Study of Predictability of Gardner's Multiple Intelligence Theory in Selecting Major between Medical and Non-Medical Sciences Students (2014)

Maryam Ansari¹*, Shaghayegh Nikneshan¹, Mehri Farzaneh²

¹ Faculty of Educational Science, Payame Noor University, Tehran, Iran
² Faculty of Foreign Languages, Payame Noor University, Tehran, Iran

Abstract

Introduction: This research has been conducted in order to study predictability of Gardner's multiple intelligence theory in selecting major between medical and non-medical students in 2014.

Method: This research is descriptive-survey. Participants are all of the medical and non-medical sciences students of Isfahan University in the academic year 2014. Using sampling method, 150 individuals were selected as sample. Data were obtained using standard questionnaire of Gardner's multiple intelligence and analyzed by SPSS software.

Results: According to obtained results, among 9 subscales of multiple intelligence best predictors in naturalist and interpersonal subscales for medical students and existentialist, intrapersonal and logical-mathematical subscales for non-medical students. Also there is difference between multiple intelligences of students of medical and non-medical group and male and female students.

Conclusion: Results showed that medical, human sciences and basic sciences students can be differentiated in terms of Gardner's intelligence.

Keywords: Multiple Intelligence, Choosing Major

Introduction

Intelligence is one of the significant aspects in compatibility of human with environment and is considered as one of the important factors in providing difference between individuals. It should be noted that intelligence conception has changed during recent years and has transformed from single nature to numerous categories. After proposing intelligence conception by Byneh and its application by Piaget, this category changed highly (1). For example, Stonberg (1996) differentiated three types of academic, creative and practical intelligence from each other (2). It should be noted that traditional intelligence tests concentrate on mathematical abilities measure, relationships between verbal concepts and thought and do not measure skills like information analysis, problem solving and critical thought that of course according to Vygotsky, these types of measurements do not provide information about potential growth range of humans (3). However, today psychologists are interested in study of strategies used to symbolize thought like language, math., representational arts, expressive motions and other symbols According to Gardner (2004), symbolic intellective operations like language are different from usual operations in music etc. So, linguistic and mathematic symbols singly do not suffice as are emphasized in traditional intelligence test. So, he believes that intelligence, reasoning, logic and knowledge have not same meanings and offered a new view of intelligence that was accepted by researchers and psychologists. He developed meaning of intelligence musical intelligence, sparial relationships conception, intrapersonal, naturalist and other types of intelligence. According to Gardner, intelligence is: ability to solve problems or produce products that are considered valuable in one or several cultures (4). Therefore, he after performing different studies, first defined 7 types of intelligence that was different from definition of traditional intelligence that was based on mathematic and linguistic abilities(5). Gardner's theory of multiple intelligence included: mathematic intelligence, verbal intelligence, sparial intelligence, musical intelligence, bodily-kinethetic intelligence, intera-personal intelligence and inter-personal intelligence. Then, he added another type of intelligence named naturalistic intelligence to his multiple intelligences list and he identified existential intelligence as the last category of multiple intelligences in 1999(6). Types of intelligences are identified in following:

Intera-personal intelligence: Gardner (1999) explains that this type of intelligence provides ability of personal conception and one effective individual activity model in individuals. According to Gardner, conceptualization of this intelligence includes awareness of one person toward ability, interests, fears and using these information to make important decisions in life (6). Gardner (2003) believes that having a certain understanding of the self is the key point of this intelligence(7). This conception of intelligence relates to conception of self-esteem and positive personal vision of Campbell and...
also conception of Metacognition and self-evaluation (8). Individual with intera-personal intelligence is aware of what he/she knows and what he/she does not know (9). According to this research conducted by Fasco (2001) intera-personal intelligence is an independent aspect of intelligence and shows to some extent one individual can judge about his/her strengths and weaknesses (10).

Interpersonal intelligence:
According to Gardner(1983), the interpersonal intelligence allow human to concept others needs, motivations and interests and make the person able to communicate others effectively and work with them. Teachers, sellers, politicians, religious leaders all enjoy inter personal intelligence in their activities. This intelligence is related to what we know as emotional intelligence (11).

Existential intelligence:
This intelligence allows individuals to design deep questions about meaning of existence, such as question about death and living and role of person in world. This intelligence seeks relationships in world and allows learners to find their position in a large picture of world and consider and evaluate their role as individual in class, society and the entire world. Existential intelligence is effective in the area of philosophy, religion and aesthetics and relies on values, reality and such issues. People who have significant existential intelligence can combine and summarize different ideas obtained from deep study of one study unit (6-12). According to Gardner (1999), existential intelligence has significant growth in first years of life. Theory of rapid intellective growth and designing philosophical questions in childhood has been for many beginning point of viewing world in a different way (6). In addition, children who become physically or mentally dependent to church, abbey or other religious centers, existential intelligence and philosophical-spiritual thought are more possibly grown in them (12).

