

PRESERVICE TEACHER TRAINING THROUGH ACTION RESEARCH: THE CASE OF A PRESERVICE SCIENCE TEACHER IN CHANGE

MAHA AL-QURA'N

Abstract – *In March 2000, a researcher from Al-Qattan Center for Research and Educational Development (QCRED) in Palestine, integrated reflective practice into the process of the third year science specialized preservice teacher training through collaborative action research. Five preservice teachers from the Educational Science Faculty (ESF), which is one of the institutions of the United Nations Relief and Works Agency (UNRWA) and an inservice teacher from Beddo cooperative school shared in the study. Many preservice science teachers continue to view teaching as lecturing. They fail to put the constructivist theory in action. In addition, they are unaware of the complexities of the teaching profession, and expect success through following a 'preordained' task. This case study aims at studying the factors that hindered one of the preservice third year science teachers, who participated in the study, from adopting the constructivist theory in teaching science to the sixth grade students. Data obtained during both the two months and the three weeks implementation phase was analyzed qualitatively.*

Introduction

This article analyses the case of a preservice third year science teacher from the UNRWA (United Nations Relief and Works Agency) Educational Science Faculty (ESF), who participated in a collaborative action research project, whose aim is to encourage student teachers to adopt student-centered teaching methods. I chose to discuss this case thoroughly, because among the five preservice teachers who shared in a collaborative training project, the preservice teacher of this case was the only one who continued to be a traditional teacher. The action research project involved a researcher from Al-Qattan Center for Research and Educational Development (QCRED) who is also a science instructor and trainer at the ESF, five preservice teachers from the ESF, and an inservice teacher from the Beddo UNRWA basic school. The project, that went through two phases of two months preparation and three weeks implementation, used reflective practice to overcome the problems of ordinary training programs that view teaching as 'something to do not something to think about or study'.

The review of literature covered the causes of the prevailing knowledge transfer teaching practices, the constructivist approach to teaching science, the

need for reflective practice to accomplish a real change in the content of student teachers' beliefs, and the problems with preservice teacher training programs. Qualitative data analysis clarified the dissonant reasons that caused the preservice teacher to disdain the intended change, and highlighted the need for alternative teacher training programs that go beyond the survival skills through technical means.

Despite the limited scope and time of this pilot project, it explored the problems of preservice teacher training through authentic experience. The exploration of these problems is essential for evaluating the strategies used to implement wider scope programs.

Literature review

Preservice teacher training is considered a major issue in teacher development. Ginns, Heirdsfild, Atweh and Watters (1997) pinpoint the importance of early school experiences in inhibiting or catalyzing effective mathematics and science teaching, and advised educators to start building an action research culture. Action research can be conducted through final year project where collaboration and reflection can take place. In Brazil, Hong Kong, and USA, preservice teacher training takes the form of school-university partnership (Garrido, Pimenta, Moura & Fusari, 1999; Angelina & Priscilla, 1996 and Levine, 1988). In these countries, student teacher training and field teaching experiences occur in the cooperative schools, which are also called practice schools or partner schools (Goodlad, 1990).

A major concern of teacher educators is to alter the way the preservice teachers perceive teaching. Student teachers persist in using a teaching methodology that views teaching as dictating, and learning as recalling (Calderhead, 1991 and McDaniel, 1991). Russel (2000) refers to 'teaching as telling' as the 'default teaching style' and asserts the importance for preservice teachers to recognize that their accepted teaching style is due to early school years, cultural aspects, and existing training programs. Many researchers confirm the effect of the early twelve years schooling and the later university years, in which preservice teachers observed models of teaching, to form their own teaching theories (Ginns et al., 1997; Mayer, 2000; Russel, 2000). Britzman (1986) discussed the impact of cultural effects or 'cultural myths' on the preconceived conceptions of teaching that reinforce teacher control, view the teacher as the expert, and propagate the idea that teachers are self-made. Ordinary preservice training programs that provide student teachers with survival and technical teaching skills have little impact on the coexistence of the 'default teaching style'. Researchers call these programs that fail to challenge the existing beliefs of good teaching as 'default

programs' or 'vocational programs' (Russel, 2000; Mayer, 1999; and Hill, 1999). Lack of suitable training programs is one of the problems of science teaching.

