Action Research in Under-graduation Teacher Program: Case of Lebanese University

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Abstract: Action research, one of the requirements in undergraduate program in education, is a systematic approach that enables teachers to solve problems they face in their classes on a daily basis. Participants in this study are students in their final semester of a three-year teacher preparation program and graduates in their first-year teaching. The study discusses mathematics and science preservice teachers and novice teachers' beliefs and thoughts about their benefits of action research as a means of professional growth and teaching skills. It reports feedback from the two groups about the impact of doing action research on: (a) their learning about action research, (b) their thinking and problem-solving skills, (c) their professional growth, (d) their self-efficacy, (e) their outcome efficacy, (f) their beliefs about whether or not action research is applicable to their future as teachers. Participants views are studied and compared by the mean of a questionnaire that measures the previously mentioned categories. Scores for the six categories were computed by using descriptive statistics for each one of them

Keywords: Action Research, preservice teachers, novice teachers, Professional growth

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Introduction

The use of action research as a strategy for encouraging reflective teaching practices and reflective thinking by preservice teachers is not a new idea. In the USA During the 1950s many experienced teachers were encouraged to participate in various kinds of action research work (e.g., Corey, 1953; Shumsky, 1958). At that period, there were also efforts to introduce action research to students in preservice teacher education programs (e.g., Beckman, 1957; Perrodin, 1959). Over the past decade, most research has focused on the benefits of action research as a mean for: first, developing practical experience by being involved in activities inside classrooms. Researchers suggest that preservice teachers' participation in action research helps them become more aware of student learning, of the complexity of their classrooms, and of their own capacities as teachers. (Chant, Heafner and Bennett, 2004; Rock and Levin, 2002). Second, reflecting on their teaching practices by assessing the teaching methods which is an essential part of action research method. Third, knowing better their students; teachers need to know how much students know about a topic and where they may be having difficulty. Fourth,

developing classroom management strategies by observing and adapting to real classroom situations. Fifth, encouraging preservice teachers to adopt a growth mindset, where they view challenges as opportunities for growth and development. Sixth, building a professional portfolio to demonstrate their continuous professional improvement and development.

Lebanese university undergraduate students take an obligatory action research module over two semesters during their last academic year of a three-year Bachelor degree in Education. They learn to conduct action research to develop their critical and reflective thinking as the course syllabus indicates. It is a course that "introduces students to action research as a method of improving teaching and learning at the elementary level." Some of the objectives of the two modules are to:

- "Demonstrate knowledge of, and the ability to use, action research as part of personal professional development and reflective practice.
-Design an action research project based on educational theories and teaching practices to identify, define, and solve problems in teaching and learning elementary mathematics."

The first module addresses topics such as "what is action research, and how does it improve schools? types of action research, generating a research focus and research question, reflection in action research, planning the study, and methods of data collection". At the end of the semester pre-service teachers present their action research projects. The second module comprises implementation of the planned strategy in classrooms in order to collect, analyze and reflect on the collected data.

In both modules, factual knowledge is introduced by the lecturers in a weekly, two-hour seminar period. Working within a social constructivist framework, pre-service teachers are expected to complete their work in pairs or in groups of three.

They will be trained to become "professionals who reflect about teaching in general and about themselves as teachers through applying research that deals on finding a solution for a local problem" (Mills, 2007).

The following are some examples of the topics that pre-service teachers have investigated their third year:

- What is the impact of problem-based learning (PBL) on grade three student's achievement and understanding of multiplication?
- How can the use of manipulatives ameliorate students' misconceptions in mixed numbers and improper fractions operations?

Does self-assessment of the math homework enhance students' understanding of addition in grade one?

How Can the Non-Traditional Activities Enhance Participation and Achievement In Adding Numbers Without Regrouping In Grade 2

To what extent do using manipulative and visual aids affect grade six students' achievement and conceptual understanding in learning signed numbers operation?

Will the usage of virtual manipulatives and space GeoGebra enhance students' performance in space geometry and reduce their misconceptions?

To what extent does modeling fractions affect students' achievement in solving operations of fractions with different denominator?

To what extent does the use of real-life problems, along with modeling, affect grade three students' understanding of the concept of multiplication?

Does the integration of technology in the teaching learning process increase the motivation of students to learn?

What is action research?

