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An Investigation of Institute Factors Affecting School Failures in Mathematics from the View Point of Teachers and Students in Zanjan, Iran

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Abstract: The following study is to examine effective factors of institutions in educational failure in Mathematics from the perspective of teachers and students in Zanjan. Research statistical population of teachers and students in secondary schools in Zanjan, sample range and sampling were conducted via random and cluster sampling. The research tool consists of two sets of questionnaires specified for learners and teachers whose validity and reliability were acquired through Cronbach's alpha by Gharebaghi and Nasiriand the calculated Cronbach's alpha for students in Mathematics was 70% and for Math teachers was 70%. To analyze the data Kolmogorov-Smirnov test has been conducted and to compare the variance of the groups, Leven test has been performed. The result of the test showed that according to students and teachers the following affected students' educational failure in Mathematics: difficulty of Mathematics, frequent replacement of teachers, absence or no use of teaching aids while teaching, the allotted for Mathematic sessions, irrelevance of teachers' fields of study to teaching and heavy books of Mathematics. No significance difference was found boys' and girls' opinions, nor was there a meaningful difference between the viewpoints of male and female teachers, their educational certificates or educational records related to institute factors affecting school failure.

Key words: Institute factors, educational failure, mathematics, fields, teachers

INTRODUCTION

If the educational system of a country fails to nurture its human power under-education to acquire necessary skills and complementary proficiencies required in the society and if it fails to play its role in the prosperity of the community, all those skill and proficiencies are in fact wasted. One of the issues with which educational systems are facing is educational failure of the students in different school levels and different courses. Educational failure means descending from level to a lower one and the descent range which is considerable between the potential and actual aptness, is called educational failure. Nowadays, the issue of educational failure is one of the major concerns of the families and education systems. Beside its adverse effects on national economy, it affects mental health of the students.

One of the courses in which educational failure is apparent is Mathematics. The major objectives of Mathematics include creating students' mental ability and intellectual discipline and the main purpose of teaching Mathematics is to develop comprehension of logic; to nurture logical thinking, to devise a method of reasoning and logical thinking and to make mental creations and creativity are the other objectives of Mathematics to be developed in the learners. Mathematics is a way of thinking helping us to be equipped with a strategy by which we can organize, analyze and synthesize data. It is an art described by internal order and consistency. Educational failure in Mathematics includes a decline of students' learning performance in courses from satisfactory to poor level. As a result, comparing and evaluating previous and current academic performances of students is the best way to indicate educational failure.

There are many factors which affect the process of teaching and provide the ground for failure. Understanding all these factors can help us scheduling so that the problem is solved. This failure is partly caused due to problems in education system. The present study examines some of the decisive factors affecting the education failure from the viewpoint of teachers and high school freshmen and it tries to find out which institute factors, more than any other have had an impact on education failure in high school.

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Literature review:

- A research (Westwood, 2006) shows that according to 62% of teachers, the factors associated with students' learning difficulties are because of family background and culture by 14%, curriculum schedule by 8%, teaching style by 2%, parent-student relationship by 4%, school and classroom space by 6% and other factors by 1%
- Educational failure is accordingly a major concern in a number of African countries. African Examination Council has published the results of an investigation on English and Mathematics courses illustrating students' poor performance and approximately 26% of the learners could pass the course successfully. The issue of educational failure can be seen in countries like England where economic and social concerns of the community of England have had impact on improving or deteriorating education of England
- Elhampoor research results showed that the factors affecting educational breakdown caused by teachers and teaching include issues related to family, problems caused by scheduling, issues related to corporal and psychological health of the students and problems caused by educational management
- In his research, Iravani (2011) came to the following conclusions: disregard of students' creativity and presence of teachers with poor performance and high demands of life, together with tuitions and crowded classes affect students' educational failure
- Vasel and Hamidreza (2010)'s research findings showed that factors related to institutions including teachers' negligence, unsolved Math exercises, not teaching all Math materials, teachers' bad manners, teachers' indifference, teachers' misbehavior and his delay in holding the class affect students' academic failure in Mathematics
- In their research, Afsaneh and Nahid (2011) mentioned that teachers' lack of enough and appropriate training or students' inability to acquire basic concepts are major reasons for educational failure
- Tillyer and Hartley (2010) state that race issue is one of the reasons for academic failure; this is to be solved by applying theoretical frameworks and suitable qualitative and quantitative approaches. Each mentioned researches consider one set of factors as the sources of these failures. Adopting a systematic approach, it is possible to conclude that all cited factors affect educational failure in some ways

