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# A Case Study on Pre-service Science Teachers' Assessment of Some Teaching Science Courses at the Faculty of Education, Lebanese University

**Suzanne El Takach***

Science and Mathematics Department Name, Faculty of Education, Lebanese University, Beirut, Lebanon
*Corresponding author: suzanneeltakach@ul.edu.lb

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**Abstract** The present case study examined pre-service teachers' attitudes towards 6 courses taught in 3rd till 6th semesters at the Lebanese University, the Faculty of Education, during the academic year 2016-2017. They also assessed science teaching courses that are essential for preparing future teachers to teach science to primary and elementary pupils. These courses were: Action Research I and II in Teaching Science, New trends in Teaching Science, Teaching Science I and II. All of those courses are taken by pre-service teachers majoring in elementary science education, and Teaching Science for Early Childhood Education, recently referred to as primary education. Qualitative and Quantitative Data were gathered from a) a survey questionnaire consisting of 16 items; some were of Likert scale type that aimed at collecting students' opinions on courses, in terms of teaching, assessment and class environment. The sample consisted of 67 pre-service teachers, who filled 105 questionnaires and b) pre-service science and mathematics teachers' reflections (N=35) in their last semester in Science and Mathematics, in order to know more about their opinions of teaching science courses for teacher preparation at the Faculty of Education, their skills gained and for improving the present curriculum of science education. Pre-service teachers were satisfied with science teaching courses and they have admitted that they gained a good pedagogical content knowledge, such as, lesson planning, use of various teaching and assessment strategies, and how to do action research in a science class.

***Keywords:*** *assessment in higher education, pre-service science teacher, teacher education program*

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## 1. Introduction

Many studies emphasized the importance of students' assessment in higher education [1,2] for achieving quality assurance in science education [3] and measuring teaching quality in higher education [4], while other studies lessen students' evaluation of teaching or SET [5,6,7]. But at the end, there is no doubt that assessing courses by students at the Faculty would give a better overview of the needs of students and the gaps in teaching.

Moreover, it is vital in science education to know more about students' beliefs about gained skills, in order to compare with national and international standards for teacher preparation. For instance, the National Science Teachers Association supported the importance of early experiences in science so that students develop problem-solving skills that empower them to participate in an increasingly scientific and technological world [8]. To reach this goal, this association emphasized on teacher preparation and professional development, that a) must enable the teacher to implement science as a basic component of the elementary school curriculum. And b) must provide experiences that will enable teachers to use hands-on activities to promote skill development, selecting content and methods appropriate for their students, and for design of classroom environments that promote positive attitudes toward science and technology. In addition, the NSTA Elementary school science instruction must reflect the application and implementation of educational research. Elementary school science programs are improved when:

a. teachers keep abreast of appropriate science education research.
b. educational research becomes the premise for change or innovation in elementary school science, and teachers participate in action research in elementary science.

On the national level, the Ministry of Education and Higher Education (MEHE) and the Centre for Educational Research and Development (CERD) in Lebanon, released in 2017, a report on *the teacher référentiel de compétence* or *competency framework* [9]. This framework classified the teacher profession into four domains: specialized professional practices, professional relations, continuous professional development and professional ethics. The MEHE stressed on the required teacher profession to facing challenges of the 21st century and its priorities as well as reaching the teaching quality assurance.

I have been teaching the Science Methodology Courses since 2005 at the Faculty of Education and in 2010 the Faculty of Education, Lebanese University has implemented the LMD Program [10,11]. Lately, the Faculty of Education is in the middle of reforming the current Faculty curriculum. In addition, I took the responsibility as the head of the Science and Mathematics Department at the Faculty, between the academic years 2015-2016 and 2016-2017. I had the goal with the board of the department to assess the department courses.

To continuously update my skills as a teacher of the courses under study, I found it vital to ask students to assess courses I'm currently teaching. These six courses were: Action Research I and II in Teaching Science, New trends in Teaching Science, Teaching Science I and II. All of those courses are taken by students majoring in elementary science education, and Teaching Science for Early Childhood Education and primary education. Hence, the research questions are the following:

1. What is the overall assessment of pre-service teachers about their science teaching courses, at the Faculty of Education, Lebanese University?
2. How do preservice teachers assess each of the courses researched in this study?
3. What are the skills acquired by these pre-service teachers?
4. Do the acquired skills, mentioned by the pre-service teachers, match the learning outcomes of these courses?
5. What are science pre-service teachers' reflections, in their last semester, about elementary teacher preparation?