Naturalist intelligence:
Gardner (1999) explains that naturalist people are those who have ability to identify and classify different subjects. According to Gardner's opinion, hunters, farmers and orchardmans should benefit high degree of this type of intelligence. Also artists, social sciences experts, poets, and scientists should enjoy this intellective pattern. He states that professional sellers benefit this intelligence for identification of the minimum differences in order to compare produced goods (6). Based on above explanations, the main element in naturalist intelligence is ability to classify subjects based on their differences and similarities. People having this intelligence are able to classify subjects based on their available or absent properties. This type of classification requires ability of logical reasoning like what is regarded by Gardner in his mathematic-logical intelligence. In fact, person with naturalist intelligence is a biologist that classifies species well (9-13).

 Bodily-kinethetic intelligence: This intelligence provides for us ability to use the entire body or a part of it to solve problem and provide a new product. Gardner believes that not only athletes and actresses have this aspect of intelligence, mechanism, individuals, surgeons and craftsman also benefit this intelligence since these activities need constant cooperation of mind with body and motions control(6).

Musical intelligence: musical intelligence relates to logical intelligence. This intelligence includes ability to adjust different rhythms and tones. Rhythm and tone is complex issue that needs complicated cognitive abilities. This intelligence allows persons to understand, enjoy and repeat music and rhythm (6-9).

Mathematic-logical intelligence: this intelligence includes ability to discover patterns, deductive reasoning and logical thought. Persons who benefit this intelligence think to establishing relationship between information based on numerical and logical patterns, perform mathematical operation rapidly, are curious to environment and show interest to solve numerical issues and legalistic games (6-9).

Spatial intelligence:
This intelligence includes solving problems through manipulation, providing mental pictures, and video visualization. Interpretation of diagrams, map reading and orientation are of interests of individuals having this intelligence. This people have significant skill in painting, planning, making and repairing objects. Architects, surgeons and chess players also benefit from this intelligence in their activities (5).

Verbal intelligence:
Persons with this intelligence are very sensitive to verbal-written language and application of words and language. They enjoy reading, writing, speech and discussion. They think in the framework of words instead of forms. Authors, poets, lawyers and religious leaders benefit this intelligence in high ratios (5).

McKenzi (2002) has classified multiple intelligences to three areas based on their relationship mode: analysis area, interaction area and subjectivism area. These areas represent internal areas between intelligence types so, identification of function mode of these areas is considered as a key point in training affair (14). In Mack Kenzy's idea (2002), analysis area includes three logical, naturalist and musical intelligences. In these three intelligences, individual deals with constant process of obtained information and knowledge analysis. Analysis area based on its nature has a mental and exploratory process. He also shows that interaction area includes three intelligences of verbal, inter-personal and bodily intelligences. Reason for classification of these three intelligences is in its interactive area that these three dimensions of intelligence are used to state themselves and to discover environment and what is necessary to acquire awareness in these three intelligences is interaction and practice. This area of intelligence has social process based on function type. Third area is an internal area based on Mack Kenzy classification (2002). Spatial, existential and inter-personal intelligences are in this area. The reason of this is that having these three intelligences requires hesitating inside and for new learning, person should communicate personal experiences and his/her beliefs(14).This area based on function has emotional process. In this regard, some studies are performed that some of them are mentioned: Synder(2000) studied relationship between learning modes, academic development of high school students and its relationship with Gardner's multiple intelligences theory. Research results showed that awareness from learner's intelligence type and their learning mode has direct relationship with teacher's success in class (15). Jen (2001) using self-evaluation method on 192 Chinese students in secondary school determined their intelligence type. He finally concluded that evaluation of intelligence
types based on the self-evaluation method can show differences between students well (16). Gaines & Lehmann (2001) showed in their research that study skills and academic development of students can be improved using multiple intelligence theory (17). Stanford (2003) used Gardner's multiple intelligences theory in his research in relation to teaching math. Based on his results, training three intelligences (logical, naturalist and musical) is effective in successful teaching of math to students (18). Razmjoo (2008) studied relationship between mastering language and multiple intelligence that according to his belief, no significant relationship was found between special type of intelligence and using and mastering English language in students of Shiraz University (19). Study performed by Wext (1997) also confirmed Gardner's multiple intelligences theory. Results of this study showed that process of chain and mathematical information occurs in left hemisphere and process of cognitive, visual, sparial and verbal activities occurs in right hemisphere of brain. Based on domination of brain hemispheres in individuals, a special type of intelligence may dominate in each person other than other types of intelligence (20). Dryden, L.M., &Morrone, 1999 believe that continuation in academic development is more affected by genetic determinants and intelligence that represent themselves in form of cognitive abilities and environmental variables although are effective but have less share(21). So, one of the fields that role of intelligence components can be evaluated in it, is selection of major. Some studies show that in different time parts, tendency to each of the majors has changed. One etiological study conducted by Jenabi and Haghparast (1983) shows that about 66% of students select human science majors due to not acquiring accepted score in other majors and the reason is incoherence of intellective with selected major (22). Moreover, relationship of occupational skills with multiple intelligence fundamentals is a point regarded by Gardner. He, after offering multiple intelligences theory, presented different definitions for each of them and also definitions for each of the intelligence categories and their suitable occupational skills. For instance, sparial-visual intelligence, ability to concept visual affairs, ability to concept patterns and skills like completing puzzle, table and diagram, design, architecture and sculpture. Logical-mathematic intelligence also is related to jobs and fields of electronics engineering, computer and based on this existential intelligence also relates to many branches of human resources like philosophy and psychology (7). One of the important issues that occupied mind of politicians and planners is that if students have selected their academic major based on their abilities and potentials or is imposed them. This is while many theorists believed that students of human sciences branches are weaker than students of experimental sciences and mathematics majors. So, the present study is performed in order to determine predictability of academic major choice based on multiple intelligences components in different branches.

