



RESEARCH ARTICLE

ANALYZING EFFECTIVENESS OF SCIENCE CURRICULUM WITH TEACHING- BASED PRACTICES
AND RESEARCH- BASED PRACTICES IN TERMS OF ESSENTIAL KNOWLEDGE AND SKILLS IN
ELEMENTARY PERIOD IN IRAN

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ABSTRACT

Main purpose of this research is Analyzing effectiveness of science curriculum with teaching- based practices and research- based practices in terms of essential knowledge and skills in elementary period. This research is done with semi- experimental method with a sample containing 50 girl students in elementary third grade in Urmia City that are selected randomly and with multilevel-cluster sampling with the hypothesis of science curriculum with teaching- based practices and research- based practices. For data collecting a post- test was used with validity accepted by experts and 68% reliability and an activity observing check list was used with a validity accepted by experts and 98%reliability. In this research according to comparison of two teaching- based and research-based education methods U Mann- Whitney test was used. Research findings indicated that there are significant differences in knowledge and skills level between students who are educated with teaching- based practices and those that are educated with research- based practices and research hypothesis were accepted in 95% confidence level. As a result, science curriculum in elementary stage is more effective with research- based practices than teaching- based practices.

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INTRODUCTION

Current century is the century of quickness, change, innovation and data generation. Education and training system and especially its programs have key role in this innovation. Despite this one of problems is curriculum planning in educational system of state (Zahed, 2005, P 275). To achieve education and training objectives in view point of Deivi, knowledge, skills and values are some tools that help individual in adapting with new situations and problem solving and skills acquisition becomes possible through school and its curriculum (Naghibzadeh, 2009, P 170). Thus curriculum is defined as formal and informal content, content process, overt and covert educations that through these the learner acquires required knowledge under the guidance of school, gains skills and changes trends, gratitude and values in himself (Maleki, 2004, P17). In science curriculum most of skills, attitudes and ideas that children acquire through activities is such that they can be used in other academic subjects (Rastegar *et al.*, 2008, p6). In teaching- based approach science educating method is transferring a mass of information and scientific facts to the learner and also learning is attaining scientific facts and information that the learner achieves them by practicing and repeating (Ahmadi, 2001, P5). In research- based approach science educating is rather as a dynamic activity and process

namely the steps that scientists pass in the process of facing with uncertain status. In this approach science should be educated at the same way that scientists have produced it.

Mehr Mohammadi (1992) in a paper under the name of "why science teaching should be changed?" by stating scientific features in today's evolving world emphasizes on the changes of science teaching traditional methods and coordinating them with existing needs and says "changing science teaching sight from a traditional sight to this sight that how learning considers learning, is in fact acting as required by future conditions. Despite special status of research- based curriculum and performing practical activities in science effective teaching unfortunately this curriculum isn't run in Iran's schools. And according to result of researches in Third International Mathematics and Science Study (TIMSS) our students are in a low level in skills such as hypothesis making, data analysis and problem solving and applying tools and scientific methods or research in environment (Asgari, 2008, P4). Essential knowledge are a set of principles, rules and information that students acquire in general education periods in some fields such as physics, chemistry, earth sciences, and health and based on these knowledge develop their wisdom in every case and next stages (Rastegar *et al.*, 2008, P7). In science curriculum essential skills make students more capable in taking scientific steps and allow them to easily use new knowledge through applying some skills such as observing, measuring and hypothesis making. Regarding that science

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curriculum objectives are common in all elementary stages and education and training duty is to realize these objectives in elementary period so for ease of research work elementary third grade is selected. Considering above matters this research is intended to analyze effectiveness of science curriculum with teaching- based practices and research- based practices in elementary period and make clear whether science curriculum with research- based practices is more effective than teaching- based practices in elementary period?