## 2. Method

The present research is case study and descriptive in nature. Two questionnaires were used in order to collect qualitative and quantitative data. These questionnaires were developed, piloted and adopted by the board of the Science and Mathematics department [12]. Data entry was assured by the IT personnel of the Faculty of Education, and data validation was assured through peer review as the board regular meetings.

### 2.1. Participants and Procedure

During 2016-2017, for English sections, pre-service teachers majoring in science and mathematics, early childhood education, enrolled in the 3rd, 5th and 6th semesters, took part of this study, at the Faculty of Education, Branch I..

The first questionnaire aimed at collecting pre-service teachers' assessment towards the science teaching courses. A sample of 67 students filled in 105 questionnaires. The second questionnaire was administered to pre-service teachers in their last semester, in order to collect their overall views about the present teacher preparation and their reflections about the science and mathematics teaching courses. Both questionnaires were distributed during the last week of each semester of Years 2 and 3. By that time, pre-service teachers would have undergone the required formative assessment for each course and would have formulated a clear idea of the content of each course. The first questionnaire was formed of 23 items, 21 items were of Likert scale, and 2 items were open-ended questions.

The second questionnaire was made of 8 questions; four of them were closed-ended, while four questions were open-ended questions.

The first sample consisting of pre-service teachers present at the day of the questionnaires administration was:

Science students in 5th semester= 6 (New Trends in Science Education)

Science students in 5th semester= 5 (Action research I)

Science students in 6th semester= 8 (Action research II)

Science students in 3rd semester= 16 (Teaching Science I)

Science students in 4th semester= 16 (Teaching Science II)

Early Childhood Education students in 3rd semester= 23 (Teaching Science for ECE)

Math students in 5th semester= 18 (Teaching Science I)

Math students in 6th semester= 15 (Teaching Science II)

The total number of filled questionnaires is= 105 out of the sample= 67 students.

## 3. Results and Discussion

This section gives details of data coded and analyzed, according to pre-service teachers' assessment of the course in terms of, teaching, evaluation and class environment.

### 3.1. Results Related to Research Question1

Figure 1 depicts pre-service attitudes towards the courses. More than 82% admitted that the teacher used various teaching strategies and 91.73% pointed out positively about the modes of course evaluation. In addition, 93% benefit very much of the courses. All agreed that they knew from the beginning of the semester, the course objectives and procedure (Table 1).

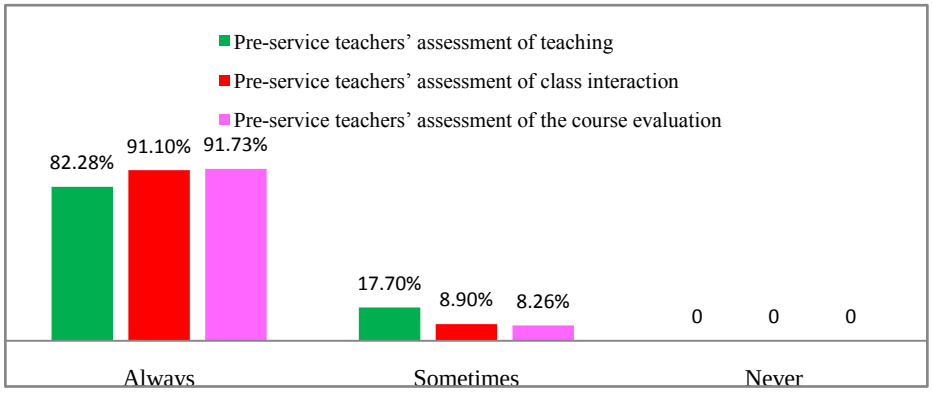


**Figure 1.** Pre-service Overall Assessment for Science Teaching Courses (N=105)

More details are presented in Table 1.

