TITLE: THE DEVELOPMENT OF PRE-SERVICE SCIENCE TEACHERS' REFLEXIVE PRACTICE

AT THE LEBANESE UNIVERSITY FACULTY OF EDUCATION

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THE DEVELOPMENT OF PRE-SERVICE SCIENCE TEACHERS' REFLEXIVE PRACTICE AT THE LEBANESE UNIVERSITY FACULTY OF EDUCATION

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ABSTRACT: A major aim in teacher's preparation program is to promote reflective practice among future teachers. Literature in teacher education points out to the importance of reflection in the development of quality teaching (Coffey 2014; Jay & Johnson, 2002; Perrenoud 2012). Schon's (1983,1987), proposed a conceptual framework about reflective practice that involves two phases of reflection: reflection-on-action which refer to the reflection after doing the action anf reflection-in-action which occurs during the doing. The framework was adapted later to include reflection for action, that takes place before the doing of the action as the teacher reflects about the future experience informed by the past practice. The current study, aims to explore if the training program at the Lebanese University, Faculty of education, prepare reflective primary science teachers, on the basis of Schon's (1983,1987) framework. For this purpose a convenience sample of 30 participants from third year primary science pre-service teachers was selected to participate in the study along with their five trainers. Both quantitative and qualitative method including questionnaire, interviews, curriculum and reflection report analysis were used in the study. The results show that pre-service teachers develop to some extent "reflection-for-action" and "reflection-in-action", however they lack strategies for the "reflection on- action" as they face difficulties in regulation and self-improvement.

Key words: Reflective Practice, pre-service science teacher, professional development.

INTRODUCTION

Teacher education programs around the world have always raised the issue of the relationship between "theory" and "practice" to ensure better preparation of tomorrow's teachers. Tardif (2001) considered that the debate between "theory" and "practice" became more complicated when "theory" have been extended from knowledge grounded in scientific research by professional education researchers (typically associated with universities) to knowledge created through on-the-job-inquiry into practice by teachers acting as "action researchers" or "reflective practitioners" " (page 9). That constructivist approach has induced a reform in pre-service training programs illustrated mainly by the implementation of classroom-based research (action research), and the use of professional portfolios as a mean of self-assessment and regulation. So programs have become a blended form between external theories with the findings from classroom-based inquiry by trainee teachers. In this vein, Educators and stakeholders have developed frameworks and models that describe the teacher as a reflective practitioner.

Morissini, Cabrera and Felicetti, (2011) considered that pre-service teachers should demonstrate sound acquisition and use of competencies. In other word, competency refers to the knowledge, skills and attitudes that the pre-service trainee teacher should demonstrate. To state, Perrenoud (2001) developed ten core competences for professional teaching. According to him the pre-service trainee teacher should:
1. Organize and facilitate learning situations.
2. Manage the progress of learning.

3. Design and develop differentiating features.
4. Involve students in their learning and their work.
5. Work in team.
6. Participate in the school management.
7. Inform and involve parents.
8. Use of new technologies.
9. Facing the duties and ethical dilemmas of the profession.
10. Manage its own training.

Similarly, Danielson (1996; 2007; 2001; 2013) has developed a framework for teaching evaluation that identifies four domains of a teacher's responsibilities: Planning and Preparation; Classroom Environment; Instruction; Professional Responsibilities. Each domain includes a set of components with theirs related-elements, making a total of 22 components and 76 elements.

That reform in teacher education programs made one of its major goals of teacher education programs is to help future teachers to put in place a "habitual mode of thought, practice and refinement or reflection" (Ryan, 2001, p2). Learning to become a teacher is not just a process of acquisition and application of knowledge, but also a practical action in which knowledge is endorsed in reflecting and developing a specific action (Altrichter, 2005). In this vein, Cornish & Jenkins, 2012 considered that learning to become a teacher is a developmental process, part of which is learning to become a reflective practitioner. They argued that teacher quality is an outcome of the engagement in regular reflection during their development and that this self-assessment promotes continual self-improvement. Similarly, Ryan (2007) pointed out that a "successful pre-service program is not a teacher-building factory, but rather the first step in a long, collaborative, and reflective process that influences the professional development of a teacher's career" (page 2).