The present study aims to examine the institute factors in educational failure of School Mathematics from the perspective of high school teachers and students in Zanjan. The research questions of this study are as follows:

- Is there a link between frequent replacement of teachers and students' failure in Mathematics?
- Are teachers' methodology of teaching and students' failure in Mathematics related?
- Is there is a link between teaching aid material and students' failure in Mathematics?
- Is there is a link between time of each instruction and students' failure in Mathematics?
- Is there a link between heaviness of math textbooks and students' failure in Mathematics?
- Is there a link between teachers' field of study and students' failure in Mathematics?
- Are exam conditions and assessment in Mathematics related to students' failure?

MATERIALS AND METHODS

The following study adopts descriptive survey research method. In this research two questionnaires are used as major materials to estimate and collect data. The first set of questionnaires, consisting of 24 questions based on Likert scale, is designed for high school freshmen and the other set is designed for Math teachers, consisting of 22 questions with respect mentioned variables (heaviness of the book, content of the book, time of instruction, teaching aids, teaching methodology, field of study, teachers' aptness, exam conditions and evaluation). This questionnaire is also set according to Likert scale including 6 spectra.

Validity and reliability of the research is acquired through Cronbach's alpha by Gharebaghi and Nasiri (1384). The estimated Cronbach's alpha for Math students was 70% and for math teachers was 70%.

Statistical society for this research included 3230 high school freshmen and 124 Math teachers in Zanjan. The sample size of the research included 312 students and 71 teachers. The method of was random and cluster sampling.

Statistical methods adopted in this research: The results in this study were obtained in two levels. The first level included descriptive statistics such as the mean and standard deviation and in the second level the inferential statistics to compare general scores in the questionnaire in a number of grouping variable to compare research data distribution with standard distribution was adopted.

To compare group variances, Lovin test was conducted. To compare the overall score in the questionnaire in gender variable independent t-test was done. To compare the overall score of the questionnaire in different academic levels of the teachers, the inter-group variance analysis was conducted. At the end, Pearson Correlation Coefficient was used to examine correlation of overall scores in the questionnaire with teachers work experience (Table 1).

In the first research question, teachers and students believe that frequent replacement of teachers has something to do with their educational failure and this considerably hinders students' learning in Mathematics.

In the second research question, teachers adopted role playing approach less and they use teacher-centered approach more considerably in teaching Math. In spite of this, high school teachers believe that students' feedback can positively affect students' learning to a large degree and, while teaching Math, making use of what students already know can considerably influence students learning for better.

High school students also believe students' weekly questions have helped them learn better and pay attention to their teachers while they are teaching Mathematics.

In the third question of the research, the teachers and the students have reported that they have limited access to aid materials in Mathematics and Math teachers use teaching aids very rarely.

In the fourth question of the research, both teachers and students admit that the allotted time for a Math session is very short and the current time of each class is too limited to teach the heavy Math books. As a result of inadequate time of Math classes during the week, there is not sufficient time to go through all chapters of the book; accordingly, teachers are very positive to increase the time of Math classes and students believe by expanding the time of each session, they will learn Math considerably more.

In the fifth question of the research, high school teachers have reported that the extent of Math book has a meager connection to the annual programs and both teachers and the students believe the Math books are relatively heavy.

In the sixth research question, according to high school teachers and students, teachers' field of study has a lot to do with how they teach and those teachers who have studied Math as their major are more successful in teaching Mathematics than those whose major is irrelevant.

In the seventh research question, high school teachers have reported that there are a variety of question in the Math final exams and testing plan for final exams seems to be relatively appropriate. Similarly, students admitted that final exam questions are relatively highly various and different questions are posed from different chapters of the book. These learners, accordingly, were rather greatly satisfied with testing in final math exams.

To compare the overall score of the questionnaire between both male and female teachers as members if the sample group, we conducted independent t-test. It should be noted that before this test was performed, to ensure the normality of the overall score of the questionnaire, Kolmogorov-Smirnov test was taken in each level of dependent variable. This test proved the normality of distribution in each level of dependent variable in respect to gender ($p>0.05$).

Table 2 illustrates the result of the independent t-test to compare the overall score of the questionnaire between both male and female teachers. According to the data presented in this table, it is clear that group variances are not significantly different; therefore, to use the result of the t-test, we can use the row which has supposed the homogeneity of variances. In this row, it is clear from the results that the overall score of female teachers in this study is meaningfully higher than that of male teachers.

