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The Effectiveness of Instruction Based on Gardner's Theory of Multiple Intelligences (TMI) on Career Self-Efficacy of Deaf Students

Saeed Rahimi-Pordanjani, PhD
Department of Psychology
Shahrekord, Branch, Islamic Azad University, Shahrekord, Iran
sr.psycho21@gmail.com

Bagher Ghobari-Bonab, PhD
Department of The University of Tehran, Iran

Mansooreh Fazilzti, PhD
Department of Psychology
Tehran Branch Center, Islamic Azad University, Tehran

Mohammad Ghasemi Pirbaloti, PhD
Assistant professor of Islamic Azad University, Shahrekord,Iran

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This study aimed to investigate the effects of instruction based on Gardner's theory of multiple intelligences on deaf students' career self-efficacy in vocational schools. In order to achieve this goal, 60 male and female students from deaf vocational schools in Isfahan, Iran, were randomly selected and divided into experimental and control groups with 30 students in each group (15 males and 15 females). This study used a quasi-experimental design with pretest-posttest and control group. Career self-efficacy questionnaire (Betz, 2000) and Tirri, K., & Nokelainen (2008) was administered during pretest, posttest and follow-up stages. The instruction lasted about three weeks, two sessions per week with each session lasting two hours for the experimental group. On the other hand, the control group did not receive any instruction other than their conventional instruction. Data analysis, using analysis of repeated measures design, showed that the tow groups were significantly different in terms of career self-efficacy. The obtained results indicated that instruction based on Gardner's theory of multiple intelligences significantly enhanced the career self-efficacy of deaf students. Theoretical implications and practical applications of this research are discussed further.

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Career self-efficacy is considered as one of the important and crucial issues for students with special needs, especially for deaf students who start their real social life after leaving school. These students commonly lack a thorough understanding of their career objectives and capabilities, and have little awareness of career selection (Punch, Creed & Hyde, 2006). Therefore, a career instruction program for special needs follows a life-oriented plan which includes career awareness, career exploration, and career preparation (Dastjerd & ShafieAbadi, 2014). Considering career self-efficacy, deaf and hard of hearing students receive less parental support than their normal counterparts (Michael, Most & Cinamon, 2013).

In addressing student's career decisions, personal abilities should be taken into account. The results of studies by (Hartman & Betz, 2007) and (Ataabadi, Yousefi & Moradi, 2013) have demonstrated that the most important factor in selecting a job for students in vocational schools is their personal capabilities. Due to the traditional approach in today's educational system, career guidance of high school students has not led to much success. Therefore, applying new methods of teaching and career conduct can pave the way for students' career development.

With the emergence of cognitive psychology, students are no longer considered as mere recipients of information, but are creators of their own cognitive structures (Sharifi, 2005). Thus, this approach must be used as a positive step toward understanding cognitive abilities of students, especially deaf individuals, and applying them in their career self-efficacy. The reason is that planning career decision for special needs' students

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leads to their proper transition from the instructional environment to career environment and future life experiences (Nekah & Mohsen, 2015). Here, it seems that applying methods of career conduct and decision making for deaf students might resolve one of their career efficacy problems.

One of the modern cognitive insights is the theory of multiple intelligences proposed by (Gardner, 1984). This theory considers individual differences and self-awareness in cognitive aspects where education based on this theory can present a proper model for adolescents and youth in their career exploration period in terms of both their career decision-making and conduct (Shearer, 2009). Nevertheless, due to the paucity of the studies conducted on deaf students, it seems that this model can be used to improve these students' self-efficacy conditions in order to help them in identifying skills, responsible individual actions, and making proper career decisions.

Different studies (Chan, 2003), (Taylor, 2007), (Wu, 2004), (Shaffiei & Aziz, 2012) and Shearer (2009) have indicated the influence of the theory of multiple intelligences on self-efficacy of students and teachers. Shearer and Taylor found that education and intervention based on Gardner's theory can enhance self-efficacy of adolescent and young students. Also, Chan (2003) observed that application of interpersonal and linguistic intelligence by teachers can boost their self-efficacy and improve their teaching methods.