So the main objective of pre-service teachers training programs is to train competent, professional teachers who effectively contribute to student learning (Tardif, 2001).

What Is Meant By Reflective Practice?

Dewey (1933) identified reflection as a way of thinking. According to him, reflection come for experienced situation and begins with experience and stresses on practice, in other words on "learning from doing", starting by detecting the problem, to formulating hypotheses to be tested. So Dewey argued that reflective thinking moved people away from routine thinking/action towards reflective action. Dewey's ideas provided a basis for the concept of 'reflective practice'.

Both the content and the process of reflection have been addressed in the research into the teaching of reflection; the content refers to what teachers reflect upon, and the process shows how teachers reflect (Jay & Johnson, 2002). Many authors have discussed different levels of reflection which generally progress from a preoccupation with the more technical aspects of teaching to a consideration of alternative approaches to the various dilemmas that arise in teaching (Cavanagh & Prescott, 2010 as cited in Coffey 2014; Perrenoud 2012).

The literature includes many models for reflection. Quinn (2000), as cited in Finlay (2008), sees that all models tend to involve three fundamental processes that start with "retrospection" that refers to the thinking back about the situation, then a "self-evaluation" which is a critical analysis and evaluation of the actions and feelings associated with the experience, and finally a "reorientation" by using the results of self-evaluation to influence future approaches to similar situations or experiences."

Kolb's (1984) developed the Model of Experiential Learning. It is based directly on Kolb's experiential learning cycle that includes four main components: concrete experience, reflective observation, abstract conceptualisation and active experimentation. Those four components of the cycle can be accessed at any point. The Model suggests that active experimentation leads to a transfer of learning from current cycle to a new cycle. The figure below illustrates Kolb's (1984) Model of Experiential Learning
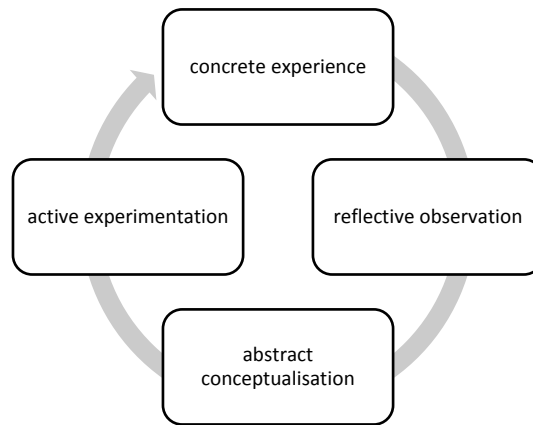
Figure 1: Kolb's (1984) Model of Experiential Learning

Inspired from Kolb's experiential learning cycle, Gibbs (1988) proposed a Reflective Cycle model that highlights the relationship between theory and practice, as they enrich each other in a never-ending circle.

The model invites the individual to think about different aspects of a given situation, to evaluate it, and establish an action plan for dealing with such a situation when it rises again. It helps the practitioner to consider how they think and react within a situation and provides insight into self and practice. Gibbs' cycle has been widely adopted in professional education as a way to facilitate reflection.
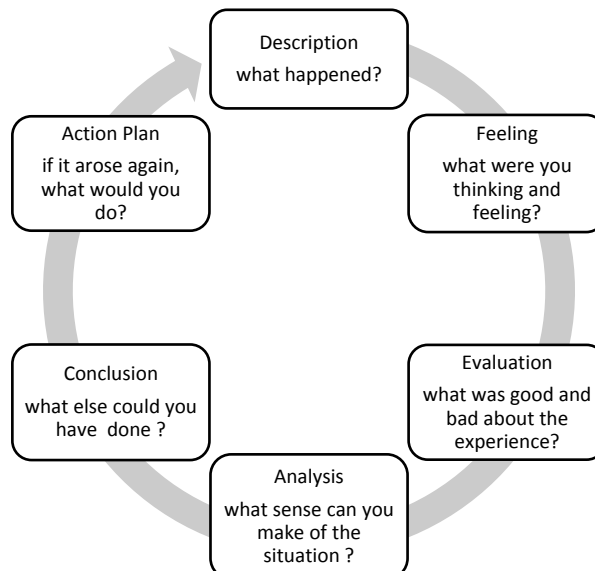

Figure 2: Gibbs (1988) Reflective Cycle model

Schon's (1983; 1987) believed that it is important to develop the reflective practice skills that allow to revise, modify and refine individual's expertise. Consequently , the author proposed reflection-on-action which refer to the reflection after doing the action so, in the educational context, the teacher reflects in hindsight about the lesson, student engagements, and other components of the practice, and reflection-in-action which occurs during the doing, so the teacher reflects during the teaching of the lesson.