Action research is 'the study of a social situation with a view to improving the quality of action within it' (Elliott, 1991). This simple definition draws attention to one of the most essential motivations for conducting action research which is, when used in classrooms, to improve the quality of teaching and learning as well as the working conditions of teachers and students at the school. McNiff (2002) considers action research as one form of "self-reflective practice" that involves thinking and reflection and that is open ended.

Many models of action research have been used; they all have the same main elements (Goodnough, 2011). The process starts with the identification of a problem and an inquiry about the possible causes of that problem. Then the researcher plans and implements a strategy designed to address the problem. the data is collected and analyzed to check the impact of the change. Action research is described as cyclical, with several cycles of planning, implementation, observation, analysis, and reflection (Kemmis & McTaggart, 2005; Riel, 2007; Stringer, 2007). With each cycle, reflection is done based on the data collected from the previous cycle in order to decide on the next step.

Table 1. The Phases of the Routine Relate to Traditional Research Practice

A Basic Action Research Routine
Look
• Gather relevant information (Gather data)
• Build a picture: Describe the situation (Define and describe)
Think
• Explore and analyze: What is happening here? (Analyze)
• Interpret and explain: How/why are things as they are? (Theorize)
Act
• Plan (Report)
• Implement
• Evaluate

Source: Stringer (2007:8)

Action research difference from other types of research

According to Stringer (2004, 2007) action research differs from other types of research by not being objective and generalizable. It is research to solve a specific problem in a local situation. Also, it is not quantitative research; it is qualitative research with a purpose is to gain "greater clarity and understanding of a question, problem, or issue." Moreover, the role of the researcher in action research is not that of an expert but of a facilitator who assists participants in defining and solving their problems. consequently, action research can be considered as a tool for learning in classrooms and schools

Action research and Teacher Professional Development

Professional development cannot be done by attending a class or a seminar, it is the development of learning habits that occur on a daily basis (Fullan, 2001). Teacher professional development is the teacher's commitment to a process of "an ongoing process of inquiry, where they deal with skepticism and values which compose the basis of their practice" (Oakes & Lipton 2003, p.379). Therefore, teachers' professional development should center on their critical thinking and students' learning. This is one of the reasons that educators are urged to conduct independent study or work in groups with their colleagues in the classrooms and educational institutions where they are employed in order to solve issues that arise on a daily basis.

Several scholars and teachers (Stenhouse,1975; Rudduck and Hopkins,1985) encouraged teachers to view themselves as researchers and continuously evaluate their practice. They demonstrated the positive influence of action research as professional development for teachers. On the contrary there were some criticisms for the research work of teachers, some studies pointed out the fact that sometimes teachers are not equipped the needed knowledge, skills and research methodology in order to conduct research of value (Norton, 2009). On the other hand, McMillan (2008) found that teachers are empowered by action research and that participating in collaborative action research fosters an environment in which all teachers are welcomed to ask questions. openly consider their teaching strategies, take chances, and rely on their peers for in-depth knowledge that deepens their comprehension of the data. When teachers reflect on their current practices, it becomes the ultimate reflection in action. It is the best mean to discover how they can improve their instruction. Moreover, empowerment is the Action research is a recurring theme in Mertler's (2014) works; he thinks that teachers get "an increased level of empowerment" and "have a lot more interest in how things are going on both in their classroom and at their schools.

So, wouldn't it be more fruitful to empower the people who are at the center of education—the teachers—to continuously reflect on their methods as part of their model for self-improvement rather than assign blame? Action research offers a method by which existing behavior can be modified to better behavior "p. 14; Mertler, 2014). Teachers are tasked with improving professional practice, critical reflection, and lifelong learning through action research .enhancing the learning of students (Mertler, 2014) .

Purpose of the study

The study will investigate from the standpoint of elementary mathematics and science pre-service teachers (group1) and mathematics and science teachers, graduates of faculty of pedagogy who practice teaching for the first time (group 2), how the specific information about action research and the experiences of engaging in action research as part of the requirements of a degree in Education program impacted their: (a)learning about action research, (b) thinking and problem-solving skills, (c) professional growth, (d) self-efficacy, (e) outcome efficacy, (f) beliefs about whether or not action research is applicable to their future as teachers. The data from these six variables answered by the two groups will provide sufficient information that creates a picture of how they benefited from this two-module action research course and how they do compare.