Out of 71 teachers who were members in the sample group taking part in this research, 3 people (4.2%) had AA diploma, 51 (71.8) had a bachelor's degree, 15 (21.1) had Masters. To compare, the overall score of the questionnaire between teachers with different degrees, the inter-group variance analysis test was used.

Table 1: Statistical analysis of effective institute factors in Mathematics failure from the viewpoint of teachers and students

Students' view		Teachers' view		
SD	Mean	SD	Mean	Effective institute factors
800/1	068/4	524/1	000/5	Teachers' replacement
695/1	792/2	226/1	338/2	Use of teaching aids
443/1	650/3	223/1	157/3	Time of instruction
907/0	801/4	635/1	362/4	Heaviness of textbooks
406/1	425/4	26 0.1	13.5	Relevance of teachers' field of study
558/1	833/3	1/473	3/914	Assessment

Table 2: The result of independent t-test to compare overall scores of the questionnaire between male and female teachers

Independent t-test results			Leven test to check the homogeneity of variances		
Sig.	df	t-values	Sig.	F-value	Independent t-test
027/0	69	266/2	0/346	835/0	With the assumption of homogeneity of variances
017/0	575/42	481/2	-	-	Without the assumption of homogeneity of variances

Table 3: Test of comparing the overall scores in the questionnaire among teachers with different academic degrees

Statistics test	Sum of squares	Degree of freedom	Mean square	Coefficient F	Significance	Practical significant	Statistical power
Groups (3 groups)	58/453	2	29/226	0.270	0.764	0.008	0.091

Table 4: The result of independent t-test to compare the overall scores in the questionnaire among male and female students

Independent t-test results			Leven test to check the homogeneity of variances		
Sig.	df	t-values	Sig.	F-value	Independent t-test
0.129	309.000	1.523	0.207	1.600	Assuming homogeneity of variances
0.096	115.659	1.676	-	-	Without the assumption of homogeneity of variances

Correspondingly, before running this test, to ensure the homogeneity of variances in groups, Leven test was performed. This test revealed the homogeneity of variances ($F = 1.054$; $df1 = 2$; $df2 = 66$; Sig. = 0.354).

Table 3 is the test of comparing overall scores in questionnaires among teachers holding different academic levels. The table illustrates that the average score of the questionnaire among teachers with different degrees does no vary significantly as $p>0.05$.

Table 4 shows the independent t-test comparing the overall score in the questionnaire among male and female students. According to the given data, it is clear in this table that group variances are not different from each other significantly, so to use the results of the t-test, we can use the row overlooking the assumption of homogeneity of variances. In this row, it is clear from the results that the overall scores of female students do not differ significantly from those of the male students as $p>0.05$.

To sum up, the complexity of Math books, the frequent replacement of teachers, shortage of teaching aids or not using them while teaching, the allotted time for teaching math classes, irrelevance of teachers' field of study to their field of instruction and the heaviness of math books are among the major factors affecting students' educational failure and both teachers and the students agree on it. In this study, we merely investigated institute causes from the viewpoint of high school freshmen and their teachers. The findings of this research correspond with those of Alaie.

CONCLUSION

In this research, from the perspective of students the decisive factors in educational failure include the limited time of teaching, the heaviness of textbooks, teachers' methodology, lack of teaching aid and teachers' lack of expertise and from the view point of the teachers, teaching methodology and teachers' expertise have affected educational failure. The findings of this research are in line with those of Lakhue. Using text books has caused a reduction in educational failure in students. This research also shows that there is not a significance difference between the point of view of male and female teachers and neither is there a meaningful difference in their university degree and their academic records in relation to the decisive factors in education failure in Mathematics. Also, according to this research, the difference between female and male students' points of view in relation to educational failure is not significant.

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RECOMMENDATIONS

The officials and educational program designers can revise the heaviness of Math books to reduce the decline and educational failure. Accordingly, they can have some changes in the education content of math books and provide math teachers with teaching aids. Moreover, training the teachers and presenting the latest methodologies, they can help the teachers with using teaching aids. This training can be done during teachers' service period. It is also needed to increase the time allotted to Mathematics and avoid replacing teachers frequently. One of the major factors in educational failure, mentioned by both the teachers and students, is irrelevance of teachers' university field of study to mathematics as a result of which officials and educational directors are to recruit those who are qualified and expert enough to teach Mathematics. Eliminating and reducing many of these barriers, we can improve the quality of education and prevent educational failure which annually destroys human and financial resources.

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