In the educational context, Freese (1999) perceived reflective practice as a process to help teachers modify and improve instructional practices by asking probing questions. Grushka, Hinde-McLeod and Reynolds (2005), adapted Schon's model and identified a third phase of reflection: "reflection for action" where teachers are advised to consider their planning and preparation e.g. resources and how long the lesson will take (technical); how to make the resources relevant to different learning styles (practical); and to question why they are teaching this particular topic (critical).

Rolfe, Freshwater and Jasper (2001) developed also a three level reflective model based upon three simple questions: What? So what? Now what? The first level, the "What?" one, reflection addresses the description of the situation, and the second level, "So what?", consists on the process of learning from the situation by developing the personal theory of understanding. The final level, "Now what" is the reflection level on action, about what can be done for improvement.

Jay and Johnson (2002) developed a typology model that involves three dimensions: descriptive, comparative and critical reflection. In the descriptive dimension, the student teachers describe the matter for reflection, e.g. "What is happening?" In the comparative dimension, they reframe the matter for reflection in the light of alternative views, perspectives and research: "How do other people who are directly or indirectly involved describe and explain what is happening?" "What does research contribute to an understanding of this matter?" "How can I improve what is not working?" Then in the critical dimension a new perspective is established: "What are the implications of the matter when viewed from these alternative perspectives?

It well noticeable the dominance of the three phases level of reflection that has been considered by educators and researchers as multidimensional and complex , where the past, present and the future are all involved in the process of reflective practice (Smith, 2001).

Pre-Service Teaching Course At The Lebanese University, Faculty of Education

At the Lebanese University, Faculty of Education pre-service primary science teachers undergo three year teacher education course, Following LMD program that was implemented in 2009-2010. The program includes formal university studies with practical experiences in schools. İt typically comprises units in curriculum, psychology, pure science, classroom management, evaluation and assessment, teaching methodology, action research as well as classroom practice, with a total of 180 credits. Throughout those years students are encouraged to develop their reflective skills through different means, especially in the teaching methodology and practicum courses through practicing micro and macro teaching, writing reflection papers, portfolios and projects.

The Practicum course represents 11 % (20 credits) of the whole program (180 credits). It includes 4 units disturbed over the second and the third year: School Observation (2 credits), Practicum I (6 credits); Practicum II (6 credits) and Practicum III (6 credits) for Pre-service minor science teachers.

The staff members at the faculty vary between formal and practice courses. For formal theoretical courses, a PhD degree in the field is required for all staff members, whereas for practice courses trainers must hold a master degree in the teaching of the related area and at least five years of experience in the field, in addition to training in professional development.

The literature lacks studies about the implementation of LMD at the faculty, however a single research study was lately conducted by a group of researchers at the faculty lead by Professor Antoine Sayah about the practicum program at the faculty of education in The Lebanese University (Sayah et al, 2015). The study presents an overall assessment of the practicum course and highlight the major problems faced by both trainers and trainees. However, the research does not address the reflective practice in the program.

Problem of the Study

Being science educators at the Lebanese University, Faculty of Education, we have noticed that science pre-service teachers do not perceive the inter-relationship between teaching and the development of reflective skills. They are often worrying about satisfying the requirements of the course rather than for the purpose of deeper analysis and reflection. Reviewing the literature, it is found that reflective practice is developed across all units in the teaching preparation program, however, it can be best detected and implemented in the practical training units, where pre-service trainee teachers are expected to plan, implement and reflect on their practice. So the main question is that "does the training program develop trainees reflective practice skills?"