Research questions

1) What are preservice and novice teachers' beliefs about action research as a mean to improve their knowledge about action research, problem solving skills, professional development, self-efficacy, students' outcome efficacy, and applicability of action research in the future?
2) Is there a difference in the beliefs of preservice and novice teachers?

Method

Participants

The participants in this study are 33 third year students (pre-service teachers) enrolled in mathematics or science education programs in their last semester and 9 elementary mathematics or science teachers who graduated from the Lebanese University and are in their first teaching year. The majority of the participants are female (91%) whose ages are between 22 and 26

Instrument

The research sought to uncover what the preservice and novice teachers thoughts about the action research process as related to their knowledge about action research, problem solving skills, professional development, self-efficacy, students' outcome efficacy, and applicability of action research in the future. For this purpose, the study adopted and adapted a questionnaire developed by Debby & Ron Zambo (2007). The original questionnaire examined students' beliefs about action research and targeted eight areas of interest, referred to as variables, each of which was assessed by a subset of items. "The variables include the following:

LEARN: Did doing action research help students learn the process and cycle of action research?
THINK: Did action research improve students' thinking and problem-solving skills? PROFDEV: Did action research help students grow professionally?

SELFEFF: Did action research increase students' self-efficacy?

OUTEFF: Did action research increase students' outcome efficacy?

MENTOR: Were mentor teachers knowledgeable and interested in action research?

COMMUN: Did doing action research foster communication between students and their mentors?

FUTURE: Do students believe that action research is applicable to their futures?" (Debby & Ron Zambo, 2007, p64)

Our research neglected two of these variables, MENTOR and COMMUN, that assess students' relationship with their mentor teacher since our pre-service teachers do not have a mentor teacher accompanying them during their practice.

The first variable (LEARN) examined the extent to which our pre-service teachers were able to learn the process of action research through the way it was taught. They were asked to assess their ability to produce methods for gathering and analyzing data, inform oneself through literature, and develop a successful intervention strategy.
The second variable (THINK) focused on how students felt action research affected their ability to think critically. We wanted to know if our pre-service teachers thought that engaging in action research enhanced their capacity for decision-making, critical analysis, and problem-solving.

The third variable (PROFDEV) looked at whether teaching our students about action research aided their professional development. We wanted to know if students believed that action research made them more reflective and if it provided them with a plan for upholding their values.

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The fourth and fifth variables addressed self-efficacy and outcome efficacy. These two variables assess students' thought about whether action research "increased positive self-efficacy beliefs (SELFEFF), if learning to think as action researchers gave them a strategy to reach and teach each child" (Zambo, 2007)

Students' perceptions of the relevance of action research to their futures was the focus of the final variable (FUTURE). We were interested in knowing if our pre-service teachers thought action research was important and applicable to their future classrooms. We questioned whether they would apply it in the classroom and whether this motivated them to learn about action research and complete their project successfully.

The reliabilities of the six variables were high, with coefficient alphas as follows: LEARN = .88, THINK = .88, PROFDEV =.89, SELFEFF = .85, OUTEFF = .91, and FUTURE = .85.
The items for each of the six variables are listed in Table 2

Table 1. Items for Each of the Eight Variables

LEARN	**Did doing action research help them learn about action research** ?
	Doing the action research project helped me learn how to find a focus .
	Doing the action research project helped me learn how to collect data .
	Doing the action research project helped me learn how to analyze data .
	Doing the action research project helped me learn how to create an intervention .
	Doing the action research project helped me learn how to review literature
THINK	**Did learning action research improve their thinking and problem-solving skills ?**
	Learning how to do action research made me a more critical thinker about what goes on in classrooms .
	Learning how to do action research made me a better problem solver about educational issues .
	Having an action research component in an education program helps develop expert teachers .
	Doing action research helped me understand the complexity of teaching .
	Doing the action research project helped me know how to apply theories and concepts to my teaching.
PROFDN	**Did doing action research help them to grow professionally?**
	Learning how to do action research has made me a more reflective educator .
	Action research changed my beliefs about teaching .
	Doing action research helped me understand the kind of teacher I want to become .
	Knowing how to do action research caused me to grow professionally .
	Knowing how to do action research helps me keep my ideals about education.
SELFEFF	**Did doing action research increase their self-efficacy?**
	Because I know how to do action research, I will be an effective teacher .
	My self-confidence has grown because I learned how to do action research .
	I feel empowered because I know about action research .
	Doing action research changed my beliefs about my competence as a teacher.
OUTEFF	**Did doing action research increase their outcome efficacy?**
	Doing action research helped me see that I can bring about change in a classroom .
	Because I know how to do action research my students will meet more of the standards .
	Because I know how to do action research my students will score better on standardized tests .
	Because I know how to do action research my students will learn more .
	Action research will allow me to reach more of my students.
FUTURE	**Do the students believe action research is applicable to their futures?**
	Action research is relevant to my career as a teacher .
	I will use action research in my classroom .
	I was motivated to learn how to do action research because I know I will use it in my future .