Contrary to knowledge transmission, constructivism proposes that knowledge does not exist outside a person. Students can only obtain knowledge through constructing it within their minds (Cobb and Steffe, 1983). Thus in teaching science, Wittrock (1986) emphasizes the need to utilize strategies that allow students to construct 'conceptually ordered representation' of the relations among the parts to be learned and one's knowledge base and experiences. According to Fullan (1982, P. 33) 'beliefs guide and are informed by teaching strategies'. Other researchers also highlight the issue of changing prior teachers' beliefs to overcome conservative, and problematic teaching (Borko, Lalik, and Tomchin, 1987).

However, changing long lasting beliefs is not an easy task. Studies suggest that teachers tend to avoid information that might attack their deep-seated schema, and put their prior conservative beliefs into action (Bullough, 1991; Calderhead, 1991; Kagan, 1992; Zeichner; Tabachnick and Densmore, 1987). Studies on student teachers' beliefs, found that it is not easy to change the persisting personal beliefs and teaching perspective (Mayer, 1999; Borko *et al.*, 1987, and Griffin, 1989). Preservice teacher education has a major responsibility to put preservice teacher theories in action so that later they may be applied to practical situations. Teachers might filter out theories if educators failed to integrate theory into preservice belief system (Feynman-Nemser, 1983; Johnston, 1994 and Wubbles, 1992). Gore and Zeichner (1991) recommend a greater emphasis on self-reflection to help reconstruct beliefs.

Schon (1987) asserts the necessity of blending reflective practice into teacher training. Educators should create an environment where reflective practice becomes a habit in student-teacher experiences, and student teachers should be encouraged to utilize reflection in examining the educational strengths and weaknesses of different educational theories. Moreover, Johnston (1992) criticizes many programs that focus on specific skills and knowledge outcomes, rather than teacher development through reflection.

Several problems are expected with preservice teacher training. In fact, studies imply that student teaching experience might actually be harmful to their professional growth. '[It] may block the flow of speculation and reflection by which we form new habits of thought action.' (Feiman-Nemser and Buchmann, 1985, p.56). Many preservice teachers are unaware of the demands of the teaching profession, and hold idealistic and unrealistic expectations about their ability to master it (Feiman-Nemser, 1983). They perceive teaching as a 'preordained' task to follow and fail to appreciate the complexities and unpredictable nature of teaching (Johnston, 1994b; Kagan, 1992; Britzman, 1991). They may also fail to see the connection between the content of their course work and the realities of the

schools classrooms (Johnston, 1994a; Kagan, 1992; Wubbels, 1992; Aitkin and Mildon, 1991; Britzman, 1991).

Purpose of the study

This collaborative action research attempted to change a science teacher from being a content oriented and textbook dependent to a teacher who is a curriculum inquirer and reflective practitioner. The project endeavored to create an environment that helps to change the teacher from acting as a dispenser of knowledge and students as receivers of knowledge to a teacher whose role is to provide situations and information and students as information gatherers, processors and constructors of knowledge. The research answers the following question:

What factors hinder the preservice teacher from acting as a facilitator of student learning instead of a dispenser of knowledge?

The action research spiral of 'plan-action-observation-reflection' followed by 'revised plan-action-observation-reflection' was applied (Kemmis and McTaggart, 1988). The application took the form of small spirals representing week-to-week short-term changes. Hermes and Zengerle (1999) used this methodology with university student teachers to acquaint them with action research method. Both Hermes and Zengerle's and this study used triangulation in the form of different angles of observations.

In adopting collaborative action research through a process of critical inquiry, we intended to act on the world rather than being acted on. Since qualitative studies are real social experiences, they have real consequences in people's lives despite the problems of the quality of conclusions. 'There is a responsible view of what happened in a particular situation (including what we believed, interpreted, etc.)', and we should not consider our work unjudgable (Matthew, Miles, and Michel, 1994).

Background and setting

This collaborative action research took place through a partnership project between the Educational Science Faculty (ESF), and the Qattan Centre for research and educational development (QCRED), in cooperation with Beddo school in Palestine.

The research was carried throughout the second semester of the third year science education students at the ESF. These students went through around fifty

training hours before entering this semester training course. They also completed the basic education courses in the college: Introduction to Psychology, Child Psychology, Education System in Jordan and Palestine, Psychology of Teaching and Learning, Curriculum Development and Instructional Design, Curriculum and Methods of Teaching Science I, Curriculum and Methods of Teaching Science II, Measurement and Evaluation, Classroom Management, and Practice Teaching (theoretical).

The Trainer: The trainer, a 37 years old science instructor at the ESF and a part time researcher at the QCRED, and holds a masters degree in physics and a master degree in education. She worked as a physics instructor and trainer at the ESF for 10 years. As a member of the action research unit at the QCRED, she is continually engaged in action research.

