TITLE:

Theories of Bernstein and Shulman: Their relevance to teacher training courses in England using adult numeracy courses as example.

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ABSTRACT

Since 2002, adult numeracy specifications have been introduced for the first time in England. This article investigates the relevance of Bernstein and Shulman's theoretical frameworks to teacher training using the new level four adult numeracy teacher training programmes as an example. The article discusses Bernstein's theories relating to pedagogic methods of acquisition and transmission. It investigates the recontextualization process in which subject-content and teaching standards may be translated into teaching approaches, which can be used by trainee teachers. It also investigates Shulman's model of pedagogical reasoning and action in relation to teacher training.

The article bases its evidence on a research project, which evaluates teacher-training courses in adult numeracy and literacy, and English for speakers of other languages in England.

The article suggests that the two educationists' theories have significant relevance to the design and implementation of teacher training courses. It also suggests that they can be used alongside each other with each educationist's theories having their particular strengths. Bernstein's theories emphasises a rigorous approach to course structuring; Shulman's theories offer an insightful approach to how a trainee transforms subject and teaching standards knowledge and skills into possible teaching methods to help her learners understand the subject.

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1. Introduction

The intention of this article is to discuss the relevance of Bernstein and Shulman's theoretical frameworks - transmission and transformation respectively - to teacher training in the post-compulsory education sector in England. The reasons for choosing the two educationists are that their theories relate to teacher training course structuring and implementation and that their theories are widely acknowledged in their field.

This article has five sections. First is the Introduction and is followed by a description of the research project. The findings from this project, that evaluates teacher-training courses in adult numeracy (and literacy, and English for speakers of other languages) in England, are applied in this article. The views reflected in this article are solely the author's. The third section investigates the theoretical frameworks by Bernstein and Shulman. The penultimate section is a discussion of the relevance of the two educationists' theories to teacher training in general, and with reference to the recent level four adult numeracy teacher training programmes in particular. The last section summarises the theories from the two educationists and suggests a way forward to applying them.

The introduction of adult numeracy subject specifications by the Department for Education and Skills[1] (DfES) and the Further Education National Training

[1] The Department for Education and Skills, a government body, was formed to create opportunity, release potential and achieve excellence for those wanting to be educated in England. It is responsible for issuing policy documents relating to education.

Organisation[2] (FENTO) in September 2002 alongside the current generic Teaching and Supporting Learning standards (generic teaching standards for short) represents a significant move by the government. It is "the first time in post-16 education, teachers of adult literacy and numeracy have the opportunity to work towards professional teaching qualifications" (DfES & FENTO 2002 Forward pp 1). This development and the research project evaluating the new teacher training courses resulting from the new subject specifications have prompted a reassessment of applicable educational theories. This reappraisal also represents a fresh chance for course designers and trainers to review their approaches to designing and implementing new training courses in adult numeracy.

The recent report published by the inspection body, Ofsted (2006), suggested that "few opportunities were provided for trainees to learn how to teach specialist subjects" (p1) due to "insufficient integration between taught and practice" (p16) elements on teaching training courses by further education teacher training providers. It called for a linkage between training trainees to be teachers in their specialist subject areas. The Foster Report (2005) and the further education White Paper (2006) support the idea of better training for FE teachers. The conceptual frameworks of Bernstein and Shulman with regard transmission and transformation respectively, are particularly useful in enabling teacher trainers to raise teacher-training standards by emphasising the importance of linking teaching skills to subject knowledge.

[2] FENTO, a government body, was responsible for teaching and training standards in post compulsory education sector. It has now been superseded by the Lifelong Learning UK (LLUK), which "is responsible for the professional development of all those working in libraries, archives and information services, work-based learning, higher education, further education and community learning and development" (LLUK Homepage, http://www.lifelonglearninguk.org/ @ 27/05/06).