Methods

The present research was performed by the descriptive-survey method. Statistical society includes all students in the first medical and non-medical year in human sciences and basic sciences branches of Isfahan university in 2014. Sampling was performed by the multistage method based on major and 150 individuals were selected as sample that includes 50 individuals of medical students, 50 individuals of human sciences students and 50 individuals of basic science group students. To achieve research purposes, the standard questionnaire of Gardner's intelligence was used. In this 90 questions questionnaire, testee determines his/her agreement with each of the questions based on Likret scale from very low-very high. This questionnaire includes 9 components that each includes 10 questions and the minimum accepted score in each component is 10 and maximum accepted score is 50. Since questionnaire is standard, its reliability and validity was predetermined. Farenham et al. (2002) also mentioned reliability of questionnaire as 78% based on Chronbach's alpha. Data analysis was performed by SPSS-V(18) that proportional to research purposes , descriptive and inferential statistics (t-test, fisher and ANOVA) were used.

Results

Gardner's intelligence theory indicates that to obtain all abilities of one person, his/her intellective coefficient is not enough but other types of intelligence (mathematically logical, musical, bodily-kinetics, verbal etc.) could be considered. Recent research was performed for determining predictability of selecting major based on multiple intelligence components in different branches that below information were obtained using Gardner's nine types intelligences questionnaire:

Table1: Average of Subscales of multiple intelligences among students

<table>
<thead>
<tr>
<th>Variables</th>
<th>average</th>
<th>Standar deviation</th>
<th>T</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existential</td>
<td>3.70</td>
<td>0.58</td>
<td>8.186</td>
<td>0.001</td>
</tr>
<tr>
<td>Mathematicallogical</td>
<td>3.67</td>
<td>0.55</td>
<td>8.236</td>
<td></td>
</tr>
<tr>
<td>Intrapersonal</td>
<td>3.69</td>
<td>0.44</td>
<td>10.455</td>
<td></td>
</tr>
<tr>
<td>Naturalist</td>
<td>3.80</td>
<td>0.41</td>
<td>13.194</td>
<td></td>
</tr>
<tr>
<td>Interpersonal</td>
<td>3.71</td>
<td>0.56</td>
<td>8.624</td>
<td></td>
</tr>
<tr>
<td>Bodily-kinetics</td>
<td>3.65</td>
<td>0.45</td>
<td>8.424</td>
<td></td>
</tr>
<tr>
<td>Musical</td>
<td>3.58</td>
<td>0.60</td>
<td>5.535</td>
<td></td>
</tr>
<tr>
<td>Sparial verbal</td>
<td>3.55</td>
<td>0.46</td>
<td>6.542</td>
<td>7.939</td>
</tr>
</tbody>
</table>

According to table 1, of 9 subscales of multiple intelligences, the highest averages have been in the naturalist medical group with the average of 3.80 and interpersonal with the average of 3.71. Also t-test in order to show level of intelligence types among students, shows that average of nine types scores of Gardner’s intelligence among medical sciences students is higher than table 1 and in result 9 types intelligences in students are higher than average. Also based on step by step analysis results, diagnosis coefficient among 9 subscales of multiple intelligences, the best predictors in the medical sciences group were in the naturalist and interpersonal subscale and in the non-medical group were in the subscales of existential, logical-mathematics and intrapersonal. To show correlation level between intelligences among students, diagnosis...
function and significance test of landau vilchez were used. Based on this, there is one function that has been obtained with two levels of the criterion variable. The special amount is 328%. Standard correlation (Multiple) between predictor variables and function is 497%. This shows that correlation between intelligences is in the intermediate level and relationship between predictor variables and criterion is significant in the level p=0.05.