For that reason, the current study investigates pre-service trainee science teachers' perceptions of their reflective practice at the end of the practical program that involves four units described above, in addition to an analysis of the training program curriculum. The following research questions are addressed

1) How do the pre-service primary science teachers at the Lebanese University, Faculty of Education perceive their reflective practice?
2) Does the training program at the Lebanese University, Faculty of education, prepare reflective primary science teachers?

METHODS

Both quantitative and qualitative methods are used in the study to answer the research questions. A questionnaire, interview, reflection reports and curriculum analysis were conducted. The protocol of analysis was modelled after Schon's (1983, 1987) adapted for, in and on conceptual framework which has been widely

used in educational studies by researchers, e.g. Fox, Campbell and Hargrove (2011). The framework is presented in table 1.

Table 1: Schon's (1983, 1987) Adapted For, In and On Conceptual Framework.

Phase	Description
For the action	the planning of the lesson
In the action	during the teaching of the lesson
On the action	after the teaching lesson

Sample

A convenient sample from third year primary science pre-service teachers was selected to participate in the study. The sample included 30 participants. All participants had completed three practical unit and were undergoing the fourth one. In addition a sample of five trainers was interviewed.

Data Collection and Analysis

To answer the first research question about the perception of the pre-service teachers of their professional development, a questionnaire was developed, validated and completed.

To answer the second research question an analysis of the practical units program and written reflections collected from the participants' portfolios, and an interview with the trainers were conducted. Data was collected over a period of 12 weeks.

Curriculum

The curriculum of the practicum course includes, Goals of the training program, general objectives and learning outcomes for each unit. The analysis was conducted to examine if the concept of "reflective practice" was identified in the goals, objectives and learning outcomes. Two criteria were taken into consideration:
- The notion of "reflective practice" is explicitly present in the items of goals, objectives and learning outcomes.
- The notion of "reflective practice" is implicitly present in the items of gaols, objectives and learning outcomes.

Questionnaire:

The questionnaire is designed to include open-ended and Likert-scale response (never, sometimes, and often) response items. It consists of three main sections, respecting Schon's (1983, 1987) in, on and for conceptual framework. The first section addresses the phase of planning the lesson which refers to "reflection for the action", the second section addresses the implementation of the lesson phase that refers to the "reflection in action" and the last section deals with the reflection after the lesson which refers to the "reflection on action" according to the framework.

The first two sections are three Likert-scale items where participants were asked to select one response per item regarding the frequency of engagement in reflection "for" and "in" their practice (Schon, 1983). The third section consists of an-open-ended question that addresses participants' refection "on" their practice.

The first section of the questionnaire asks the participants about their planning and preparation for a teaching session. It includes items about the coherence of their plan, instructional outcomes, resources, knowledge of students and assessment.

The second section asks about the implementation of the teaching lesson in class. It includes four sub-section: 1) introduction; 2) Development; 3) Closure; 4) Ethics and personalities. The sub-sections " introduction", "development" and "closure" include categories of items. Table 2 illustrates the sections, sub-sections and their categories, in addition to the number and examples of items.

The third section of the questionnaire represents an-open ended question that addresses "reflection on action". Participants were required to answer the following question: *"After class, write a reflective analysis on your teaching"*

The participants' answers were coded and analysed according to two main criteria:
1. Regulation , e.g the trainee is able to
- Detect the gaps in their planning and preparation.

- Reorient if necessary the organization of their teaching.
2. Openness to criticism, e.g. the trainee is able to
- Value the feedback from the trainer
- Show positive attitude to criticism from peers and trainers

The computer software computed response frequencies and percentages for each section and sub-sections where available. In the analysis, scores were divided into three percentile sand the desired outcome of the reflective practice was considered as "non- achieved", "fairly achieved" and " achieved" according to the following criteria.
- The lowest through the 50 percentile of the score the outcome is considered as "not achieved"
- Between the 50th and the 75th percentile, the outcome is considered as "fairly achieved"
- Above 75 percentile, the outcome is achieved.

Reflection Papers from Trainee Portfolios

To support the data collected from the questionnaire, an analysis of trainee reflection reports from their portfolios was conducted, referring to Schon's (1983, 1987) in, on and for conceptual framework.