The Subject (Mona): Mona is a 20 years old, third years science education student, and an excellent and committed student. The researcher taught her physics but never supervised her in a teacher-training course. Mona taught during the training course at Al-Ama'ri school which is one of the UNRWA schools at Al-Ama'ri refugee camp.

The Collaboration Team: the collaboration team consisted of the trainer, the cooperative teacher and five preservice teachers. Normally, Preservice teachers do not have a preparation phase prior to their three weeks of actual teaching training at the cooperative schools. Moreover, the college training course require a minimum of two trainer visits and the Preservice teachers have to teach twenty teaching classes. The cooperative teacher and the trainer evaluate the preservice teacher by filling a checklist.

The preparation phase: during this phase the trainer, a cooperative teacher and five preservice teachers collaborated in unit development using the integrated curriculum approach. During this phase unit objectives, activities, and teaching methods that encourage learner knowledge construction were discussed and concept map that reflect the integrated approach was drawn. Student teachers prepared the lesson plans and work sheets that were discussed thoroughly by the team members.

The implementation Phase: the case study student teacher taught the lessons in the 6th grade class at the cooperative school. The classroom of forty average students was arranged in four columns with two or three students sitting at each desk, and the teacher's desk in front. The preservice teacher taught some of her lessons in the classroom, and the rest in the science lab.

Data Collection

Initial interview: A semi-structured interview was held with the team members that focused on their previous experience as student teachers. Student teachers criticized the role of the cooperative teacher and the trainer and expressed the difficulties they faced during the training course. Action research was also introduced as a training methodology.

Audio Taped Preparation Meetings: Unit preparation meetings were also audio taped. In these meetings student teachers reflected on traditional teaching methods, organized integrated unit concept map, discussed suggested activities and prepared working sheets. At the end of these meetings, they were able to extract a definition of action research.

Observational Data: Observational data consisted of comments of trainer and peer's comments on the period observed, and an observation checklist filled by the trainer.

Post Classroom Teaching Conference: Data included discussion of the observed classroom period by the trainer, the peer, as well as the student teacher reflections on her classroom.

Discussion of video tapes: every Monday the team observed video tape of the student teacher classroom period. The team then discussed the lesson and the student teacher as well as her peers reflected on her classroom period.

Other Documents: Other documents consisted of prepared work sheets, student exams and lesson plans.

Data analysis and interpretation

The whole process aimed at helping the student teacher to alter her role as a traditional science teacher and to study the factors that hindered this change. Due to the fact that the majority of teachers at all levels have been educated in traditional fact-based science classrooms, it is not surprising that their knowledge structures take the form of transmission and that traditional science teaching remains the norm (Holt-Reynolds, 1990).

The preservice teacher was prepared during the preparation phase to opt for a number of methods to increase the time for students to talk, think, and discuss in

order to construct knowledge. The most effective methodology from team's point of view was group work. However, group work had to be carefully planned and can only get underway on the basis of concrete tasks to be carried out. Other methodologies like role-playing, self-learning were also used.

Data analysis began with a narrative approach sequenced in time from the beginning of the experiment until the very beginning of the implementation phase to help construct an idea of the case, and then discussed the factors that hindered the preservice teacher change.

Narration

The preservice teacher was suffering from the negative consequences of a previous technical training experience. This was clear from the discussion that took place during the initial interview upon starting the unit preparation phase. She described her experience:

'I taught at Al-Ama'ri school. I'm not intending to criticize the school but only to state facts. There was no discipline and the big shock was that I taught the noisy 8th grade students. By the end of the training course, I was happy to see it end and to escape the psychological pressure.'

She added:

'There were 40-50 students in each classroom and every student had her own problems at home or at school. There were excellent students but they were also selfish. In addition to maintaining discipline, I had to cover the curriculum. I'm not there to tell one student to keep silent and another to stay in her place. I wanted to have a real discussion in the classroom. My experience was catastrophic.'

The teacher realized that she had a problem in managing students' inappropriate behavior. Consequently, she had to spend more time in controlling the classroom chaos rather than in creating a powerful learning environment, and became frustrated.

By the end of phase one, she expressed her apprehension about the new approach:

'The experiment style is now different. I have to accomplish substantial outcomes. I'm afraid that the plan or the implementation period might not be appropriate and that obstacles will show up later. I feel that I have to give the students more efficiency and trust. Now they had to work and think instead of just memorizing. Student work will be central. I'm not sure that

I will succeed because the schools' status is catastrophic, and the students are not used to this teaching style or to teachers who respect their feelings and ideas. Sudden change might not be easy.'

