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Abstract

This paper proposes that teachers who undergo accommodative change do so if they are internally motivated to learn; become aware of their implicit ideas and practices and critically examine them; construct alternative knowledge, beliefs, and practices; resolve the conflicts between the prior set of ideas and practices and the new; and do so in a social climate characterized by collaboration, trust, reflection and deliberation. A teacher-written case is used to demonstrate these assertions. Even when an overall effort was made to meet these conditions, the teacher's learning outcomes were not always accommodative or progressive; sometimes they were transitional, and sometimes conservative.
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1. Introduction

The aim of this paper is to present a preliminary explanation of teacher change, and, in particular, the profound paradigm shift in conceptions, in beliefs, expectations and dispositions, and in practice that teachers have to undergo in order to carry out the current reforms in education, reforms that require re-examination of traditional knowledge and practice. In the first part of the paper, I propose that there are three possible outcomes of cognitive conflict that teachers face. Progressive outcomes occur when teachers undergo accommodative change. I identify and propose a set of conditions that have to be met for teacher accommodative learning to occur. Teachers undergo accommodative change when they are intern-

ally motivated to learn; become aware of their implicit ideas and practices and critically examine them; construct alternative knowledge, beliefs, and practices; resolve the conflicts between the prior set of ideas and practices and the new; and do so in a social climate characterized by collaboration, trust, reflection and deliberation. When these conditions are not met one of two outcomes occur. Teachers might continue to live with unresolved conflicts. These outcomes can be described as transitional. Finally, teachers might change some ideas or act to preserve prior ideas and practices. The resulting outcomes can then be called conservative.

The proposed model is in need of further examination and critique by other researchers in the future. In the second part of the paper, I demonstrate different facets of this explanation by predominantly using a case written by a teacher engaged in educational reform. I assert that while we can try to provide the setting that meets these

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conditions, it is only the teacher himself or herself that can control this process. In one of three conflict situations described in the case all conditions were met, and the teacher underwent accommodative change. In the other two situations, she was not able to accomplish this change. Since all three possible learning outcomes occurred for the same teacher at different times, the model and the case reveal that the explanation of change lies not outside the individual but in the interaction between the individual and conditions for change.

In spite of the important breakthroughs in our understanding of teachers and teaching in the last two decades, there is little research that is grounded in learning theories in general, or that draws on student learning in particular, which focuses on teacher learning, and that supplies us with explicit well-constructed and empirically validated theories of teacher learning—detailed descriptions and explanations of that learning. There is also a need to look at teacher learning, not from the usual perspective of outside researcher or of designer of professional development programs, but from the teacher's perspective. Additionally, while many researchers have drawn attention to the importance of teacher voice in the study of teachers and teaching, have argued that narrative in general, and cases and stories in particular, better represent teacher professional or practical knowledge (e.g., Gudmundsdottir, 2001), have encouraged and facilitated teacher research (e.g., Cochran-Smith & Lytle, 1993), or have used teacher-written cases for professional development (e.g., J. H. Shulman, 1992; J. H. Shulman & Mesa-Bains, 1993), few have regarded teacher-written cases as research or as data for research. The present study attempts to address these limitations by proposing an explicit model of teacher learning, and using a teacher-written case to demonstrate the model.

2. Toward an explanation of teacher accommodative change

In providing this explanation I lean heavily on cognitive psychology and the social constructivist approach to learning (Blumenfeld, Marx, Patrick, Krajcik, & Soloway, 1997), but I also use components from the situated learning approach (Lave & Wenger, 1991). Additionally, I use the conceptual change research program in science education in general (Hewson, Beeth, & Thorley, 1998; Posner, Strike, Hewson, & Gertzog, 1982; Strike & Posner, 1992), and my previous work in that area in particular (Hashweh, 1986). In the selective synthesis that I attempt I agree with Hewson et al. (1998) to "place emphasis on the individual learner, situated in a social and physical context, and locate knowledge primarily in the mind of the individual" (p. 202). Such a perspective emphasizes the metacognitive nature of learning. However, such a perspective also recognizes that such metacognitive activities are mediated by a social environment that encourages and legitimizes their use.