Trainers' Interview

Five trainers were interviewed about the pre-service trainee reflective practice. The questions of the interview were in line with Schon's (1983, 1987) in, on and for conceptual framework. Trainers answered in writing.
The following questions were addressed:
1- Reflection for the action:
- Do trainee reflect on their lesson planning before the teaching session? If yes, how?
2- Reflection in the action:
  Do trainee
- reflect on their practice during the implementation of the lesson?
- record comments in relation to their practice during the teaching session?
- Adjust the teaching process based on events occurring on spot in class?
3- Reflection on the action
  Do trainee
- detect the gaps in their planning when the desired outcomes are not achieved?
- reorient, if necessary, the organization of their teaching, basing on the proceeding one to improve the upcoming ones?
- improve the adopted approach following the trainer feedback?
- show positive attitudes to feedback and criticism from trainer and peers?
- think critically and creatively over, their educational practice?

Table 2: Categories, Numbers and Examples of Items in the First Two sections of the Questionnaire.

Section	Sub-Section	categories/nb of items	Examples of items
Planning Reflection "For the action"		10 items	Outcomes are well defined Prerequisites are well defined Assessment is prepared
Implementation Reflection "In the action"	Introduction	Motivation 3 items	Students interest and motivation are developed
		Teaching strategies 2 items	The objectives of the lessons are explicitly/implicitly set
		Knowledge 2 items	Scientific content is well mastered
	Development	Teaching strategies 6 items	Open and closed questions are addressed
		Organisation 4 items	Time is well managed
		Language 3 items	Appropriate language is used clearly and correctly
		Differentiated learning 3 items	Teaching strategies are adapted according to the level of students
		Assessment 2 items	Oral/written assessment are used to ensure students' understanding
	Closure	Assessment and evaluation	Students summarise the concept

	5 items	explained
Personality and Ethics	8 items	Appropriate physical appearance Students are respected

RESULTS and FINDINGS

Curriculum

It was found that all the objectives, generals and specifics ones, lack the notion of "reflective practice". However, the reflective practice was implicitly included in the curriculum, presented by nuances that may lead to the concept of reflective practice.

Goals

The curriculum includes 7 goals for the practical program. Only three out of seven present key words related to "reflective practice". Table 3 presents curriculum goal items with the key words related to "reflective practice".

Table 3: Curriculum Goal Items Presenting Key Words Related to "Reflective Practice".

Goal	Keyword
apply the acquired knowledge and professional skills in the teaching process"	*professional skills*
organize the activities that enhance the daily life learning	*the daily life learning*
practice self-development to improve the professional performance	*self-development; professional performance*

Observation Unit

The syllabus of the observation unit includes three objectives and three learning outcomes. Only one objective out of three leads implicitly to reflective practice.
The course aims to "an accurate observation and critical sense".
Similarly to the learning outcomes, only one contributes implicitly to reflective practice
The trainee should be able to analyze the general framework of the teaching process

Practicum I Unit

The syllabus of the practicum I unit includes five objectives and four learning outcomes. None of them is related to reflective practice.

Practicum II & III

Practicum II and III have the same syllabus, as practicum II is addressed to major science pre-service trainees and practicum III to minor science pre-service trainees. The syllabus includes three objectives and five learning outcomes. Only one objective out of three leads implicitly to reflective practice.
The course aims to "Develop the practice to meet the requirement of the profession"
Similarly to the learning outcomes, only one contributes implicitly to reflective practice
"The trainee should be able to invest the assessment to improve their performance"

Pre-Service Teachers' Perception about Their Reflective Practice in the Training Program

According to the data analysis, 80% of the participants have achieved the outcome of the first phase "for the action", while the rest 20% have fair achievement. Table 4 shows the distribution of frequencies and percentages of participants' perceptions of their reflective practice during the "for the action" phase.

Table 4: Distribution of Frequencies and Percentages of Pre-Service Trainee Science Teachers' Perceptions of Their Reflective Practice During the "For the Action" Phase.

Reflective practice outcome		Frequencies	Percentage %
Not achieved			0
Fairly Achieved		6	20
Achieved		24	80
	Total	30	100

Regarding the second phase of the reflective practice "in the action", 83.3% of the participants achieved the outcomes, while 6.7% achieved fairly and 10% didn't achieved them. Table 5 shows the distribution of frequencies and percentages of the participants' perceptions of their reflective practice during the "in the action" phase.

