportunities in teacher preparation programs studied—especially helping to reveal the kinds of opportunities that seem to be available and those that are not as frequent. For instance, the finding across these programs in these different countries that some aspects of learning to teach (planning; becoming familiar

with state or national curriculum) are given somewhat greater emphasis in the programs we studied than others (such as rehearsals, role play, simulations; or analyzing student learning) may be helpful. This suggests that programs might consider the range of activities and practices in which teachers need to engage. Indeed, data from these indicators could support fruitful conversations about areas of focus, and potential areas for exploration for teacher education programs in different contexts. Program faculty might be able to use indicators—such as these we have developed—both to help identify areas of strength and focus in program curriculum and coursework, as well as to determine areas that receive less emphasis.

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[i] 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).

[ii] The two Spanish programs (PUC (Santiago) and Verona (Havana)) were not included in the analyses at this point.

Appendix A. Reports of Opportunities to Learn on the Survey, by Program.

		Program				
		Varona	Stanford	Oslo	PUC	Total
Enact-ment	1A Plan for teaching	2.59 (1.06)[a]	3.82 (0.42)*	3.25 (0.70)	3.14 (0.96)	3.12 (0.95)
	1B Practice or rehearse something you planned to do in your K–12 classroom, in this course	2.69 (0.99)	2.83 (0.72)	2.70 (0.84)	2.53 (1.07)	2.69 (0.92)
	1C Examine samples of K–12 student work	2.06 (1.01)[a]	2.85 (0.82)	2.93 (0.75)	2.62 (0.97)	2.58 (0.97)
	1D Examine samples of your own students' work	2.28 (1.19)	2.82 (0.86)*	2.27 (1.03)	2.12 (1.09)	2.34 (1.09)
	1E Examine actual teaching materials	2.28 (1.11)[a]	3.48 0(.69)*	2.69 (0.75)	2.94 (1.02)	2.74 (1.02)
	1F Examine national/state/local/professional curriculum/standards/guidelines	2.00 (1.08)[a]	3.64 (0.66)*	3.16 (0.74)	3.27 (0.90)	2.90 (1.08)
	1G Examine transcripts of real K–12 classroom talk or student discussions	2.05 (1.05)	2.72 (0.89)*	2.09 (0.83)	1.88 (1.02)	2.15 (0.99)
	1H Watch or analyze videos of classroom teaching	2.08 (1.09)	2.99 (0.90)	2.78 (0.80)	2.21 (1.01)	2.47 (1.03)

	1I Discuss experiences from your own student teaching (field work) in your university classes	3.37(0.74)	3.44 (0.67)	3.21 (0.70)	3.10 (0.88)	3.29 (0.75)
	1J Experience your teacher educator modeling/demonstrating effective teaching practices	2.95 (0.99)	3.62 (0.54)*	3.06 (0.83)	2.54 (1.05)[a]	3.02 (0.95)
	1O Solve problems, read texts, or do actual work that your own pupils will do	2.74 (1.06)	3.01 (0.85)	2.45 (0.90)	2.64 (0.94)	2.68 (0.97)
	1P Learn about general research	2.64 (1.06)*	1.75 (0.83)[a]	2.16 (0.83)	2.17 (1.07)	2.25 (1.01)
	1QLearn about research methods you can use in investigating student learning or other questions in your own classroom	2.58 (1.05)	2.27 (1.01)	2.18 (0.80)	2.12 (1.02)	2.32 (0.99)
Vision and coherence	2A Learn about the vision of good teaching that your teacher education program promotes	3.18 (0.82)	3.82 (0.46)*	2.91 (0.85)	2.94 (0.90)	3.16 (0.86)
	2B Connect ideas from one class to another in the same course	3.21 (0.93)	3.47 (0.67)	2.82 (0.70)[a]	3.40 (0.78)	3.18 (0.83)
	2C Connect ideas from one course to those in another	2.92 (1.06)	3.29 (0.78)	2.76 (0.72)	3.18 (0.83)	2.99 (0.90)

2D Trace your own trajectory of learning – reflect upon the ways your own understanding of teaching and learning was developing	3.07 (0.89)	3.83 (0.50)*	2.89 (0.83)	2.74 (0.89)	3.09 (0.89)
2E Make connections between educational theory and the actual classroom teaching you were engaged in	2.91 (0.90)	3.58 (0.62)*	3.02 (0.75)	2.92 (0.87)	3.06 (0.84)
3A The program articulated a clear vision of teaching and learning	3.50 (0.56)	3.73 (0.48)*	2.87 (0.74)	2.90 (0.71)	3.24 (0.73)
3B I heard similar views about teaching and learning across the program courses	3.12 (0.70)	3.55 (0.58)	2.79 (0.76)[a]	2.97 (0.72)	3.07 (0.75)
3C The faculty knew what was happening in my other courses (i.e. assignments, readings, key ideas)	3.30 (0.56)	3.13 (0.71)	2.24 (0.89)	2.73 (0.90)	2.84 (0.88)
3D My courses within the teacher education program seemed to be intended to build an understanding over time	3.36 (0.61)	3.54 (0.63)	3.06 (0.59)	2.90 (0.77)	3.21 (0.68)
3E When ideas or readings were repeated in my courses, they were elaborated/treated more deeply	2.99 (0.82)	2.94 (0.77)	2.32 (0.69)[a]	2.67 (0.79)	2.72 (0.82)
3F I saw connections among ideas, and concepts across program courses	3.35 (0.61)	3.63 (0.52)*	2.63 (0.72)[a]	3.21 (0.61)	3.16 (0.73)
3G_recoded What I learned in my fieldwork was consistent with what I learned in my coursework	2.00 (0.93)	2.65 (0.72)	2.37 (0.80)	1.73 (0.77)	2.17 (0.88)

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	3.56 (0.69)	3.54 (0.52)	2.94 (0.71)	3.00 (0.76)	3.26 (0.75)
3I What I learned in my courses reflects what I observed in field experiences	2.86 (0.97)	2.94 (0.57)	2.81 (0.71)	2.59 (0.77)	2.81 (0.82)
3J The faculty was knowledgeable about the program as a whole	3.58 (0.66)	3.66 (0.61)	2.58 (0.80)[a]	3.10 (0.73)	3.20 (0.84)
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	2.39 (1.00)	2.80 (0.83)*	2.43 (0.77)	1.87 (0.89)[a]	2.37 (0.93)
3L The faculty made explicit references to other courses	3.11 (0.62)	3.20 (0.67)	2.38 (0.76)[a]	2.71 (0.72)	2.83 (0.77)
3M The faculty was knowledgeable about what I was required to do in my field teaching experience	3.57 (0.58)	3.18 (0.81)	2.17 (0.71)[a]	2.70 (0.84)	2.92 (0.92)
3N The faculty was knowledgeable about the quality and nature of my field teaching experiences	3.41 (0.67)	2.83 (0.82)	2.23 (0.72)	2.54 (0.94)	2.79 (0.91)

Note: Mean scores per item per program (standard deviation in brackets).
* = significantly higher score compared to the other three programs
[a] = significantly lower score compared to the other three programs