**Table 1. Pre-service teachers' Overall Attitudes towards all the Courses (N= 105)**

| | Indicators | Yes | No | | (%) |
|---|---|---|---|---|---|
| | **Pre-service teachers' assessment of course objectives and procedure** | | | | |
| A1 | Teacher sets the objectives of the course and the methods of evaluation at the beginning of the semester | (100%) 105 | | | 100 |
| A2 | Teacher follows the course syllabus distributed to students at the beginning of the semester | (100%) 105 | | | 100 |
| A3 | Teacher is committed to do make up sessions | (100%) 105 | | | 100 |
| | **Pre-service teachers' assessment of teaching** | Always | Sometimes | Never | |
| B1 | Teacher uses different teaching methods | (88.6%) 93 | (11.4%) 12 | | 100 |
| B2 | Teacher explained the lecture clearly | (80%) 84 | (20%) 21 | | 100 |
| B3 | Teacher spurred discussion | (79%) 83 | (21%) 22 | | 100 |
| B4 | Teacher uses teaching tools such as Power point, LCD, ... | (87.6%) 92 | (12.4%) 13 | | 100 |
| B5 | Teacher communicates with students via e-communication (EMAIL, WHATSAPP, ...) | (76.2%) 80 | (23.8%) 25 | | 100 |
| | **Pre-service teachers' assessment of class interaction** | Always | Sometimes | Never | |
| C1 | Teacher deals with the students without distinction between them and with respect | (91.4%) 96 | (8.6%) 9 | | 100 |
| C2 | Teacher's lectures are characterized by dialogue and acceptance of others | (90.5%) 95 | (9.5%) 10 | | 100 |
| C3 | Teacher manages the lecture calmly and away from the chaos/ atmosphere is distanced from tension and interactive work is dominant | (91.4%) 96 | (8.6%) 9 | | 100 |
| | **Pre-service teachers' assessment of the course evaluation** | Always | Sometimes | Never | |
| D1 | Teacher corrects questions of continuous assessment tests in the classroom | (92.4%) 97 | (7.6%) 8 | | 100 |
| D2 | Teacher announces the results of periodic tests without delay (Quiz) | (95.2%) 100 | (4.8%) 5 | | 100 |
| D3 | Teacher adopts a method of teaching that motivates students to continue learning | (87.6%) 92 | (12.4%) 13 | | |
| | **Course overall pre-service teachers' feedback** | Very much | Somewhat | Not at all | |
| E1 | I have benefit a lot from the course | (93%) 98 | (6.7%) 7 | | 100 |

## 3.2. Results Related to Research Question 2

In Table 2, pre-service teachers showed very positive attitudes towards teaching science courses in the 3rd, 4th and 5th Semesters.

**Table 2. Students' attitudes towards the courses for 3rd, 4th and 5th Semesters Courses (Science and Mathematics, Early Childhood Education)**

| | Teaching Science I (3rd and5th semester)(N= 16+ 18= 34) | | | | Teaching Science II (4th and 6th semester) (N= 14+15= 29) | | | | Teaching Science for ECE (3rd semester) (N= 23) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yes | No | | % | Yes | No | | % | Yes | No | | % |
| A1 | (100%)34 | | | 100 | (100%) 29 | | | 100 | (100%)23 | | | 100 |
| A2 | (100%) 34 | | | 100 | (100%) 29 | | | 100 | (100%) 23 | | | 100 |
| A3 | (100%) 34 | | | 100 | (100%) 29 | | | 100 | (100%) 23 | | | 100 |
| | Always | Sometimes | Never | | Always | Sometimes | Never | | Always | Sometimes | Never | |
| B1 | (94.1%) 32 | (5.9%) 2 | | 100 | (100%) 29 | | | 100 | (60.9%) 14 | (39.1%) 9 | | 100 |
| B2 | (76.5%) 26 | (23.5%) 8 | | 100 | (100%) 29 | | | 100 | (60.9%) 14 | (39.1%) 9 | | 100 |
| B3 | (73.5%) 25 | (26.5%) 9 | | 100 | (96.5%) 28 | (3.5%) 1 | | 100 | (73.9%) 17 | (26.1%) 6 | | 100 |
| B4 | (70.6%) 24 | (29.4%) 10 | | 100 | (100%) 29 | | | 100 | (91.3%) 21 | (8.7%) 2 | | 100 |
| B5 | (79.4%) 27 | (20.6%) 7 | | 100 | (100%) 29 | | | 100 | (21.7%) 5 | (78.3%) 18 | | 100 |
| | Always | Sometimes | Never | | Always | Sometimes | Never | | Always | Sometimes | Never | |
| C1 | (94.1%) 32 | (5.9%) 2 | | 100 | (93.1%) 27 | (6.9%) 2 | | 100 | (95.6%) 22 | (4.4%) 1 | | 100 |
| C2 | (91.2%) 31 | (8.8%) 3 | | 100 | (96.5%) 28 | (3.5%) 1 | | 100 | (91.3%) 21 | (8.7%) 2 | | 100 |
| C3 | (79.4%) 27 | (20.6%) 7 | | 100 | (100%) 29 | | | 100 | (91.3%) 21 | (8.7%) 2 | | 100 |
| | Always | Sometimes | Never | | Always | Sometimes | Never | | Always | Sometimes | Never | |
| D1 | (94.1%) 32 | (5.9%) 2 | | 100 | (96.5%) 28 | (3.5%) 1 | | 100 | (87%) 20 | (13%) 3 | | 100 |
| D2 | (94.1%) 32 | (5.9%) 2 | | 100 | (89.7%) 26 | (10.3%) 3 | | 100 | (100%) 23 | | | 100 |
| D3 | (94.1%) 32 | (5.9%) 2 | | | (89.7%) 26 | (10.3%) 3 | | | (65.2%) 15 | (34.8%) 8 | | |
| | Very much | Somewhat | Not at all | | Very much | Somewhat | Not at all | | Very much | Somewhat | Not at all | |
| E1 | (97%) 33 | (3%) 1 | | 100 | (93.1%) 27 | (6.9%) 2 | | 100 | (100%) 23 | | | 100 |