Before describing some important characteristics of learning we need to ask about what motivates learners, and teachers as learners in particular, to learn. Piaget, Kelly (1970), cognitive psychology or social constructivism all emphasize, in one form or another, that knowledge is constructed in search of meaning, and that the resolving of cognitive conflict, dissonance, inconsistencies or confusions is both the end and means of learning. Additionally, resolving conflict and the ensuing learning results in better adaptation to the environment, according to Piaget. The emphasis here, to use terminology from modern motivation theorists, is on learning goals rather than performance goals. Both conflict resolution and the development of one's knowledge and practice seem important for teachers. In the area of teacher professional development, Atkin (1992) and Whitehead (1989) have pointed out that teachers try to make changes when they realize the existence of a gap or discrepancy between their goals and ideals and their existing/present practice. And in reviewing a teacher research, or scholarship-of-teaching, collection, L.S. Shulman (2000) similarly commented on the motivation of professors to inquire into their teaching, writing: "As I studied the cases in this volume, a single word kept forcing itself into my consciousness: fidelity. So much of the scholarship of teaching and learning is

motivated by the spirit of faithfulness'' (p. 95). He added that there were four kinds of fidelity to consider: to the integrity of the discipline; to the learning of the students; to society, polity, community, and institution; and to the teacher's own identity and sense of self. This fidelity shaped the vision or ideals of these professors and motivated them to bridge the gap between their practice and their ideals.

As for the important characteristics of learning, the most important finding, coming early from educational psychology (Ausubel, 1968) and Piaget, through schema theory in cognitive psychology, and up to the conceptual change approach, has been the importance of the individual's prior knowledge and characteristics in determining what is learned, and the related idea that learning is linking new information to prior knowledge. Whereas psychologists and educators have previously emphasized the role of prior knowledge in forming a base or a frame for new knowledge, the conceptual change approach in science education has shown how students' prior ideas are, on many occasions, in conflict with the orthodox science concepts to be taught, and how these prior concepts, consequently, act as barriers to learning science. Theorists in that area have argued that the learner needs to go through accommodation, rather than assimilation, using Piagetian terms. They used the metaphor of historical conceptual change in science as a discipline to understand individual student learning, and have likened this kind of learning to Kuhn's paradigm shift (Kuhn, 1970) or Lakatos's acceptance of progressive research programs (Lakatos, 1970).

It is becoming clear that not only is this true for students but for teachers as well: many teachers hold knowledge, beliefs and dispositions, and practice teaching in ways that are in dissonance with those required by many new reforms. For example, some hold tenaciously to beliefs that are in contradiction with constructivist theory and practices (Hashweh, 1996a, b; Prawat, 1992). Consequently, some have advocated viewing initial teacher education (Stepans, McClurg, & Beiswenger, 1995) or professional development (van Driel, Beijaard, & Verloop, 2001) as a conceptual change process. While teacher learning is probably assim-

ilative most of the time, it is the more risky and more important accommodative learning that is the focus of this paper. By accommodative learning I do not mean, as will be clear later, that the old will necessarily have to be discarded and replaced by the new. This might be necessary in some cases, but, in general, what is needed is cognitive reorganization to resolve conflict or dissonance between a prior 'conceptual ecology' (Posner et al., 1982) and practices on the one hand, and new concepts, beliefs, dispositions, and practices on the other hand. This might include the demarcation of the ''domain of application'' of prior and new knowledge, beliefs and practice: when, why, and how to use traditional direct instruction versus alternative small-group jigsaw method, for example.

It follows from this that an important case to study is when teacher prior knowledge, beliefs and practices are dissonant with new ones. Another complexity arises when the teacher is unaware of prior knowledge and practices because they are implicit or procedurally encoded and automatically executed. Just as students studying science are unaware of their theories about motion that they use to interact with a moving object and to understand this motion, theories that are more Aristotelian than Newtonian in nature, teachers are often unaware of some of their practical knowledge, beliefs and practices. This characteristic of knowledge makes it hard to get hold of it, reflect on it, and develop it. Usually, teachers will not specify what their views about learning are. Only through questioning and probing, or through observing practice and discussing it, can we, researchers and teachers, start to get hold of these beliefs. An important condition for teacher accommodative change to occur is bringing these beliefs up to the level of consciousness. Fenstermacher (1994), writing from a different perspective that is mainly concerned with the justification of teacher practical knowledge, also emphasized the need for teachers to realize their implicit beliefs and knowledge for teacher development to occur:

> So long as this knowledge or understanding is tacit, it is unavailable to the teacher for further reflection. If the researcher probes, in a manner

indicative of trust and mutual regard, the teacher's reasons for acting as he or she did, the performance "knowledge" heretofore tacit may reach a conscious level of awareness. Once aware of it, the teacher can deliberate or reflect on it and, if it is found meritorious in that teacher's conception of his or her work, advance it as reason to justify acting as he or she did. (p. 46)

It has been asserted above, and will appear later, that the resolving of conflict is the important means and end of teacher change. However, due to the implicit nature of some prior ideas and practices, a teacher might be unaware of some specific contradiction between different ideas that he holds and practices, or between these and new ideas and practices. Engaging in practice, reflection and deliberations have important roles in throwing light on these contradictions, and, consequently, fostering accommodative change.

