




Research Paper

The Effect of Instruction Based on Web-Quest on Achievement Motivation and Learning of Students in Multigrade Classes in Science Course

Afsaneh Hamzehie ¹, Mohsen Bagheri ², Abdollah Bakhshali¹

1. MA of Educational Technology, Department of Education, Faculty of Humanities, Arak University, Arak, Iran
2. Corresponding Author: Department of Education, Faculty of Humanities, Arak University, Arak, Iran 

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Abstract

Aim: This study aimed to investigate the effect of instruction based on Web-Quest on achievement motivation and learning of multigrade students in experimental sciences course through quasi-experimental method. Statistical population for this study included all students from multigrade classes of semi-smart schools of Markazi Province in the 2018-2019 academic year. The participants (n=26) were randomly divided into two groups: an experimental group (n=13) and a control group (n=13). Data were collected using Hermans' Achievement Motivation Questionnaire and a researcher-made achievement test. The findings of inferential analysis of data, based on analysis of covariance (ANCOVA), showed that the instruction based on Web-Quest has a significant effect on achievement motivation and learning of students in multigrade classes in experimental sciences course ($P < 0.001$).

Keywords: *Instruction based on Web-Quest, Achievement motivation, Learning.*

Introduction

One of the challenges facing our country's educational system is the large number of multigrade classes in which one teacher should manage students from different elementary grades in one classroom. As compared with students of ordinary classes, students of multigrade classes have more learning difficulties (Fatahi et al., 2015).

One of the consequences of the emergence of the information technology age is the use of these technologies in order to improve learning processes. In the age of e-learning, students are given Internet resources in addition to their homework through platforms such as Web-Quest, so that they come up with creative solutions while analyzing and combining information (Mohammadi Azizabadi, 2010). Web-Quest-based instruction is based on constructivism perspective. It is a learning platform that uses a connection to the necessary resources from the World Wide Web as well as approved and licensed works to motivate students to answer focused and open-ended questions, to develop students' expertise and encourage them to participate in group processes in order to transfer the recently learned information into more complex learning concepts.

Research has shown that the use of Web-Quest-based instruction has a significant relationship with scholastic performance (Gorji, 2016) and achievement motivation (Ashouri et al., 2014; Mousavi et al., 2021).

An extensive review of literature yielded no studies on the consequences of using this instruction method in multigrade classes in Iran. Therefore, this study aims to investigate the effect of using Web-Quest on achievement motivation and learning of students in multigrade classes.

Methodology

Participants and research design

The quasi-experimental research was conducted with a pre-test post-test design with a control group. The statistical population of this study was all multigrade, semi-smart classes of Markazi Province in the 2018-2019 academic year. Twenty-six male students of the fourth and sixth grades from multigrade classes in Khomein city were selected purposively and divided randomly into two groups of 13 subjects, namely an experimental group and a control group.

Tools

1- Hermans Achievement Motivation Questionnaire: This questionnaire has 10 factors: level of desire, risky behaviors, promotion, responsibility, perseverance, temporal perception, cognitive behavior, foresight, right choice, and successful behavior. After cluster analysis, these factors were presented in the form of 29 incomplete sentences. Students are asked to complete each sentence with one of the four items provided for each incomplete sentence. Hermans (1970) calculated the correlation coefficients of each item using the achievement motivation and reported the

questionnaire as valid. Kamalpour et al. (2006) reported its reliability as Cronbach's alpha of 0.72, which was 0.70 in our study.

2- A researcher-made learning test: The face and content validity and reliability of the test was confirmed by the teacher as well as educational evaluation specialists. Based on the Kuder-Richardson formula, the reliability of the test was reported to be 0.60.

In the present study, students in both experimental and control groups completed the questionnaires as pre-test before they were subjected to training. After confirming that there was no significant difference between the two groups, educational topics were presented in 12 sessions, simultaneously in both groups. The experimental group received instructions based on Web-Quest reproduced from Bernie Dutch (1995) six-fold stages, but the control group received conventional teaching.

Results

Table 1. Analysis of covariance test for achievement motivation by controlling the effect of pre-test

Sources of changes	Sum of squares	Degree of freedom	Mean of squares	F	Significance	Partialities squared
Scattering (pre-test scores)	363.9	1	363.9	13.45	0.001	0.34
Main effect (instruction)	1620.08	1	1620.08	59.9	0.001	0.09
Remaining error	622.1	23	27.05	-	-	-

Table 2. Analysis of covariance test for learning by controlling the effect of pre-test

Sources of changes	Sum of squares	Degree of freedom	Mean of squares	F	Significance	partialities squared
Scattering (pre-test scores)	46.86	1	46.86	9.14	0.01	0.28
Main effect (instruction)	78.47	1	78.47	15.3	0.001	0.18
Remaining error	117.91	23	5.13	-	-	-

After examining the pre-assumptions related to the analysis of covariance test such as normality of data distribution, homogeneity of regression slope, similarity of variances and after realization of the assumptions, the results of

analysis of covariance tests showed that instruction based on Web-Quest had a significant effect on achievement motivation of students as well as their learning.

Discussion and conclusion

The results of the present study revealed a positive and significant effect of the instruction based on Web-Quest and achievement motivation as well as students' learning. The high flexibility of electrical technologies and the Internet facilitate achieving educational goals by improving learning conditions. In multigrade classes, the use of instruction methods based on Web-Quest solves this problem through providing a variety of information resources related to the course. This improves students' learning and paves the way for increasing their achievement motivation.

Future studies may consider the combination of different grades or other courses in multigrade classes. The effect of this method on other variables can also be investigated in future research.

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