The intention of these new teacher-training programmes in adult numeracy, like other generic ones, is to teach trainees how to be teachers. This article may have relevance for teacher training in the compulsory sector (i.e. primary and secondary to age 16) since as recent as 1998, subject standards existed for subjects like English, mathematics, science and information and computer technology. Their subsequent withdrawal meant that providers in compulsory areas have used them for guidance and have given providers a clearer focus regarding subject knowledge (Lucas. Casey, Loo, McDonald, Sagan and Koutsoubou forthcoming).

With the existence of subject specification and teaching standards in the post-compulsory sector since 2002, the aim of such a course is to acquaint trainees with them in order that they understand and able to use their new subject and teaching knowledge and skills to teach adult learners in their classes. Bernstein (2000 and 1990) viewed the previous process as part of the pedagogic device of acquisition and transmission. Included in this device was the idea of recontextualization where the link between subject content and teaching standards could be made more explicit and then be translated into teaching approaches in trainees' classes. Shulman (1987) provides an alternative viewpoint to Bernstein's with his pedagogical model illustrating how a trainee may learn to be a teacher in her subject.

2. The research

The major aims of the research project were to investigate: the diversity of curriculum approaches to teaching the subject specifications, the balance between subject knowledge, pedagogic knowledge and practical teaching skills, and how they were

translated into classroom skills[3].

The list of courses from the sample was drawn initially from FENTO. Seventeen level four courses on the adult numeracy sample were interviewed. Level four is equivalent to first year of a first degree at university in England. Nine teaching institutions in England were involved, four from further education (FE) colleges[4], and five from higher education institutions (HEIs). Nine regions in England were represented. The courses consisted of two varieties: joint and subject specific ones. In theory, joint courses are those, which deliver subject specifications and generic teaching standards usually to trainees with no mathematics knowledge at level four and generic teaching qualifications. Certificate of Education in adult numeracy subject specific and Post Graduate Certificate of Education in adult numeracy subject specific are examples of such courses. Theoretically speaking, subject specific or stand-alone courses are those, which teach subject specifications alongside trainees carrying out teaching practice in related subject. These are mainly for practicing teachers in the field with a generic teaching qualification. An example of these courses is Certificate in adult numeracy subject specific.

This project uses three methodological approaches namely: qualitative, quantitative and 'Practitioners' Sessions' (PS). Seventeen staff/trainers and 142 trainees who were sent questionnaires; two questionnaires for staff at the start and end of courses, and three for trainees at the start, during and end of their courses. For the qualitative

[3] The team comprised of Norman Lucas, Helen Casey, Sai Loo, Jeremy McDonald, Olivia Sagan, and Maria Koutsoubou. The report 'Towards a professional workforce: adult literacy, ESOL and numeracy teacher education 2003 – 2005', due to be published in 2007 was funded by the National Research and Development Centre for adult literacy and numeracy (NRDC).

[4] FE colleges are post compulsory teaching institutions offering vocational and academic courses to those learners from age 16 upwards. About half of the learners are over 21.

method, all staff members were interviewed using a semi-structured approach and usually on a one-to-one basis whenever possible. Trainees were interviewed in focus groups, between three to ten in numbers for each focus group interview, which totalled eighteen. In situations where one group could not be interviewed twice during the length of their course, another group from the same course was found.

The PS method consisted of three opportunities during the duration of the project for trainers to meet in London to discuss preliminary findings from this project and follow-up findings from the previous one-year project (Lucas, Casey, Loo, McDonald & Giannakaki 2004), to share opinions over areas of common interests, and to network. The findings are a result of analysis and triangulation from the data amassed from the three research methodologies together with course documents.

3. Theoretical frameworks of Bernstein and Shulman

This section of the article discusses theories by Bernstein and Shulman that are relevant to training of adult numeracy teachers in England. With Bernstein, it looks at pedagogical practices such as transmission, recontextualization, explicit and implicit, and delivery styles of sequential and parallel. With Shulman, it discusses his model of pedagogical reasoning and action.