The teacher's insecurity discouraged her from entering the experiment, even though she knew that she was expected to change her interaction with and perception of the students. She was conscious of the constraints of this approach, the ones related to the students and the others related to her.

The teacher's statement reflects her low self-efficacy upon entering the training course. According to Bandura (1977, 1986, and 1997), as cited by Dharmadasa (1999), self-efficacy is one's perceived ability to perform a task, and his/her performance contributes to the high or low efficacy beliefs. Henson, Stephens, Jennifer, and Grant (1999) referred to Ashton and Webb's (1982) first element of teacher's belief known as teaching efficacy and to the second element known as performance efficacy. The first deals with whether or not teachers and/or teaching methods could impact the students' learning and motivation. The second considers the teacher's own ability to perform in a way that would increase learning and motivation in all students. The teacher was not convinced that the new student centered approach would suit the students, and was not confident of her own ability to motivate the students.

Tschannen-Moran, Woollelk, and Hoy (1998) explained that lack of self-efficacy causes the teacher to express different teaching behaviors and attitudes. As noted, the teacher was critical of the students' errors, showed less enthusiasm in teaching, and was unable to persist with struggling students. After two or three periods from starting the implementation of the experiment, she held a meeting with her students and reflected on this meeting:

'I'm feeling afraid. Students need to acquire basic information, because there is no base information to build on. The students' attitudes towards each other are negative. They are feeling jealous of each other. Some students don't like science classes and try to escape them in different ways.'

The teacher's fear of the new experience and her criticism of the students' behavior persisted with almost no visible change.

Factors that hindered the preservice teacher from achieving the goals of the experiment

Even though the value of field-work experience in teacher education is accepted equivocally, Zeichner (1980) noted that 'field based experiment' seems to accomplish both positive and negative consequences. In this special case,

unfortunately the negative consequences were more pronounced. My data analysis is concerned with the factors that caused the negative consequences and prevented the achievement of change.

In addition to the influence of the teacher's previous experience and low self-efficacy, other factors affected teacher's teaching performance. Data analysis detected four other factors: pressure, teacher's instructions, inconsistency with constructivism, and discipline that continued to affect her performance.

Emotional pressure

Student teachers are surrounded by a myriad of pressures in the school site. These include: learning to cope with procedural unknown, feelings of insecurity over the curriculum, the evaluation of supervisors, the wider school context and their relationship with cooperating teacher (Britzman, 1991; Griffin, 1989 and Johnston, 1994a). The preservice teacher perceived the desired change as an additional pressure:

‘I feel there are too many things to change: I should integrate the concepts, maintain the discipline, engage students actively, talk less than the students, and act as a supervisor rather than a dictator. These make me feel unable to concentrate on one issue.’

Even though all these interrelated issues were discussed during the preparation phase, the implementation procedure was left to the preservice teacher. However, she got overwhelmed and was not able to integrate these issues. Feiman-Nemser & Buchman (1985, p.56) stated that ‘overwhelming indicate that student teaching did not significantly alter the substance of the [student teacher's] teaching perspectives.’ Towards the end of the experiment she criticized her performance,

‘I should have started group teaching gradually, starting by two students cooperating in their desk, then increase the number of students working together and the time of group work gradually.’

Discipline

Ginns et al.(1997) refer to Veeman's (1984) citation that analysis of research from United States, Europe, Australia, and Canada reveals that discipline is one of the major problems faced by the preservice teachers who have unrealistic expectations of teaching in real classrooms. The teachers focus on stopping misbehaviors without trying to understand their causes and to evaluate strategies

to deal with them. Educators should help them to develop such strategies before they begin to concentrate on students' learning (Kagan, 1992, and Swanson, O'Connor & Cooney, 1990).

The student teacher frequently identified discipline as her most significant problem. Prior to the implementation phase she said:

'My colleagues told me that the students make trouble. I'm afraid of this, but I hope that I will be able to overcome this.'

During the first implementation week, she tried unsuccessfully to apply the group work and gave the students time to accomplish their activities. She commented on the student's behavior:

'I met with the students and asked them why they make trouble during the period? They said that this is a strategy to escape the class.'

By the second week she commented:

'The classroom is a big chaos. It is even hard to hear each other.'

During the preparation phase the team discussed new teaching methods and activities, without raising the issue of students' disruptive behavior. The team underestimated the consequences of the teacher's concern of the students' misbehavior on her success in unit teaching.

