The Impact of Using Reflective Teaching Approach on Developing Teaching Skills of Primary Science Student Teachers

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ABSTRACT

The article examines the impact of reflective teaching approach on teaching skills of primary science student teachers. Twenty-five science student teachers were trained for a whole semester on using reflective teaching approach. They were divided into five cooperative learning groups, each of which consists of five students. Each group was asked to prepare a science lesson. In each class, a representative of each group presents the lesson (15 minutes). After the presentation, the presenter was evaluated by the researcher and his colleague students according to an evaluation checklist. At the end of the training course, they were asked to respond to a questionnaire consisting of 26 open-ended questions that asked for their opinions and ideas on the reflective approach. Data analysis revealed that this approach was effective on developing the overall teaching skills of elementary education student science teachers. It is also effective on the following teaching skills: lesson-planning, introduction, use of new materials, classroom management, and evaluating their teaching and learning process. Furthermore, students involved indicated that the approach helps them in identifying strengths and weaknesses in teaching. They also indicated that it assists them in discovering means of correcting and improving their teaching. In addition, reflective teaching approach enables teachers to analyze, discuss, evaluate and change their own practice as well as to adopt a systematic analytical approach towards teaching. Consequently, it is highly recommended that students' teachers should be encouraged to use written reflections during teaching practice in the post-practicum seminars conducted after the teaching practice.

Keywords: *reflective teaching, student teachers, teaching skills, primary science teachers.*

INTRODUCTION

Education has never been more challenging and pertinent than in today's global world. It is considered as one of the most important factors in the development of nations. Irrespective of the vast reliance on technology, teachers remain the key in the teaching learning process. Therefore, the education and preparation of teachers is a critical issue in national development. Maarof (2007) and Cobb (1999) see that the attributes of quality teachers include possessing pedagogical knowledge, subject content knowledge, skills, and attitudes necessary for effective teaching, strong sense of ethics, and capacity for renewal and ongoing learning.

Reflective teaching which Dewey talked about in his book "How We Think" was reconsidered in recent research. In this book Dewey makes an important distinction between action that is routine and action that is reflective (Schon ,1983). He defines reflective action as that which involves active, persistent, and careful consideration of any belief or practice in light of the reasons that support it and the further consequences to which it

leads. According to Dewey, reflection does not consist of a series of steps or procedures to be used by teachers rather it is a holistic way of meeting and responding to problems, a way of being as a teachers.

Greene (1986) defines reflective action as a process that involves more than logical and rational problem-solving processes. Reflection involves intuition, emotion, and passion and is not something that can be neatly packaged as a set of techniques for teaches to use. Schon (1983; 1987) clearly writes about reflection that is intimately bound up with action. Rather than attempting to apply scientific theories and concepts to practical situations, he holds that professionals should learn to frame and reframe the often complex and ambiguous problems they are facing, test out various interpretations, then modify their actions as a result.

Schon (1987) differentiates between reflection – in –action and reflection-on –action. Reflection-in-action is when a practitioner, who is often already an expert, learns to think on his or her feet and is able to improvise with new incoming information and is able to deal with the unexpected. An example Schon provides is that of people playing jazz music or of people having a good conversation. Reflection-on-action involves the practitioner reflecting and contemplating on the underlying, implied understandings and assumptions that he or she has and further analyses them consciously in order to arrive at deeper understanding of roles of the teacher and student, the motivations and behaviors in the learning context(Pickett,1999).

These concepts of reflection – in and on – action are based on a view of knowledge and an understanding of theory and practice that are very different from the traditional ones that have. Goodman (1992) uses the terms "off line" and 'on line 'to distinguish between reflection – on action and reflection – in action. Reflection – on action takes place after the activity (i.e. offline). When full attention can be given to analysis without the necessity for immediate action and when there is opportunity for the professional to receive assistance from others in analyzing the event.

