Chapter 4-7

CONCEPTUALISING PEDAGOGICAL VALUES AND IDENTITIES IN TEACHER DEVELOPMENT

A Comparison of Taiwanese and Australian Mathematics Teachers

CHIN Chien
National Taiwan Normal University

1. INTRODUCTION

Values are an inherent, more likely implicit, part of all educational processes, and they are a crucial component of the cognitive, affective, and conative environment of mathematics teaching (FitzSimons, Seah, Bishop, & Clarkson, 2001; Fraenkel, 1977). Mathematics teachers, in this case, inevitably teach particular values, and students thus perceive implicitly the values through classroom teaching activities. The extent to which teachers are aware of or willing to teach their own values, and such values' selection process, is important, although not clear, for mathematics teaching and learning. And yet, there is little knowledge about values teaching in mathematics classrooms and values education of mathematics teachers (Bishop, FistzSimons, Seah, & Clarkson, 2000).

Parallel research on values in mathematics teaching from two countries Taiwan and Australia (Bishop, FitzSimons, Seah, & Clarkson, 2001; Chang, 2000; Chin & Lin, 2000a; Leu & Wu, 2000), where one is a typical Chinese and the other is an Anglo English society, shared a common belief that the quality of mathematics teaching can be improved if there is more understanding about values teaching and the values education of mathematics teachers. Their purposes were to investigate mathematics teachers'

values, the extent to which teachers can clarify or gain control over their own values, and forms of classroom teacher-student values interaction.

Values represent one's internalisation and awareness of affective variables in the socio-cultural context (Krathwohl, Bloom, & Masia, 1964), including the cognitive, affective, and behavioral elements (Rokeach, 1973). They form the underlying standards of a teacher's choice and judgment of action, attitudes toward and knowledge about students and the ethos of the classroom. Values serve as abstract frames of references (McConatha & Schnell, 1995), are conceived and expressed as decontextualised words (Seah & Bishop, 2000), or underlying substances of (pedagogical identities about) personal testable propositions (Chin & Lin, 2000b; 2001a). Beliefs, in the light of this, are seen as personal testable propositions or the actualisation of values in contextualised situations (Chin & Lin, 2001a; Seah & Bishop, 2000). For example, a teacher's valuing of 'individual thinking' may be the result of his or her internalization of such belief propositions as 'there is no learning if students do not think' and 'in teaching, all I have to do is to initiate student thinking on their own'.

The research approaches adopted, although slightly different in its application and form for this cross-nation project, were basically questionnaire survey, classroom observation, and pre and post lesson interview. Several common issues emerged from a comparative analysis of the values research in Taiwan and Australia (Victoria) relating particularly to the professional development of mathematics teachers, and these will be discussed in this chapter. A model of incorporating teacher professional identities and pedagogical values will also be proposed.

2. CONTEXT OF MATHEMATICS TEACHING IN TAIWAN AND AUSTRALIA

Several differences in the context of classroom mathematics teaching are salient between Taiwan and Australia (see Chin & Lin, 2001a; Seah & Bishop, 2001). Teachers' social backgrounds are multi-cultural in Australia but not in Taiwan. In Victoria, mathematics teachers may come from very different cultural backgrounds, ranging from English, Chinese, Malaysian, to Indian. But, Taiwanese mathematics teachers are quite uniform in that over 90% of them are born and educated in the same Taiwanese (Chinese) culture. So values conflicts here are more about pedagogical issues rather than cultural issues as in Victoria. The student background in Victorian schools is normally multi-cultural, and is more uniform in Taiwan except for the areas near the aboriginal regions. In this case, values teaching and values edu-

cation of mathematics teachers in Taiwan are likely to be didactically rather than culturally oriented.