3.1 Bernstein

Bernstein started with codes, elaborated and restricted, to explain the relationships between social classes in a society. He was mainly concerned with the disadvantages

of people from the working class as opposed to those in the middle classes. According to Sadovnik (Power, Aggleton, Brannen, Brown, Chisholm & Mace 2001), Bernstein went further and used code theory to investigate schools and pedagogical practices: which included what knowledge (curriculum) to teach to learners, how it is taught (transmission), and how knowledge is realised (evaluation/performance)[5]. Bernstein viewed pedagogic practices in two forms – visible/explicit and invisible/implicit – and related to these are the ordering of teaching curriculum either sequentially or in parallel and the pacing of the delivery. These pedagogic theories are discussed next.

Bernstein (2000) saw recontextualization process as consisting of two parts: the curriculum (i.e. the 'what') and the pedagogical approach, which relates to theory of instruction (i.e. the 'how'). Thus recontextualization straddles two parts of his pedagogic practices – acquisition/curriculum and transmission. He defined recontextualizing principle as one "which selectively appropriated, relocates, refocuses, and relates other discourses to constitute its own order and orderings" (Bernstein 1990 pp 184). "The recontextualizing rules regulate not only selection, sequence, pace, and relations with other subjects, but also the theory of instruction from which the transmission rules are derived" (Bernstein 1990 pp 185). This is the second stage of his pedagogic practices.

[5] The first stage of Bernstein's (2000) pedagogic practices – acquisition/curriculum – deals with types of knowledge, both horizontal and vertical, and the make up of vertical knowledge to form a curriculum. Horizontal knowledge is knowledge that is everyday and verbal and has features such as context, tacit nature, and locality. It is acquired in embedded forms like in peer groups and work places and is usually not easily translated. Turning to vertical knowledge, it has the following characteristics namely: explicit, coherent and systematically structured with rules of acquisition and transmission and is mediated through recontextualization. From the context of adult numeracy teacher training courses, it is usually the vertical knowledge that is learnt and as such constitutes the curriculum, and with it used in classes by teacher trainees as it can be made explicit and put into text. The vertical knowledge in the case of this article is subject specifications and generic Teaching and Supporting Learning standards or generic teaching standards for short.

In terms of teacher training courses, recontextualization process has to do with 'how' parts of the subject specifications and generic teaching standards are selected, taught in terms of order, required time to cover the contents and related to each other together with the way in which the course is delivered. The state has a hand in this process in terms of the selection of its agencies. He named this as an official recontextualizing field (ORF). In relation to numeracy, it was through New Labour that the subject specifications for this adult subject were finally published by DfES and FENTO in 2002. The other field – pedagogic recontextualizing field (PRF) – relates to pedagogues in schools and colleges, education departments, related journals and other related institutions (Bernstein 2000). In terms of numeracy, PRF relates to those FE colleges and universities that are involved in the delivery of these training courses.

As part of the transmission pedagogic practice, it is also involved in the sequencing of curriculum. Bernstein viewed sequencing rules as transmission that extends in time and thus one part of the content comes before another part (Bernstein 1977). Extending this principle further, using adult numeracy as an example, a sequential approach to teaching the subject specifications might involve teaching numbers first before algebra as they are separated parts of the specifications. Theoretically, there might be instances where a parallel approach be used where two parts of the curriculum could be taught in different classes but alongside each other in the same term or timeframe.

The final part of this transmission stage, which maybe relevant to teacher training courses is visible and invisible pedagogies (Bernstein 1977). These two types are

relevant from the point of view of the acquirer i.e. trainee teacher. A visible or explicit approach is one, which the acquirer is aware of or has knowledge of the content that is being taught. Trainee teacher in relation to numeracy training course is aware of which part of the specifications or teaching standard that is covered. She would also be able to distinguish between them. In the case of invisible or implicit approach, a trainee will not be told but only the transmitter i.e. the trainer knows the specifications and teaching standards. The trainee will not know of her progress either, only her trainer.

So, what are the criticisms of the above frameworks? They form part of a wide sociological approach of reproduction of power in relation to education, society and families. They have a profound impact on how teacher-training courses are viewed as already shown above. Like in any theories, there are not perfect. The theories were created for schools and not adult learners and so their applicability must be questioned. There appeared to be less than detail explanation by Bernstein regarding recontextualization process especially how exactly the vertical knowledge (course curriculum) interfaces with horizontal knowledge (trainees' past teaching, employment and relevant life experiences) in the transmission stage.

