

Full Length Research Paper

Evaluating secondary school students' levels of five mind areas in terms of some variables

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Received 2 October, 2014; Accepted 31 December, 2014

Gardner's "Five Minds for the Future" approach is focused on disciplined, synthesizing, creative, respectful, and ethical minds. Based on this approach, the purpose of this research is to determine senior secondary school students' levels of five mind areas, and investigate the relationship between these mind areas and the students' socioeconomic status, gender, professions they wish to have, favorite courses and disliked courses. This study is a descriptive and associational research in the form of a survey model. Scale for Determining Mind Areas (66 items) developed by the researcher, it has .81 Cr. α reliability coefficient. In the scale (N=528), explained variance for disciplined, synthesizing, creative, respectful, and ethical mind was 52.7, 46.5, 46.6, 53.0 and 46.6 respectively. The variance is 52.8. For determining socioeconomic level Bacanlı's scale was used. The findings showed that the students have "satisfactory" level of disciplined, synthesizing and creative minds and "medium" level of respectful and ethical minds. Significant differences were found between students' mind area levels and their socioeconomic levels. Additionally, the students' mind areas differed significantly with respect to their genders and professions they wish to have. There is no significant difference between the professions students wish to have and their mind areas.

Key words: Five minds, future, gender, individual differences, socioeconomic level.

INTRODUCTION

In education, new theories like constructivism, project based learning, multiple intelligent theory, thinking skills, cooperative learning, teaching styles, learning styles, quantum learning, emotional intelligence, brain based learning, allosteric learning, suggestopedia, accelerated learning, neuro linguistic programming (NLP), right left brain theory, triune brain theory, holistic learning are being discussed for the last two decades. How learning occurs is focused on rather than what is learned. After analyzing common characteristics and key concepts of

these theories, it is seen that most of them focus on "thinking skills". These skills that refer to our mental skills include abilities of learning to learn, metacognitive skills, abilities to get knowledge, abilities of reasoning (decision making, problem solving, imitative reasoning, research, evaluation of evidence, etc.), abilities to express what you think and understand, critical thinking, reflective thinking, creative thinking, positive thinking, real life problems.

These dominant and distinctive features that belong to human attracted educators all along history and they

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became subjects of interest and research. These skills are features attributed to intelligence or are explained by intelligence.

Although the relationship between intelligence and learning has been put forward by numerous investigations, "what" intelligence or learning is has not been fully defined. Despite different definitions of intelligence, all contemporary theories of intelligence merge on the points that intelligence is a capacity or potential that can be improved and has biological basics. Intelligence contains use of many mental abilities such as verbal comprehension, verbal fluency, digital competence, area and space relations, memory, perceptual speed, reasoning in different occasions and conditions (<http://wp1.tzv.org.tr>).

Skills such as consciousness, classification, selection, reasoning, decision-making, generalizing, learning and inferring from experiences are behaviors specific to intelligence. Nowadays, the ability of computers or computer-controlled machines to perform tasks related to higher mental processes gained a controversial dimension as artificial intelligence. Today, machines can also perform applications such as decision-making, understanding natural language, pattern recognition, recognition of graphical images, playing logic games, translation, understanding and fulfilling a verbal command, and sharing. These applications with complex logical operations arise from the power to perform a large number of processes at a great speed. In addition, it is also a subject of discussion whether it is a capability or not.

Although there are studies on the measurement of intelligence dated back to the time of ancient civilizations, systematic and scientific studies related to measurement of intelligence began to emerge towards the end of the 19th century. Galton, Kraepelin, Binet, Simon, Stanford, Terman, Cattell, Spearman, Stern, Thorndike, Thurstone and Wechsler are important people recognized on this subject. The first psychologists assumed that intelligence comprised a general mental factor referred to as a general g-factor. They agreed that intelligence test was designed to measure this g-factor, assuming that this factor affects performance of intelligence in every aspect. Following researchers argued that there were two types of intelligence, fluid intelligence and crystallized intelligence. One of the most important criticisms about intelligence tests focused on identification of mental abilities that make up intelligence and whether IQ can satisfactorily reflect these abilities. Cultural, socio-economical, historical, geographical, and educational levels are some of the variables that affect children's test results (Schultz and Schultz, 2007; Wang, 2009; <http://wp1.tzv.org.tr>).

For the last 20 years (in 1983, *Frame of Mind: The Theory of Multiple Intelligences*), Gardner (1993b) suggests that intelligence is multi-dimensional examined abilities of people who have exhibited extraordinary

success in specific areas and argued that there are nine different mental areas (linguistic, musical, logical-mathematical, spatial, bodily-kinesthetic, naturalist, existential, interpersonal, intra-personal intelligence). Although each of these areas described is independent of each other, any activity takes place by activating several of these mental areas at the same time. Nowadays, many educational programs and courses are shaped by multiple intelligence theory (MIT) worldwide. While it is attempted to improve an individual's nine intelligence areas by also associating them with each other by multiple intelligence theory, creating a school culture as well as professional and working lives are also taken into account by five minds. Gardner (2008a) refers to the need for utilization of multiple intelligence to improve this structure in schools; example, it is impossible to develop a respectful mind without interpersonal intelligence.

