

## **THE TENSION BETWEEN TEACHER BELIEFS AND TEACHER PRACTICE: THE IMPACT OF THE INSTITUTIONAL CONTEXT**

M. Kerem Karaagac

University of Leeds

*This paper presents part of my research on teachers' beliefs and practices in state schools and privately owned exam preparation schools in Turkey. Extracts from an interview with a teacher who uses a technique that he disapproves of will be reported, revealing a tension between the teacher's beliefs and his classroom practice. This will be complemented by results of three questionnaire items. The results indicate that certain practices are associated with institutional context and thus institutional context can be an important parameter in understanding and teachers' professional developments.*

### **INTRODUCTION**

The current trend in mathematics education research is from cognitivist approaches to socio-cultural approaches, where students' and teachers' practices are understood in relation to their context. As Daniels (2001) pointed out, empirical research seems to be sparse, especially at institutional level. He argued that "unless we understand the ways in which possibilities for learning are enacted within institutions we will be frustrated in our attempts to really raise standards." (p.1) and that there is a "tendency to under-theorise differences between schools in terms of institutional effects on the social formation of mind." (p.135 ) This research set out to examine teachers' practices in relation their institutional context.

### **THE RESEARCH**

The research findings presented here are a part of an ongoing project to investigate teachers' beliefs about teaching and learning and their actual practices in two different educational institutions in the Turkish education system for 17-18 year olds. Many students of this age in Turkey are taught mathematics in two places. They attend state schools (SS), but at weekends or in the evenings many of them also attend courses in privately owned schools (PC). The main objective of private school courses is to prepare students for the university entrance examination (UEE), which is made up of multiple-choice questions. Unlike state schools, these private courses teach for test, the UEE. As a PC teacher who worked in PCs for 12 years put it:

"The aim of mathematics teaching [in PC] is not to teach mathematics basically, but to prepare students for the examination they will take – to make them able to answer the questions that they will face in the examination in the most practical and easiest way. Our aim is not teaching mathematics deeply and with its theory. As an educator in private courses, our aim is to prepare them for the examination in a practical manner"

I have used an exploratory case study methodology (Yin, 1994) in order to examine teaching in its natural context. Series of lessons of teachers from each kind of

institution (SS and PC) were video recorded. The recordings were made during teaching of the topic of functions to have comparable results. Semi-structured interviews were conducted with 24 teachers and a complementary questionnaire was completed by 87 teachers. The research reveals a widespread difference between PC and SS teachers in their mathematical practices (See Karaagac 2004a, 2004b). In this paper I will draw, first, on the data obtained from a single PC teacher, a mathematics teacher with eleven years of experience of teaching in different PCs. He has been chosen as the case study for this paper, because not only is he aware of the discrepancy between his beliefs and his practice, he is able to reconcile the two. This will be followed by complementary data from the questionnaire.

## RESULTS

### Numerical Value Technique (NVT)

The essence of NVT lies in assigning simple numerical values to the variables in the root and options of the question and comparing the results of the root with each option. I have explained and exemplified this technique elsewhere (Karaagac & Threlfall, 2004). NVT enables students to solve problems in a very short time and usually without recourse to the theoretical knowledge supposedly required by the question. The classroom observations as well as researcher's interactions with several PC teachers suggest that this method is commonly practised in PC, but not in SS, as a method to reach the correct answer in a relatively easy way. In explaining his practice, a PC teacher clearly points out that he aims at students' high performance in the UEE and that he considers this as his primary objective.

- 1 **I:** What do you think about using numerical values to solve problems?
- 2 **T:** Yes, this is a part our system. In terms of university preparation, preparation for
- 3 university entrance examinations, this is part of our system...Using numerical
- 4 values is of interest to them and they like it very much. 'Let's assign 1 to the
- 5 value of 'a', and after that, lets give the options, lets put 1 for wherever you see
- 6 'a', what a simple thing, isn't it!' This is a part of our system, I mean, as a
- 7 private course it is a part of us, we make use of it.
- 8 **I:** Do you mean it is one of the indispensables of private courses?
- 9 **T:** To me<sup>1</sup>, look, sometimes you may not be able to remember the solution of a
- 10 problem. Because the student may become nervous during the examination s/he
- 11 may not be able to do things s/he can do normally. But if you approach them
- 12 like 'you can solve it using numerical values' s/he can make use of a second
- 13 method and s/he can possibly solve the problem in a practical manner with ease
- 14 **I:** Do you think it is a healthy method in terms of mathematics?
- 15 **T:** In terms of mathematics teaching it is not a healthy method. Because it keeps
- 16 students away from formulas, it keeps them away from definitions. I mean
- 17 without understanding the definition, without understanding the formulas, they
- 18 want to solve problems. That's not healthy in terms of mathematics education.