The second important idea about learning, coming from social constructivism, is the idea of the learner constructing his or her own knowledge in a social context. From this perspective, the learner might learn from experience or might appropriate ideas from others who scaffold her learning, but it is she herself who is actively forming new knowledge and connecting it to an existing cognitive structure. Activity, engagement and participation are needed for learning. The idea that knowledge is simply transmitted to the learner is no longer accepted. Closely related to this is a third idea, that learning is goal oriented. The learner has two goals: to construct meaning and to regulate his or her own learning. Additionally, learning is strategic, that is, involves metacognition, or the awareness about and control of cognition by the learner (Jones, Palincsar, Ogle, & Carr, 1987). Fifthly, learning is situated. Hence there is a necessity for authentic learning tasks; knowledge learned in practice is knowledge that can be expected to be used by teachers in practice (Ball & Cohen, 1999). Finally, there is growing criticism of these descriptions of learning as being too rationalistic (Geelan, 2000) or too 'cold'. Learning, according to many, involves emotions, and is more "whole" than the present approaches

portray it to be. Bloom (1992) points out that "meaning includes not only semantic knowledge but also episodic knowledge, products of various mental processes, interpretive frameworks, and emotions, values and aesthetics" (pp. 177–178).

These characteristics of learning lead us to identify some other conditions that have to be met to assist teachers in constructing new ideas and acquiring new practices. Since learning is goal oriented and strategic, teachers must be involved in the design of teacher development programs and innovations in order that they share the purposes of these learning activities. As briefly stated above, purpose determines the product of a learning activity. Additionally, such involvement will allow teachers to act metacognitively while learning. Learning, as a socially mediated activity, can best be conducted in collaboration with others. In order that the learning activities be authentic teachers have to acquire new knowledge and skills in practice. Finally, the social climate should not only foster metacognition, discourse, and practice, but it should also facilitate the expression and discussion of "hot" cognition, including teachers' expectations, anxieties, and joys.

Before concluding this section some factors that hinder conceptual change in general, and teacher accommodative change in particular, need to be discussed. It has been previously pointed out that teachers might find it difficult to discard or limit the use of prior ideas and practices because these are implicit or procedural, and consequently, difficult to reflect upon. Additionally, teachers, like students and other persons (see Hashweh, 1986; Ross & Lepper, 1980) can use a variety of strategies to preserve these prior ideas and practices. They can search only for confirming evidence rather than try to search for evidence that can falsify their ideas, or they can simply fail to test their expectations due to overconfidence. Teachers can add ad hoc explanations, consider anomalies as special cases, or refuse counter evidence. In addition, they can hold irrefutable metaphysical explanations or self-verifying beliefs. Only by creating a context that allows critical examination of ideas and practices and that allows disciplined inquiry into these prior ideas and

practices can we facilitate teacher dissatisfaction with them, and the consequent discarding or limiting of their use. Confrontation of prior ideas and practices to induce satisfaction might not be enough; what is needed is acquisition of syntactical knowledge and skills to limit the use of common sense epistemology and methodology for validating knowledge.

Engaging teachers in inquiry, collaborative action research, or other forms of teacher research can facilitate this. Roschelle (1999) reminds us that Dewey (1938) considered inquiry as sitting on the boundary between commonsense and scientific reasoning because it is an available tool in both realms, and an instrument to develop commonsense into scientific reasoning.

The role that the students, colleagues, principals, parents, and the educational system plays in maintaining the prior ideas and practices should also be recognized; the conceptual ecology that provides the niche for a specific prior teacher idea or practice is not only in that particular teacher's mind, it is ubiquitous in the professional and lay society. Hence, one condition for teacher change is the weakening of the influence of this conceptual ecology on teachers by legitimizing alternative ideas and practices.

Having identified some conditions that facilitate the construction of new knowledge and practices and some that allow the preservation of the old, it is important to discuss conditions that can facilitate the cognitive restructuring that teachers need to do to resolve the cognitive conflict associated with accommodative learning. Fig. 1, developed from previous work on student conceptual change in science (Hashweh, 1986), represents what might be involved in accommodative change. A teacher has a prior idea (belief, concept, theory, or expectation that is usually part a prior conceptual ecology not presented in the model, for

Fig. 1. A model of accommodative change.

simplification purposes) that she uses to interact with some part of the world (the model does not claim that ideas are isomorphic with the external world). She might believe that student ability is largely stable across time and domains. So, if a student X is poor in mathematics she expects him to stay poor in math in the future, and to be poor in languages as well. Her past experiences with the world (R0 and R1) have confirmed this belief. She is involved in a new collaborative project and tries small group complex instruction for the first time. She is confronted by an anomaly, R2: student X suddenly shines in this new environment and displays hidden talents that demand the respect of his peers. This is the cognitive conflict that has been the focus of attention of psychologists and educators. However, she is exposed during the same project to the theory of multiple intelligences, that, in spite of the fact that it better explains or accounts for R2, conflicts with the teacher's prior idea about unidimensional stable intelligence. The teacher has to resolve both conflicts for cognitive restructuring to occur.