Gardner (1984) believed that we must observe and analyze intellectual abilities and behavior, instead of measuring them as they were measured by other scholars (Galton, 1883); (Binet & Simon, 1905). (Gardner, 2011) stated that intelligence is influenced by individual differences. He also believes that intelligence cannot be totally measured, rather it is measured in

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defined parts. He classified human cognitive abilities into seven and then eight as well as nine parts including1) Verbal linguistic intelligence, 2) logical mathematical intelligence, 3) spatial intelligence, 4) musical intelligence, 5) kinesthetic intelligence, 6) interpersonal intelligence, 7) intrapersonal intelligence, 8) naturalistic intelligence, and 9) existential intelligence (Armstrong, 2009).

Note that these cognitive abilities are not measured in the traditional way which only included verbal and mathematical abilities (Sharifi, 2005). Rather, it is done through dynamic assessment ((Shokoohi-Yekta & Parand, 2006). Gardner emphasized different abilities of humans and emergence of these abilities in different cultures in order to create a new way in its understanding and application in the education process and career decision-making. Gardner's theory highlights people's integrative needs in career conduct and guidance. The results of Shearer's research suggested that the use of an intervention program based on Gardner's view can help high school students know different domains of intelligence and their relationship with different kinds of careers thereby improving their decision-making method and career self-efficacy.

Armstrong (2009) believed that Gardner's theory can be effective in developing a wide range of ways leading to selecting a proper job and career in life. As mentioned earlier, Gardner's theory could open a new path for increasing students' self-awareness and self-efficacy. Using the concept of self-efficacy, especially for deaf students (Absalan, Pirasteh, Dashti Khavidaki, Nasr Esfahani & Nilforoush, 2013) as well as (Engel-Yeger & Weissman, 2009) stated that the issue the self-efficacy and its assessment for students with hearing impairment are significantly different from those of normal people. Further, according to the

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study conducted by (Hassanzadeh, Mohseni, Afrouz & Hejazi, 2007), fewer verbal and linguistic assignments must be used for cognitive assessment of deaf students. So, it seems that implementing instruction based on Gardner's view, despite its limitations for deaf students, could culminate in good results.

(Bandura, 1990; Bandura & Locke, 2003) considered self-efficacy as individual perceptions of self-confidence in doing homework. For (Visser, Ashton & Vernon, 2006), self-efficacy means people's judgment about their ability to organize and be prepared for performing a special activity or behavior in future. (Yingchun, 2010) studied the relationship between self-efficacy and well-being of deaf students in high school. They concluded that deaf students with high self-efficacy had positive emotions and their life satisfaction was higher. Further, (Von Thomas, 2014) stated that free education fosters self-efficacy of deaf and hard of hearing students. similarly, (Zeza & Stavrou, 2015) stressed the self-efficacy differences in normal and deaf students.

Studies (e.g. Taylor, 2007; (Shaffiei & Aziz, 2012); (Özdener & Özçoban, 2004) which have been carried out on the importance of Gardner's theory in career decision-making and the necessity of considering career self-efficacy in students have demonstrated the positive impact of this theory on students' self-efficacy. This has led to the improvement of self-esteem, desirable social behaviors, positive attitude towards working, desirable working habits, and proper communication skills (Dastjerd & Shafieabadi, 2014). It is necessary to mention that using Gardner theory of multiple intelligence in career choice leads adaptation of each student ability to characteristics and demands of a job or career. This adaptation leads enhanced self-efficacy and psychological well-being.

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No studies have already been conducted on the effect of education based on the theory of multiple intelligences in the context of Iranian deaf students. So, the present study sought to fill this gap.

Here, the researcher intends to examine the Instruction based on multiple intelligences theory on the Career self-efficacy of deaf students.