The five mind areas

Gardner particularly conducted mind oriented studies in his numerous books and publications, which have been published since 1973. Gardner (2008a), who particularly worked in Project Zero (<http://www.pz.harvard.edu/>) and Goodwork Project (<http://www.goodworkproject.org/>), focused on the necessity of bringing disciplined, synthesizing, creative, respectful, and ethical minds to future generations in his theoretical approach called "Five Minds for the Future", which he set forth on the basis of all these publications, projects and theories while entering the third millennium.

According to Gardner (2008a,b), mind areas and their characteristics are as follows.

Disciplined mind. Disciplined mind is a researcher, follows innovations, complements his missing parts, fulfills his responsibilities, accepts guidance, is influenced by a guide, applies what he has learned on a regular basis, is patient, and prescriptive. He may think multidisciplinary, interdisciplinary or transdisciplinary, or by multiple perspective (Wrenn, 2010). He notices and queries problems, does not act in a dogmatic way and has self-confidence (Schmidt, 2000). He is responsible for his actions, controlled and committed to communication and co-operation (Brinstein et al., 2005). An individual that does not own a disciplined mind sufficiently, when flexible thinking is needed follows the procedures blindly without an opinion. He tries to seem prepared or adequate (Gardner, 2007).

Synthesizing mind. Synthesizing mind gathers and arranges, limits and follows information that works for himself; he is an entrepreneur, makes classifications, asks questions about the main topic, comments on events, produces suggestions; he is planned, organized and stable; he organizes new information with his prior

knowledge; he is reflective, collaborative. He benefits from narrations, taxonomies, metaphors, images, aphorisms, key concept and nonverbal symbol systems, sets a goal and a starting point, adopts a strategy, method or an approach, creates a draft and receives feedback. An individual that does not own a synthesizing mind generalizes excessively or classifies inaccurately, and is inadequate in questioning (Gardner, 2007).

Creative mind. Creative mind asks unusual questions, creates new connotations and solutions, is not content with what he has, leads projects and works; he is productive, not a free-rider, generates viable ideas, is an entrepreneur, likes to try new ways, takes risks, does not pursue fame, learns something new from his mistakes, he is unorthodox thinker, is out of bounds and tries to move a step forward. He can establish original matrix links related to other people, environment and subject of study (Gardner, 1993a). Inference and control of inference, strategic thinking and control of thinking are characteristics of a creative mind (Ram et al., 1994, Boden, 2004, Holmes, 1919).

Creativity is stimulated and facilitated based on one's belief and the self and social factors can hinder creativity (Magno, 2009). Religious, aesthetic, emotional and artificial factors also influence the brain, which is the centre of creativity (Newberg and d'Aquili, 2000; Riley, 2004). Therefore, the emergence of creativity depends on respectful and ethical minds as well as disciplinary and synthesizing minds. An individual that does not own a creative mind produces slight ideas that are unusual but not well accepted (Gardner, 2007). His product is not original, important or adequate.

Respectful mind. Respectful mind tolerates differences between individuals and groups, is neutral, makes effort to work together with those who are different, and cooperate with them, is successful in communication, tries to understand others, is committed to the rights and freedoms of others (Zebua, 2010), shows empathy (Smith, 2008b), is helpful and just. An individual that does not own a respectful mind adequately shows respect to people who have higher statutes than him, and underestimates, excludes, ridicules, and ignores weak people. He seems gentle, rather than being a cooperative and understanding person (Gardner, 2007). It is difficult to obtain educational aims if there is no respective mind.

Ethical mind. Ethical mind makes effort for good work and good citizenship, agrees to the right thing, not his personal interests, fulfils his responsibilities on every subject (Smith, 2008a), wishes to share those he knows to be right and acts unselfishly. He makes decisions with his emotions, heart, and mind (Ambrose, 2009).

According to Gardner (2007), an individual who does not own an ethical mind adequately, is not aware of his

responsibilities, if he contradicts with other people's benefits, he does not tell what he think is true, and discrepancies occur in his behaviors.

In fact, except for these five mind areas, there can be many mind areas from technological mind to digital mind, from the market mind to the democratic mind, from the flexible mind to the emotional/joyful (Pava, 2007)/reconciled mind (Torrance, 2013), and from strategic/opposable minds to the spiritual mind (Gardner, 2008a/b; Stark, 2013; Avishai, 2013). Gardner (2008a) focused on five minds seen as chief borden instead of this variety. Development of these mind areas in schools is facilitated by tension exit, wake up calls and role modeling (Gardner, 2009).

As long as questions of philosophy, including good and bad, right and wrong, beautiful and ugly exist, educational perspectives will also vary over time. "*Technological and scientific breakthrough, political trends, economic forces, social-cultural and personal trends in the modern era, the shifting cartography of knowledge, the view from multiculturalism and modernism*" (Gardner, 2008a) compose requirements of these five mind areas, particularly the disciplined mind. The first three of these mind areas are related to cognitive domain areas, whereas the last two dimensions are related to humanitarian and cultural areas.

