
Comparison of science performance among urban, suburban and rural areas' Iranian eighth grades students

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ABSTRACT: The purpose of this study is to find the comparison of science performance among urban, suburban and rural areas' Iranian eighth grades students. The participants in the study were 680 guidance school students, (317 male and 363 female, in the age 14 years old) at Tehran and Shahriar City, the province of Tehran, Iran. The research design was an ex-post facto and tested the alternative hypothesis. The students' science performance which measured by the report school test was used to assess science performance. Descriptive statistics, and to compare urban, suburban and rural areas' students in science performance ANOVA was used. The result demonstrated that, there is significant difference between.

Keywords: science performance, geographical location, Iranian students.

INTRODUCTION

Students who believe in their abilities tend to perform successfully (Bandura, 1993). One of the most important issues of development, education and academic achievement is to consider the psychological dimensions in the curriculum. One of these dimensions is *self-efficacy* (first introduced in Bandura and Adams, 1977), where it is the belief, whether accurate or not, that one has the power to produce an effect upon something. For example, a person with high self-efficacy may engage in a more health-related activity when an illness occurs, whereas a person with low self-efficacy would harbor feelings of hopelessness (Sue, Sue, and Sue, 1986), and following, science self-efficacy is the belief in one's own capability to do science, in terms of organizing and executing the skills and knowledge needed to manage science content and processes (Miller, 2006). Self-concept refers to the global understanding a sentient being has of him or herself. It presupposes, but can be distinguished from self-consciousness, which is simply an awareness of one's self. It is also more general than self-esteem, which is the purely evaluative element of the self-concept (Fleming and Courtney, 1984), and science self-concept is a term used to describe one's perception of self in relation to achievement in science (Byrne and Shavelson, 1987) and one's confidence in science (Campbell, 1992). Self-esteem can generally be defined as the set of attitudes and beliefs that a person bears in relation to the outside world, which includes expectations of success/failure, the effort required for possible success and the reaction to possible failure (Coopersmith, 1967, 1981). Spielberger, (1983) state that anxiety is a psychobiological process involving stressors that evoke perceptions of threat, which culminate in an unpleasant emotional reaction. As its name would suggest, science anxiety in students is a debilitating fear of learning science— but with the emotion processed on a cognitive level, and lastly, science anxiety manifests itself primarily during examinations, but is distinct from an apprehension towards examinations in general, since students who exhibit science anxiety often react normally in their non-science subjects (Mallow, 1994). Therefore, Ismail and Awang (2008) state that in Malaysia, there is a variation in the digital divide between urban and rural schools, and between developed and less developed states—but no such situation exists in Singapore. Furthermore, Mahyuddin, (2006) state that students from urban areas in Malaysia have a higher degree of self-efficacy in the English language compared to those from rural areas ($t = -3.9$; $X = 36.4$; $SD = 4.6$; $p = 0.000$). This shows that geographical location is a significant determiner in the learning ability of students. Azimi (1996) asserts that the examination of the spatial distribution of land uses reveals a higher degree of concentration and

significant change in the geographical location of urban activities within the city. In terms of geographical location, there has been a strong tendency for shifting the industrial activities, public organizations, government and some commercial (especially services) activities from the city Centre to the peripheries. Howie, (2006) in their research have shown a strong relationship with location, socioeconomic status, self-concept of the student (about having difficulty with mathematics) and the importance of mathematics (according to mother, friends and the student). Fathi (2006) in his study indicated that there is significant difference between urban and rural teachers and the total self-efficacy scores. Anderson and Brown (1997) revealed that there is the relationship between career decision making self-efficacy and career development attitude appeared to be a function of both rural and urban settings. Meanwhile, Qi and Zhang, (2010) in their study stated that the scores of the students from rural areas are significantly higher than those who come from cities.

Based on to above mentioned and importance of the factors in academic achievement, this study generalized this information to specifically Iranian eighth grade lower secondary school students. Some studies obtained similar results and the other studies were showed different results. This study determined whether, the geographical location can influence on general self-concept, science self-concept, self-efficacy, science self-efficacy, self-esteem, anxiety, and science anxiety among Iranian eighth grade lower secondary school students.

2. Objectives

To investigate the differences of geographical location in the students' psychological factors among Iranian eight grade students.

MATERIALS AND METHODS

3.1. Sample

The sample for this study is selected from the total population of Eighth Grade students in lower secondary schools from large community schools in Tehran city as urban and Shahriar as suburban and the rural areas of Shahriar, during the academic year of 2010/2011. For the present study, stratified sampling was used, and therefore the sample of this study involves two centrally-located school districts among 21 districts of Tehran with 120 male and 160 female students, and also Shahriar lower secondary schools with 202 male and 198 female students.

3.2. Procedure

Data were collected by means of structured questionnaires and by taking class as a unit. Based on verbal agreements of the training lecturers and participants, the questionnaires forms were distributed to the 680 guidance school students. Participants were asked to complete the questionnaires simultaneously at the start of a core lecture and return them to their lecturer on the spot. All completed questionnaires were passed on to the researchers. All participants were informed that the participation was voluntary and anonymous based.

