Types of Multiple Intelligences among Undergraduate Students at Yarmouk University in Light of Gardner's Theory

Dr. Suad Ahmad Younes Mustafa
Ph.D. Graduate, Faculty of Educational Sciences
University of Jordan

Dr. Saleh Mohammad Abu Jado
Associate Professor of Educational Psychology
Faculty of Educational Sciences and Arts (UNRWA/Jordan)

Dr. Sa'ad Majed Onoz
Assistant Professor of Educational Psychology
Faculty of Educational Sciences and Arts (UNRWA/Jordan)

Abstract

This study aimed to identify the types of multiple intelligences among undergraduate students at Yarmouk University in light of Gardner's theory. To achieve this aim, the Multiple Intelligences Test (MIT) prepared by Onoz (2009) was administered on a study sample consisting of (759) students at Yarmouk University in Jordan. The results of the study showed that the linguistic intelligence ranked first, while the spatial intelligence came last, and that there were no statistically significant differences on the intrapersonal intelligence, while there were statistically significant differences on the rest of the intelligences attributed to the gender variable. Results also showed that there were no statistically significant differences on the intrapersonal intelligence while there were statistically significant differences attributed to the faculty variable in favor of students of scientific faculties in the logical, spatial, and the naturalist intelligences and in favor of students in humanity faculties in the rest of intelligences. The study also found out that there were no statistically significant differences on all intelligences attributed to the study level variable, except for the linguistic, logical, and spatial intelligences in favor of third and fourth year's students. The study concluded with suggesting many recommendations the most important of which is that faculty of universities should pay more attention to multiple intelligences of students.

Keywords: types of intelligences, Yarmouk University, Gardner's Theory, multiple intelligences

Introduction

Since the early 1980s Howard Gardner's ideas of multiple intelligences has led a generation of educators to exceed the narrow idea of IQ scores which dominated largely during the entire periods of the 20th century (Goleman, Barlow, and Bennet, 2010). The new theory is considered as a revolution against the stability and unitary perspective of intelligence (Marlowe and Canestrari, 2006), and created dramatic transformations from the traditional view of intelligence to a more comprehensive one that gives importance to each part of the human mind (Johnson, 2007). Gardner addressed this theory in his revolutionary book *Frames of Mind* published in 1983, where he identified seven intelligences suggesting that this number of abilities is expected to increase (Gardner, 1999a).

The theory of multiple intelligences since its emergence deeply influenced all domains of general psychology in general and the educational practices in particular. It changed teachers' perception of their students and clarified the appropriate methodologies of dealing with them in accordance with their intellectual capabilities. Two decades later, Gardner concluded two educational implication of this theory. First, all educators should seriously take into account the individual differences among learners and design teaching to enable them to address each learner in the most efficient way. Secondly, educators need to teach the essential topics in different methodologies that take into account the activation of multiple intelligences (Gardner, 2009).

Theoretical Background

The attempts to deeply understand human intelligence commenced at the beginning of the twentieth century, when the Ministry of Education in France approached the French psychologist Alfred Binet to develop tests to identify school students who were unable to benefit from the regular school programs in order to address the problem of the crowded classrooms (Santrock, 2008). Binet, in collaboration with his colleague Simon, developed the first tests to measure students' intelligence. In spite of the widespread use of these tests during the first half of the twentieth century and in particular during World War I (Buvoltz, Powell, Solan, and Longbotham, 2008), and in spite of the tendency during the whole century to define intelligence in terms of IQ scores; some scholars thought that intelligence has non cognitive aspects as well, among them was Thorondike (1920), who proposed three types of intelligences among them the social intelligence. Twenty years later, Wechsler suggested that non cognitive elements are not less important than the cognitive ones (Black 2003).

The beginnings of the multiple intelligences theory draw back to the late 1970s when Harvard University approached some scholars and asked them to carry out a scientific research to assess the scientific knowledge related to the human intellectual capabilities and highlighting the extent of realizing and using these capabilities. To achieve this goal, a team of specialized scholars at the university conducted research that lasted for several years to explore these capabilities and the extent of achieving them in the real world. The team also organized many international meetings which addressed issues related to developing the concept in different global cultures (Paulus, Lysy & Yik, 1998). The researchers involved in this research study belong to a diversity of domains such as psychology, educational psychology, philosophy of education, philosophy of science, and social anthropology; which reflects the inspiration of the project and the role of each scholar in its success. The result of this research was the emergence of the multiple intelligences theory, which was supported by the scientific findings of cognitive and neurology sciences (Furnham & Fong, 2000).

In this context, the French scholar Pierre-Broce stated that there is a relationship between the damage of a certain area in the mind and the malfunctioning of a certain cognitive ability. The damage which occurs in the upper left side of the cortex results in the loss of the speech ability and patients who suffer from brain damage of the left hemisphere loose the speech ability because the right hemisphere remains intact, while patients who suffer from brain damage of the right hemisphere may read fluently, but can't interpret what they read (Viens & Kallenbach, 2006).