3.2 Shulman

Shulman (1987) concentrates on the types of knowledge[6] that are required in teacher training and the processes trainees needed to go through to becoming a teacher, which

[6] The seven categories of knowledge base, according to him, that are required by a teacher are: content knowledge, curriculum knowledge, general pedagogical knowledge, pedagogical content knowledge, knowledge of learners and their characteristics, knowledge of educational contexts, and knowledge of educational values.

he calls ‘Processes of Pedagogical Reasoning and Action’.

A model of pedagogical reasoning and action advocated by Shulman (1987) had six stages namely: comprehension, transformation, instruction, evaluation, reflection and new comprehensions. Comprehension stage requires understanding of the subject area like numeracy but also values, characteristics, needs and learning interests of students (trainees and their learners).

Shulman suggested that in order for a trainee to teach, he needed to transform his understanding or comprehension of the subject matter. Thus transformation requires some ordering, which includes preparation of subject materials, their understanding and critical interpretation, representation that requires ways in which ideas and concepts of the subject materials can be conveyed to learners using examples, metaphors, experiments and demonstrations, and instructional selections, where teaching and learning styles like lecture, group learning and project work can be applied in a learning environment. The other two transformation processes are adaptation of the previous three in which the teaching and learning materials are adapted to a teacher’s generic cohort, and tailoring the adaptations to a teacher’s specific cohort.

In terms of adult numeracy, understanding and critical interpretation of numeracy subject matter are important for a trainee before she can teach the subject. Knowing what teaching and learning styles to apply for a particular mathematics topic is also useful in the pedagogical sense and using ways of conveying it is a must. Adapting to generic and to specific cohorts have their use and especially to specific learner group.

The third pedagogical process from Shulman's model is instruction. It requires the most important of teaching acts like organising and managing the classroom, providing succinct explanations, handing out and assessing work, interacting effectively with learners via questions and answers, praise and criticism. Next comes evaluation where understanding or not by learners is monitored in both formal and informal ways. Reflection is used by a teacher to refer back to his teaching where what has worked and what has not, and to rethink how the lesson has gone in relation to achieving its aims. Finally, new comprehension is achieved after going through the previous five stages where documentation, analysis and discussion have been carried out. Shulman suggested that the five stages need not be linear nor need all five stages be experienced. However, the five stages provide, in primary school teaching, a comprehensive structure for a trainee teacher to follow.

What are the criticisms of Shulman's model of pedagogical reasoning? The pedagogical stages are particularly useful in understanding a trainee's cognitive processes to becoming a teacher. Perhaps one wonders if some of the steps are very similar like instruction and representation (part of transformation) where both are concerned with presenting succinct explanation to learners by using metaphors, demonstrations, and examples. The cyclical nature has resonance with other educational cycles like Kolb's (Kolb 1984) and Lewin's (Kolb 1995).

To summarise, both theoretical frameworks by Bernstein and Shulman have their strengths and weaknesses. Bernstein provides a broad sociological structure to view his three stages of pedagogic processes with course deliveries and pedagogic practices

as support. Shulman gives a different take by focusing on a model to illustrate pedagogic process from the viewpoint of a trainee teacher. Both approaches have their relevance to numeracy teacher training. In terms of weaknesses, Bernstein's theories may fall short on details as regards how the recontextualization process takes place and definitions of horizontal and vertical knowledge. With Shulman, there also appeared to be a lack of linkage between his knowledge types and model of pedagogical reasoning and action and how these can be implemented on a teacher-training course. Finally, neither of the theoretical approaches was originally written for adult education.

4. Discussion in the context of adult numeracy programmes

What relevance do the theories by Bernstein and Shulman have on teacher training courses such as adult numeracy programmes? The previous investigation has pointed out some possible applications to these courses. This section will discuss these theories in the contexts of course structure and curriculum, and delivery of teacher training courses with specific reference to adult numeracy subject.