Method

The present research had a quasi-experimental non-equivalent control group design. The statistical population consisted of all deaf students in special vocational school centers in the city of Isfahan, Iran. Because of the availability of the total members of deaf students' population, the researcher used stratified random sampling. First, the list of all deaf students of vocational schools was taken from the Isfahan Special Education Office. In the first stage, sampling was performed considering gender and grade level using stratified random sampling. Here, a list of the ten classes of first, second and third grades in three disciplines of computer, sewing, and designing for girls and electrical engineering, computer, and carpentry for boys was prepared. In the second stage, considering the proportion of the number of students in each class, the participants were randomly selected and divided into experimental and control groups. Here, the proportion of boys and girls was 8 to 10. Then, 3 students were randomly selected from each class and were randomly divided into experimental and control groups. In general, out of 174 deaf students (88 boys and 86 girls) in high schools of Isfahan, 60 students were randomly selected considering educational grade and gender. Next, they were randomly divided into two groups with 30 students (15 females and 15 males) as experimental and

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control groups. Out of 174 students, 60 students (30 males, and 30 female) were selected to be recruited in the experiment. These sixty students were divided randomly and assigned to experimental and control groups. Selection of these students was based on their consent to participate (from each grade 5 male and 5 female students were selected). Therefore, we had 30 individuals (15 males, and 15 female) in the experimental group and the same value existed in the control group. The criteria for including subjects in experimental and control group were student's interests to participate voluntarily and not having any mental, physical, emotional, or behavioral disabilities.

Instruments

The following questionnaires were used for the purpose of data collection.

Tirri, K., & Nokelainen (2008) Multiple Intelligences Questionnaire

Kirrsi et al. (2002, 2003) administered the first version of this questionnaire on university students in Finland. The original form of this questionnaire had 90 items, which was then reduced to 35. Items of this instrument were graded on a Likert Scale from completely agree as score 5 to completely disagree as score 1. The items were fitted based on a preliminary study in 9 domains of intelligence, each of which was arranged considering deaf students' cultural and cognitive abilities. The reliability of this questionnaire, using Cronbach's Alpha, was reported as .64 for linguistic intelligence, .76 for logical mathematical intelligence, .93 for musical intelligence, .73 of spatial intelligence, .74 for kinesthetic intelligence, .82 of interpersonal intelligence, and .70 for intrapersonal intelligence (Tirri & Nokelainen, 2008). The

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second revised version of this instrument which captured spiritual or existential intelligence was investigated by Tirri and Nokelainen (2008), in which the reliability was reported as .70 to .74 using Cronbach's Alpha. Its third version, which included environment-oriented intelligence, was analyzed by Tirri and Nokelainen (2008) whereby an index of internal validity was obtained as .88. This questionnaire has been used for male and female groups ranging from 14 to 51 years old and includes 9 intelligence items of Gardner and 35 other items (4 items for each intelligence domain and 3 items for environment-oriented intelligence). According to the studies by Tirri and Komulainen (2002), (Tirri, Nokelainen & Ubani, 2006), (Ubani & Tirri, 2006) and Tirri and Nokelainen (2008), this questionnaire is sufficiently valid. The results of Kirrsi, Komulainen, Nokelainen & Tirri (2002, 2003) research suggested that men had a higher ability than women in logical mathematical intelligence while women had a greater ability than men in verbal linguistic intelligence. This questionnaire was self-report where the maximum and minimum scores of 20 and 4 were considered for each intelligence domain, respectively. For environment-oriented intelligence, the maximum and minimum scores of 15 and 3 were considered, respectively. Based on the results of this questionnaire, a score profile can be drawn for each of the participants.

Before administering the questionnaire, a pilot study was conducted.