This theory has represented a challenge for the traditional perception of intelligence which recognized one type of intelligence remains constant during the different stages of life, and confirmed the diversity of intelligences among people, and the way of using these intelligences, which consequently enrich the society and diversify its culture and civilization through the provision of opportunities for these intelligences to contribute in developing the society and its advancement. Psychologists have received this theory and found that it provides them with a new pedagogical model in addressing the intelligence topic since it takes into consideration the individual differences and lays the foundations for a new concept of intelligence that considers the diversity of learner's abilities, skills, capabilities and competencies (Kallenbach, 2006; Gardner, 2011).

Gardner views intelligence in a comprehensive way underpinning the importance of individuality since he thought that individuals have different types of strengths and weaknesses in their diverse abilities. Accordingly, it is crucial to understand the appropriate tools for each individual in order to develop them. The definition of multiple intelligences from Gardner's view point comprises three basic following components: (1) The human competence which implies the skills of problem solving and overcome difficulties; hence, Gardner views intelligence as a group of skills that enable the individual to solve the problems countered (2) The ability to achieve effective products or providing services valued by the culture of the society he/she lives in and (3) The ability to reach creative solutions which contribute to laying the foundations of acquiring new knowledge (Gardner 1983).

Upon providing a new vision of intelligence by Howard Gardner the concept of intelligence becomes more functional with profound effects on people's lives in different ways, and presented a profile of a wide range of abilities that individuals have through organizing these abilities in eight categories, summarized as follows (Armstrong, 2009; Gardner, 2000; Fetsco & McClure, 2005; Gardner, 1999b):

Linguistic: The ability of effective use of the written and verbal language, and giving a meaning to the world through language.

This intelligence includes the ability to produce a group of relationships to support transmitting of meaningful information. The individuals who excel in this intelligence show flexibility in producing language and feeling the sense of difference between vocabulary items, their order and rhythm. Moreover, they prefer reading, writing and storytelling and master the grammar rules and language structures.

Logical-Mathematical: The ability to use numbers effectively, the sensitivity to logical models, relationship, hypothesis testing, classifying, reasoning and understanding the abstract relationships. People possessing this type of intelligence are characterized by developing the necessary hypotheses to solve problems, recognizing graphics and abstract relationships, high ability of thinking and solving problems, formulating logical questions, and superiority in logic related to science.

Interpersonal: The ability to recognize other's feelings, intentions, interpreting them, distinguishing between motives and feelings, sensitivity to cues and facial expressions and sounds of others, responding to them in a practical way, and the ability to influence them. This type of intelligence provides opportunities to understand others, identify their desires and interacting with them effectively. Individuals who excel in this intelligence prefer working in teams and have advanced skills in leadership, organization, communication, mediation, and negotiation.

Intrapersonal: This intelligence refers to self-knowledge and the ability to adaptation based on this knowledge, formulating an accurate image about self; including strengths and limitations and awareness of the internal mood and the ability to self-control and self-esteem. People who possess this intelligence can discriminate between their own feelings to formulate mental models about themselves, make decisions about the different aspects of their lives and enjoy a feeling of ego and personal skills.

Bodily-Kinesthetic: The ability to use the whole body to express thoughts and feelings, as in acting, dance and dexterity in the use of hands as in sculpture, drawing, and the surgical procedures. This type of intelligence includes physical skills such as: coordination, strength, speed, balance, and flexibility. People, who possess this intelligence, excel in physical activities, coordination between visual and motor stimuli, and they have tendency to movement and touch things.

Musical: The ability to perceive musical pieces and discriminate between them and the sensitivity to rhythm and music taste. This intellectual ability provides opportunities to understand the sounds, give them meaning, and diagnose the musical tones. It was noticed that this type of intelligence is available among those who can remember tunes, recognize tones, sounds and rhymes.

Visual-Spatial: The ability to perceive the visual-spatial world accurately. This intelligence includes the sensitivity to colors, lines, models, space and relationships between these elements and directing the self appropriately in a spatial matrix. This intelligence enables the individuals to perceive the visual and spatial information and create visual representations of the world and the ability to adapt them intellectually, perceive directions, recognize faces or places, highlight details and process the geographical maps, paintings, tables, games and mazes.

Naturalist: This intelligence allows individuals to understand the environments surrounding them, classifying, and using them. It includes the ability to identify the natural organisms of plants and animals and classifying them. People of this kind of intelligence are fond of observing the living organisms, recognizing their characteristics, the sensitivity to the natural phenomena such as the clouds, mountains, earthquakes, volcanoes and the ability to differentiate between their different manifestations.