The important role of anomalies, or classroom incidents that contradict teachers' prior expectations, in inducing accommodative change cannot be overemphasized. They play the dual role of refuting prior ideas and instantiating new ones at the same time—in inducing dissatisfaction with prior ideas and making new ones intelligible and plausible, employing the terms used by Posner et al. (1982).

The conflicts can be resolved, not necessarily by discarding the prior beliefs about intelligence, but by a process of demarcating the domain of application or explanation of each idea, that is defining the portion of the world to which each can be successfully mapped. Students behave as if they have unidimensional stable intelligence under traditional teaching methods (R1 and R2), but they show multidimensional intelligences under complex instruction methods (R2), and possibly under new still-to-be-discovered circumstances (R3 and R4). The conflicts existed because it was assumed that both C1 and C2 represented exactly the same part of reality. When we show that R2 is different from R0 and R1 we contribute to resolving the conflict. These explanations that
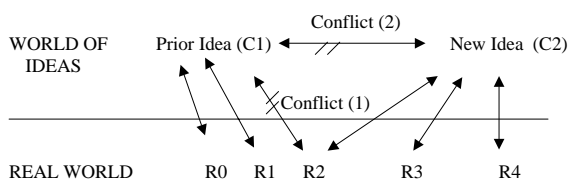
show that the prior ideas and practices are not simply wrong but limited, and that explain why the conflicts existed in the first place, are synthesizing schemata that can foster genuine cognitive restructuring.

Having briefly delineated what we know about learning at present, it is possible to identify the following conditions that are necessary for accommodative teacher change to occur. It is not claimed that these conditions have to be met in any specific order for change to occur.

1. Teachers must be internally motivated to develop professionally: to develop their ideas and practices. Usually, they must see a gap between their ideals and goals and their existing practices.

2. Teacher prior knowledge, beliefs, dispositions, expectations and practices should be critically examined.

   a. The teacher must become aware of his or her tacit knowledge, beliefs and practices.
   b. The teacher should realize the limitations of prior knowledge, beliefs and practices.
   c. The context of learning should support disciplined inquiry that facilitates the acquisition of syntactical knowledge, skills and habits of mind to limit the use of common sense epistemology and methodology for validating knowledge.
   d. The influence of the larger culture (principals, colleagues, parents, and system) on the teachers in maintaining the status quo should be minimized.

3. New knowledge, beliefs, dispositions, expectations and practices should be constructed.

   a. The teacher must be cognizant of the purposes of learning activities: he or she must participate in designing professional development activities and educational innovations.
   b. The teacher should construct new knowledge, beliefs and practices in practice.

4. Cognitive restructuring must occur.

   a. Two types of conflict must be resolved; the dissonance between prior ideas, on the one

hand, and reality and new ideas, on the other hand, must be worked out.
   b. Synthesizing schemata should be constructed or appropriated.

5. The social climate for change should be characterized by:

   a. Collaboration with colleagues and university-based educators/researchers.
   b. A discursive community that emphasizes reflection, deliberation, and inquiry.
   c. Trust and respect to allow expression and discussion of ideas, practices and emotions, and to allow experimentation.

The fact that all these conditions have to be met for accommodative change to occur reveals why this type of change is very difficult. When the resulting change is accommodative we can describe the outcome of cognitive conflict as progressive. If the conditions are not met, one of two outcomes might occur. The teacher can continue to live with unresolved conflicts or dilemmas. These can be called transitional outcomes. Finally, the teacher might change some ideas or act in ways to preserve prior ideas and practices. The resulting outcomes can be termed conservative in this case.

3. Accommodative change as depicted in a teacher-written case

How useful is the above-described model in helping us understand what teacher accommodative change entails? One way to "test" the fruitfulness of the model is to use it in analyzing stories of change in general, and as narrated by the teachers themselves. I have chosen for this purpose a democracy education project in Palestine that used teaching cases in a problem-solving approach, and that extended over a period of 3 years (Hashweh, in press a), focusing on one of six "documentary" cases written by teachers who had participated in the project. The data for this section of the paper comes mainly from the case written by this teacher. It is supplemented by my own observations and interpretations as a

participant observer in the project. The case is revealing because it shows the difficulty of inducting accommodative changes since it is essentially an internal process controlled by the teacher herself. While the project, briefly described below, attempted to provide the conditions needed to foster change, this particular teacher was not always able to undertake accommodative change.

The case shows the three previously described possible outcomes of cognitive conflict. Three conflict situations that demonstrate these three outcomes will be described and examined in the rest of this paper after a brief description of the context within which the teacher wrote her case.