The values portrayed, which underlie school mathematics curricula in the two societies, are varied. For example, Australian schools addressed the values of individual difference, cooperation, and listening to students (Seah & Bishop, 2001), while the values of uniformity, individual work, and listening to teachers were central in Taiwan (Chang, 2000). As informed by the specific Taiwanese examination culture, helping students pass all kinds of tests, getting higher scores in those tests for the students, and training them to be skillful in solving varying kinds of mathematical questions were the three top priorities for school teachers to teach mathematics (Lin & Tsao, 1999). As a result, the major purpose of teaching mathematics is to induce students to acquire content knowledge and procedural skills for solving school mathematical items given in the textbook or pseudo-text book (Leu & Wu, 2002; Lin & Tsao, 1999). In this chapter, the goals of learning and teaching mathematics for school teachers are driven by the values of getting higher student scores and passing the examination.

Therefore, the values portrayed by the mathematics curricula and taught by mathematics teachers in different cultures, may differ enormously. As values teaching often takes place implicitly and unconsciously, it is then important for us to compare the varying degree of values clarification and articulation, and the awareness of and willingness to teach certain values within and across these two societies.

3. VALUE ISSUES IN TEACHER PROFESSIONAL DEVELOPMENT

3.1 Clarification and articulation

It was through intensive reflection on the values taught that school mathematics teachers became clear about their value positions, although some of them did not choose the values that we expected them to have (Chin & Lin, 2001b; Change, 2000). This seems to be very different from Australian teachers, as most of them claimed that they acknowledged the important roles that values should play in mathematics teaching (FitzSimons et al., 2001). This also reveals the societal differences between the West and East Asia, in which values are often a generally recognised issue for the Western people to discuss but not so obvious for us to talk about. It seems to me that the issues of values clarification and articulation are natural for

teachers in the Western cultures but not the Eastern. In this case, the concept of values is there for the Western mathematics teachers, and yet, it might be quite a difficult concept for the Eastern teachers to even think about in relation to classroom teaching of mathematics. Another essential difference is related to the orientation of clarification and articulation. For Australian teachers, more efforts should perhaps be used in clarifying value conflicts from different cultures, and the extent of values articulation to which they could gain control. The issues for Taiwanese teachers are concerned mainly with the extent of clarification that they can make within their own value systems and between different values of self and others. However, it seems to be a problem for both sets of teachers to recognise the varying degrees of values clarification within the intended and implemented phases. Some teachers might have learned about the issues but not others, as the high and low values clarification of Taiwanese teachers showed (see Chin, Leu, & Lin, 2001) compared with different degrees of values nomination and explicitness among Australian teachers (Bishop et al., 2001).

In short, there are cognitive issues concerning the need to clarify teacher values in terms of different cultures. For Australian teachers, the concept of values in relation to mathematics teaching may be relatively easy for them to think through but not an easy affair for Taiwanese teachers, as they are not so sure about the notion of values in mathematics education. There are also different aspects that teachers have to articulate and clarify. For Australian teachers, more difficulties exist concerning the different values that teacher and student share within a multicultural environment of mathematics teaching. However, they all have similar problems with value discrepancies between self and others, and with the inconsistencies of one's own intended and implemented values.

3.2 Awareness and willingness

Two affective aspects about teacher values have emerged. The first issue is about the extent of consciousness of imposing personal values. Being unaware of the reality of classroom values teaching, it took quite a long time for the 6 out of 7 Taiwanese teachers from primary to senior high schools to realize the roles that values play in their mathematics teaching (Chang, 2000; Leu & Wu, 2000). The one exception was a senior high school master teacher who was in a short period of time passing through the five stages of values clarification, moving from a value carrier to a value communicator, and who described the significant features of his values teaching to others in terms of his own classroom incidents (Chin & Lin, 2000b). This notion is also supported by the Australian research findings (FitzSimons et al., 2001), in which different values were taught by different teachers according to the

degree of awareness of their own intentions to teach particular values. The second issue is about teachers' willingness or conation to teach particular values. Varying degrees of the explicitness of the values teaching were examined and discussed in the Australian research (Bishop et al., 2001; FitzSimons et al., 2001), in which the number of values explicitly taught by the teachers, either consciously or unconsciously, was greater than the implicitly taught values. However, in our researches in Taiwan (Chang, 2000; Chin & Lin, 2001b; Leu & Wu, 2000), not only were fewer teachers aware of the taught values, they were also unwilling to teach certain values and even refused to teach the values that they had taught before. As a result, it is clear that there are pedagogical and socio-educational tensions surrounding the extent of the explicitness, willingness, and awareness of teachers' classroom values teaching.