Table 5: Distribution of Frequencies and Percentages of Pre-Service Trainee Science Teachers' Perceptions of Their Reflective Practice During the "In the Action" Phase.

Reflective practice outcome		Frequencies	Percentage %
Not achieved		3	10
Fairly Achieved		2	6.7
Achieved		25	83.3
	Total	30	100

As mentioned in the methodology, the "in the action" phase represents the implementation of the lesson in class, and includes four sub-section.

It was found that the outcomes of the reflective practice during the introduction were achieved by 73.3% of the participants, where as 26.3 % did not achieve them.Table 6 shows the distribution of frequencies and percentage of the participants' perceptions of their reflective practice during the introduction in the "in the action" phase.

Table 6: Distribution of Frequencies and Percentages of Pre-Service Trainee Science Teachers' Perceptions of Their Rreflective Practice During the Introduction in the "In the Action" Phase.

Reflective practice outcome		Frequencies	Percentage %
Not achieved		0	0
Fairly Achieved		8	26.7
Achieved		22	73.3
	Total	30	100

During the development of the lesson, it was found that 66.7% of the participants achieved the outcomes of the reflective practice, 30 % achieved fairly and 3.3 % did not achieve. Table 7 shows the distribution of frequencies and percentages of participants' perceptions of their reflective practice during the development of the lesson in the "in the action" phase.

Table 7: Distribution of Frequencies and Percentages of Pre-Service Trainee Science Teachers' Perceptions of Their Reflective Practice During the Development in the "In the Action" Phase.

Reflective practice outcome		Frequencies	Percentage %
Not achieved		1	3.3
Fairly Achieved		9	30
Achieved		20	66.7
	Total	30	100

During the closure of the lesson, it was found that 63.3% of the participants achieved the outcomes of the reflective practice, 30 % achieved fairly and 6.7 % did not achieve. Table 8 shows the distribution of frequencies and percentages of participants' perceptions of their reflective practice during the closure of the lesson, during the "in the action" phase.

Table 8: Distribution of Frequencies and Percentages of Pre-Service Trainee Science Teachers' Perceptions of Their Reflective Practice During the Closure in the "In the Action" Phase.

Reflective practice outcome		Frequencies	Percentage %
Not achieved		2	6.7
Fairly Achieved		9	30
Achieved		19	63.3
	Total	30	100

"Personality and ethics" represent a component of the teaching process. It was found that 83.3% of the participants achieved the outcomes of the reflective practice regarding this component, 6.7 % achieved fairly and 10 % did not achieve. Table 9 shows the distribution of frequencies and percentages of participants' perceptions of their reflective practice in relation to their personality and ethics during the "in the action" phase.

Table 9: Distribution of Frequencies and Percentages of Pre-Service Trainee Science Teachers' Perceptions of Their Reflective Practice in Relation to Personality and Ethics in the "In the Action" Phase.

Reflective practice outcome		Frequencies	Percentage %
Not achieved		3	10
Fairly Achieved		2	6.7
Achieved		25	83.3
	Total	30	100

Regarding the reflective practice in the last phase, the "on the action", which occurs after the implementation of the lesson, it was found that all participants did not achieved the desired outcomes. Table 10 shows the distribution of frequencies and percentages of the participants' perceptions of their reflective practice during the "on the action" phase.

Table 10: Distribution of Frequencies and Percentages of Pre-Service Trainee Science Teachers' Perceptions of Their Reflective Practice During the "On the Action" Phase.

Reflective practice outcome		Frequencies	Percentage %
Not achieved		30	100
Fairly Achieved		0	0
Achieved		0	0
	Total	30	100

Refection Reports

The result of analysis of the refection reports collected from trainee portfolios supports to some extent the findings from the questionnaires.

The analysis of the report indicates that trainees focus on their emotional responses to the teaching experience with few attempts to examine teaching styles and techniques. It is well noticeable that all reports are very brief where trainees narrate about their experience in class, some present self-assessment and only two of them present suggestions for improvement.

Most of the reports, twenty reports out of thirty represent brief descriptions that highlight basically some aspects of their planning and teaching process.