In the first year of the project, teachers met under my leadership during one weekly meetings over the length of the school year. In the first few weeks they developed a shared understanding of the rationale and objectives of case-based teaching. Students, in this approach, are faced by sets of cases created around real problems and events in their society that have ''educational potential''. Cases are used to provide common grounds for problem definition and problem solving, exploration and collaboration among the students, to establish a community of learners, to allow students to notice changes in their knowledge and beliefs, to allow deep student disciplinary understanding and to connect the knowledge in different disciplines.

During the rest of the first semester, they collaborated in designing a case-based democracy unit. The teaching case was about punishment of students in schools, and the teachers used it as an anchor for collaborative learning about citizenship, the rule of law, the separation of powers, the legislative process, accountability, and basic rights. The actual case was about two pages long, but the case-based unit included materials and guidelines to teach it using about 16 periods, and was about 25 pages long. Additionally, it required the students to refer to a number of booklets about different elements of democracy, and to gather information using the local library, the internet and through interviews and questionnaires. During the second semester of the first year the teachers taught the case-based unit, and continued to meet on a weekly basis to discuss their teaching

during the previous week and to plan for teaching during the next week. In teaching the unit, students started to work as one group to identify problems and cases raised by the case. Consequently, they worked in small groups to answer questions related to certain elements of democracy, such as citizenship or the rule of law. They used external references, conducted interviews, and designed questionnaires to answer these questions. Using the jigsaw method, the students were then rearranged in new groups to propose solutions to the original problems raised by the case. (A detailed description of this phase of the Project is found in Hashweh & Njoum, 2001.)

During the second year, the teachers collaborated in designing four new case-based units, using the same approach and structure developed in the previous year. In the first semester of the third year (2000/2001), each of seven teachers taught one of the five units in grades 9–11, and, during the second semester, each of six teachers wrote a documentary case recording some aspects of his or her experience in teaching that unit. Thus, the products of the project were a set of five teaching cases and a second set of six documentary cases. The Palestinian–Israeli violent clashes re-erupted at the beginning of this final year, and their impact on the project was clearly felt. Mira, who wrote the documentary case chosen here during the last half of the third year of the project, participated in the project for the entire 3 years. Fig. 2 summarizes the 3-year project.

Teachers were instructed during the first semester of the third year to keep journals to document their teaching experience. They were reminded of the four commonplaces upon which they might want to focus: themselves and their professional development, the students, the content, and the context. The teachers used the weekly meetings to discuss problems they encountered in teaching and to provide mutual support for each other. While some teachers were able to pinpoint an issue they wished to explore in more details and use in their cases, to be written the next semester, Mira and others were not able to do this until after they had finished the teaching of the unit.

In the second semester the weekly meetings were used exclusively to write and revise the
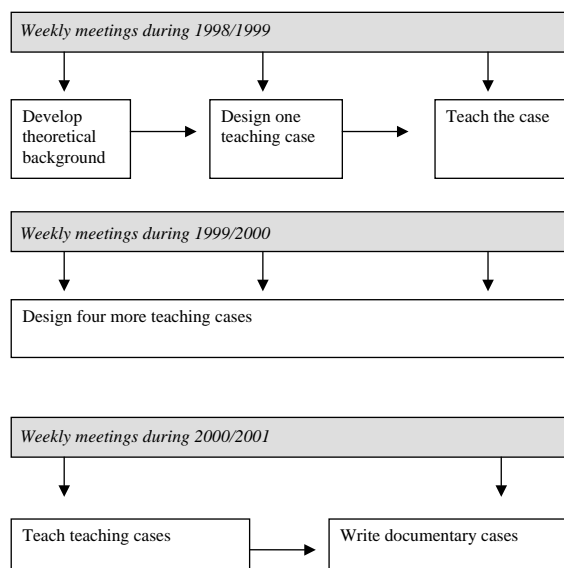
Fig. 2. Description of the project.

documentary cases. The teachers were given written instructions to help them in case writing. They were reminded that the aims of the cases were to document their experience and communicate it to others, and that cases were cases of a phenomenon or some theoretical entity such as using the jigsaw method for the first time. We struggled with determining what each case was a case of. Teachers were encouraged to describe their attempts of resolving problems, including the unsuccessful attempts. The main aim of the cases, thus, was to document the experience and not to write cases that could be used pedagogically for teacher development. We did not insist that each case end with an unresolved dilemma, a common format used in other teacher-written cases. Indeed, many cases ended with a successful resolution of an important problem that the teacher had faced. The final versions of the six documentary cases ranged between 6 and 30 pages in length. Mira's case was about 2400 words long.

The teachers submitted their cases to their colleagues and to myself, received feedback, and revised their cases a number of times. In many cases, especially at the beginning of the process, we asked the teacher to develop a certain issue and provide more details, and to neglect other details that seemed unimportant. However, the teachers

also occasionally helped each other explore the reasons for their actions, and identify their implicit beliefs. We tried to create a learning community in which each teacher reflected on her or his practice, and deliberated with others on possible courses of action. The process of case writing and its functions in describing and promoting teacher change is described in detail elsewhere (Hashweh, in press b). The focus of this paper is using cases to understand teacher change.