Instructional practices

Bullough & Knowles (1990) noted that 'there seems to be a crucial gap in novice teachers' understanding of the nature of pupils and the ways to design instructions to meet pupils' needs, and student teachers can become disillusioned and frustrated police men.'

Peers criticized the student teacher's instructional practices, and assumed that the classroom mess resulted from her practices of giving the instructions in the form of orders that students have to obey at the beginning, and converting to ease instructions later on. She also failed to give instructions in the appropriate time and tone. One of her colleagues said:

'I think there is a problem with your instructions. You should give clear instructions. The tone of your voice while giving instructions was not assertive enough, and you should also continue to remind students about the agreed method of instructions.'

The student teacher admitted that she had a problem in giving instructions:

‘I think the problem was that I gave all the instructions from the first period and I was too tough, which caused a negative effect. They said they felt happy when I blamed them for disobeying the instructions, because then I stopped teaching.’

Another peer commented:

‘You should not have given instructions without noticing any behavior that require a special instruction.’

The preservice teacher attributed her ease instructions to her previous experience as a student:

‘I used to become angry when my teacher looked angry at me. That’s why I thought I should be nice to them.’

The teacher’s change to loose instructions later on assures the relevance of her previous experience as a student on her classroom behavior. Many researchers attributed nonprofessional behaviors to the beliefs acquired from pupil’s perspective, and emphasized that learning to teach is distinctively different from previous school experiences (Wubbles, 1992; Zeichner et al., 1987 and Feiman-Nemser, 1983).

Inconsistency with constructivism

Tobin (1989) outlines a process of knowledge construction as follows: Sense perception, reflection, collaboration, consensus, and sharing. This outline suggests the need for adopting teaching methods that reflect a change in teachers’ beliefs about how their students learn. However, the practices of this case study teacher were not consistent with the constructivist approach.

The preservice teacher’s comments indicated that she was more interested in giving information rather than scaffolding students to construct information and acquire skills:

‘In this period there were many new concepts about rocks, like the rock bar and the rock bound. These concepts were strange to the students. Consequently, I decided to use the classroom discussion rather than giving the students the opportunity to do activities.’

She added:

‘On purpose, I spoke most of the time. Otherwise, there would be no time left to explain the lesson, and I wanted to finish and I didn’t want to leave part of the lesson unexplained.’

She kept repeating that the students had no information to build on, and knew nothing. A peer confirmed:

‘Yesterday, she felt that the students lack an acceptable academic background, and today the students interacted very little. She tried to deal with the students as the center of the educational process, and planned to give them the opportunity to conduct hands on activities and to explain concepts by themselves, and to give them home work. However, she was upset because the students have no academic information.’

The preservice teacher asked the students to write a short dialogue at home. She reflected on the classroom period, where the students read the dialogue they wrote:

‘The students were happy with this activity, but I was not, since it was just reading information; questions and answers. The students couldn’t arrive at any informative conclusions for they were used to just memorizing information.’

Rather than just giving academic information to the students, the constructivist theory proposes that the student always has some knowledge of the subject, and it’s the teacher’s duty to discover it and build on it. Teaching is not about dictating well-organized facts to the students, it is about helping students to connect their fragmented ideas about science, and to change misconceptions through engaging students in hands-on/minds-on activities, and to conduct active dialogue with the students. Another important teacher’s role is to help the students to overcome the borders that stand against their readiness to understand science (Hashweh, 1991).

The student teacher found that the students were used to reinforcement as motivation to study and to interact in the classroom, contrary to the constructivist theory. As the student teacher discovered the students’ positive reaction to reinforcement, she decided to go on with the procedure of praising the students with no intention to change to strategies that relied on the students’ exploration and understanding. Constructivist theory states that students do not learn as a result of being reinforced by the teacher (Hashweh, 1991). The preservice teacher said:

‘I noticed that the students’ engagement in the learning process depends on reinforcement. If I promised to give them good marks, and praised them using words and phrases like: good work, excellent, fine, great answer,... etc, they interact, study, and prepare their lessons, otherwise they don’t. When they recognized that there will be marks and prizes they actively interacted, and actively prepared their lessons.’

And,

‘The best methodology is to ask the students to prepare for the class, and to do the home works, accompanied by my satisfying their need for enhancement.’

The student teacher wrote in the questionnaire:

‘I recognized the importance of reinforcement.’

And,

‘I noticed that our students rely very much on reinforcement to learn. They need it.’

The student teacher’s final decisions about the experiment

The student teacher faced many obstacles in carrying out the experiment, which caused her to reject the desired change. Bolin (1988) stated that being unable to make adequate sense of their experience, some student teachers might fall back to their latent philosophy.