In short, there appear to be varying pedagogical and socio-educational tensions for mathematics teachers in different cultures. For Australian teachers, the tensions of values teaching were more about personal consciousness and the explicitness of engaging in some particular values. However, for the Taiwanese teachers these tensions seemed more to do with the conative and socio-educational aspects than to the individual awareness of values teaching. These observations are also evident in the light of Leung's (2002) six-dichotomy model of conceptualizing/contrasting the features of the East Asian and the Western countries' identities in mathematics education and their underlying values.

The above analyses led me to integrate the concept of values and (pedagogical) identities within the professional development of mathematics teachers. This idea takes the socio-cultural aspects of individual development into account, in which mathematics teachers from different cultures establish certain different (pedagogical) identities framed by their own socio-educational values. Different cultures, in turn, create different tensions both for the teaching of values and for the development of pedagogical identities for the mathematics teachers.

4. VALUE TRANSITION AND IDENTITY DEVELOPMENT OF MATHEMATICS TEACHERS

Three approaches are prevalent in the literature of teacher development. The first aspect is to conceive the process as professional knowledge growth/change, for example, the change or growth of teachers' pedagogical content knowledge or knowledge about students. Researchers such as Even, Tirosh, & Markovits (1996), imply a theoretical framework of necessary knowledge for teaching a specific mathematics topic in order to design

activities in the teacher education programme for teachers to learn. Another aspect is to educate teachers through the construction of their beliefs, for instance, by identifying beliefs in terms of the role of "authority" and seeing it as a growth indicator to conceptualize the process by which a teacher becomes a reflective person. This research (e.g., Cooney, Sheatly, & Arvold, 1998) uses a theoretical framework of change in beliefs to set up activities in an educational program for individual teachers to articulate. The third aspect is to consider the process as an intertwined web of conceptual changes, including knowledge, beliefs, and context, using a situated learning model to monitor the professional growth of a group of prospective teachers. This approach (e.g., Llinares, 1996) combines knowledge and beliefs into the situated context, as a mean for promoting teachers' development.

Although these approaches have been productive, however, they have missed a crucial issue for mathematics teachers concerning the nature of *being a teacher*, as he or she is potentially in the process of learning different ways *to be a mathematics teacher*. In other words, all teachers are in the process of developing their pedagogical identities through which they learn to see themselves as becoming the teachers that they value most. Therefore, a fourth aspect of conceptualizing teacher professional development is to conceive the process as the development of (pedagogical) identities and the transition of values.

There have been similar ideas explicitly developed, concerning the role of identity and value in education and learning. For example, Chickering and Reisser (1993) identify a seven-vector model, in which the *establishing identity* vector addresses the development of a person from confusion about 'who I am' to clarification of self-concept through roles and lifestyles in the process of education. To maintain self-image as a teacher, Furlong and Maynard (1995) identified four interconnecting dimensions in establishing a professional relationship for student teachers, in which awareness of self to the notion of *me-as-a-teacher* is related to individual teacher identity. Another vector of Chickering and Reisser's model (1993) is *developing integrity* concerning the inculcation of humanizing and personalizing individuals' values through education. In this case, the value systems may properly reflect those features of the development of eight identity stages, from early youth to old age (Erikson, 1963). The unity of personality that one perceives and understands bears the imprint of the ego and is close to what the person thinks of him or herself (Loevinger, 1976), in which the conscientious, autonomous, and integrated stages are more aligned with individuals' values transition and identities development in the process of searching for one's standards, uniqueness, and integrity.