Many characteristics of the project allowed some important conditions for accommodative change to be met. Firstly, teachers were self-chosen, and highly motivated to develop professionally. Mira, for example, was involved in another peace education project and was active in a teacher development center while participating in the democracy education project. Secondly, weekly meetings during the actual teaching of the cases were used to plan for the consecutive week and reflect upon the teaching during the previous week. The reflections and deliberations allowed teachers some critical examination of their prior ideas and practice. The process of writing the cases, which included presenting drafts to others, and discussing these drafts, also facilitated the critical examination of ideas and practices. Thirdly, conditions for the formation and acquisition of new ideas and practices were largely met. Teachers participated in designing the units and jointly planning to teach them. They actually taught the units in their classrooms, and had a chance to learn through experience, and to collectively analyze and document this experience. Finally, the conditions of a facilitative social climate were also largely met. The teachers collaborated with each other and with myself, a university-based researcher. They reflected upon and debated ideas, and deliberated about practice. They inquired into their ideas and practice in order to teach and to write the cases. The long period of the project allowed the creation of trust, openness, and mutual respect.

3.1. First conflict situation: a transitional outcome

Mira starts her documentary case entitled "Is This the Right Time?" by describing how she

distributed copies of a teaching case in class. The teaching case was about a 12th-grade student who could not study well for her school graduation exams because the neighbors celebrated their son's wedding, using the street as a site for these celebrations as is the custom in many Palestinian towns and villages, for a week. The students had to identify problems raised by the case, pose questions, and answer them collaboratively in small groups using the jigsaw method, and learn about different components of democracy, such as individual rights, the rule of law, and the legislative process, to answer these questions.

She describes how highly motivated she was to teach the case-based unit to develop her practice: "This was not my first experience in teaching democracy using the case-based approach for I had used it two years ago. However, I had used a different case then. I did not expect any problems in teaching this new unit because I had a strong desire to try out, as well, what I had recently acquired from participating in a different project during the summer vacation. It was a project that treated students as young archeologists. The French archeologist who led the project used teaching methods that facilitate creativity and innovation, and the discovery of scientific knowledge through actual participation in field work. I learned a lot from the project, especially the use of inquiry methods in teaching."

Mira discusses with one group of students possible methods to answer the questions, and suggests that they meet some officials from the municipality, the judicial system, or some of their representatives in the Palestinian Legislative Council. One student, Yousif, interjects: "Do you think this is the right time? Our leaders are very much involved with more important matters at this time, and do not have time to meet us." During the course of the story it becomes clear that the student is opposed to learning about democracy because he believes the national struggle against the Israeli occupation should supercede internal issues that might negatively impact on national unity. He also does not believe one can or should have access to representatives and to hold them accountable. "Who are we to question those in authority and power?" he asks at some other point in the case. Yousif does not participate in any meaningful manner in class activities, and keeps showing negative attitudes towards democracy and its study.

The teacher senses a conflict, according to the case she wrote, between two beliefs: that all students should participate in class activities, and that democracy requires providing freedom of choice, including respecting the right of the student to participate or refuse to participate in a school project or activity. She writes: "I thought he should participate and contribute like other students in the class. But I couldn't force him to participate since I would be acting in contradiction with the democracy that I am trying to teach." Using the model of accommodative change described above we can represent the cognitive conflicts she faced in Fig. 3, noting that conflict (2) is between two prior ideas she has, and not between a prior idea and a new one as portrayed in Fig. 1. Nevertheless, the use of the presentation is fruitful in that it shows that a teacher, or any other person, can be unaware of contradictions in his or her own cognitive structure until placed in a situation that requires simultaneous attention to two dissonant ideas. It is also worth noting that the representation does not make the usual distinction between thought and action; a contradiction can occur between two ideas or between ideas or expectations and reality or action, whether one's own actions or those of others, including student behavior. Teachers are aware of contradictions when the task at hand, whether reflecting, deliberating or acting, requires the simultaneous attention to or "activation" of two dissonant ideas or ideas and events.
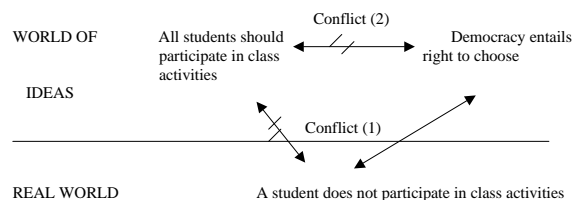

Fig. 3. Conflicts between a teacher's conception of democracy, her beliefs about appropriate students' behavior, and actual student behavior.