Towards the end of the experiment, the group held a discussion conference to evaluate the long-term result of the experiment on the student teacher’s practices. During the discussion, the student teacher expressed clearly that she discarded the new practices as soon as the students began the hands on activities and turned the classroom into a messy place:

‘I should have prepared the demonstration and presented it to the students. From the beginning I wasn’t convinced by the idea that the students should work by themselves. I told my colleague that I was crazy for allowing the students to work with stones.’

Later, she informed the researcher:

‘I was not convinced by your idea that my role in the classroom should be as a supervisor, nevertheless, I applied what we agreed upon regardless of

my own beliefs. I thought that I might be wrong, and should give myself the chance to try out the new practices. I tried as much as possible, but I found that I resorted to my old practices and beliefs.'

The preservice teacher found that classroom teaching was more effective than moving to the science lab that allows for group work. She also rejected using the group work in teaching the lessons:

'The group work was not appropriate without training the students gradually on conducting it. They made noise in the library when we went to watch the video-tape and the librarian came and complained about the noise. I should have treated them individually rather than allow them to have group discussion.'

Discussion and conclusion

This case study aimed to throw light on one preservice science teacher's interaction with an experiment designed to help a teacher to change her teaching methodology towards a more student-centered approach that relied on the constructivist theory of teaching science.

The case of this preservice teacher was analyzed because among the group of five preservice teachers, she was the only one who decided finally to reject all the new practices and converted to the previous teacher-centered practices based on the behaviorist theory of teaching.

The preservice teacher was chosen to be part of the team that worked on unit development, and designed lesson plans, working sheets, and activities that foster students to construct knowledge. The reason for electing her was that she was a young, committed and an excellent student. The researcher deemed these characteristics as the factors that would accelerate the change process. However, at the end of the process the researcher unexpectedly concluded that these factors caused the teacher to hold to her previous practices. The preservice teacher remained committed to the traditional teacher-centered method used by her teachers that allowed her to excel as a student. Cooney (1994) states that the ability to be reflective and adaptive has to do with the teacher's orientation. For teachers with external orientation, who view what is salient to come from external authoritarian agent, their school experiences, as students will affect the change in their beliefs and practices. From the beginning of the experiment, the preservice teacher expressed her doubt about its success.

This study was mainly concerned with the factors that hindered the preservice teacher to change. These factors were: her inability to give appropriate instructions

on time, the pressure that she was exposed to during the training course, her worry about the classroom discipline, her concern to give information to the students and her reliance on reinforcement. The preservice teacher ascribed her failure to implement the change to the lack of students' readiness to cope with the given freedom and responsibilities to accomplish activities in a group.

As a researcher I do not deny the external factors mentioned by the preservice teacher, but I conclude that other factors related to her abilities to deal with the training variables are more relevant to the teacher's decision to resort to her previous practices. A peer once replaced the preservice teacher and gave the lesson to the preservice teacher's students. She was able to overcome problems faced by the preservice teacher. The preservice teacher commented:

'I noticed the change when my peer gave the period to my classroom, she was able to overcome the problems and to give a good period.'

The peer teacher commented on the period:

'I was able to give appropriate instructions, to explain the lesson very well, to keep the students busy all the time, to encourage students to cooperate, and to check students work in class.'

Her peer asked the students about their opinion on having the period in the science lab that allows for group work. The preservice teacher mentioned this:

'I asked my peer to interview the students and to ask them why they liked to have the period in the classroom? She told me that some students told her that they preferred to have the period in the lab.'

Unlike the preservice teachers, her peers were able to apply the planned change and were amazed with its effect on the students' learning.

However, another factor that affected the final results, was the teacher's low self-efficacy upon entering the implementation phase. The teacher's previous training courses strengthened this problem, and the preparation phase paid no attention to aid the preservice teacher to overcome the problem. The preservice teacher's belief in her ability to teach and motivate the students to learn is critical for success (Wingfield, and Nath, 2000). Researchers emphasized the importance of building teacher's self-efficacy especially in the case of preservice teachers training. First, self-efficacy is easier to establish with preservice teachers who are more receptive to instructional feedback, and second, once self-efficacy is established it is resistant to change (Drahama, 1999). For any innovation to succeed, it is imperative to assure the individual teacher's high self-efficacy.

However, more time was needed for the student teacher to enter new ‘practice-reflect-evaluate’ cycles so that she can make her final decision about her teaching methodology.