With the development of science and technology complementing each other in a global world, it is observed that education has become global with a new concept. Education, which began to emerge from a conservative, isolative and traditional structure ongoing for years, has started to gain a new identity with the third millennium. Breakthrough changes in science and technology (internet, cell phone, trade symbols, etc.) cause rapid globalization of education and result in worldwide educational structures and processes to be rapidly affected by each other (James et al., 2010). Developing concepts such as worldwide class and teacher competency standards, interdisciplinary curricula, knowledge economy, sharp minds (Farr, 2014), cooperation prepare the ground for emergence of new mind empires. They require individuals with a global mindset of the future thinking globally but acting locally, nationally and traditionally to be individuals with enhanced creativity skills, respect for himself as well as for others, and global ethical values who can make developed, personal and professional synthesis in one or more disciplines (Gardner, 2007, 2008b; Hartnett-Edwards, 2013). We should not forget that "existence and development of human in every condition only depends on development of our human potentials" (Gardner, 2007). In this context, for development of human potential that Gardner mentioned, the focus of this research is to determine students' mind areas according to some variables.

Accordingly, the purpose of the research was to determine mind area distribution of senior year secondary

school students and determine whether the students show any variance in their mind area levels with respect to their socioeconomic levels, their favorite courses and challenging courses, gender, and professions they wish to achieve in the future.

Research questions

Answers to the following questions have been sought based on the purposes above.

1. What is the distribution of mind areas among senior secondary school students?
2. Do senior secondary school students' mind area levels differ with respect to their socioeconomic status, genders, their favorite courses and challenging courses, and professions they wish to achieve in the future?

METHODOLOGY

Model of the study

The study is a survey type of study conducted on the basis of a basic theory set forth under the name "Five Minds for the Future". The first question of the study was intended to determine mind areas of senior secondary school students so a descriptive survey model was adopted. By research questions, it was attempted to investigate the relationship between these mind areas and the students' socioeconomic levels, favorite courses and challenging courses, genders, and professions they wish to achieve in the future so it was designed in the form of an associational survey model. The research is limited by senior secondary school students, five mind areas and socioeconomic levels of the students and the courses they took during final year.

Sampling

Study population of the research comprises final year government secondary school students in the province of Hatay, Turkey during fall semester of academic year 2009-2010. Sampling was conducted on study population by simple randomized sampling, one of randomized sampling methods. Thus, it was chosen to represent all units in the sample "as they are". 528 senior students from five different secondary schools in the city center participated in the study.

Measurement tools

Depending on the objectives of the study, two types of measurement tool were used. One is Socioeconomic Level (SEL) Scale used to determine socioeconomic levels of the participant students and the other is "Scale for Determining Mind Areas" developed by the researcher to measure minds areas of the students.

Socioeconomic Level (SEL) Scale: The scale developed by Bacanlı (1997, ss. 97-106) comprises 11 items in total. Some of the choices in the scale (level of income, type of heating) were updated according to today's conditions. Scores that can be obtained from the scale are minimum 11 and maximum 51 points. Accordingly, those who got 11 to 23 points were evaluated as students from low

socioeconomic level, those who got 24 to 36 as students from medium income level and those who got 37 to 51 points as students from high income level. The correlation coefficient between socioeconomic level and total points of items of the scale was found as $r: .91$. Whereas, the correlation coefficient between sociocultural level and total points of the items was found as $.75$. Also, reliability coefficient of the scale in our study was computed again and $Cr \alpha$ reliability coefficient was found as $.72$.

The Description of Five Mind Questionnaire Scale:

Measurement tool was developed by the researchers according to the logic of minds areas defined in the source called "Five Minds for the Future" (2008a). Initially, an item pool was created for each mind area, draft form of measurement tool was evaluated by taking experts' opinion and several items were removed and several were edited. A measurement tool of 94 items in total, 19 of which are for measuring each mind area, was obtained. The measurement tool was designed in five-point Likert model. The measurement tool has 31 negative item roots. "Strongly agree" option is given 5 points, whereas "strongly disagree" option is given 1 point. Prior to analysis, "normal distribution fitness test" was performed in order to determine whether the items show a normal distribution. Accordingly, Kolmogorov-Smirnov value was determined as 1.182 and $p=.122$. Thus, it was established that the distribution is normal and fulfils conditions of parametric statistics.

Reliability Analyses

Item power (P_j) and its standard deviation (S_j) were calculated for each item. Any item, item discrimination (r_{jx}) of which is found to be below $.20$ by correlation analysis conducted between each item and total score of items, was removed from the scale. Also, any item p value of which was found to be above $.05$ and which is not significant by independent samples t test conducted between 27% bottom and top sections of total points of the scale was removed from the scale. By removal of 19 items from the scale, the scale consisting of 94 items in total was reduced to 75 items. $Cr. \alpha$ reliability coefficient of the scale applied to 528 people was found as $.93$. Then, following factor analysis conducted for construct validity, 9 more items (28 items in total) were removed from the scale. Final $Cr. \alpha$ reliability coefficient obtained as a result of reliability analysis conducted with the remaining 66 items was $.81$.