The researcher translated (Tirri & Nokelainen, 2008) the questionnaire and presented it to three reviewers in education and psychology of exceptional children. These professors suggested some revisions. After revising the materials, each session was rated by three professors according to the exhaustiveness and exclusiveness criteria. Each professor rated it from 1 to 10: “1

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"indicated the lowest relevance and "10" showed the greatest relevance. If an item was rated less than "5", we revised that session according to the rater's advice. Finally, we calculated the relevancy scores. The range of relevancy exhaustiveness and exclusiveness was between 7 and 9/5. After editing and confirming its validity, it was administered to a group of deaf students of vocational schools in Tehran and Shahreza, as the pilot study. In the pilot study, the respondents were asked to comment on their understanding of items as well as the clarity of the questions. If a question or word was ambiguous, it was edited in order to be understandable for the main study. For example, instead of using the word "complex", whose understanding is a little hard for deaf students, the word "difficult" was used. Similarly, the word "problem" was replaced with "riddle". The same was done for all other questions as well. After running the pilot study, the content validity of the questionnaire was again verified by professors. Then, the completed questions were administered in another group of deaf students. According to the comments of experienced referees, who were faculty members of university, the content of the questionnaire matched the Iranian culture. The internal consistency of this questioner was .89 as calculated by Cronbach's Alpha.

Betz et al.'s Career Self-Efficacy Questionnaire

This questionnaire was developed based on (Betz & Luzzo, 1996) questionnaire. The primary form of this questionnaire had 20 items, which was then increased to 60, and measured the rate of career self-efficacy. This scale was developed to measure the perception of self-efficacy in the domain of job requirements. This questionnaire was translated by Abedi and Haghshenas (2010) who reported that via this questionnaire with high school

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students, the internal consistency of this questionnaire ranged from .84 to .88. Betz et al. estimated the reliability of this questionnaire on a sample group of 2700 people using Cranach's Alpha and obtained .84 to .88 reliability which was desirable. Betz's questionnaire (1981) contained 60 items for Harland's six types of personality (realistic, browser, artistic, social, intrepid, and contractual); each of these types included 10 items in the questionnaire. Furthermore, (Abedi & Haghshenas, 2010) research on its validity indicated that scores of this questionnaire could significantly predict membership in career groups.

One of the popular and conventional scales of career self-efficacy is (Betz & Hackett, 1986) career self-efficacy scale consisting of 20 items, which has been designed to measure the perception of self-efficacy in the field of educational needs and career duties. The studies on reliability of scale of self-efficacy expectations have indicated that this scale has acceptable reliability. (Ahmadi, Shariati, Jahani, Tabesh, & Keikhaei, 2014) reported internal consistency reliability coefficients for total scale of career self-efficacy as .95, for traditional women's careers in the subscales of educational needs and occupational duties as .91. On the other hand, for male careers in the subscales of educational needs career duties it was as .92 for expanded scale of self-efficacy expectations which was related to career tasks for each of 20 careers in the scale of beliefs of career self-efficacy. In Ahmadi et al.'s study, correlations in women were significantly higher than those of men. (Layton, 1984) also found a significant correlation between women's self-efficacy and a range of traditional career options at levels of .91 and .81, respectively. In both samples of university students, the correlations between men's self-efficacy and range of non-traditional career options were reported as .44 and .33, respectively. Today, the scale of

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career self-efficacy includes 60 items and is run as a self – measurement scale.

This instrument was first used for a group of deaf students in vocational schools as the pilot study. After standardization and final correction, its validity was verified by three professors. The reliability of this questionnaire was also examined using the test-retest method. Therefore, the null hypothesis of equality of scores of both questionnaires were accepted (p=.292). The self-efficacy questionnaire had the required reliability. After standardizing, the questionnaire was reduced to 50 items and according to Likert scale, grades 4, 3, 2 and 1 were assigned to high, somehow, low and never, respectively. In this regard, the maximum score was 200 and the minimum was 50. In general, the higher the score, the higher the self-efficacy of a person in career decision-making would be (Rajabi, 2004).

Intervention Program and Procedures

The content of this program consisted of the objectives of career instruction based on Gardner's theory. The training package for high school students was designed and developed considering the theoretical basis and research results in the field of multiple intelligence and self-efficacy. The content of the sessions was designed and compared with similar studies and existing theoretical foundations. After designing the content of MI, the package and evaluation form were presented to five university professors of psychology across Tehran universities. The package was then revised in line with the professors' comments and sent back to them for final confirmation of the validity of the package. The professors' agreement coefficient, estimated by Kappa coefficient was .91 indicating the appropriateness of the MI package for deaf high school students.