Acknowledgements

I am grateful to Dr. Lynne Rogers for her critical comments, to Prof. Fouad Moughrabi, the Director of Al-Qattan Center for Research and Educational Development, and Dr. Andre Mazawi, the consultant of the center, for their continuous help and support, and to Dr. Tafeeda Jarbawi the Dean of (UNRWA) Educational Science Faculty for giving me the opportunity to carry out this research.

Maha Al-Qura'n is an Instructor with Educational Science Faculty (UNRWA), and a researcher with the Al-Qattan Center for Research and Educational Development. Address for correspondence: Al-Qattan Center for Research and Educational Development, P.O.Box 2276, Ramallah, Palestine. E-mail: mquran@qattanfoundation.org

References

- Angelina, L. & Priscilla, F. (1996) ‘Fostering partnerships between the Hong Kong institute of education and primary schools in Hong Kong - a study of the cooperating teacher scheme in the practicum of the new course.’ A paper presented to the 43rd ICET conference, Teacher Education and School Reform, Amman: Jordan.
- Aitken, J. & Mildon, D. (1991) ‘The dynamics of personal knowledge and Teacher education.’ *Curriculum Inquiry*, Vol.21, pp.141-162.
- Ashton, P.T. & Webb, R.B. (1982) ‘Teachers’ sense of efficacy: Toward an ecological model.’ Paper presented at the Annual Meeting of the American Educational Research Association, New York.
- Bandura, A. (1977) ‘Self-efficacy: Toward a unifying theory of behavioral change.’ *Psychological Review*, 84, pp.191-215.
- Bandura, A. (1986) *Social Foundation of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1997) *Self-Efficacy: The Exercise of Control*. New York: W. H. Freeman.
- Bolin, F. (1988) ‘Helping student teachers think about teaching.’ *Journal of Teacher Education*, Vo.39(2), pp.48-54.
- Borko, H., Lalik, R., & Tomchin, E. (1987) ‘Student teachers’ understanding of successful and successful teaching.’ *Teaching & Teacher Education*, Vol.3(2), pp. 77-90.
- Britzman, D. (1986) ‘Cultural myths in the making of a teacher: Biography and social structure in teacher education.’ *Harvard Educational Review*, Vol.56(4), pp. 442-456.

- Britzman, D. (1991) *Students Makes Student: A Critical Study of Learning to Teach*. New York: SUNY Press.
- Bullough, R. (1991) 'Exploring personal teaching metaphors in preservice teacher education.' *Journal of Teacher Education*, Vol.42(1), pp.43-51.
- Bullough, R., & Knowels, J. (1990) 'Becoming a teacher: struggles of a second career beginning teacher.' *Qualitative Studies in Education*, 3, pp.101-112.
- Calderhead, J. (1991) 'The nature and growth of knowledge in student teaching.' *Teaching & Teacher Education*, Vol.7(5), pp.531-535.
- Cobb, P., & Steffe, L.P. (1983) 'The constructivist researcher as teacher and model-builder.' *Journal for Research in Mathematics Education*, Vo.14, pp.83-94.
- Cooney, T. (1994) 'Conceptualizing teacher education as a field of inquiry: theoretical and practical implications.' Proceedings of PMEXVIII (vol. II/pp. 225-232), Lisbon, Portugal.
- Dharamdas, I. (1999) 'Preservice and inservice teacher's perceptions of skills in teaching for primary grades.' Paper presented at the Annual Meeting of the Mid-South Educational Research Association, Point Clear, AL.
- Feinman-Nemser, S. (1983) *Learning to Teach*. East Lansing, MI: Institute For Research on Teaching.
- Feinman-Nemser, S., & Buchmann, M. (1985) 'Pitfalls of experience in teacher preparation.' *Teachers College Record*, Vol.87(1), pp.53-65.
- Fullan, M. (1982) *The Meaning of Educational Change*. New York: Teachers College Press.
- Garrido, E., Pimenta, S., Moura, M. & Fusari M. (1999) 'Collaborative research as an approach to foster teacher development, teacher production of knowledge and changes in school practices.' *Educational Action Research*, Vol.7(3), pp.384-398.
- Ginns, I., Heirdsfield, A., Atweh, B., and Watters, J (1997) 'Scaffolding the beginning teacher: the EMSTAR project.' Paper presented at the Annual Meeting of the Australian Association for Research in Education, Brisbane, QLD.
- Goodlad, J. (1990) *Teachers for our Nation's Schools*. San Francisco: Jossey-Bass.
- Gore, J., & Zeichner, K. (1991) 'Action research and reflective teaching in preservice teacher education: A case study from the United States.' *Teaching and Teacher Education*, Vo.7, pp.119-136.
- Griffin, G. (1989) 'A descriptive study of student teaching.' *Elementary School Journal*, Vol.89, pp.343-364.
- Hashweh, M. Z. (1991) 'Palestinian science teachers' epistemological beliefs: A research for the constructivist teacher.' Paper presented at the Sixth International IOSTE Symposium on World Trends in Science And Technology Education, Palm Springs, CA.
- Henson, R., Stephens, J., Grant, G. (1999) 'Self-efficacy in preservice teachers: Testing the limits of non-experimental feedback.' Paper presented at the Annual Meeting of the Southwest Educational Research Association, San Antonio, TX.
- Hill, L. (1999) 'Preservice teachers thinking about teaching, Annual Conference of the Australian Association for Research in Education (AARE), Melbourne, Australia.
- Hermes, L. & Zengerle, P. (1999) 'Triangulation in teacher training: 'The Rest is silence...'. *Education Action Research*, Vol.7(3), pp.451-456.