Validity analysis

Explanatory factor analysis was performed on the data set in order to ensure construct validity and content validity. Prior to factor analysis, KMO (Kaiser-Meyer-Olkin) test was performed for testing fitness of data to factor analysis. Since the value obtained was higher than 0.50 ($KMO > 0.50$), fitness of data set to factor analysis was individually tested in each mind area. Also, as a result of Bartlett's test, $p=.000$ was significant so it can be concluded that high correlations exist between the variables and data set is suitable for factor analysis. In addition, Measures of Sampling Adequacy (MSA) of data was also tested by Anti-image matrix and all items were found suitable for analysis. Also, new factor scores obtained meet normal distribution requirement and do not cause multi-link problem.

During determination of factor number, any factors with eigenvalue statistics higher than 1 were considered significant. Table 1 shows factors with eigenvalues higher than 1 in each of five mind areas.

Factors were subjected to rotation to obtain factors that can be named and interpreted. To avoid any correlation between factors obtained in scale analysis, Varimax rotation technique of Orthogonal

Table 1. Factor items obtained as a result of rotation, explained variances and nomenclature table.

The Minds	Five Factors	Items	Naming	Explained Variance	X	ss
Disciplined Mind	Factor 1	16, 17, 27, 33	Prepared and Prescriptive	11.780	3.85	0.21
	Factor 2	9, 39, 57, 94	Accepts guidance and self-disciplined	9.471	2.92	0.61
	Factor 3	3, 13, 51	Responsible	18.186	4.02	0.28
	Factor 4	15, 21, 23	Patient and Determined	13.272	3.16	0.61
	(KMO= .792, Barlett p=.000)		<i>Total Variance Explained</i>	52.709		
Synthesizing Mind	Factor 1	26, 31, 35, 36, 40	Organizes information and entrepreneur	13.365	3.37	0.26
	Factor 2	1, 2, 20, 34, 44, 45	Organizes and interprets preliminary information	11.968	3.77	0.23
	Factor 3	24, 25, 30	Reckless and Fictional	10.742	3.20	0.20
	Factor 4	38, 42, 43	Planned and stable	10.431	3.74	0.13
	(KMO= .837, Barlett p=.000)		<i>Total Variance Explained</i>	46.506		
Creative Mind	Factor 1	8, 41, 46, 50, 72	One who improves what is present and generates feasible ideas	16,901	3.93	0.20
	Factor 2	32, 56, 59	innovative, risk-taking	16,874	3.25	0.44
	Factor 3	54, 60	One who searches for new solutions, is not content with what he has	12,836	2.18	0.38
	(KMO= .718, Barlett p=.000)		<i>Total Variance Explained</i>	46,611		
Respectful Mind	Factor 1	82, 91, 92	Making effort to be a good person	19.474	4,13	0.20
	Factor 2	6, 19, 69, 85	Choosing the right thing, not one's own personal interests	17.746	2.32	0.40
	Factor 3	7, 86	Fulfilling one's responsibilities and sharing those one knows to be right	15.848	3.98	0.52
	(KMO= .745, Barlett p=.000)		<i>Total Variance Explained</i>	53.068		
Ethical Mind	Factor 1	62, 63, 65, 68, 73, 93	One who likes to communicate and help	14.141	4.24	0.25
	Factor 2	77, 79, 80, 88	Just, Neutral	13.952	2.45	0.26
	Factor 3	5, 10, 18, 70, 74, 75	Making effort to work together with those who are different, being committed to the rights and freedoms of others	18.460	1.94	0.24
	(KMO= .843, Barlett p=.000)		<i>Total Variance Explained</i>	46.553		

N=528.

Rotation method was used. Factors were obtained by correlations between original variables and its factor. The greater the weight as absolute value of a variable under a certain factor, the stronger that variable is related to that factor. For a number of data which is 350 and above (which is N=528 in our study) factor weight should be 0.30 and above (Kalaycı, 2006). Therefore, factor weights of 0.30 and above were evaluated under the relevant factor herein. Nine more items were removed from the test as a result of rotation analysis. Then, total variance and reliability coefficient (Cr. α) value explained by the scale was re-calculated using the remaining 66 items.

In factor analysis conducted with the remaining 66 items after reliability analysis and factor analysis (KMO=.883, p=000), total explained variance of scale was found as 57.812. In other words, the scale can be said to explain 58% of the dimensions when all

five mind areas are considered. In consideration of the Table 1, it is clear that individual mind areas and respective dimensions and explained variance rates are also at an acceptable level. After validity and reliability analyses, it can be said that validity and reliabilities of measuring tools used in the study have been ensured.