	Action research will become a regular part of my teaching .
	I understand how action research will apply to my life as a teacher

Items on the questionnaire were formatted with a 4-point Likert scale (4 = strongly agree, 3 = agree, 2 = disagree, and 1 = strongly disagree

Data Collection and Analysis

After obtaining pre-service teachers' agreement to participate, they were given the questionnaires on the final day of their last semester before graduation. They were referred to as group 1. It took around 15 minutes to complete the questionnaire. Completed anonymous questionnaires were placed in the author's box located at the university. The second group, referred to as group 2, were the teachers who graduated the previous year from the faculty of pedagogy and who were teaching elementary science or mathematics. They were contacted at the end of the academic year and they sent their responses through mail.

A 4-point Likert scale was used to format the questionnaire's questions (4 being strongly agree, 3 being agree, 2 being disagree, and 1 being strongly disagree. Since the questionnaire used a 4-point scale, we considered means above 2.5 (the scale's midpoint) to indicate agreement, means below 2.5 to indicate disagreement, and their distances from 2.5 to indicate the strength of their agreement or disagreement.

Results

The data collected in this research was intended to portray pre-service teachers and novice teachers' beliefs of action research. The results are presented in the following section in a way to answer the research questions. Regarding the first variable, LEARN: Did doing action research help them learn about action research? group 1 mean was 3,47 and the mean of group 2 was 3,51. both means reflect an agreement of both groups that the two action research modules helped them to learn how to do action research. The below figure shows in more details the difference between the two groups

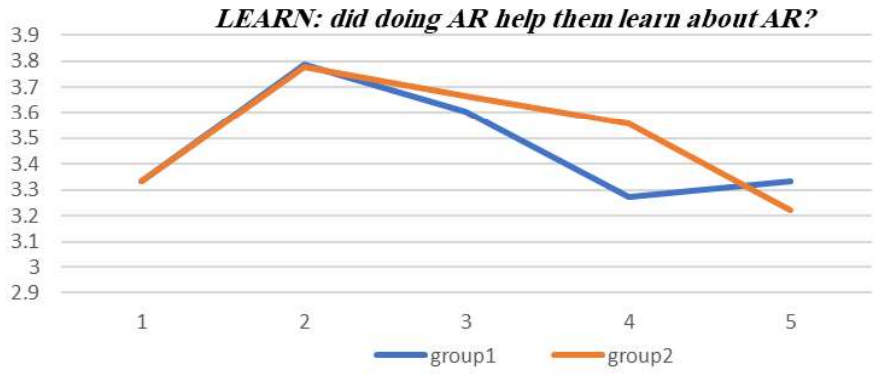

Figure1. means of the five items of the first variable in the two groups

Regarding the second variable, THINK: Did learning action research improve their thinking and problem-solving skills?, group1 mean was 3,472 and group2 mean was 2,66 with an obvious stronger agreement of group 1 that action research modules helped them to be a more critical thinker and better problem solver who understands the complexity of teaching. The figure below shows the means of the five items of the second variable in the two groups