4.1 Course structure and curriculum

There are two main types of courses in the research – joint and subject specific – as mentioned in the second section of the article. In the case of a joint programme, it would be important to decide how the parts in the subject specifications and in the generic teaching standards are taught as according to Bernstein – sequentially or in parallel. Which of the two methods a course designer chooses will have teaching and

learning implications for trainers, trainees and those involved in teaching practice institutions like mentors and adult learners. Theoretically, one could have a sequential situation where all the subject knowledge was taught first, followed by teaching standards or in reverse. The parallel version would be that both subject specifications and teaching standards were taught over the same duration but in different sessions. What was found in the project was six out of eight joint courses offered parallel approach and two (from the same institution) offered sequential approach with coverage of teaching standards first. In a focus group interview with the trainees where curriculum was delivered sequentially, one of the four main criticisms was the mathematics content (i.e. subject specifications) should be taught in parallel with teaching standards as it would be easier to connect the two topics which trainees could then apply in their classes.

The very nature of numeracy specific courses is that only numeracy is taught with teaching practice and thus the ordering of delivery is not an issue. There maybe issues with which parts of the content to deliver first. This will be discussed next in relation to curriculum. Before that, what if a trainee who has no teaching qualification or subject knowledge at the required level is accepted onto such a course? In the research there were some who were in this situation. In one institution, the trainee was taking a generic teaching qualification alongside the stand alone one. In this case, the trainee saw the two courses as complementary where the Certificate of Education (teaching qualification) offered practical value whilst emphasising pedagogic theories but that juggling two courses alongside teaching and young large family was not easy. She said, “I’m so self-disciplined, it’s absurd.”

With the other institution, which took on trainees who had no teaching qualifications, the trainer justified her decision on the grounds of overcoming "the vicious circle of lack of teaching qualification to come onto this course and the difficulty to get a teaching practice without a teaching qualification in adult numeracy." She consciously made available this course to those graduate candidates whom she thought were capable of completing the level four course.

Turning to curriculum, it is driven by FENTO and DfES - Bernstein's ORF which forms part of his recontextualization process. Basing on findings from the research, there were criticisms of the curriculum from trainers, course designers, trainees and a FENTO reviewer. These included: uncertainty as to the aim of the subject specifications and teaching standards (to teach trainees how to teach numeracy to their adult learners to level four or to have obtain a professional numeracy teaching qualification or to train people to have mathematics ability to level four?) and inconsistency of mathematics language in specifications due to incorporation of several types and levels of mathematics syllabi.

Following a Bernstein perspective, a course designer and trainer (whether in a compulsory or post compulsory sector) might want to ascertain the following to assist in course organisation: explicit aim of the curriculum, the manner in which curriculum is written out which can assist trainers and course designers in translating curriculum content into course syllabus for teaching trainees how to be teachers (of numeracy in this article), and the relationship between subject specifications and generic teaching standards in order that course designers and trainers can have a clear idea for teaching. These are merely some indicators of what curriculum design can be

of help to its users. Shulman did not provide any indication regarding structure of programme or nature of curriculum.

4.2 Delivery

This area relates to the hub of the two educators' ideas of recontextualization (part of transmission) and transformation.

Basing on Bernstein, the recontextualizing principle relates to how a trainee uses the curriculum (numeracy specifications and generic teaching standards) to change, reorder, and relate into pedagogic approaches and strategies that can be applied to her adult learners. How to recontextualize also impact on what to teach (selecting from curriculum by trainer and trainee), how to deliver curriculum (in parallel or sequentially), how fast to cover curriculum (pacing and course duration), and how to relate to her students and to the subject. There needs to be theories of teaching strategies, which can be used in general and adopted for specific instances. He also discussed that a trainee might be explicitly told of the relevant parts of the curriculum (subject specifications or teaching standards) when they were covered or not – implicitly - by the trainer. A possible advantage of an explicit approach might be that any future changes to parts or whole of the curriculum can be reconfigured by the then qualified numeracy teacher to suit the needs of her learners. With an implicit approach, she might not be able to tease out elements of the specifications from teaching standards to help her adapt the modified curriculum to her learners' needs[7].

