The Development of Pedagogical Understanding Among Student-Teachers in a Four-year Initial Teacher Education Programme

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1. Introduction
Having identified a knowledge gap about how some student-teachers turn out to be "more thoughtful" than others, Fairbanks et al. [1] suggest that 'teachers' self knowledge and sense of agency,' together with the development of the required pedagogical content knowledge, are essential in the preparation of teachers who are responsive to student needs. Our research team is interested in investigating the relationship between different dimensions of the student-teachers' learning such as the integration of pedagogical understanding with the teaching contexts, integration of feedback from lecturers and supporting teachers, with an attempt to explain such differences. We are addressing two research questions:
1. What are the differences in pedagogical understanding among student-teachers in an initial teacher education programme?
2. How may the differences in pedagogical understanding among student-teachers be explained?
We propose to explain the differences in pedagogical understanding among student-teachers' professional learning in terms of three major dimensions, 1.Integrating different aspects of learning; 2. Interaction with context and 3. Focus of concern. For analytic purposes, we examine the various dimensions one after the other, yet it is important to note that they are inter-connected rather than discrete, and together they explain the complexity and dynamics of the development of pedagogical understanding.

2. Literature
The examination of student-teachers' pedagogical understanding can be informed by researchers' work on teachers' professional knowledge and the cognitive dimension of teachers' professional practice. Shulman's [2] work provides a useful basis for examining domains of teacher's knowledge. Koehler and Mishra [3] highlight the importance of developing fluency and cognitive flexibility in each of the key domains of professional knowledge, and the manner in which these domains and contextual parameters interrelate.
Levin [4] portrays the development of pedagogical understanding as progressing from quite global, vague or confused initial thinking to increasingly better articulated, differentiated and integrated understandings of behaviour, development, learning, and teaching.
Student-teachers' professional learning can be attributed to three major sources of influence, namely pre-training experiences, teacher education coursework, and fieldwork in the teacher education programme [5].
In ITE coursework, Grossman, Hammerness and McDonald [6] regard that foundational courses are meant to impart "conceptual tools" (e.g. principles, frameworks, or guidelines for decisions about teaching and learning), whereas methods courses provide "practical tools" (e.g. practices and strategies that teachers can enact in classrooms).
Researchers' work student-teachers' focus of concerns and interaction with context further illuminate our understanding of student-teachers' professional learning from teaching experience in fieldwork. Fuller and Bown's [7] work marks the progression of teacher concerns from survival, mastery to a stage in which the teacher may either settle into stable routines and become resistant to change or may become consequences-oriented, i.e. concerned about impact on students and feedback about oneself. Ward and McCotter [8] view teacher's focus of concerns about practice as ranging from "focus on self, to focus on students, to focus on the impact of broader concerns on student learning" (p.250).

3. The research context

3.1 The programme and the participants
The findings reported in this paper are part of a larger longitudinal study which used both quantitative and qualitative methods and was conducted in the context of pre-service teacher education at the Hong Kong Institute of Education during 2006-2011. Findings from three cases were selected as information-rich cases [9] to illustrate professional learning in this paper, and each was assigned a pseudonym.

3.2 Data collection
The paper adopts a qualitative approach using case studies to track professional learning along with identifying possible factors that may have influenced the learning experience of the student-teachers, as the method offers an in-depth understanding of student-teacher learning in its natural setting [10]. We followed the same group of student-teachers from their Year 1, and carried out five in-depth interviews over the four years. An interview was conducted at the end of each year, so as to understand their thoughts and meaning construction [10] and their ideas and experiences in the programme [11].

4. Findings and Discussion

In order to answer the two research questions, we have identified the pedagogical understanding of the three student-teachers as they progress in the programme. For Peggy and Lilian, their pedagogical understanding is observed to have been enriched during the four-year period, while that for Stephanie remains confused throughout. In an attempt to explain this difference in their pedagogical understanding, the research team analyse the three cases to reflect how each integrates different aspects of their learning e.g. the messages and feedback they received from the campus-based programme and the field experience, as well as the way they integrate and work with constraints or challenges in the teaching contexts. Finally, the focus of concerns of each case is presented and changes during the programme are also identified.