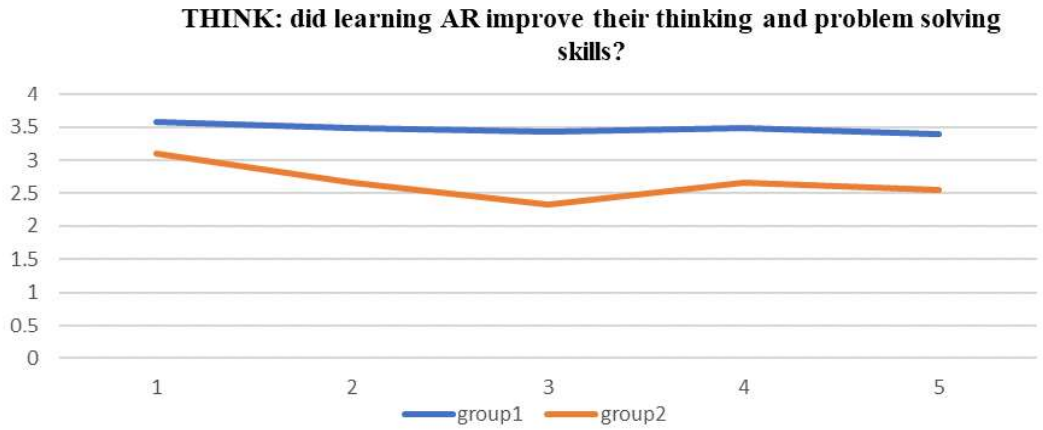

Figure2. means of the five items of the second variable in the two groups

The third variable means, professional growth PROFDN: Did doing action research help them to grow professionally?, were 3,33 for the first group and 2,46 for the second group. Novice teachers did not agree that action research modules helped the to grow professionally. Figure3 shows the difference in the means of the five items of the third variable.

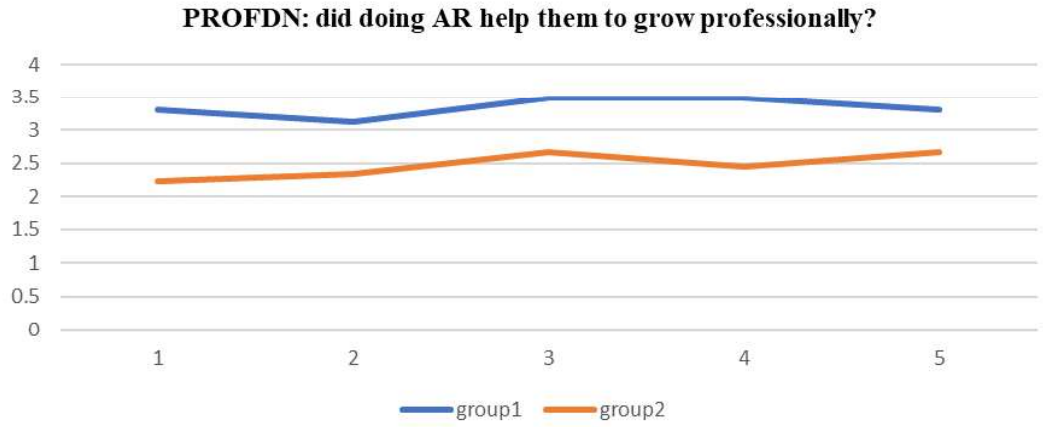

Figure3. means of the five items of the second PROFDN in the two groups

In terms of action research improving group 1 and group 2 self-effectiveness and confidence (SELFEFF: Did doing action research increase their self-efficacy?) group 1 students were more positive, with a mean 3,41 than

were group2 whose mean was 2,63. The below figure show the two groups means of the four items of this variable.

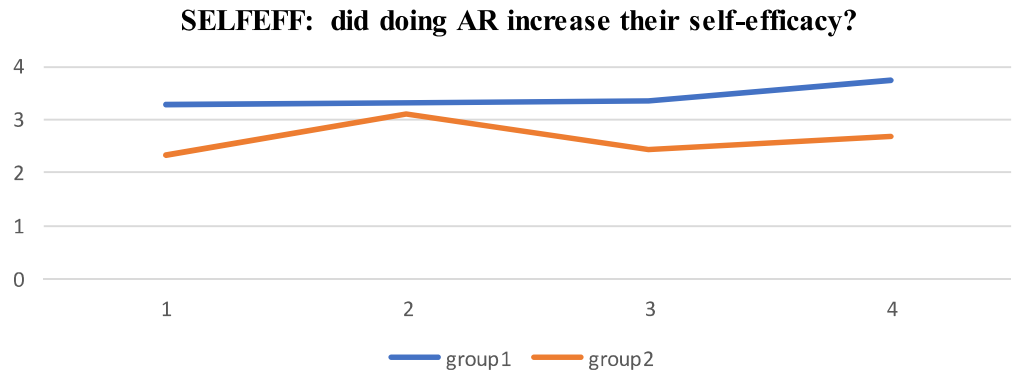

Figure4. means of the four items of the SELFEFF in the two groups

In terms of action research improving effectiveness and helping students reach set standards (OUTEFF: Did doing action research increase their outcome efficacy?), group 1and 2 means were respectively 3,30 and 2,53
In the following figure we notice the means of all the items of the fifth variable for the two groups.