 Various approaches of reflective teaching were developed. Some of these approaches (Powell, 1985; Bailey, 1990) include the following: Peer observation, written accounts of experiences, self-report, autobiographies and journal writing.

Reflective practice in both pre-service and in–service levels of teaching were emphasized by various studies (Schon, 1987; Schon, 1996; Stanly, 1998; Kullman, 1998). Perspectives on reflective thinking include ideas derived from the domains of psychology, education, philosophy, and the arts. Early philosophers and thinkers such as Plato, Aristotle and Locke contemplate and discussed the ideas on reflection; meta-cognition or thinking about ones thinking (Maarof, 2007).

Schon (1987) defines reflective teaching as looking at what you do in the classroom, thinking about why you do it, and thinking about if it works - a process of self-observation and self-evaluation. Richards and Lockhart(1997) state that : "reflective approach to teaching is one in which teachers and student teachers collect data about teaching, examine their attitudes, beliefs, assumptions, and teaching practices; and the data are then used further to reflect critically about teaching" (p:1) . Richards (1990) sees reflection as a key component of teacher development. He indicated that self-inquiry and critical thinking can help teachers move from a level where they may be guided largely by impulse, intuition, or routine, to a level where their actions are guided by reflection and critical thinking.

Reflection involves promoting techniques that include reflective journals, comprising dialog journals, peer reflection, diaries, learning logs and audio-video recordings and others (Pickett, 1999; Richards and Lockhart, 1997).

Pollard (2008) showed that reflective teaching leads to a steady increase in the quality of education provided for children. Indeed, because it is evidence based, reflective practice supports initial trainee students, newly qualified teachers, teaching assistants and experienced professionals in satisfying performance standards and competencies.

Arredondo and Rucinscki (1994) used reflective teaching journal writing in a workshop approach designed for graduate and undergraduate education students at university level. One of the strategies used in the workshop approach was journal writing. A total of 69 students in five classes participated in the study. The findings indicated that students had used meta-cognitive thinking. In this case, the journals helped foster thinking in-depth with their Japanese students, whereby the students were asked to write down their thoughts about the class lesson.

Rahman, Mohd Jelas, and Osman (1999) conducted a survey on the conception, perception, and practice of reflective thinking of 108 trainee teachers in a diploma of education program, and 133 trainee teachers from a bachelor of education program. They found that there is a weak understanding of the practice of reflection among the students. In addition, the practice of reflective thinking was found to be minimal and the students had inadequate exposure to reflective thinking. The results also showed a positive linear relationship between factors such as knowledge, perception and the roles of teaching practice supervisors and the practice of reflective thinking.

Ogonor and Badmus (2003) conducted a study to examine the reform outcome of reflective teaching introduced by the faculty of education among student teachers in a Nigerian university. The sample consisted of 304 students who were in the final and penultimate years at university. The findings indicated that student teachers were elated and had the opportunity for professional growth as they practiced reflective teaching.

Maarof (2007) examined the reflective journal entries of 42 trainee teachers who underwent teaching practicum in schools in Malaysia. The study investigated the types of reflections, strategies, and perceptions of the trainees toward reflective journal writing. The findings of the study indicated that 77% of the trainees stated that the task assisted them in evaluating their teaching methods, strengths, weaknesses, and problems in teaching.

The Problem of Study

Based on the above discussion, the present study attempts to develop teaching skills of elementary education student teachers of science through a training strategy to help them develop their overall teaching skills, as well as investigate the effect of this strategy on students' mastery of: lesson planning, introduction, use of new materials, classroom management and evaluation.

Questions of The Study

The study addressed the effect of reflective teaching on developing the overall teaching skills of elementary education student teachers of science, by providing answers to the following questions:

1. What is the effect of reflective teaching on developing the overall teaching skills of elementary education student teachers of science?

2. What is the effect of reflective teaching on developing elementary education student teachers of science teaching skills in: lesson planning, introduction, use of new materials, classroom management, and evaluation?