[7] The article, 'Adult numeracy teacher training programmes in England: A suggested typology', International Journal of Lifelong Education (2006), gives a more detail account of curriculum implementation and course structuring. It also offers a classification of teacher training courses.

How the above are done, Bernstein did not provide much detail.

Shulman offers more insight into this process of using knowledge gained from curriculum into ways of teaching numeracy that adult learners can understand which he names transformation. He provides five stages of this process: preparation, representation, instructional selection, adaptation and tailoring to needs of learners. Needless to say, the typology of knowledge interfaces with each other in transformation process. However, how exactly they interface was not made clear by Shulman. After saying the previous point, it has the advantage over Bernstein 's approach in that Shulman gives a more detail view of what a trainee may need to go through. This stage-by-stage approach may also be helpful for trainee. It is a complex and personal journey, which has to be experienced by a trainee and each journey has its own specificity. It is this staged approach by Shulman that appears to provide greater clarity on this complex process than Bernstein's.

Some related quotes from trainees from the project that may help to illuminate this complex journey:

"There were tips by trainers to help us know the different teaching approaches to adult numeracy in the unit on Social factors and issues related to number development."

"Micro teaching was useful for helping me to learn how to teach my learners."

"Teaching strategies were picked up from my peers mainly."

"The three-day stint looking at Core Curriculum Training strategies was useful in linking up specifications and teaching standards."

"We have sessions where we have to explain to our peers like teaching to an adult learner. This sharing of peer experiences and learning at the same time of how to

teach in a classroom setting is helpful to my learning. It makes us think of practical ways to teach."

Linking up theoretical teaching knowledge and skills to teaching practice was also an important element in learning how to be teachers. In the second questionnaire survey, 79 per cent of those trainees who participated strongly agreed or mainly agreed that their teacher education courses offered valuable opportunities to deepen their understanding and to explore and resolve difficulties in their teaching practice. The same per cent of participants strongly agreed or mainly agreed that their teaching experience had so far been a valuable opportunity to apply what they had learnt on the course. Representative quotes include:

"Gives me confidence in my ability and to try new approaches."
"It is good to be able to apply the theories in practice and see if they work; and how well they work; and what I can learn from."
"The subject specific knowledge has been the most helpful aspect of the course as I am an experienced teacher."
"Teaching practice has enabled some theoretical methods to be tried out with some success."

5. Summary

This article discusses the relevance of some of the theoretical frameworks of Bernstein and Shulman with regard to the new level four adult numeracy teacher training courses in England, specifically, and also to teacher training, in general. The

article explores the two educationists' theories using the author's research findings (see section 2) and a brief methodological approach of this research is indicated. It discusses Bernstein's theories on pedagogic practices of acquisition, transmission and production and supporting practices such as parallel and sequential, and visible and invisible. It also investigates Shulman's model of pedagogical reasoning and action.

So what lessons can be drawn from the theories of Bernstein and Shulman in this area? Bernstein's theories on sequential/parallel and visible/invisible practices can have a profound influence on any course organisation, may they be in compulsory or post compulsory sector. As regards curriculum, the two educationalists' theories have searching questions for course designers and trainers, which can assist them in designing a course. The important implications of the two theorists' ideas relate to how trainees grapple with curriculum knowledge and skills to enable them to teach numeracy (or other subjects) to their adult students using recontextualization and transformation theories respectively. Even though details of how this complex process occurs remain unresolved, at least trainees and trainers have two not dissimilar theories for guidance. They can help in the thinking of possible course delivery strategies that may assist trainees to learn how to be teachers.

Finally, this article suggests that the investigated theories of Bernstein and Shulman are not too far apart to see them as disparate approaches. Indeed, as regards course curriculum, and delivery, one may argue that they can be used alongside each other as shown in the previous section. Bernstein's theories have the advantage of offering a more rigorous approach to course structuring. The strength of Shulman's theories is in the finer details of how a trainee transforms curriculum knowledge into ways of

teaching her learners.

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