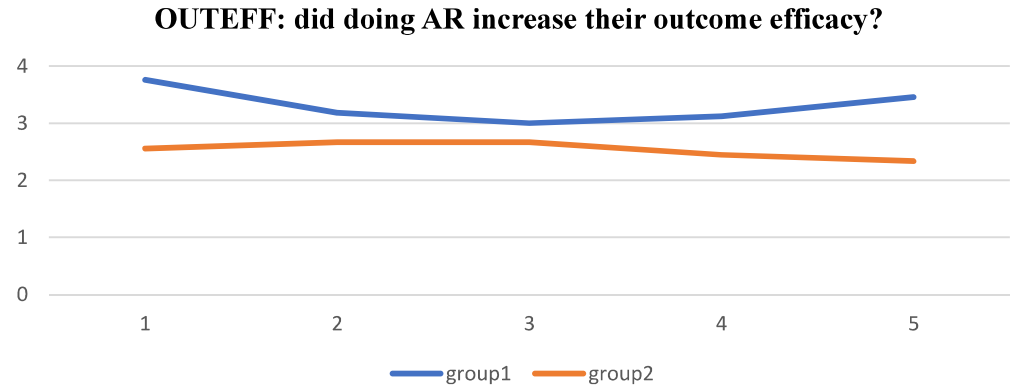

Figure 5. means of the five items of OUTEFF in the two groups

In terms of action research being applicable in both groups future work (FUTURE: Do the students believe action research is applicable to their futures?) both groups agreed that action research is relevant to their as a teacher and could become a regular part of their teaching. Results showed that group1 agreement was stronger with a mean 3,53 compared to group 2 mean 2,73. Details of means difference of all the items of the sixth variable are in Figure 6

To summarize, Figure 1 represents a comparison between the means of the two groups.

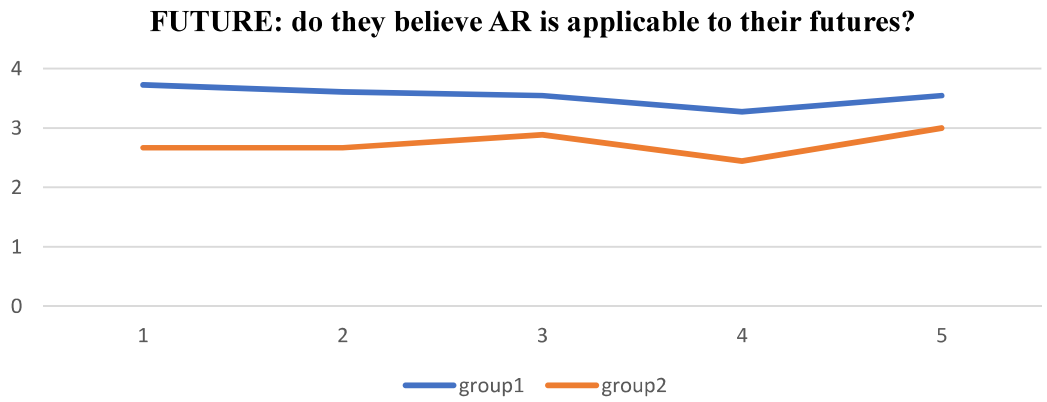

Figure 6. means of the five items of FUTURE in the two groups

The thirty-three pre-service teachers who participated in this study showed a stronger and significant agreement on the effect of action research on their knowledge about action research, problem solving skills, professional development, self-efficacy, students' outcome efficacy, and applicability of action research in the future. The t-value is 13.39086. The p-value is < .00001. The result is significant at $p < .05$.