Table 2: Fisher Linear Functions among Gropes

<table>
<thead>
<tr>
<th>Medical sciences</th>
<th>Non-medical sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naturalist</td>
<td>Mathematic-logical</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Intrapersonal</td>
</tr>
<tr>
<td>Mathematical-log-</td>
<td>Naturalist</td>
</tr>
<tr>
<td>Constant coefficient</td>
<td>Constant coefficient</td>
</tr>
</tbody>
</table>

Based on above table, two equations can be written for groups:

Medical sciences students = naturalist (/389) + interpersonal (/335) + mathematic-logical 12/49-(-/064)

Non-medical sciences students=mathematic-logical (/274) + intrapersonal (/428) + naturalist10/20-(-/03)

By placing scores of each person in each of the predictor variables in above equations, it can be predicted that person is placed in which group. Based on test results, percentage of correct classification in each group is 73% that is using multiple intelligences subscales, academic groups can be differentiated in 73% of cases. Finally, analysis results showed that about academic group, observed F (5/64) has been significant in the level P≤0/01 and also about gender, observed F (3/49) has been significant in the level P≤0/01. So there is difference between multiple intelligences of medical sciences and non-medical sciences group students and male and female students.

Discussion

With regard to above mentioned contents, multiple intelligences theory can provide a deep change in the traditional intelligence concept and intelligence assessment methods. According to Gardner's view (2004), all individuals have types of intelligence in different ratios that of course each of the intelligence types acts each other in the process of learning as complement. In his opinion, all types of intelligence have both biologic and cultural base (3). Researchers of neurologist confirm the fact that learning is result of change in relationships between nerve cells but Gardner, in addition to biologic bases, believes that cultural factors are effective in growth of intelligence type. Regarding that which type of the intelligence is known valuable in one culture, different cultures foster different types of intelligence in their society individuals. What is important here, concept of multiple intelligences relates to academic development, selection of academic field and development in learning. Studies of Synder (2000) and Dryawn and Morrone (1994) also confirm this (15-21). It seems that one of the dominant components in selection of academic field and success in it is intelligence. Based on obtained results, medical science students in the analysis and interaction areas (naturalist and interpersonal), human sciences students in the interaction and subjectivism areas of identified areas by Mack Kanzy (2002) have preference compared to analysis area intelligences and students of basic sciences in the analysis area including intelligences have more preference. Stanford's research (2003) also based on application of more mathematic-logical intelligence for mathematic students shows incoherence of findings (18). While Razmjoor's research (2008) and Jenabi and Haghparast (1983) is based on incoherence of intelligence efficiency with academic field (19-22) but Gaines & Lehmann (2002) state that using multiple intelligences, study skills and selection of academic field can be improved (17). Other findings of research showed that among 9 subscales of multiple intelligences, the best predictors for the medical group were naturalist and existential and mathematic-logical, intrapersonal and existential subscales of intelligence for the non-medical group. Research findings of Gen (2001) in the field of assessment of intelligence types for identification of learners’ differences confirm findings of this research (16). This is while Gardner (1999) has pointed in his researches to relationship of professional skills with types of intelligence (6). Based on this intelligence scale, medical and non-medical sciences can be differentiated from each other. This is while no significant difference was observed in terms of gender between students of different groups in application of intelligence types.

Conclusion

Assessment of intelligences types identified by Gardner provides the ability to use intelligence factor as a tool to help learners in selection of academic field this is while according to Amini et al. (2010), curriculum system of Iran has ignored many intellective potentials and abilities of individuals due to presence of a set of mental limitations and executive shortages (23). Based on research findings and using the Fisher linear function method students can be classified in medical and non-medical groups based on intellective scores in subscales. Generally, research results indicate that using subscales of Gardner’s intelligence can be used as a complement for available tools in determination of academic field like university entrance test that of course for realizing this idea, the necessity to perform complementary researches is known for everyone.

References


128 Journal of Health Policy and Sustainable Health