3. What are the students' perceptions and understandings of the reflective teaching approach

Hypotheses of the Study

The study tests the following hypotheses:

1. There are non- statistically significant differences between the mean scores of students' performance on the pre-application of the evaluation checklist versus the post application in overall teaching skills.

2. There are non- statistically significant differences between the mean scores of students' performance on the pre-application of the evaluation checklist versus the post application in each of the following aspects of teaching skills: lesson planning, introduction, use of new materials, classroom management, and evaluation.

METHODOLOGY

Design of The Study

The pre-experimental approach according to the one shot case study design was followed. It was performed on an available sample consisting of 25 primary science student teachers in their third year at Bahrain Teachers College, Bahrain University who were taking a course on science teaching in the first semester of the academic year 2010/2011. Their age ranged from 21 to 22 years old (10 females and 15 males).

Instruments

The present study used the following tools:

1. An evaluation checklist prepared by the researcher to evaluate students' teaching practice.

2. An open –ended questionnaire: the questions were constructed based on Richards and Lockhart's (1997: 16) Guidelines on Reflection Questions. The purpose of the questions was to elicit as much information as possible on students' conception of reflective teaching. The validity and reliability of this instrument were established by the developers.

Procedure

The study was carried out according to the following steps:

1. Students were divided into five cooperative learning groups, each of which consists of five students.

2. Each group were asked to prepared a science lesson.

3. In each class, a representative of each group presents the lesson (15 minutes).

4. After the presentation, the students were evaluated by the researcher and his colleagues according to the evaluation checklist (5 minutes).

5. In order to examine the students' perceptions of the reflective approach, they were given a questionnaire consisting of 26 open-ended question that asked for their opinions and ideas on the reflective approach. The questions were constructed based on Richards and Lockhart's (1997; 16-17) guidelines on reflection questions, which mainly focused on events that took place during a lesson.

6. The researcher held a discussion with the students about the strengths and weaknesses of their colleague's teaching.

7. Each student was given five times of teaching (one time as a pre teaching and four times as post teaching).

DATA ANALYSIS AND RESULTS

The statistical Package for the Social Sciences SPSS was used for data analysis. Frequencies and the t-test were used. In what follows a summary of the obtained results are organized and presented according to the research questions and hypotheses as follows:

Results Pertaining To The First Question And Testing The First Hypothesis

The t-test was used for answering the first question and testing the first hypothesis, which states that there are non- statistically significant differences between the mean scores of students' performance on the pre-application of the evaluation checklist versus the post application in overall teaching skills. The obtained mean score by students on overall teaching proficiency at the pre-application of the evolution checklist (9.324) was compared with their obtained mean score at the post application (13.712). The results of this analysis revealed (see table 1) statistically significant differences between these mean scores (t = 11.432 df= 23, significant at α= 0.01). These results are evidently in favor of the post evaluation. In addition, the estimated effect size value is 6.87. This indicates that the effect size of the strategy is large in enhancing students' overall teaching proficiency. Thus, one can conclude that the training strategy based on the reflective teaching approach is effective in developing students' overall skills.

Table 1. T-test results for comparing the students' overall teaching proficiency on the pre-application of the evolution checklist versus the post application

Measure	Mean	S.D.	Mean Difference	S.D. of Difference	D.F.	T-Value	Sig	Effect Size
Pre	9.324	2.003	2.943	0.976	23	11.432	0.01	6.87
Post	13.712	0.737						

The t- test was used for answering the second question and testing the second hypothesis which states that "There are non- statistically significant differences between the mean scores of students' performance on the pre-application of the evaluation checklist versus the post application in each of the following aspects of teaching skills: lesson planning, introduction, use of new materials, classroom management, and evaluation.