It is also worth pointing out that the teacher's conception of democracy is not very accurate. She believes that democracy necessitates the provision of freedom of choice for every individual in every situation that requires decision-making. She does not take into consideration that freedom of choice exists within limitations prescribed by law, or rules and regulations. (This equating of democracy with unlimited freedom of choice is also shared by many students, in my experience, and as I and some colleagues are discovering in an initial examination of students' ideas about democracy.)

How does Mira resolve these conflicts? She decides to talk to Yousif outside the classroom, and to try to convince him about the importance of democracy for Palestinian society, and the importance of studying it in class. The case describes how the student gradually gets involved in the activities, and finally becomes an initiator in his group. He even changes many of the initial beliefs about and attitudes towards democracy that he initially held. It is unfortunate that Mira does not adequately describe how and why the transformation in Yousif's ideas and behavior occur, but one gets the impression that he reluctantly obliges his teacher, then gets interested due to the intrinsically motivating nature of the learning activities themselves, and gradually undergoes the change.

However, in spite of Mira's success with this student it is evident that the conflicts in this case did not result in accommodative change, or what I have called progressive outcomes. Mira convinced the student to participate in class activities and, thus, resolved conflict (1) presented in Fig. 3. She did not go through the more significant change that requires reconsidering any of the two beliefs in conflict that she held. She gave none of the counter beliefs, that some activities can be electives that students may choose not to do, or that democracy does not entail complete freedom of choice, any serious thought. She probably failed to do so because she was not able to come up with the counter ideas on her own, and because the context of the project, despite all its emphases on discourse, deliberation and reflection, did not allow her to express and discuss these particular conflicts. The conditions necessary for the construction of new knowledge, beliefs, or practices were not met in this case, and she was not able to resolve conflict (2) between her beliefs about the necessity for all students to participate in all class activities and her belief that democracy necessitates the provision of free choice on all occasions. The case ends with the teacher living with the dilemma, and the outcome could be described as transitional.

3.2. Second conflict situation: a progressive outcome

On the other hand, the change in Yousif's thoughts and behavior served as an anomaly that led to progressive outcomes, or that induced accommodative change in other beliefs that Mira held. Mira originally believed that students held attitudes and beliefs and had abilities that would not change as a result of instruction; she believed that student characteristics are largely stable across time. This is why she was very concerned about the student's refusal to study democracy at the beginning of the case. This belief appears when she discusses another student in the case. In the middle of the case, Mira describes Sara, the student "whose eyes shine with intelligence", and who works hard and is highly motivated. She mentions that Sara was prominent in her small group and a leader, just as she used to be during traditional teaching. She adds, "Sara was proving to me a point with which I am troubled, namely that a student who is a leader stays a leader no matter what teaching methods we use. Students will continue to depend on her because they respect her performance [probably meaning abilities]."

When Yousif defends democracy at the end of the case Mira expresses surprise. "The change that happened was greater than all my expectation." Reflecting on her experience, she adds, "I realized that taking prior decisions about the outcomes of teaching is not correct. I also realized the importance of coming to know students' prior ideas because this will affect how you interact with different kinds of students and how you take individual differences in consideration." Fig. 4 describes the conflicts leading to accommodative
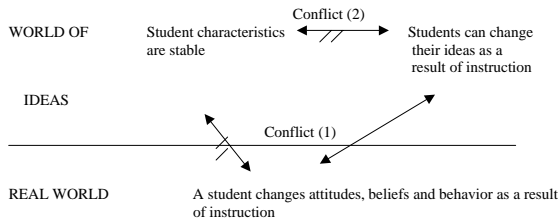
Fig. 4. Conflicts between a teacher's expectations about outcomes of learning and actual outcomes.

change in this case. This particular case underlines the importance of anomalies or classroom discrepant events in inducing accommodative teacher change. It also shows that, while the incident served in inducing accommodative change, it also served to re-emphasize, rather than change, other prior beliefs that she held, namely the importance of knowing student prior beliefs as the above quotation shows. That this was a prior belief is clear from the beginning of her case where she writes: "I moved across the different groups while they were working to achieve something that is important for me, namely to get to know their aptitudes, abilities and personalities, especially because I did not know them before. This was the first year I taught this group. This direct interaction with them led me to achieve that quickly; I knew the rebel among them, the quiet, the leader, and the diligent." While in the beginning of the case she is stressing the importance of abilities and personality traits, at the end she stresses the importance of knowing her students' prior ideas.

3.3. Third conflict situation: a conservative outcome

The first conflict situation discussed previously showed how the conditions for accommodative change were not met, and consequently the teacher still grappled with a dilemma until the end of the experience. I called this a transitional outcome. The second conflict situation showed how, when the conditions for accommodative change are met, the outcomes are progressive. The final situation to be discussed shows how when the conditions for the construction of new ideas or practice were not

met, the teacher used assimilative strategies to preserve her prior beliefs when faced with conflict. The outcome was conservative because she preserved her beliefs and resolved a conflict that might have motivated or induced accommodative change under different conditions.