As for science pre-service teachers, they were highly satisfied with learning the core courses related to their major: these courses were New Trends in Teaching Science, Action Research I and Action Research II. Table 3 highlights in details their attitudes towards the three courses.

**Table 3. Students' attitudes towards the courses (Major: Science)**

| | New trends in Teaching Science (5th semester) (N= 6) | | | | Action Research I (5th semester)(N= 5) | | | | Action Research II (6th semester) (N= 8) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yes | No | | (%) | Yes | No | | (%) | Yes | No | | (%) |
| A1 | (100%) 6 | | | 100 | (100%) 5 | | | 100 | (100%) 8 | | | 100 |
| A2 | (100%) 6 | | | 100 | (100%) 5 | | | 100 | (100%) 8 | | | 100 |
| A3 | (100%) 6 | | | 100 | (100%) 5 | | | 100 | (100%) 8 | | | 100 |
| | Always | Sometimes | Never | | Always | Sometimes | Never | | Always | Sometimes | Never | |
| B1 | (83.3%) 5 | (16.6%) 1 | | 100 | (100%) 5 | | | 100 | (100%) 8 | | | 100 |
| B2 | (83.3%) 5 | (16.6%) 1 | | 100 | (40%) 2 | (60%) 3 | | 100 | (100%) 8 | | | 100 |
| B3 | (83.3%) 5 | (16.6%) 1 | | 100 | (60%) 3 | (40%) 2 | | 100 | (62.5%) 5 | (37.5%) 3 | | 100 |
| B4 | (100%) 6 | | | 100 | (100%) 5 | | | 100 | (87.5%) 7 | (12.5%) 1 | | 100 |
| B5 | (100%) 6 | | | 100 | (100%) 5 | | | 100 | (100%) 8 | | | 100 |
| | Always | Sometimes | Never | | Always | Sometimes | Never | | Always | Sometimes | Never | |
| C1 | (83.3%) 5 | (16.6%) 1 | | 100 | (60%) 3 | (40%) 2 | | 100 | (87.5%) 7 | (12.5%) 1 | | 100 |
| C2 | (83.3%) 5 | (16.6%) 1 | | 100 | (60%) 3 | (40%) 2 | | 100 | (87.5%) 7 | (12.5%) 1 | | 100 |
| C3 | (100%) 6 | | | 100 | (100%) 5 | | | 100 | (100%) 8 | | | 100 |
| | Always | Sometimes | Never | | Always | Sometimes | Never | | Always | Sometimes | Never | |
| D1 | (83.3%) 5 | (16.6%) 1 | | 100 | (100%) 5 | | | 100 | (87.5%) 7 | (12.5%) 1 | | 100 |
| D2 | (100%) 6 | | | 100 | (100%) 5 | | | 100 | (100%) 8 | | | 100 |
| D3 | (83.3%) 5 | (16.6%) 1 | | | (80%) 4 | (20%) 1 | | | (87.5%) 7 | (12.5%) 1 | | |
| | Very much | Somewhat | Not at all | | Always | Sometimes | Never | | Very much | Somewhat | Not at all | |
| E1 | (50%) 3 | (50%) 3 | | 100 | (100%) 5 | | | 100 | (87.5%) 7 | (12.5%) 1 | | 100 |

## 3.3. Results Related to Research Questions 3 and 4

In this section, the courses syllabi as well as the pre-service teachers' acquired skills are displayed.