Data collection and analyses

SPSS database was used to analyze the data. Descriptive and parametric estimative statistical techniques were used. During evaluation of means obtained by Five-point Likert, scores between 1-1.7 were evaluated as totally unsatisfactory, between 1.8-2.5 as unsatisfactory, between 2.6-3.3 as medium, between 3.4-4.1 as satisfactory and between 4.2-5 as totally satisfactory. Any negative

The Minds

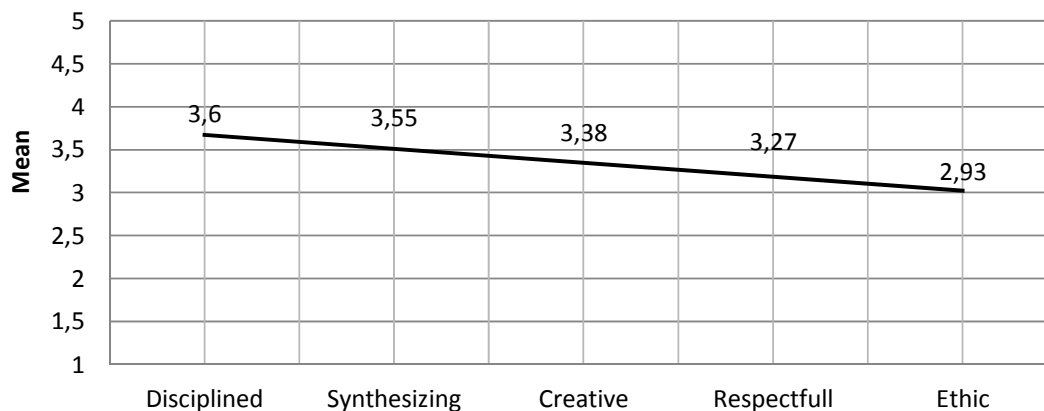


Figure 1. Distribution graph of mind areas of senior secondary school students.

Table 2. Table of One Way Anova performed between means of mind areas.

	Sum of squares	Df	Mean square	F	p
Between groups	151,082	4	37,77		
Within groups	689,165	2603	,265	142,66	,000
Total	840,247	2607			

items discovered in measuring tool was reversed and encoded for analysis. Descriptive statistics, independent samples t test, One Way ANOVA, Two Tailed MANOVA analyses were used to analyze data. It was assumed that the students sincerely replied to items of the scale.

RESULTS AND DISCUSSION

The findings obtained in line with the purpose and questions of the study are presented under 5 sub-sections.

What is the distribution of mind areas among senior secondary school students?

In Gardner’s (2007, 2008a/b) theoretical approach related to five mind areas, presence of a hierarchical structure ranges from disciplined mind to ethical mind. The first three of them are about a hierarchy related to mental area, whereas the last two are mostly about a hierarchy related to values (morality, ethical and universal values). The first question of the study defines distribution of mind areas of senior secondary school students on one hand and test hierarchical sequence of the theoretical approach on the other. As can be seen in the following table, it is observed that the students’ status of having mind areas corresponds to the hierarchical structure.

It is clear that the students’ level of having disciplined mind ($\bar{X}=3,6$, $ss=0.54$), synthesizing mind ($\bar{X}=3.55$, $ss=0.61$) and creative mind ($\bar{X}=3.38$, $ss=0.51$) is “satisfactory”. It is seen that their level of having respectful mind ($\bar{X}=3.29$, $ss=0.48$) and ethical mind ($\bar{X}=2.9$, $ss=0.41$) with higher relevance with values is at “medium” level (Figure 1).

According to the result of one way ANOVA performed to test if there is any significant difference between these five mind areas, it has emerged that there is a significant difference between mind areas ($F_{(4, 2603)}= 142,66$, $p=0.00$) and that effect (gamma) size is 0.42 (higher than 0.05), so mind areas affect each other (Table 2).

According to Post Hoc (Tukey HSD) test conducted to understand between which mind areas such difference exists, significant differences were found not only between disciplined and synthesizing minds but also between all other areas (Table 3).

According to this, the students compare with each other in terms of their level of having disciplined and synthesizing mind areas, while they differ in terms of others. As such difference is maintained, it is apparent that their level of having such competencies “decrease” as going down to ethical mind. When the students’ level of having all mind areas are evaluated together, the students can be said to have such competencies at a “satisfactory” level ($\bar{X}=3.35$, $ss=0.5$).

Table 3. Table for post hoc test (multiple comparisons) conducted between mind areas.