Mira is an excellent teacher when she uses traditional instruction as I have observed her during the project. She is well organized, relies heavily on the use of the blackboard to represent the structure of her presentation in the form of hierarchal concept maps, uses many examples from the experience of her students, and is skillful in the use of questions to involve students and to monitor understanding. However, this style requires that she be in full control of the classroom, and that only one person speaks at any one time. When she shifted to the use of small groups, in accordance with the project's philosophy, she became uncomfortable with the high noise level in the classroom, especially at the beginning of the class period when the students rearranged their heavy desks for group work. Mira writes in her case: "The chaos at the beginning of every period greatly worried me, and I asked myself if I were to blame for this situation. I searched for a way to draw my students quickly to work. I also wondered why am I having this problem, and why I don't face it with the same students in other regular periods? All my efforts to change this chaotic beginning of every period failed." However, although she focused on the beginning of the class periods, it was clear from observing her class that she was not comfortable with the high noise level during the rest of the period. As Fig. 5 shows, Mira faced a conflict between her prior ideas, her expectation for appropriate student behavior and her beliefs about how quiet students should be, and the classroom reality of high noise level, especially at the beginning of the period. Lacking any other idea about appropriate noise level, she attributed the high noise level to the inappropriate furniture. "I finally realized that the real problem lies in the furniture, the heavy desks that are also dangerous to move in a crowded classroom and that are not appropriate for the new method of teaching.... If I were to repeat this experience I would pay attention to choosing an appropriate

Conflict (2)

WORLD OF
IDEAS Students should be very → Acceptable noise
quiet all the time level varies with
teaching method

(Furniture source of
high noise level) Conflict (1)

REAL WORLD Noise level is high, especially during beginning of group
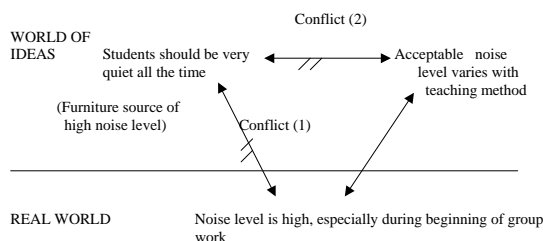work

Fig. 5. Conflicts between a teacher's expectations about acceptable student behavior and actual behavior.

place that is properly equipped for this kind of teaching.''

While it is probably true that more appropriate furniture would have partially solved Mira's problem, the facts that she did not discuss the problem with her colleagues and that the problem did not appear in early drafts of the case so that it could be discussed did not give her a chance to construct the alternative idea that some noise level is acceptable, indeed desirable, under different teaching conditions, in particular, when using collaborative small group work.

4. Conclusion

In the first part of this paper it was argued that there is a need to better describe and understand the accommodative learning or the significant change in knowledge, beliefs and practice that teachers might need to undergo to develop professionally and to implement the new reforms in education. A possible model of teacher accommodative change was presented, and some conditions necessary for inducing this change were specified. In the second part of the paper the model was used to describe and analyze the cognitive conflict that motivates and underlies teachers' attempts to change, and to describe the outcomes of this process.

The focus of this article was to propose a model of teacher accommodative learning, and to exemplify its plausibility and fruitfulness by using it to understand a teacher-written case. The fact that the model was used successfully to account for three different outcomes of teacher learning by the same teacher testifies to its plausibility and usefulness. However, it is clear that the model is in need of further testing and critique in the future.

The present article reinforces what we have known about student learning in the domain of teacher learning. We can better understand learning, and the conditions that facilitate different kinds of learning, but we cannot, and do not want to, completely predict and control learning outcomes. Mira, the teacher described in this paper, participated in a project that attempted to emphasize the conditions that might facilitate accommodative change. She underwent this change in some cases, but did not in other cases. The context can be very conducive for professional development, but it is finally the teacher himself or herself that has to make the change.

Mira's case, and the cases written by other teachers in this Project, explain the difficulties encountered by teachers attempting to design and implement educational innovations consonant with the current reforms in education. In addition to the accommodative learning they had to do, the teachers had to juggle simultaneously with three balls: new content, new theory and new practice. The partial, but important, success Mira and the others achieved testifies to their courage and to their commitment to teaching.

The collaborative process of writing cases by teachers engaged in projects of educational reform, and in which other colleagues and university-based researchers are involved, in order to document, profile and analyze teacher change, has not been given the attention it deserves. Neither has the use of these cases as sources for data been widely practiced. The fact that it was possible to describe and analyze teacher learning depending predominantly on a teacher-written case lends support to viewing these cases not merely as pedagogical materials but also as research and data for research.

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