### 3.3.1. New Trends in Teaching Science

**General Objectives**

- Recognize new trends in instructional strategies and assessment procedures in science teaching.
- Document and demonstrate research studies in relation to recent issues and trends in the teaching of science.
- Engage in professional development activities.

**Intended Learning Outcomes**

- Develop and implement instructional strategies that promote the development of critical thinking and problem solving.
- Modify or develop instructional activities and teaching strategies in response to the changing conditions of the learning situation.
- Seek out professional literature, colleagues, and other resources to support their development as learners and as teachers.

**Skills gained by pre-service teachers in New Trends in Teaching Science**

Pre-service teachers' skills are the following:
I have learned how to analyze a research article.
I learned new strategies to teach science.
I learned about new teaching tools, e.g., teaching science with technology.

### 3.3.2. Action Research I

**General Objectives**

- Developing skills in analysis of qualitative quantitative research in education in general and science education in particular.
- Develop skills in the development of data collection instruments for use by researchers and teachers of science education, mathematics education and education in general.
- Developing skills in designing, conducting and analyzing action research projects in schools and classrooms.

**Intended Learning Outcomes**

- The procedures for designing and conducting action research projects.
- Design and conduct action research projects aiming at improving teaching practices.
- Apply statistical techniques and procedures for analyzing action research projects.

**Skills gained by pre-service teachers in Action Research I**

I learned how to read and analyze a research article.
I learned how to make a research article and organize it.
I can now analyze a research article and write a plan to perform action research.
I know how to write a proposal for an action research.

### 3.3.3. Action Research II

**General Objectives**

- Conducting the action research project prepared in "Action Research I".
- Analyzing data and reporting results.

**Intended Learning Outcomes**

- Conduct action research project aiming at improving teaching practices.
- Apply statistical techniques and procedures for data analysis.
- Write up the research report.
- Present action research results.

**Skills gained by pre-service teachers in Action Research II**

I learned how to do action research.

I have acquired the ability to deal with students with various and modern ways, and to face difficulties I can encounter with students.

Now I can make any study related to what we took and we know how to categorize the data, and analyze them.

I learned to implement intervention in schools.

I learned how to find problems and ways to solve such problems, to do an action research.

### 3.3.4. Teaching Science I

**General Objectives**

- Demonstrating knowledge of how people learn and how to apply this information in teaching science.
- Understanding and identifying the different misconceptions held by elementary level students concerning scientific ideas and concepts and how they affect their learning.

**Intended Learning Outcomes**

- Describe the learning theories that present a rationale for using different teaching strategies in science classes.
- Identify students' scientific misconceptions.
- Discuss the relative advantages and disadvantages of the various modes of instruction.
- Develop lesson plans using a variety of teaching strategies.

**Skills gained by pre-service teachers in Teaching Science I**

I gained skills in research and development of my abilities in addition to the love of work.

I learned about several teaching methods based on learning educators and theorists.

I liked the class project and how we were assessed.

### 3.3.5. Teaching Science II

**General Objectives**

- Developing the knowledge and skills needed to create a classroom instruction based on relevant science teaching strategies.

**Intended Learning Outcomes**

- Understand the different teaching strategies and techniques used in the teaching of science at the elementary level.
- Plan science lessons that are consistent with current trends in science education using appropriate strategies and techniques.

**Skills gained by pre-service teachers in Teaching Science II**

I learned how to deal with students and how to make a lesson plan.

I learned different teaching strategies and how to put skills for science activities.

I learned how explaining in the classrooms.

I learned about cognitive, social and affective skills for children I will teach.

The content of the course will make us professional teachers that have enough skills and strategies while we are teaching.

I learned how to teach science and I learned lots about teaching strategies, we will use it in our teaching when we graduate.