	Disciplined	Synthesizing	Creative	Respectful	Ethical
Disciplined	-	-	-	-	-
Synthesizing	.47	-	-	-	-
Creative	.000	.000	-	-	-
Respectful	.000	.000	.035	-	-
Ethical	.000	.000	.000	.000	-

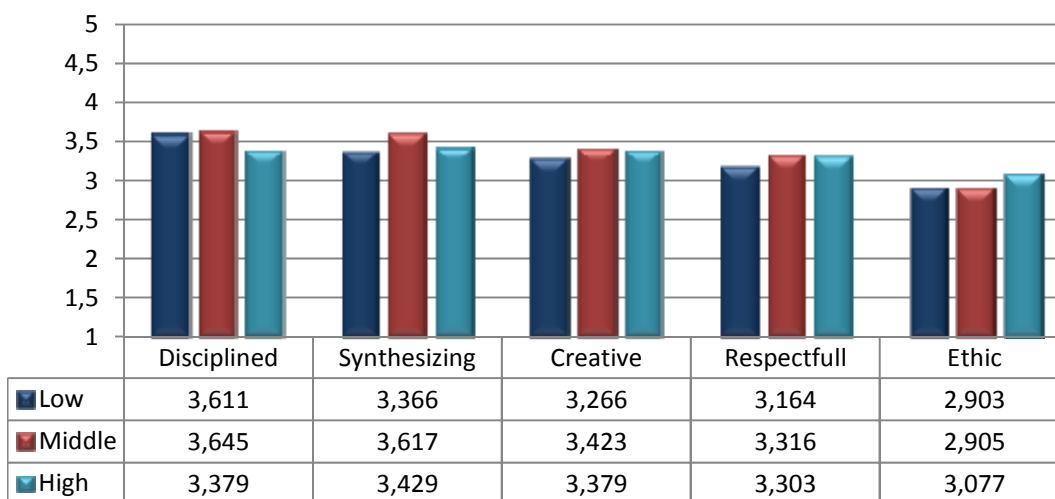


Figure 2. Distribution graph of the students' socioeconomic levels with respect to their mind areas.

These findings confirm hierarchical sequence about mind areas that Gardner (2008a/b) introduced. In findings, students have adequate disciplined mind synthesizing mind, and creative mind (Figure 1). Gardner's disciplined mind, synthesizing mind, and creative mind about mental field correspond with Bloom's (1956), Krathwohl and Masia's (1964), Anderson's (1999), Marzano's (2001), Gagne and Briggs's (1979), Gronlund's (2000), Mager's (1990) and Reigeluth and Moore's (1999) cognitive area classification.

Students have respectful and ethic mind in middle level (Figure 1). This situation, Gardner's respectful and ethic mind about affective area correspond to affective area classification of Neuman and Friedman (2008), Bloom (1956, 1964) and Krathwohl et al. (1964).

Do senior secondary school students' mind area levels differ with respect to their socioeconomic levels?

Testing whether there is any significant difference between students' levels of mind areas and their socioeconomic levels is an important question in terms of

Five Minds for Future as well as learning theories. 16.1% of the students ($\bar{X}=20.69$, $ss=2.37$, $N=85$) are from low socioeconomic level, 69.7% from medium socioeconomic level ($\bar{X}=29.95$, $ss=3.72$, $N=368$) and 14.2% ($\bar{X}=39.07$, $ss=2.45$, $N=75$) from high socioeconomic level.

According to the result of one way ANOVA performed to test if there is any significant difference between five mind areas with respect to socioeconomic level, a significant difference was found to exist between mind areas ($F_{(2, 525)}= 591.876$, $p=0.00$). According to post hoc (Tukey HSD), test conducted to understand between which mind areas such difference exists, significant difference was found ($p\leq 0.005$) between all levels (Figure 2).

Moreover, when socioeconomic status distribution with respect to the students' mind areas is evaluated as a whole, the students can be said to have disciplined ($\bar{X}=3.61$ $ss=0.538$) and synthesizing ($\bar{X}=3.55$, $ss=0.611$) mind areas the most, and creative ($\bar{X}=3.37$, $ss=0.506$) and respectful ($\bar{X}=3.29$, $ss=0.48$) minds the least, and ethical mind at a medium level compared to others ($\bar{X}=2.93$ $ss=0.16$).

In ANOVA analysis conducted to understand students' mind areas and socioeconomic distribution and if there is

Table 4. Table for One Way ANOVA conducted between total scores of mind areas and socioeconomic status.

		Sum of Squares	df	Mean Square	F	Sig.
Disciplined	Between Groups	4,441	2	2,220	7,877	,000
	Within Groups	147,987	525	,282		
	Total	152,427	527			
Synthesizing	Between Groups	5,647	2	2,823	7,747	,000
	Within Groups	191,331	525	,364		
	Total	196,977	527			
Creative	Between Groups	3,131	2	1,566	6,232	,002
	Within Groups	131,879	525	,251		
	Total	135,010	527			
Respectful	Between Groups	1,619	2	,810	3,504	,031
	Within Groups	121,298	525	,231		
	Total	122,917	527			
Ethical	Between Groups	1,906	2	,953	5,616	,004
	Within Groups	89,101	525	,170		
	Total	91,007	527			

any significance between the levels of these two variables, significant difference was found between all mind areas.

According to Table 3, significant differences were found to exist between disciplined mind and socioeconomic level ($F_{(2, 525)} = 7.877$, $p=0.00$), synthesizing mind and socioeconomic level ($F_{(2, 525)} = 7.747$, $p=0.00$), creative mind and socioeconomic level ($F_{(2, 525)} = 6.232$, $p=0.02$), respectful mind and socioeconomic level ($F_{(2, 525)} = 3.504$, $p=0.031$) and ethical mind and socioeconomic level ($F_{(2, 525)} = 5.616$, $p=0.04$). Post hoc (Tukey HSD) test was conducted to establish between which socioeconomic levels and which mind areas such significance exists.