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They included self-awareness (self-evaluation via running questionnaire of multiple intelligences in the first session and then drawing its profile for each participant in the experimental group), adaptation (relationship of different careers with each of the various domains of intelligence in participants and matching different characteristics of careers), motivation (changing attitudes and beliefs as a result of knowing intellectual abilities and its relationship with different kinds of careers), and valuation (clarifying intellectual intelligent abilities and their relationship with different careers in order to make a proper decision about career) children. Then, the self-efficacy questionnaire was administered as the pretest in the first session, posttest in the sixth session, and in the follow-up session to investigate the influence of the instructional method (i.e. intervention). The program was run using general communication method (sign language and speech reading) by a sign language performer.

Results

In this section, statistical results obtained from the instruction based on Gardner's view and its impact on career self-efficacy of deaf students in vocational schools are reported both descriptively and inferentially.

Table 1 shows that the mean scores of control and experimental groups were different in pretest, posttest, and follow-up stages. In both groups, in females and males, the growth between the pretest and follow-up on the one hand and posttest on the other was significant ($p<.05$). To investigate the research hypothesis and the significance of the difference in pretest and follow-up, relative to posttest stages, repeated measures design was used. Table 2 outlines the inferential analysis of the data.

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Table 1
Mean Scores for Self-Efficacy According to Stage and Gender

Timeframe	Sex	Group	Mean	+_St.d
Pretest	Male	Experimental	98.93	20.59
		Control	104.73	17.43
	Female	Experimental	109.8	19.2
		Control	111.2	22.5
Posttest	Male	Experimental	113.2	19.56
		Control	101.4	18.3
	Female	Experimental	135.53	28.38
		Control	116.27	17.57
Follow up	Male	Experimental	106	22.45
		Control	103.6	24.67
	Female	Experimental	125.53	26.45
		Control	109.73	14.67

The design of the present study is pretest-posttest and follow-up study with a control group; therefore, to analyze the effect of play therapy, as the independent variable, at three-time intervals, repeated measures analysis of variance was employed, while checking for the assumptions.

The normality assumption, based on Kolmogorov-Smirnov and homogeneity variance, based on Levene was not significant; therefore, the following assumptions have been considered (Levene, .89, degrees of freedom, 18; level of significance, .24) and (Kolmogorov-Smirnov normality test, .75, level of significance, .32).

To test the research hypothesis, Mauchly's *test* of sphericity (Table 2) was run before using repeated measures analysis of variance.

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Table 2
Results of Mauchly's Test of Sphericity for Equality of Variances and Covariances in Career Self-Efficacy Scale

Within group effects		Mauchly's W	Chi-Square	Df	sig	Epsilon
Time	Career self-efficacy	.85	2.64	2	.26	.87

Table 2 indicates that the results of variance and covariances, in career self-efficacy scores, between the experimental and control groups, was not significant (P> .05). This suggests the equality of variance and covariance for repeated measures analysis. Therefore, the assumption of sphericity was in place, so the repeated measures analysis of variance was permitted (Table 3).

Table 3
Results of Univariate Analysis of Variance Repeated Measures of Career Self-Efficacy Scores in Betz Scale

	Sources of change	Sum of squares	df	Mean Squares	Fvalue	Sig.	power	Effect size
group	career self-efficacy	124.03	2	161.72	43.16	.01	.56	1
Time	career self-efficacy	221.23	2	163.71	56.06	.001	.59	1
Time*group	career self-efficacy	128.43	2	64.71	9.31	.01	.34	.96
error	career self-efficacy	248.13	36	6.89				

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The results presented in Table 3 exhibit that intervention has caused a significant change in career self-efficacy variable (P<.01). Furthermore, the differences were significant in the posttest, follow-up, and group and time interaction while the difference was more significant for time. This means that career self-efficacy had a greater increase in the posttest and follow-up measures compared to pretest. However, no difference was observed between post-test and follow-up. In other words, multiple intelligences-based training enhanced the career self-efficacy in posttest and follow-up. By observing the F scores at the three mentioned modes (group, F = 43/16; Time, F = 56/06; interaction between time and group, F= 9/31), In other words, it can be said that the difference between the mean scores of career self-efficacy at different times is depending on the variable levels of the group. The results suggest that use of multiple intelligences-based programs increased the career self-efficacy of the experimental group in posttest and follow-up, while no increase was observed in the control group.