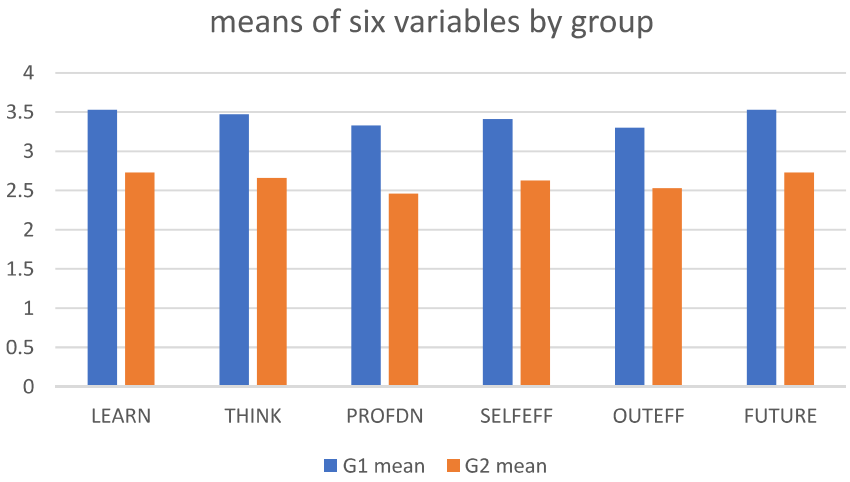

Figure 7. means of the six variables by group

Discussion

Being an instructor working with pre-service teachers, I wanted to survey how our students felt about learning the action research process and what, if any, benefits they thought they gained from it. Despite the fact that the questionnaire appears to have content and face validity in addition to a high degree of reliability, we consider that this study has some limitations and may not be generalizable to other populations. Keeping this in mind, we

provide the following discussion and implications.

One purpose of the study was to reveal what pre-service teachers and novice teachers thought about the action research process as related to their knowledge, professional development, self-efficacy, problem solving skills, students' outcome efficacy, and applicability of action research in the future. It was evident from the data that the pre-service teachers expressed a strong agreement for the all examined domains and an average agreement for novice teachers.

The strongest agreement for both groups of teachers was for the learning process of action research and its applicability in their future teaching with a remarkable difference between the two groups.

We think that the detailed structure of the two modules of action research that the students learn allows us to hypothesize that students who complete our program will be familiar with the action research process because they receive thorough instructions about each component of the action research project.

The results also indicated that taking part in action research led to an increase in self-efficacy. Participants agreed that learning about action research will make them be effective teachers, more self-confident and more empowered also it changed their beliefs about their competence as teachers. According to the Self-Determination Theory, one of the fundamental human psychological needs that fosters effective learning is autonomy. People are intrinsically motivated to perform tasks with a high degree of aspiration and a sense of choice when they feel independent and in control (Ryan & Deci, 2000). Other studies (Henson, 2001; Mulholland & Wallace, 2001; Ross, 1994; Wyatt, 2013) also stated similar results although the context was different.

Since teaching is a complex profession, we believe that delivering knowledge to students is not sufficient to assume that they have become proficient teachers. This is why we tracked a group of our graduates to examine their beliefs about action research after one year of graduation and teaching. There was a significant difference between their results and the results of pre-service teachers. Group 2 participants showed slightly positive agreement on all the variables except profession development that was slightly negative. This is compatible with previous research that indicates that efficacy beliefs of new teachers get lower as teachers traverse along the early paths of their careers (Woolfolk & Hoy, 1990).

Although group 2 participants agreed that action research is applicable in their future teaching, none of them has conducted action research during their first-year teaching. They claimed that the lack of time, the fact that action research is not a part of the requirements, the unfamiliarity with action research within the school staff were obstacles to its implementation. However, they said that occasionally and in certain situations, they followed the steps of action research without writing the research. Meaning that, they identified a problem, they searched for methods to solve it, they tested these methods and analyzed the results. They claim that action research had a positive impact on their teaching practices.

Conclusion

More research is required to examine the value that action research add to the teacher preparation programs. However, the results of this current study suggests that pre-service teachers should be involved in action research as part of their teacher preparation. While the traditional preparation programs' required courses and fieldwork provide candidates who possess the necessary knowledge and abilities, action research can foster growth of the qualities required to be a successful teacher in the classroom.

This study is truly the beginning of on-going inquiry regarding the impact of action research on pre-service teachers' practices and development. The data that were collected will add to the literature and raise future questions to be answered.

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