When analyses (Figure 2, Tables 3 and 4) are evaluated together, students from low ($\bar{X}=3.611$, $ss=0.48$, $p=.016$) and medium ($\bar{X}=3.65$, $ss=.539$, $p=.000$) socioeconomic levels can be said to have "more" disciplined mind than students from high socioeconomic level ($\bar{X}=3.38$, $ss=0.55$). Students from medium socioeconomic level ($\bar{X}=3.617$, $ss=0.597$) can be said to have "more" synthesizing mind than those from low ($\bar{X}=3.366$, $ss=0.57$, $p=.002$) and high ($\bar{X}=3.429$, $ss=.666$, $p=.037$) socioeconomic levels. Students from medium socioeconomic level ($\bar{X}=3.423$, $ss=.491$) can be said to have "more" creative mind than those from low ($\bar{X}=3.266$, $ss=.474$, $p=.026$) and high ($\bar{X}=3.245$, $ss=0.576$, $p=.014$) socioeconomic levels. Students from medium socioeconomic level ($\bar{X}=3.316$, $ss=0.481$) can be said to have "more" respectful mind than those from low ($\bar{X}=3.16$, $ss=0.441$, $p=.024$) socioeconomic level. Students from

high socioeconomic level ($\bar{X}=3.077$, $ss=0.41$) can be said to have "more" ethical mind than those from low ($\bar{X}=2.9$, $ss=0.442$, $p=.022$) and medium ($\bar{X}=2.91$, $ss=0.405$, $p=.000$) socioeconomic levels.

According to these analysis results (Figure 2, Tables 3 and 5), the students from medium and high socioeconomic levels can be said to have more of all mind areas than the students from low socioeconomic level (except for the students from high socioeconomic level in the case of disciplined mind).

It is known that there is a close relationship between students' socioeconomic level, poverty, income and welfare, and students' socioemotional developments (Fech, 2009; Cauthen, 2006; Douglas-Hall and Chau, 2008; Isakson et al., 2011). In USA, approximately 80 million children live with 40 million low income families. In the same city, 24 million young children live with 18 million families (<http://nccp.org/profiles/demographics.html>). For that reason, in this research the relationship between students' socioeconomic level and Gardner's five mind area is tested. Brooks-Gunn and Duncan (1997) state that students with low socioeconomic level have low levels of success, vocabulary, and intelligence. The relationship between school success, beliefs and behaviors defined by Marzano et al. (2005), and income and success defined by Payne(2005) is similar to Gardner (1997)'s classification.

According to analyses of the second research question:

1. Students with low socioeconomic income own

Table 5. Post Hoc test conducted to establish between which socioeconomic levels and which mind areas such significance exists.

		Socioeconomic Level	
		Low	Middle
Mind Areas	Disciplined	Low	-
		Middle	.853
		High	.016*
	Synthesizing	Low	-
		Middle	.002*
		High	.789
	Creative	Low	-
		Middle	.026*
		High	.96
	Respectful	Low	-
		Middle	.024*
		High	.161
	Ethical	Low	-
		Middle	.999
		High	.022*

*p ≤ .05.

satisfactory level of disciplined mind ($\bar{X}=3.611$), medium level of synthesizing ($\bar{X}=3.366$), creative ($\bar{X}=3.266$), respectful ($\bar{X}=3.164$) and ethical ($\bar{X}=2.903$) mind.

2. Students with medium socioeconomic level own satisfactory level of disciplined ($\bar{X}=3.645$), synthesizing ($\bar{X}=3.617$) and creative ($\bar{X}=3.423$) mind, and medium level of ethical ($\bar{X}=2.905$) mind.

3. Students with high socioeconomic level own satisfactory level of synthesizing mind ($\bar{X}=3.429$), and medium level of disciplined, creative, respectful, and ethical mind (Figure 2).

After findings are evaluated, there is a decreasing relationship from disciplined mind to ethical mind according to students' socioeconomic levels.

Is there any significant difference between the students' favorite and challenging courses and distribution of their mind areas?

Although the theory of five mind for future is a new approach, one dimension of the theory has some features of old mental and cognitive theories, and other dimension of the theory has some features of effective theories and value education.

In a similar way, lessons that are learned in school have some dimensions of mental, effective, ethic, and

skills. A student may like a course although it is challenging for him/her or a student may not like a course although he/she is successful at it. Based on this knowledge, whether there is any significant change between the students' favorite or challenging courses and their mind areas has been analyzed as question three of the study.

Total variance (Table 1) which the scale explains with all its dimensions is 52.8. Accordingly, two tailed manova was conducted between the students' most favourite courses or the courses said to be challenging for them and average of their mind areas.