Discution

The results of data analysis indicated that instruction based on Gardner's theory of multiple intelligences increased career self-efficacy of deaf students in vocational schools. In the traditional educational system, students' abilities have not received enough attention and students do not enjoy the opportunities required for developing their decision-making methods. This issue should be considered for instruction and career conduct of high school students. Many studies worldwide have tried to overcome this problem and analyze new methods for career decision-making and conduct of students. All of these researchers have agreed on

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the point that traditional methods of education and career conduct cannot account for students' needs in the 21st century.

It seems that Gardner's theory of multiple intelligences, because of its wide view on students' abilities, can be a basis for planners and counselors to present a plan which can use individual abilities and experiences and apply them to students' career decision-making and conduct. The evident characteristic of this theory is that students are not considered one-dimensional beings; rather, they are considered a versatile set of capabilities, known as multiple intelligences by Gardner. These intelligence abilities can help high school students in their educational and career decision-making, especially for students with special needs who have clear individual differences. One of these groups is deaf students who have communication problems in career conduct and decision-making. Utilizing special communication methods for these students can facilitate research on deaf students. Hassanzadeh, Mohseni, Afrooz and Hijazi (2007) conducted a study on cognitive development of deaf students and concluded that, in order to evaluate cognitive thoughts of deaf students, assignments with less language and verbal communication should be used. (Engel-Yeger & Weissman, 2009) and (Absalan et al., 2013) studies have also indicated no significant difference between self-efficacy of students with hearing impairment and their normal counterparts. So, we night expect to see more research on deaf students' self-efficacy based on new theories like Gardner's theory of multiple intelligences.

In line with the results of this study, (Taylor, 2007), Shearer (2009), and Chan (2003) believe that teachers' and students' career self-efficacy and decision-making should be examined by modeling Gardner's theory and its program. One of the factors affecting self-efficacy is considering individual abilities and

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factors as Gardner's theory has emphasized individual abilities. In this regard, the results of studies by Betz and Hakatt (1986), (Powell & Luzzo, 1998), (Kracke, 2002), and (Gushue, 2006) have indicated that personal and self-discovery factors can enhance high school students' self-efficacy and facilitate their career conduct; otherwise, individual' beliefs important role in making career decisions.

(Anderson & Betz, 2001) also studied self-efficacy resources including personal experiences and the relationship with individual abilities and factors considered by Gardner. In his research, he enhanced the participants' self-efficacy using an intervention plan. (Creed, Prideaux & Patton, 2005) studied predictive variables in the career selection process of high school students and observed that the most important factor in career selection was individual abilities and factors. So, it can be concluded from these results that instruction based on Gardner's theory can boost students' self-efficacy by considering individual factors as the profile of multiple intelligences.

According to students' self-discovery and its importance in cognitive development which is the same as increasing participant's self-efficacy, this study's instruction based on Gardner's theory could create a new approach in students' instruction and career conduct. Therefore, the results of studies which have improved students' career decision-making and educational status based on Gardner's theory of multiple intelligences can be considered along with this study. In this regard, studies by Shearer (2009) and Sharifi (2005) can be referred to, each of which has improved students' educational and career situation using Gardner's cognitive view.

Finally, it should be mentioned that one of the limitations of this study was the selection of the sample group of deaf students

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in vocational schools in Isfahan, which was a limited sample; thus, the results of this study cannot be generalized to other deaf students. Therefore, it can be recommended to study other deaf students in other cities and compare the results in different educational grades of high schools. Furthermore, interview can be used for data collection.

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