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<sup>1</sup>Considering the original interview recording, there is an unuttered but definite 'yes' at this point.

This seems to be a clear indication of three separate issues: [1] the teacher is well aware of his practice (lines 2-4, 9, 11-13), [2] he associates this technique with the institution in which he is working (lines 2-3, 6-7, 9), and [3] there is a clear indication of disapproval of the technique that he teaches (lines 15-18). To him NVT keeps students away from a theoretical understanding of mathematics. Although it could be argued that this is not deep-seated belief and it may be suggested by the question itself, other parts of the interview and my personal contact with the teacher strongly supports the claims made here. Hence, there seems to exist a tension between what the teacher believes and what the teacher practices. I have observed this tension in some other parts of the data. Similar observations can be made in the following excerpt from the same teacher.

19 **I:** Is it [NVT] characteristic of mathematics in private courses?

20 **T:** Whether one likes it or not because the characteristic of the University entrance  
21 examination is to deal with the practical side of mathematics<sup>2</sup>. In the exam it is  
22 not important the way you solve the problem, it is not important how the  
23 student solves the problem.

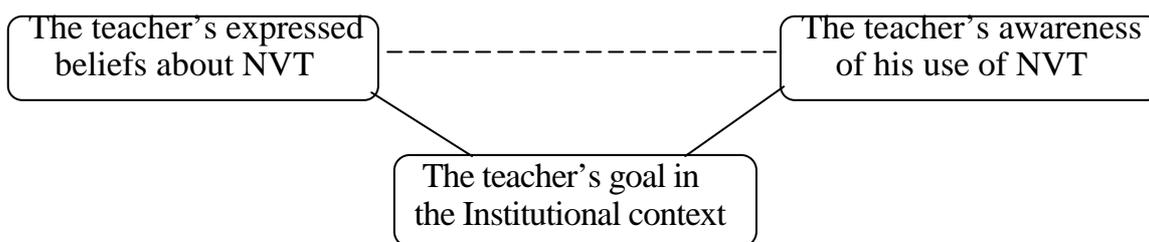
24 **I:** Let's ignore state school mathematics or private course mathematics.  
25 Considering using numerical value to solve the problem, do you think it is an  
26 ideal way to teach mathematics?

27 **T:** It is not healthy. In my opinion, solving a problem using numerical value is  
28 only going for an easy ride. But it perfectly fits with the private course  
29 approach. It attracts students' attention. Students like it because students' aim  
30 is solving the problem in any possible way, but it is not an ideal way to teach  
31 mathematics. From my perspective, it is going for the easy way, a kind of  
32 escape to an easy way.

In understanding and interpreting the tension, I made use of Festinger's (1957) theory of cognitive dissonance. This approach is based on the principle that disharmony among cognitive 'elements' (people's mental representations of their beliefs, attitudes, and attitudinally significant behaviours, decisions and commitments) motivates cognitive changes designed to restore harmony. When cognitive elements cannot be changed a new element is introduced. In this teacher's case, the use of NVT is associated with the institution he is working and his practice is resistant to change. His belief about NVT as a teaching method also seems to be robust. Hence, in Festinger's (1957) terms, he added a new 'consonant element' to his thinking to 'water down' the tension. This new element as suggested by interviews is the teacher's goal in this particular institutional context, the PC. Therefore the teacher is reconciling his beliefs and his practice through the institutional context in which he is situated.

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<sup>2</sup> Here the term 'practical' refers to solving problems in a shortest time and quickest way without dealing with any theoretical aspect of the problem at all.



**Figure.** A representation of the teacher’s inner conflict.

Having realised the significance of the institutional context, I devised a questionnaire to see if other teachers also associate certain practices and solution methods with certain institutions and if institutional context is such an influential parameter for all the teachers. The questionnaire was anonymous but asked about their teaching experience. It provided a problem and two solution methods with their mathematical explanations. Solution-1 was a common solution method for the problem as I observed in both institutions, but solution-2 was NVT, which was observed only in PC lessons. In total 87 teachers took part in the questionnaire. 45 of them were SS teachers and 42 were PC teachers. I asked “which of the solution methods do you think a **typical state school teacher** would be more likely to use?” The table below shows the results (percentages).