The students' most favorite courses are Turkish (3.72%, N=173), Maths (20.47%, N=105), Social Studies (16.18%, N=83) and Science (15.98%, N=82). On the contrary, English (7.21%, N=37), Physical Education (2.34%, N=12), Art (1.56%, N=8), Music (1.17%, N=6), Technology and Design (0.58%, N=3), Computing (0.39%, N=2) and Religion (0.39%, N=2) are also among the students' favorite courses even though they are small in number.

Maths (45.56%, N=237), English (24.66%, N=128), Science (12.33%, N=64), Social Studies (8.09%, N=42), Turkish (3.27%, N=17), Art (2.5%, N=13), Music (1.54%, N=8), Technology and Design (1.35%, N=7), Physical Education (0.58%, N=3) were established to be the courses the students find most challenging.

No significant difference ($p \geq .05$) was found in two tailed manova analysis conducted between the students' most favorite courses or the courses said to be the most challenging and averages of their mind areas. In fact, this finding is a finding that checks mutual consistency of the students' opinions they stated about the courses (i.e. their opinions about their favorite courses and challenging courses).

According to this, the students' most favorite courses and most challenging courses do not show any significant difference with respect to their mind areas.

Is there any significant difference between the students' mind area levels and their gender?

Based on the question "do the students' mind area levels vary with respect to their gender?" variance of the students' mind areas with respect to gender was tested. 50.38% of the sample is (N=266) female and 549.62 (N=262) is male.

According to findings of Independent Samples t Test analysis carried out between the students' gender and their total scores from the Scale of determining mind areas, no significant difference ($p=0.21$) is shown to exist in their mind area levels with respect to their gender. In other words, no distinction between females and males was found with respect to having mind areas. When the difference between the students' mind area levels and their gender is analyzed individually for every mind area,

no significant difference was found, either.

Is there any significant difference between the professions the students wish to have in the future and their mind area levels?

All professions need different competencies. Some of these competencies are mostly mental (teacher, doctor, engineer, lawyer etc.), and some are mostly effective (artist, psychologist, sociologist etc.), and some mostly need ability (sportsman, police, repairman). However, all of these professions also need other competencies. Variance of the students' mind areas with respect to the professions the students wish to have in the future was tested. Professions the students wish to have in the future are doctor (26.89%, N=142), teacher (22.37%, N=113), police/soldier (21.19%, N=107), engineer (9.5%, N=48), lawyer (7.72%, N=39), athlete (2.38%, N=12), actor (1.78%, N=9), architect (1.18%, N=6), pilot (0.59%, N=3), politician (0.198%, N=1), journalist (0.198%, N=1), other (4.75%, N=24).

One Way Anova and post hoc analysis were performed between the professions the students wish to have in the future and their mind area average scores. In the case of comparisons individually made in relation to mind areas and professions, no significant difference ($p \geq .05$) was found between their mind areas and the professions the students wish to have in the future. Furthermore, the difference between the students' mind area levels and the professions the students wish to have in the future was analyzed individually for every mind area and no significant difference was found, either. In other words, the students' mind areas do not vary with respect to the profession they wish to have.

CONCLUSION AND SUGGESTIONS

The findings obtained in line with the questions of the study and suggestions are presented below.

Conclusion

1- Participants have "satisfactory" level of disciplined, synthesizing and creative minds and "medium" level of respectful and ethical minds. While going from disciplined mind to ethical mind, their levels of having these mind area qualifications were also demonstrated to decrease. This corresponds to hierarchical structure of Five Minds for the Future theory. This finding can be said to also confirm the theoretical structure in that respect.

2- Participants' mind area distribution differ with respect to socioeconomic level. Students from low and medium socioeconomic levels can be said to have "more"

disciplined mind than the students from high socioeconomic level. Students from medium socioeconomic level can be said to have "more" *synthesizing and creative minds* than students from low and high socioeconomic levels. Students from medium socioeconomic level can be said to have "more" *respectful mind* than students from low socioeconomic level. Students from high socioeconomic level can be said to have "more" *ethical mind* than students from low and medium socioeconomic levels.

3- No significant difference was found between the students' most favorite courses or the courses said to be the most challenging and averages of their mind areas. Accordingly, the students' most favorite courses and the courses they stated as challenging do not differ with respect to their mind areas.

4- Students' mind areas do not show any significant difference with respect to their gender and the professions they wish to achieve in the future.

Suggestions

1- It can be useful to introduce these mind areas, which the teachers voluntarily or involuntarily bring to their students, into curricula so that teachers bring them more consciously.

2- Exemplary activities related to bringing and developing these mind areas should be planned for all courses.

3- Examples of how relevant mind areas will be measured and evaluated should be generated.

4- This study was conducted on senior secondary school students. Similar studies can also be conducted in other educational levels. Thus, the course of change in students' mind areas can be defined in all educational levels.

5- Individual scale development studies can be carried out for each mind area.

6- Further theoretical and practical studies can be made on mind areas other than those referred to above.

Conflict of Interests

The author has not declared any conflict of interests.

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