I am now able to assess students and to use various and relevant teaching strategies.

### 3.3.6. Teaching Science for Early Childhood Education

**General Objectives**

- This course prepares students to plan, prepare, and implement appropriate lesson plans for ECE Lebanese science curriculum for preschoolers.
- This course aims to motivate early childhood student teachers to see science as a part of their everyday lives and encourage them to nurture young children's curiosity and natural desire to learn about the environment. It will also help early childhood student-teachers to develop positive scientific attitudes and acquire a functional understanding of basic scientific skills, concepts and principles.

**Intended Learning Outcomes**

- Define the components of curriculum: philosophy, goals, lesson planning and activities planning.
- Identify the role of curriculum planning in early childhood education programs.
- Create appropriate lesson plans for 3-8 year olds.
- Create appropriate learning activities for 3-8 year olds; including, but not limited to science, math, and social studies.

**Skills gained by pre-service teachers in ECE in Science Teaching**

I gained new skills in teaching science for this stage.

I learned how to explain a science lesson.

I gained self-confidence during the lesson explanation in a real class setting.

I have gained new experiences, skills and science concepts.

I learned many skills such as the skills of communicating and dealing with students.

I have benefited greatly because early childhood education because I gained important scientific concepts and different teaching methods I can use in the future.

I learned how to deal with children and how to teach scientific concepts for children.

I learned about class management not only as a material to study.

In this course I benefit more because we made our own lesson plans, activities, lesson explanation... Plus we even saw the work of other students which gave us more ideas.

I learned to be creative in explaining lessons in new ways.

I found that I could prepare a lesson with attention to small details and I learned how to prepare a lesson with the goals and appropriate methods.

I have benefited from many of the activities and lessons that we have prepared and presented in class.

I learned about learning theories and lesson plan.

I learned about the importance of science in our practical days.

I learned how to explain a lesson and how to prepare a lesson in an effective way.

Thank you for giving us an opportunity to express our opinion and to evaluate the course.

In sum, the acquired skills match the different science teaching syllabi.

## 3.4. Results Related to Research Question 5

Pre-service teachers in their last semester reflected on the science teaching courses and their preparation as future teachers. They wrote their reflections to the following questions: what courses did you like: why? And what skills you find that they have improved or developed at the end of this semester?

**Skills at the end of Teacher Preparation**

Table 4 and Table 5 summarize science and mathematics pre-service teachers' reflections and their skills acquired at the end of their teacher education program. Note that many pre-service statements present in the tables were frequent more than once.

**Science Students 6th Semester (N=16)**

**Table 4. Science Pre-service Teachers acquired PCK skills**

| Emerged Themes | Pre-service Science Teachers Reflections |
|---|---|
| Teaching-learning settings | Teaching materials helped us to prepare lessons and activities related to each lesson and organize time in class.<br>We could practice teaching and interact with students in different grades using different strategies in teaching.<br>At the end of the semester, the skills that have been improved: preparation of the lessons and preparation of exams and class time management.<br>I developed several skills; I have learned how to evaluate children in many ways.<br>I have now the ability to practice in a better way. |
| Skills | I have developed learning skills and how to organize my work as a future teacher, as well as learning how to deal with students with special needs and using technology in education.<br>I have acquired knowledge of the scientific research.<br>I am more confident in myself and I have become a career lover. |
| Courses I found important for my career | I preferred the courses that are related directly to science (chemistry, physics, biology) and the teaching courses (Teaching Science I and 2 and Practice).<br>It is important to know how students think in elementary classes and how we must deal with the ones who have difficulties and the teaching courses help me during practice.<br>Healthy Education because it is good and useful.<br>Teaching science and math because during these courses we have introduced to new strategies and ways in teaching, we were also introduced to solve misconceptions that students may face and how we can deal with.<br>I liked how to deal with students and taking into account different capacities of students and the class control and different strategies for a better delivery of information to all students.<br>I liked the courses: Human rights, Education on citizenship because they develops national awareness towards rights and duties.<br>I like courses on Animal and Plant Physiology, Animal and Plant Reproduction because these courses are directly related to science topics that I will teach to students in the future.<br>I liked Earth and Space Science and Technology in Education.<br>I liked Classification, Cytology and Histology, States and Organization of Matter, Descriptive Statistics because they are directly related to science education.<br>Education for children with special needs because I've gained knowledge of special cases that I may face in schools.<br>Technology in Education because it interests me and I love the use of technology in education and the use of software in teaching science. |