Moreover, Wenger's (1998) description of *learning as a process of becoming* echoes my idea for mathematics teacher professional development:

> Because learning transforms who we are and what we can do, it is an experience of identity. It is not just an accumulation of skills and information, but a process of becoming – to become a certain person or, conversely, to avoid becoming a certain person. Even the learning that we do entirely by ourselves eventually contributes to making us into a specific kind of person. We accumulate skills and information, not in the abstract as ends in themselves, but in the service of an identity. (p.215)

On the other hand, researchers in mathematics education have also called for attention to be paid to the intertwined relationship between identity development and values, in which the aspects of articulation, clarification, awareness, and conation were used to empower professional development (e.g., Bishop et al., 2000; FitzSimon, Seah, Bishop, & Clarkson, 2000). For example, Bishop (2001) suggested several ways of educating and clarifying student teachers' ideas about values in mathematics teaching, such as through the sensitizing of value issues, engaging in values clarification and values-related activities, and providing critical teaching incidents. Lerman (2001) in a review of research perspectives on mathematics teacher education, argued for a focus on the development and articulation of teacher identities; and Chin, Leu, and Lin (2001) described activities that can be used to educate student teachers about values in mathematics teaching through values clarification and values articulation. A similar argument was also made by Boaler (2002) in terms of the knowledge-practice-identity triad, in which *mathematical identity* is used to describe the resulting intrinsic relationship of the students and their mathematics, which represents the varied aspects of (mathematical) knowledge and its (classroom) practice. Most importantly, different relationships with mathematics might inculcate different mathematical identities which accompany different pedagogical beliefs and values.

As far as this scheme is concerned, five transitional stages of teachers' identities seem to be crucial in the process of learning to teach. At the student teacher stage, a teacher sees his or her identity as *a student* in which learning and thinking about a different ethos and ideas are of importance for *the learner*. In *the probationary teacher* stage, one might see oneself as *a classroom practitioner* and his or her jobs are to integrate theory into practice and to inform theory with practice. In the following stage, the teacher becomes *a novice* in the teaching community as *a newcomer*. Later, she or he is gradually reaching the stage of *an experienced teacher* seeing her or himself as *an old-timer*. Then the teacher might approach the final stage of teaching profession as *an expert teacher*, and being viewed as *a master* in the teaching community. This five-stage developmental sequence fits well a possible path of teacher's identity transition, within which a

mathematics teacher commits her or himself to the compatible values of their pedagogical identities.

For example, the case of Ming (Chin & Lin, 1999), who taught mathematics over 20 years, recollected his own profession as being developed through three stages in the same school, from a textbook *follower* and own *style builder*, to a *value characteriser*. His pedagogical identity moved from being *a knowledge transmitter* and a *mathematics tutor*, to a *contextual knowledge initiator*. Each stage entailed specific pedagogical values, from being committed to mathematical structure and knowledge to reality and pleasure. For teacher Yi (Chin, 2002a), there was a higher developmental stage of *socialized follower*, in which he followed fully the textbook content and procedure in teaching but abiding by and rectifying the pedagogical values that he preferred most. This teacher acts as *a philosopher* who respects the ways of teaching that the community shares, however, incorporating his personal ethos in teaching that he thinks are better for his students to learn and understand mathematics. He has gone through three schools' ethos during which his pedagogical identity as *knowledge initiator* was stable and consistent with the value of thinking, reasoning, and communication. The other two senior high school teachers are also well situated within this developmental scheme (see Chin, 2001, 2002b). One of them valued the knowledge and structure of mathematics, and identified herself as *a transmitter* throughout 30 years of teaching; and the other committed to the values of knowledge and structure at the beginning years, and then a few years later he moved to the stage of including student mathematical reasoning and thinking. The model has been further examined on the basis of a group of 3 pre-service mathematics teachers at the student/ learner stage (see Chin, 2001, 2002b).

The identity transition and the values entailed throughout the stages of professional growth that these four school teachers showed represents an interwoven relation between pedagogical identities and values evolving in the process of teacher professional development, in which different teacher identities embody different pedagogical identities and values. The transitional phase of (pedagogical) identities and values is thus incorporated into an intertwining path of the teacher professional development, within which different teacher identities entail different pedagogical identities and values.

This aspect of considering mathematics teacher development from the transition of identities and the articulation of values adds to that of Lerman's (2001) proposal and echo also what Llinares (1996) suggests, addressing the contextual, integrated, active, and practical aspects of teacher development.

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