<b>Solution-1</b>	<b>Solution-2(NVT)</b>	<b>Both</b>	<b>N/A</b>
86.2	1.1	11.5	1.1

**Table 1.** Questionnaire result of the item regarding a typical SS teacher’s practice.

As can be seen in the results there is a clear difference between teachers’ perceptions of what would be the solution method SS and PC teachers make use of. It seems that SS teachers are associated strongly (86.2 %) with solution-1, where the solution requires some level of understanding of the theoretical side of the mathematics involved. I also asked “which of the solution methods do you think a **typical private course teacher** would be more likely to use?”

<b>Solution-1</b>	<b>Solution-2(NVT)</b>	<b>Both</b>	<b>N/A</b>
3.4	63.2	32.2	1.1

**Table 2.** Questionnaire result of the item regarding a typical PC teacher’s practice.

The answer of this question is divided between ‘solution-2’(NVT) and ‘Both’. The majority (% 95.4) associated PC teachers with NVT. The questionnaire results provide strong support to my observation results, where PC teachers use both of the methods. If teachers’ practices are influenced by the institutional context they work, one may raise the question of if they were also influenced in terms of their views and beliefs. Another item in the questionnaire was devised for this purpose. The item asked “Do you think the institution teachers are working in influences the teachers’ views? Why? Please explain”. I left a blank space for them to give their reasoning. Table 3 shows the teachers answers to this item.

Yes	No	Depends	N/A
79	11	2.3	6.9

**Table 3.** Questionnaire result of the item regarding influence of institution on teachers' views.

The majority of the teachers (79%) thought that the institution teachers are working in influences the teachers' views. They also articulated their reasoning in their answers to this item. Here is some of the reasoning they gave for this item:

"It influences. Because the students' expectations are different, teachers have to adapt themselves to it. If the teacher cannot cope with it, he receives first reactions from students and then immediately the manager of the institution." **SS Teacher No 34.**

**(Teaching experience: 13 years in SSs)**

"I think teachers influence each other as much as the institution they are working. Because one PC teacher prefers solution-1 and other solution-2, the one which uses the longer way will be disliked by the students. Thus he will have to change his [teaching] system." **SS Teacher No 10. (Teaching experience: 7 years in SSs and 3 years in PCs)**

"Of course [it does]. For a teacher, there is nothing more wrong than staying in the institution unless he internalises and adopts the mission and the vision of the institution." **SS Teacher No 20. (Teaching experience: 13 years in SSs)**

"Yes. Because there is a syllabus in SSs. In PC there is the aim of making students able to answer most number of questions and fewest mistakes within shortest time. SS teachers generally strictly follow the syllabus and the content of the textbook they use" **PC Teacher No 24. (Teaching experience: 2 years in SSs and 5 years in PCs)**

In their answers teachers reasoning generally linked with either the goal of the institution or constraints and affordances existing in the institutional context. A number of those who disagreed with the idea of institution influencing teachers' views (11%) argued that the teachers' views do not get influenced but their classroom practices do. This lends supports to existence of the tension between teachers' beliefs and practices, for some teachers who may not, as one teacher put it, 'internalise and adopt the mission and the vision of the institution'. Thus the questionnaire results seem to be supporting the results of the case study in this project.

## DISCUSSION

Although researchers generally report consistency between teacher beliefs and practices (Thompson, 1992), a number of researchers do report a discrepancy between teachers' beliefs and their classroom practices (Raymond, 1997). Regarding the observed discrepancies Thompson (1992) pointed out that 'one must question the extent to which teachers are aware of such discrepancies and if so how do they explain them' and 'some explanations offered by teachers may reveal various sources of influence on their instructional practice, causing them to subordinate their beliefs' (p. 135). In my review of literature I could not find any reported case where a teacher was aware of discrepancy. The teacher reported here, however, is well aware of the discrepancy and he explained this situation on the basis of the institutional context by

referring his goal in context and constraints imposed upon his teaching by the institutional setting. This indicates the significance of the context since the goal that teachers have in certain contexts may even 'subordinate' the teachers' beliefs on teaching mathematics. Parallel to this situation, Turkish teachers seem to associate certain teaching practices with certain institutions. This distinction is apparent in the interviews with the PC teacher mentioned and it is also supported by the results of the questionnaire which was administered to a considerable number of teachers with different institutional backgrounds. It implies that teachers may 'have to' prioritise certain practices depending on the specific context they are exposed to in spite of their personal preferences. The questionnaire results also indicate that teachers' views on teaching mathematics are influenced by the institutional context. If the teachers adjust themselves to the context with time then institutions would affect teachers' professional development considerably, especially when they work in the same type of institution for a long time. If we are to understand teachers' practices then it is vital that we give serious considerations to the institutional context that teachers are exposed to.

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