> Reflection
>
> The time was enough to give my students time to think and answer and conclude the concepts, also there was no time for the group work that benefit the students to work in more enjoyable and interesting way because they share the ideas and learn from each other, thus I did not do the assessment that I wrote in my lesson plan, the materials also were not enough, but if I want to speak about the environment, it was good my students were calm and there was interaction between us and they were active.

Eight reports include a brief reflection, identifying the problem during the teaching session and suggesting an action for possible remediation. However, the reflection was limited to the "In action" phase.

> Reflection paper
>
> ➢ The time was not accurate because I thought they are in grade one they will take long time to get the idea.
> ➢ When the group work started the students were confused of what they should do, then I was supposed to give the students the instructions at the beginning of the activity (before giving them the masks)
> ➢ The students didn't know how to act like the animal they got, and they didn't understand the information that I gave it to them so I had to pass to each group to explain it.

Within this category, some trainees identified the problem, however they go to blame students for rather than trying to suggest remediation. For the example listed below, the trainee stated that three out of six groups (the half) faced difficulties in completing the task thought she defended her choice for the activity and blamed students.

Reflection

The teaching session was good for me. I was comfortable with the class, the students interacted with me in the three different parts of my explanation. I should have made sure of the outer sources, I planned o explain in the lab but the teacher that has the keys was absent, and the computer lab was not that good to use, but I had no other choice otherwise I would have had explained in the classroom and not all students were able to watch clearly the video. My preparation was very clear and easy for all students to understand (I had to talk in Arabic most of the time), the video was a bit fast for them (the English) but it was very clear. I made a good point by stopping the video and explaining each part to them in order to make sure that they are getting the ideas smoothly. I thought the video based activity is easy for them but I think I should have made it easier (there were 7 students that weren't able to answer half of the sheet). The group work needed more time, I should have also left the first activity with them until they finish the group work because three out of six groups had troubles solving the questions (they didn't have enough time to memorize well everything). The problem is in the students not in my activity.

Only two reports show a sound reflection that includes regulation and criticism. In the example below, the trainee approach different aspects of the teaching process: planning; classroom management; motivation and teaching strategies. She listed her strong points and approached the weak one.

Refection

I was explain chapter 5: Sound and musical instruments for elementary grade 4. I have already explained for this class before, so I felt no stranger. That's make me and the students feel comfortable.

I was fascinated by the interaction between us; it's a positive term of successful management. They discover the idea due to my activities. This is my goal to encourage self-learning in addition to learning by doing. They were active and feel the soul of competition due to the gift I promised to give. I may use my way in my future explanations, it's a good strategy to students for understanding quickly without forgetting the concept.

However, I was frustrated since the school suffers from the loss of technology including LCD and electricity. That obliged me to play the video on the lab top screen and grouped the students around the laptop which makes a bit of mess, but it is normally since they are children and in need for playing and having fun while studying. In addition, to the next time I should give all students a small simple gift as a positive reinforcement, since there was a girl that felt lazy and started to cry. I can't encourage one and forget the others. This is a good point.

I was happy during the lesson. I will take into consideration all my faults for the next time to be more skillfully in teaching.

Interview

The interview consisted of three main parts. As for the first part, regarding the reflection for action, all the trainers agree that trainee pre-service teachers practice reflection on their planning informally in class by participating in classroom discussion about their lesson planning.

"Normally, every session one of the trainee presents their planning in class, discuss it with their peers and with me, defend their plans by talking about its strong and weak points."

"The trainees don't write a formal reflection about their lesson planning, but we do group discussion for lesson planning that help them regulate their plans."
"During classroom discussion, the trainees practice self-assessment by asking: is the plan well prepared? Is it coherent? Did I use the right resources? Is the equipment chosen available in school? Etc…"

Regarding the second part of the reflection that occurs during the implementation of the lesson in class trainers agree that their trainees apply very limited modifications in class, and they don't record comments in relation to their practice during the teaching session.

"During the class session, most of the trainees adjust their language, as students may not understand English, they explain in Arabic…however, they don't put effort to find other strategies for language problem. Trainees rarely record any comments during their teaching, they rely on the trainer's feedback."