4.1 The three cases and a continuum

In our analysis, we categorize student-teachers' pedagogical understanding into 'articulated and integrated', 'articulated and expanding' and 'vague'. The dimension 'integrating different aspects of learning' provides a continuum showing 'thorough', 'partial' and 'weak' integration among the cases. These two dimensions are related. Peggy who is most articulated about her pedagogical understandings can also integrate her learning from a wide range of sources such as integrating feedback from supporting teachers and supervisors. Lilian was less well articulated about her perceived best teaching strategy early on, but demonstrates a gradual shift to student-centered teaching approaches. Stephanie at the other extreme is in a confused state and is not able to integrate different aspects of her learning. Stephanie started with raising doubts about the 'theories' in the taught modules and remained in a confused state throughout the programme. She saw feedback from supporting teachers as devoid of theory, while seeing feedback from supervisors as lacking in practical relevance. She struggled with her prior learning experience following a traditional approach of teaching where teachers gave instruction and students followed.

The analysis under 'integration with contexts' covers the student-teachers' interpretations of the teaching contexts. This constitutes their approach to learning as to whether they see the contexts as presenting challenges and address them positively, or whether they blame the contexts as posing incircumventable constraints impacting on both their pedagogical understanding and actions in practice. At one extreme the student-teacher is 'agentic' [1], [12], that is actively addressing challenges in the teaching context, while 'confused' is at the other extreme where the student-teacher blames the teaching context as posing constraints and is struggling between actual and best practices. Peggy was determined to put forward her convictions in teaching despite classroom management constraints. Lilian was limited initially by constraints in the teaching contexts but was gradually able to reflect and evaluate her own teaching. She has taken into consideration pupils' learning problems and worked to address them. Stephanie blamed contextual constraints. She was not able to figure out ways which facilitate pupils learning, nor was she able to work out how her teaching may be informed by her learning in the programme.

The focus of concern ranges from impact on pupils' learning, teaching tasks and self or teacher-centered. Peggy demonstrates concerns on pupils' learning throughout the four years and she was concerned about nurturing pupils' interest as well as improving their learning in the subject. Lilian is mainly concerned about the design of their teaching in considering the time planned for activities and pupils' presentations during classes. Stephanie holds concerns about herself as a teacher in relating her previous education experience, her own character and her ability to teach. The following sections look into each of the dimensions and will establish with the support of the interview data on categorization in each dimension.

5. Discussion and implications

The findings of this paper add to the literature by proposing a framework to analyze and unpack the complexity involved in the development of pedagogical understanding among student-teachers. The framework allows researchers to articulate and describe professional learning. It provides a tool for teacher educators to analyze both the content and the process of professional learning among student-teachers, thus offering suggestions for support and improvement. In a similar vein, Ward and McCotter [8] developed a rubric for reflection among pre-service teachers. The framework proposed in this paper achieves similar functions as the rubric for reflection. It may achieve a formative function, providing scaffolding, making the qualities and developmental pathways which we desire as teacher educators visible.

As teacher educators, this dynamic representation of professional learning helps to explain why some student-teachers or teachers turn out to be 'more thoughtful' than others, a question which Fairbanks et al. [1] asked and proposed an answer to based on a review of the literature. This persistence among 'thoughtful' teachers can be attributed to a sense of agency which is developed with an awareness of individual beliefs and theories about learning and teaching. It therefore becomes crucial for teacher educators to identify ways to nurture this sense of agency among student-teachers. In line with the suggestion from Fairbanks et al. [1], teacher educators need to provide opportunities in teacher education programmes for student-teachers to develop 'self-knowledge', 'self consciousness about who they want to become as teachers' (p.167) and to negotiate how to accomplish their targets despite complex classroom situations.

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