METHOD OF RESEARCH

In this method experiment pattern with post- test is used with control group (Delavar, 2005, P132). In stated pattern 50 girl students in elementary third grade in 9 years old age level were selected randomly and replaced in framework of two experiment and control groups. These students were replaced randomly in two experiment and evidence groups with same project pairs from one school located in one zone and all are among students those families have same economic status in normal level and their past years academic records are analyzed. Both groups' teachers have bachelor degree in elementary education with more than 10 years work experience. First independent variable namely teaching- based method was applied in science curriculum of elementary third grade in health science part for 15 days namely 6 educational sessions and then another independent variable namely research- based method was applied for 15 days namely 6 educational sessions. Finally for data collecting about dependent variable (essential knowledge) a post- test was obtained from both groups also observation checklist was used for data collecting about dependent variables (skills, attitudes, and students satisfaction) in both groups. Then post- test scores average differences and checklists were specified in both groups and a comparison was done between scores average differences in both groups and by using statistical methods existing significant differences between under analysis averages and effectiveness independent variable determined. Statistical population volume in this research containing public schools of zones 1 and 2 in Urmia is 1114 girl students that are educating in third grade of elementary schools in academic year (2011- 2012). For information collecting and measuring about research hypothesis post- test and checklist of activities observation were used that formal validity of these tools is accepted by curriculum senior experts and their reliability determined through spss16 software with 68% alpha coefficient for post- test and 98% for checklist of activities observation.

RESULTS

First hypothesis: those students that in third grade in science curriculum have educated with research- based method gained more essential knowledge than students who have educated with teaching- based method. According to schedule 1, considering that significant level of this test is lower than 0.05 so there is significant difference between essential knowledge of students who are educated with teaching- based method and students who are educated with research- based method. According to schedule as essential knowledge's score averages of students who are educated with research- based method

(32.76) is more than essential knowledge of students who are educated with teaching- based method so the hypothesis "those students that in third grade in science curriculum have educated with research- based method gained more essential knowledge than students who have educated with teaching- based method" is accepted with 95% confidence.

Schedule 1. Comparing essential knowledge of research- based and teaching- based curriculum

Significant level	U Mann- Whitney statistical value	Sum of scores	Scores average	U Mann- Whitney test
0.00	131	458	18.24	Teaching- based
		819	32.76	Research- based

Second hypothesis: those students that in third grade in science curriculum have educated with research- based method gained more essential skills than students who have educated with teaching- based method

Schedule 2. Comparing essential skills of research- based and teaching- based curriculum

Significant level	U Mann- Whitney statistical value	Sum of scores	Scores average	U Mann- Whitney test
0.00	42.5	366	14.64	Teaching- based
		909	36.36	Research- based

According to schedule 2, considering that significant level of this test is lower than 0.05 so there is significant difference between essential skills of students who are educated with teaching- based method and students who are educated with research- based method. According to schedule as essential skills' score averages of students who are educated with research- based method (36.36) is more than essential skills of students who are educated with teaching- based method so the hypothesis "those students that in third grade in science curriculum have educated with research- based method gained more essential skills than students who have educated with teaching- based method" is accepted with 95% confidence.

DISCUSSION

Considering that significant level in this hypothesis lower than 0.05 so there is significant difference between essential knowledge of students who are educated with teaching- based method and students who are educated with research- based method. According to this matter that essential knowledge's score averages of students who are educated with research- based method (32.76) is more than essential knowledge of students who are educated with teaching- based method (18.24) so it is concluded that "those students that in third grade in science curriculum have educated with research- based method gained more essential knowledge than students who have educated with teaching- based method". According to analysis that were done in existing research resources no research was found that directly deals with attaining essential knowledge with research- based method and teaching- based method in elementary third grade. But the research results of Nasrabadi and Noroozi (2005) and Taghipoor Sahlabadi (1995) that indirectly are related to this subject are consistent with results

of current research. Considering that significant level in this hypothesis is lower than 0.05 so there is significant difference between skills of students who are educated with teaching-based method and students who are educated with research-based method. According to this matter that essential skills' score averages of students who are educated with research-based method (36.36) is more than essential knowledge of students who are educated with teaching-based method (14.64) so it is concluded that "those students that in third grade in science curriculum have educated with research-based method gained more essential skills than students who have educated with teaching-based method". According to analysis that were done in existing research resources no research was found that directly deals with attaining essential skills with research-based method and teaching-based method in elementary third grade. But the research results of Mehrinejad and Sharifi (2005) and Badri Gargari and Noroozi (2007) that indirectly are related to this subject are consistent with results of current research.

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