3.3. Measures

All participants responded to Iranian translation of the instruments in this study which is listed below. They were translated into Persian and then the questionnaires were verified by the panel of lecturers and researchers to check the format, arrangement, appropriateness of the content and the language used in the instruments (Asghar-Nezhad, Karimi Klwadapanahi, and HeydariI, 2004; Fathi-Ashtiani, Ejei, Khodapanahi, and Tarkhorani, 2007; Fathi, 2006; Hayati and Ostadian, 2008; Khodarahimi, 2010).

2.3.1. Self-concept Attribute Attitude Scale (SaaS)

The SaaS instrument was developed by Campbell (1991). The response format is a five-point Likert scale. The first version of SaaS was developed by factor analyzing the data from 1300 high achieving high school students, with exploratory and confirmatory factor analyses determined for each sample. These factors were extracted by using the Principal Component Analyses with varimax iterations. The three factors that were produced from the factor analyses are math self-concept, science self-concept, and general self-concept. In the present study, only general self-concept and science self-concept were used which include 6 and 14 items relating to general self-concept, For example, I take a positive attitude toward myself and science self-concept, for example, I have a lot of self-concept in science. A major contribution to the validity of the self-concept scales comes from the extensive factor analyses used in the development of the SaaS. Most items had factor loadings in excess of .60 (Campbell, 1991). Alpha reliability values were calculated for general self-concept of 0.85 and a science self-concept of 0.89 were used, (Carmines and Zeller, 1979). In this study, the reliability coefficient for each subscale ranged between 0.87 for science self-concept and 0.61 for general self-concept.

2.3.2. State-Trait Anxiety Inventory (STAI)

The STAI developed by Spielberger (1970) contains self-report scales for measuring both state and trait anxiety. The S-Anxiety Scale (STAI Form Y-1) used in this study consists of twenty statements designed to evaluate how a respondent feels at that particular time, for example, I feel calm in science. The T-anxiety (STAI Form Y-2) refers to the relatively stable-individual differences in anxiety proneness, i.e., the tendency of an individual to perceive stressful situations as a threat, and to then respond to these situations with a heightened S-anxiety reaction (O'Neil and Spielberger, 1979) and used in this study consists of twenty statements, for example, I feel pleasant. The S-Anxiety Scale required the respondent to determine how he or she feels at a particular moment in time. Evidence bearing on the construct validity of the state scales was derived from a sample of 977 undergraduate students at Florida State University with a median r of .73 for females and .60 for males (Spielberger, 1983). Caldwell (1988) obtained an alpha coefficient of 0.94 for the S-Anxiety. T-Anxiety scores (Dreger, 1978; Katkin, 1978). In this study, the reliability coefficient for each subscale ranged between 0.88 for S-Anxiety and 0.85 for T-Anxiety.

2.3.3. Coopersmith Self-Esteem Inventory (CSEI)

The CSEI measures general self-esteem. Coopersmith's (1967) own inductive work examined CSEI scores as they related to other personality constructs. The present study has used the Adult Form of the CSEI, which is adapted from the School Short Form for children. The CSEI-A is a 58-item questionnaire completed by respondents by way of answering a five-point Likert scale. As Coopersmith (1967) claims, the questionnaire is designed to measure "the evaluation a person makes and customarily maintains with regard to him or herself". The CSEI has been the subject of many validity research studies (Taylor and Reitz, 1968). For example, I spend a lot of time daydreaming. A study by Kokenes (1978) confirmed the construct validity of the subscales used to measure of self-esteem that were proposed by Coopersmith. Test retest reliability for the CSEI was originally reported by Coopersmith to be 0.88 for a sample of 50 children in grade V and 0.70 for a sample of 56 children, 12 years old (Azar and Vasudeva, 2006). In this study, the Cronbach's coefficient alpha for CSEI was 0.86.

2.3.4. General Self-Efficacy (GSE)

General Self-Efficacy (GSE) developed by Sherer, (1982) is designed to gauge self-efficacy in clinical, educational, and organizational settings (Chen, Gully, and Eden, 2001). The measure contains items assessing GSE and social self-efficacy, but only GSE items be considered in the present study. As Sherer, (1982) claim, these items tap a "general set of expectations that the individual carries into new situations." The GSE Scale contains 17-items, for example, When I make plans, I am certain I can make them, while the response format is a five-point Likert scale. The sum of item scores reflects general self-efficacy, meaning that the higher the total score, the more self-efficacious the respondent. Convergent validity has been established in studies comparing the general self-efficacy scale and similar clinical measures (Sherer, 1982). Reliability, measured with Chronbach's alpha, was found to be .86 for General Self- Efficacy (Sherer, 1982). In this study, the Cronbach's coefficient alpha for CSE was 0.79.