- Holt-Reynolds, D. (1992) 'Personal history-based beliefs as relevant prior knowledge in course work.' *American Educational Research Journal*, Vol.29, pp.325-348.
- Johnston, S. (1994a) 'Conversations with student teachers? Enhancing the dialogue of learning to teach.' *Teaching & Teacher Education*, Vol.10(1), pp. 71-82.
- Johnston, S. (1994b) 'Experience is the best teacher; or is it? An analysis of the role of experience in learning to teach.' *Journal of Teacher Education*, Vol.45(3), pp.199-208.
- Johnston, S. (1992) 'Images: A way of understanding the practical knowledge of student teachers.' *Teaching & Teacher Education*, Vol.8(2), pp.123-136.
- Kagan, D. (1992) 'Professional growth among preservice and beginning teachers.' *Review of Educational Research*, Vol.62(2), pp.129-169.
- Kemmis, S., & McTaggart, R. (1988) *The Action Research Planner* (3rd ed.). Victoria, Australia: Deakin University Press.
- Levin, M. (ed.) (1988) *Professional Development Schools: Building a Mode*. Washington: American Federation of Teachers.
- Mayer, D. (1999) 'Building teaching identities: implications for preservice teacher education.' Paper presented at the Australian Association for Research in Education and New Zealand Association for Research in Education Conference, Melbourne, Australia.
- McDaniel, J. (1991) *Close Encounters: How do Students make sense of their Social Foundations?* Paper presented at the annual meeting of the American Educational Research Association, Chicago.
- Miles, M. B. & Huberman, A. M. (1994) *Qualitative Data Analysis*, London: Sage Publications.
- Schon, D. (1987) *Educating the Reflective Practitioner*, New York: Basic Books.
- Russel, T. (2000) 'Moving beyond 'default' teaching styles and programme structures: The rise, fall, and marginal persistence of reflective practice in preservice teacher education in the period 1984-2000.' Queen's University, Ontario, Canada, unpublished paper.
- Swanson, H. L., O'Connor, J. B. (1990) 'An information processing analysis of expert and novice teachers' problem solving.' *American Educational Research Journal*, Vol.27, pp.533-556.
- Tobin, K. (1989) 'Radical constructivism.' An invited lecture presented at Florida State University, Panama City.
- Tschannen-Moran, M., Hoy, W. (1998) 'Teacher efficacy: Its meaning and measure.' *Review of Educational Research*, Vol.68(2), pp.202-248.
- Veenman, S. (1984) Perceived problems of beginning teachers, *Review of Educational Research*, Vol.54(2), pp.143-178.
- Williams, D. D. (1986) 'Naturalistic evaluation: potential conflicts between evaluation standards and criteria for conducting naturalistic inquiry.' *Educational Evaluation and Policy Analysis*, Vol.8(1), pp.87-99.
- Wittrock, M. C. (1986) 'Students' through processes.' In M. C. Wittrock (ed.) *Handbook of Research on Teaching*. New York: Macmillan Publishing Company.
- Wubbels, T. (1992) 'Taking account of student teachers' preconceptions.' *Teaching & Teacher Education*, Vol.8(2), pp.137-149.
- Zeichner, K. (1980) 'Myths and realities: field-based experiences in education.' *Journal of Teacher Education*, Vol.31(6), pp.45-49.

Zeichner, K., Tabachnick, B., & Densmore, S. (1987) 'Individual, institutional and cultural influences on the development of teachers' craft knowledge.' In J. Calderhead (ed.) *Exploring Teachers' Thinking*. London: Cassell.