Results Pertaining To The Second Question And Testing The Second Hypothesis

The t-test was used for comparing the mean score obtained by students on each of these five aspects of teaching proficiency at the pre-application of the evolution checklist versus the associative mean obtained at the post application. The results of this analysis revealed (see table 2) statistically significant differences between each of the tow associative mean scores in favor of the post evaluation.

Table 2.T-test results of students' performance on pre-application of the evaluation checklist versus the post application in lesson planning, introduction, classroom management, practice new materials and evaluation

Skills	Measure	Mean	S.D.	Mean Difference	S.D. of Difference	D.F.	T-Value	Sig	Effect Size
Lesson planning	Pre	5.762	0.853	1.998	0.897	24	11.7	0.01	5.12
	Post	7.861	0.2911						
Introduction	Pre	7.3512	1.82154	6.270	1.1858	24	13.569	0.01	6.54
	Post	13.5321	0.73585						
Practice of new materials	Pre	14.6846	1.9754	3.1606	0.8570	24	10.025	0.01	4.31
	Post	17.8452	1.1284						
Classroom management	Pre	8.2530	1.1955	4.313	.6331	24	13.543	0.01	5.8
	Post	12.5430	.46254						
Evaluation	Pre	5.6851	.81265	1.7434	.5625	24	10.562	0.01	5.2
	Post	7.4285	.3643						

Looking at the results of each of these five aspects we see that:

1. For the lesson planning, table 2 shows that the estimated t-value is 11.7 which has statistically significant difference at 0.01 levels in favor of students' performance on post-application of the evaluation checklist versus the pre-application. Moreover, the estimated effect size value is 5.12, which means that the effect size of training strategy is large in developing students' mastery in planning lessons.

2. For the introduction of the lesson , Table 2 illustrates that the estimated t-value is(13.569) which is statistically significant difference at 0.01 level in favor of students' performance on post-application of the evaluation checklist versus the pre-application in the introduction. Moreover, the estimated effect size value is 6.54 which means that the effect size of training strategy is large in developing students' performance in the pre-application of the evaluation checklist. This means that the training strategy is effective in developing mastery of introducing of the lesson.

3. For the presentation and practice of new materials, table 2 shows that the estimated t-value is10.025 which has statistically significant difference at 0.01 level in favor of students' performance on post-

application of the evaluation checklist as compared to the pre-application in presentation and practice of new materials. Moreover, the estimated effect size value is 4.31, which means that the effect size of training strategy is large in developing students' performance in presenting and practicing new materials. Thus, we could also conclude that the training strategy is effective in developing mastery of presenting and practicing new materials.

4. For classroom management, table 2 shows that the estimated t-value is 13.543, which has statistically significant difference at 0.01 level in favor of students' performance on post-application of the evaluation checklist vs the pre-application in teacher personality and classroom management. The estimated effect size value is 5.8 which means that the effect size of training strategy is highly effective on developing students' personality and mastering classroom management skills.

5. With regards to the evaluation, table 2 illustrates that the estimated t-value is 10.562 which has statistically significant difference at 0.01 level in favor of students' performance on post-application of the evaluation checklist versus the pre-application in evaluation. The estimated effect size value is 5.2 which means that the effect size of training strategy is large in enhancing students' teacher ability to evaluate their students. Thus we could also conclude that the training strategy is effective in developing student teachers' ability to evaluate their students.

The above mentioned results revealed that students achieved progress in their overall teaching skills after the implementation of the training strategy as compared with their performance before the strategy application. Moreover, students' mastery of teaching skills: lesson planning, presentation and practice of new materials, teacher personality and classroom management.

Results Pertaining To the Third Question and Testing the Third Hypothesis

The third research question states that: What are the students' perceptions and understandings of the reflective teaching approach? To get an answer to this question, frequencies and percentages were obtained on students responses to a list of 26 aspects reflective teaching approach. The answers of only 20 student teachers were analyzed because 5 students were absent when the questionnaire was distributed. Students were requested to tick mark how they think reflective thinking is helpful to them.