2.3.5. Science Self-Efficacy Questionnaire (SSEQ);

The SSEQ was developed by Smist (1993) to assess students' self-efficacy in science by measuring beliefs about competence in school science tasks (Smist, 1993). The SSEQ-A is a 27-item questionnaire completed by respondents by way of answering a five-point Likert scale. The SSEQ was developed to assess students' self-efficacy in science by measuring students' own beliefs about their competence to perform or complete science-related tasks. This questionnaire includes physics, chemistry, biology, and laboratory. The researcher has used science totally. In the present study, only science self-efficacy was included which includes nine items related to science, for example, I can use a computer in science class. In this study, the Cronbach's coefficient alpha for SSEQ was 0.70.

RESULTS AND DISCUSSION

To carry out the main objective of the present study, the obtained data were subjected to a number of statistical analyses by using statistical package for social sciences (SPSS 17.0). Besides, descriptive statistics, MANOVA were also used in this study.

5.1. Descriptive statistics

Table 1 presents the mean and standard deviations of all the observed variables. Descriptive statistics is worked out to know the pattern of score distribution. A perusal of table 1 reveals that the mean and standard deviation on science self-concept, general self-concept, science anxiety, anxiety, self-esteem, self-efficacy, science self-efficacy for urban students are 47.58 and 10.44, 59.71 and 9.35, 21.10 and 3.85, 44. 53 and 10.97, 45.08 and 10.01, 190.78 and 23.3, 25.89 and 6.38, respectively, the mean and standard deviation on science self-concept, general self-concept, science anxiety, anxiety, self-esteem, self-efficacy, science self-efficacy for suburban students 48.59 and 9.89, 57.92 and 10.79, 20.36 and 4.7, 43.51 and 11.83, 45.8 and 11.09, 187,51 and 26.67, 30.11 and 6.48, respectively and, the mean and standard deviation on science self-concept, general self-concept, science

anxiety, anxiety, self-esteem, self-efficacy, science self-efficacy for rural students 46.89 and 9.53, 57.52 and 9.54, 20.98 and 4.44, 44.31 and 9.76, 45.22 and 10.17, 186.75 and 26.4, 30.5 and 5.51, respectively. (See table 1)

5.2. MANOVA

To compare urban, suburban and rural areas' students in different variables, MANOVA was used. First, the important assumptions for the method such as, outlier and homogeneity of variance-covariance matrices are investigated. The results of normality show that science self-concept in urban and suburban groups have a non-normal distribution. Additionally, the self-concept has a non-normal distribution in urban and suburban groups. The anxiety has a non-normal distribution in urban group, only. All variables have a normal distribution in urban group. Meanwhile, the results of Shapiro-Wilk show that all variables have a normal distribution in all the groups. Since, the results of statistics of skewness and kurtosis show that all values of this statistics are common range ± 1 . Therefore, the assumption of the normality can be accepted (Meyers et al., 2003). Besides, based on the results of Mahalanobis distances, there was no multivariate outlier data. Based on the results of Box's test the amounts of Multivariate Wilk's lambda were reported. These results show that there are significant difference in dependent variables between groups ($F_{(14, 1342)} = 8.539, P < 0.0001$).

Based on the results of Box's test the amounts multivariate statistically Pillai's trace test instead of the amounts Multivariate Wilk's lambda was reported. These results show that there are significant differences in dependent variables between groups ($p < 0.05$).

Finally, based on the results of table 3, the investigation of groups difference in each variable shows that there is a significant difference between groups in science self-efficacy only ($p < 0.001$) and there is no significant difference between the other variables ($p > 0.05$).

6. Discussion

Based on the results of Post Hoc Scheffe (table 2) indicates there are significant differences between mean urban and mean suburban in science self-efficacy. Also, there is a significant difference between means of urban and rural. As, we can claim mean of suburban is more than mean of urban. Also, the mean of rural is more than urban. Similarly, Fathi (2006) in his study indicated there is a significant difference between urban and rural teachers and the total self-efficacy scores. Mahyuddin, (2006) states that students from urban areas in Malaysia have a higher degree of self-efficacy compared to those from rural areas ($t = -3.9; X = 36.4; SD = 4.6; p = 0.000$). Anderson and Brown (1997) revealed that, there is a relationship between career decision making self-efficacy and career development attitude appeared to be a function of both rural and urban settings. Meanwhile, Qi and Zhang have stated that, the scores of the students from rural areas are significantly higher than those who come from cities

CONCLUSION

The results of the investigation of multi-variable variance have statistically indicated that the geographical districts are significantly different just in self-efficacy variable but in other variables there is no difference between them. The comparison of mean scores indicated that mean of rural areas and suburbs have no difference while the mean of both of them is larger than that of urban districts. According to this, it can be declared that science self-efficacy of the students who live in urban districts is less than those who live in suburbs or rural districts. Perhaps, this at least can be justified in Iranian cultural structure. In Iran, the educational style is somehow different in rural and urban districts. In rural districts, the student learns the educational materials with reliance on his/her own abilities or the teacher's instruction in other words s/he is dependent on her/his own abilities, while in the urban districts in addition to these, the existence of various facilities has caused the fact that the students of the urban districts have less reliance on their own abilities and they rely more on the private classes and teachers and consider them as the main factor to their own success. This may cause their science self-efficacy to decrease.

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