**Mathematics Students in 6th Semester (N= 19)**

**Table 5. Mathematics Pre-service Teachers acquired PCK skills**

| Emerged Themes | Pre-service Mathematics (Minor Science) Teachers Reflections |
|---|---|
| Teaching-learning settings | I learned how to explain mathematics and science lessons in the school in and how to deal with students.<br>I liked Teaching Science I and II, Teaching Mathematics and Practice, because they really help us a lot in our profession.<br>I learned how to deal with students, how students think and how to deal with teaching tools.<br>I learned various methods of teaching and how to assess students.<br>I learned how to manage mathematics and science classrooms, how to prepare and explain lessons.<br>I learned how to do and to use research in education.<br>I learned how to teach mathematics and science concepts for the elementary stage<br>I learned about the Lebanese mathematics curriculum |

| Emerged Themes | Pre-service Mathematics (Minor Science) Teachers Reflections |
|---|---|
| Skills | I gained skills to be a good teacher and effective in class.<br>I learned to know my weaknesses, how to do self-assessment and how to improve them.<br>Skills of communication and interaction with students in particular.<br>As a student at the Faculty of Education I have improved my abilities by identifying strategies and methods of dealing with children.<br>I developed skills of social communication and the ability to do research and present my work in a good way.<br>I improved my skills in delivering ideas and understanding children more.<br>My cognitive abilities in mathematics, science and technology have changed.<br>I have more self-confidence as a teacher. |
| Courses I found important for my career | I like the courses that help me in my career, which are related to mathematics and science. In short, the mathematics must be increased to deepen the student's.<br>Mathematics and Science Education (I & II).<br>Classroom Observation (Science and Math) and Practice.<br>I like the pure content courses because I will teach in schools.<br>I like the courses related to the methods of teaching and how to deal with students.<br>Many courses in mathematics and science education have contributed to the improvement and development of my scientific and educational profile.<br>I gained good experience and how to deal with students in schools.<br>I like courses in Teaching Mathematics and Science, Descriptive statistics, Mathematics curriculum, Technology in teaching technology I have loved because they contributed to the progress and development of my experience as a future teacher of the future.<br>Pure Mathematics such as Algebra, Abstract Algebra, Geometry, Arithmetic... and all subjects related to mathematics because I like mathematics.<br>Teaching Math 1 & 2, Teaching Science 1 & 2, and Human Rights.<br>Education for children with special needs: because it provides an opportunity to know different cases and how to deal with them and if we come across the classroom.<br>I like courses related to mathematics, Action research, and courses related to science, because their application is easy in schools and they are not theoretical courses. |

# 4. Conclusion and Future Research

The present case study scrutinized in depth the courses of science teaching I am currently teaching at the Faculty of Education, Lebanese University. It presented pre-service teachers reflections and overall assessment of these courses: Action Research I and II in Teaching Science, New trends in Teaching Science, Teaching Science I and II and Teaching Science for Early Childhood Education. Results showed that participant pre-service teachers were very satisfied with the content of these courses, because it helped them in developing the necessary pedagogical content skills as future science teachers in the primary and elementary levels. Moreover, pre-service science and mathematics teachers found very relevant the teaching science and mathematics courses to their career, they could realize the importance to excel the use of technology for their career.

Stark and Freishtat have made eight recommendations for student evaluation of teaching or SET (p.6) [13]; some of these recommendations were to:

(1) pay careful attention to student comments—but understand their scope and limitations. Students are the authorities on their experiences in class, but typically are not well situated to evaluate pedagogy generally.

(2) avoid comparing teaching in courses of different types, levels, sizes, functions, or disciplines.

(3) use teaching portfolios as part of the review process.

(4) use classroom observation as part of milestone reviews.

(5) improve teaching and evaluate teaching fairly and honestly, spend more time observing the teaching and looking at teaching materials.

My future research is to make a follow up of the graduated science teachers, in order to seek what are their needs in their actual teaching, how they are teaching and their professional satisfaction. I also will research whether the skills developed by pre-service teachers during their teacher preparation, match the set of the ministry standards skills as proposed by the Lebanese MEHE and CERD report [9].

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