The results indicated that a very high percentage of students (88%) hold a positive response to this approach. The majority of them (86%) stated that reflecting teaching assisted them in identifying mistakes in their teaching. A quite high percentage (77%) of students said that reflective teaching help them in identifying the characteristics of a good, interesting, creative, and effective teacher. More than three fourth of them (76%) indicated that reflecting assisted them in evaluating their teaching in terms of their strengths and weaknesses in conducting lessons in class . Approximately 72% of the students said that reflective teaching helped them in evaluating the problem–solving method they used in the teaching and learning process. More than half of them (60%)indicated that reflective teaching helped them in their teaching and learning process. Only 12% of the students said that they disliked reflective teaching.

CONCLUSIONS AND IMPLICATIONS FOR TEACHER EDUCATION

It was shown that reflective approach to teaching involves changes in the way teaching is perceived and the teacher role in the process of teaching. It is evident that this approach was effective in assisting science student teachers in evaluating their teaching and learning process. It also helps them in identifying strengths and weaknesses in teaching. Furthermore, it seems that it assists the teacher in discovering means for correcting and improving his or her teaching. In addition reflective teaching approach enables teachers to analyze, discuss, evaluate and change their own practice as well as to adopt a systematic analytical approach towards teaching. Consequently, it is highly recommended that students teachers should be encouraged to use written reflections during teaching practice in the post-practicum seminars conducted after the teaching practice.

REFERENCES

Arredondo,d.E., & Rucinski,T.T.(1994). *Using reflective journals and the workshop approach in university classes to develop students' self regulated learning.* Paper presented at the Annual Meeting of the American Education research association, Louisiana (ERIC document reproduction service No.ED404892).

Bailey, K.M. 1990. The use of diary studies in teacher education programmes. In J.C. Richards and D. Nunan (Eds), *Second Language Teacher Education* (pp. 215-226). New York: Cambridge University Press.

Goodman,J.(1992). ' The Political Tactics and Teaching Strategies of Reflective Active Pre- service Teachers" *The Elementary School Journal*, 89(1).

Greene, M. (1986). Reflection and passion in teaching. *Journal of curriculum and supervision*, 2(1),68-81.

Kullman, J. (1998). Mentoring and the development of reflective practice: *Concepts and context. System,* 26(4), 471-484.

Maarof, N.(2007). Telling his or her story through reflective journals. *International education journal,* 8(1), 205-220.

Ongonor, B., & Badmus M. (2003)." Reflective teaching practice among student teachers : the case in a tertiary institution in Nigeria" *Australian Journal Teacher Education*, 31 (2).

Powell, J.P. 1985. Autobiographical learning. In Boud, et al. (pp. 41-51).

Pickett, A. (1999). Reflective teaching practices and academic skills instruction. {Online} http://www.indiana.edu/~1506/pickett.html.

Rahman, S., Mohd Jelas, Z., & Osman, K . (1999). *The Conception, Perception and the Practice of Reflective Thinking Among Student Teachers.* (Report no. G6/99). Bangi: Fakulti Pendidikan, University Kebangsaan Malaysia.

Richards, J.(1990)" Beyond Training: Approaches to Teacher Education in Language Teaching." *Language Teacher, 14*(2).

Richards, J.C., &Lockhart, C.(1997). *Reflective teaching in second language classrooms.* Cambridge: Cambridge University Press.

Schon, D. (1983). *The Reflective Practitioner: How Professionals Think in Action.* New York: Basic Books.

Schon, D. (1987). *Educating the reflective practitioner: Toward a new design for Teaching and Learning in the Professions.* San Francisco: Jossey Bass.

Stanley, C. (1998). A framework for teacher reflectivity., 32(3), 584-591.

Zeichner,K., & Liston, D.(1996). *Reflective teaching an introduction* .New Jersey: Lawrence Erlbaum associates, publisher.