"Our trainees are still facing problems in reacting according to the situation in class, so they stick to their plans and avoid changing their actions… they only write notes during the session when the trainer asks them to do it". "The most kind of modification they can do in class, is to switch to blackboard teaching when the school lacks resources e.g. computers…however that kind of modification makes them very passive and confused… it is not meant to improve their teaching rather than to deal with the situation in a negative way". "our trainees find difficulties in adjusting their prepared plans"

Regarding the third part of the interview that addresses reflection on their teaching process, trainers agree that trainees detect the gaps in their planning with the help of the trainer, they can't figure out the problem by themselves, therefore they can't reorient and adjust their approach without the intervention of the trainers. However, they all considered that trainees show positive attitudes towards feedback from their trainers, but not always from their peers.

"Trainee face difficulties in picking up the problem in their planning…only few of them may reorient their practice without my help…."
"they (trainees) take into consideration my feedback, share it with their peers but they are not open to peers feedback, as they may consider it as negative criticism."

As for creativity and critical thinking, all trainers considered that the trainee are passive in their thinking. They lack creativity and critical thinking skills strategies for self-improvement.
"they don't show any initiative in their work… they are followers, they only modify their action according to feedback… they lack critical thinking and creativity in their work"
"critical thinking and creativity skills are not well developed…they don't have strategies for self-improvement".
"when reading other work, they try to adopt it without taking into consideration the different context…they lack flexibility and critical thinking skills in this area"

CONCLUSION

Data collected from the questionnaire about pre-service trainee science teachers' perceptions of their reflective practice show that they reflect on the "for the action" and "in the action' phase, with a total failure of the "on the action' phase.

However, the analysis of portfolios reflection paper show that trainees reflect partially only on the 'in the action" phase, with the absence of the two other phases; two third of their reports do not represent reflection, and the reflection in the rest is very limited.

This difference in the findings between the participants' perceptions of their reflective practice and their written reports was well clarified by the trainers' interview when they pointed that trainees reflect in an informal way, mainly by oral class discussion, about the "for the action" phase, which is the planning of the lesson phase before its implementation

In addition, trainers consider that the reflection during the teaching session is very limited. This finding may be explained that the reflection is taken place after the teaching session and is reduced to self-assessment rather than real reflection that requires changes of plans when needed during the implementation of the lesson. A similar finding was reported by Fox, Campbell and Hargrove (2011), where few pre-service teachers practice "in action" reflections. The authors considered that this might be due to the lack of "control in making pedagogical decisions…they may not have a repertoire of strategies and tools to change course in practice" (page 45).
Those findings may also be justified by the result of the curriculum analysis, that show an almost denial of the reflective practice in its goals and objectives. In fact, there is no clearly articulated definition and rationale for reflective practice in the program, and all the related learning outcomes, activities and assignment including the reflection papers written in the portfolios are vague and non-structured.

Consequently, referring to the definitions of reflective practice proposed by Freese's (1999) and smith (2001) which it as a multidimensional and complex process that aims to help teachers modify and improve instructional practices by asking probing questions , we may conclude that the participants in this study practice to some

extent reflection before teaching the lesson and during the teaching session, with merely a total denial of the third phase of the reflective practice which is "on the action", that requires self-assessment and regulation for improvement.

In addition, we may conclude that the pre-service trainee science teachers are just practicing a reflective thinking in retrospect about their teaching session, rather than a well-defined reflective practice leading to the desired outcomes.

Moreover, the findings imply that pre-service science teachers don't know what is meant by "reflection" and "reflective practice", and the trainers are not showing explicitly a reflective practice in their work with their trainees. Finally, the results reveal that the pre-service science teacher training program at the Lebanèse university partially prepares reflective practitioner teachers.

RECOMMENDATIONS

The results shed the light on the need to include explicitly reflective practice skills in the goals, objectives and learning outcomes of the pre-service science training curriculum. In addition, trainers are required to implement explicitly the skills of reflective practices with trainees, by referring to a well-defined framework using the three phases of reflection: for, in and on practice. For that purpose, it is recommended that all trainers would undergo specialized workshops for modelling reflective practice and trainees must be provided with rubrics that include the three phases of reflective practice for the assessment of their reflection reports in portfolios.

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