In the context of displaying the eight multiple intelligences proposed by Gardner, Armstrong (2009) refers to a group of points about this theory; it could be summarized as follows: (1) this theory does not postulate one intelligence that suits the individual, it is a theory of a cognitive function and assumes that each individual has all the intelligences, which work together in unique ways (2) Most people could develop each intelligence to an appropriate level of competency if there is a sufficient level of enrichment in instruction or training, in addition to necessary encouragement (3) The intelligences work together in a complex way, since no intelligence is separated from other intelligences, having in mind that the segregation is done for the purpose of investigating the core features of these intelligences and recognizing how to use them effectively (4) There are no standard features for the individual to be intelligent in a given area; consequently, the individual could be unable to read or write while he could be a distinguished poet or a brilliant speaker.

Armstrong (2009) added that the multiple intelligences theory exceeds the classroom instruction and does not call for drastic changes in the school structure. However, it provides educators with a strong message that each student comes to school every day with the right to obtain all the experiences necessary to activate all the intelligences and enhance them, not only the verbal or logical intelligences which remain for long decades the focus of attention.

Related Literature Review

As for the studies that addressed the effect of the multiple intelligences on some variables, Khataybeh & Al-Bdor (2006) investigated the effect of using multiple intelligences strategies on acquiring skills of science processes among seventh graders in general science curriculum. The sample of the study comprised (95) male and female students. The results of the study revealed that the multiple intelligences strategies excel the traditional methodology in acquiring science processes in the area of basic science processes, and that females excel males in acquiring these processes.

Abdel-samee' & Lashin (2006) carried out a research study to investigate the effect of a program based on multiple intelligences to develop achievement, mathematical thinking and preparatory students' tendency towards Mathematics. The sample of the study consisted of (78) female students who were distributed equally into control and experimental groups. The findings of the study confirmed the effectiveness of the proposed multiple intelligence-based program on developing students' achievement, mathematical thinking and students' tendency towards mathematics.

Al-Ahdal (2009) examined the effectiveness of activities and methodologies based on the multiple intelligences theory on improving First secondary students' geography achievement in Jeddah governorate. The sample of the study consisted of (72) female students distributed into experimental and control groups. The results of the study indicated that there were statistically significant differences between the two groups in favor of the experimental group.

Al-Aslani (2010) investigated the effectiveness of using a remedial strategy in light of the multiple intelligences theory on developing second preparatory slow learners' achievement in geometry and on their attitudes towards geometry in Jeddah governorate. The findings of the study revealed that there were statistically significant differences in favor of the experimental groups on both dependent variables.

In the same context, Ahmad (2010) examined the effect of a program based on multiple intelligences on developing creative thinking and achievement among students in secondary commercial school. The sample study consisted of (120) female students distributed into two groups; (40) students in a control group, and (80) students in an experimental group. The results showed that there were statistically significant differences between students of the two groups in favor of the experimental group.

As for the studies that addressed the multiple intelligences and their relation to some variables, Wiseman (1997) carried out a study to identify the types of multiple intelligences among students of a secondary school in the United States in theoretical and applied subjects. The sample of study consisted of (240) female and male students. The results of the study pointed out that there were significant differences between the students of the theoretical and applied schools in logical, bodily-kinesthetic and intrapersonal intelligences in favor of the students of the theoretical subjects.

Afanah & Al-Khazendar (2003) conducted a study to identify the level of multiple intelligences among students of the lower elementary cycle in Gaza and the relationship of these levels with achievement in Mathematics and students' tendency towards this subject. The sample of the study consisted of (1387) male and female students in Gaza government schools from 1-10 grades. The findings of the study revealed that the participants of the study sample possess multiple intelligences in varying degrees. It also revealed that males excel females in logical-mathematical and bodily-kinesthetic intelligences, and found positive relationship between the logical-mathematical intelligence and the tendency towards Mathematics among tenth graders.

Gogebanakan (2003) explored the intelligence preferences of students and the variations in these preferences in terms of gender and grade level. The study sample consisted of (321) male and female students from 1st, 3rd, and 5th basic grades. The findings of the study showed that students have different intelligences that vary in accordance with the grade level.

The results also showed that 1st grade students have preferences of the linguistic and magical-mathematical intelligences while the 3rd grade students showed preferences towards the spatial, intrapersonal and magical-mathematical intelligences, whereas the 5th grade students showed preferences towards the intrapersonal, bodily-kinesthetic and musical intelligences. The results of the study found out that male students tend to prefer the magical-mathematical, bodily-kinthesitic intelligences, while female students tend to prefer the musical intelligence.

The study conducted by Al-Alwan (2008) aimed to identify the multiple intelligences preferences among 4th and 8th graders in the light of Gardner's theory and explore the differences in these preferences based on variations in gender and grade level. The study sample consisted of (623) male and female students in Maa'n governorate in 2006/2007. The results of the study showed that the preferred intelligences among 4th graders included the linguistic, logical-mathematical, spatial and bodily-kinesthetic intelligences. However, the 8th graders preferred the bodily-kinthesitic, interpersonal, musical and naturalist intelligences. The results also revealed that the least preferred intelligences were the existential and naturalistic intelligences.

Net, Ruiz & Turnham (2008) conducted a study to investigate the relationship between gender and attitudes towards intelligence and self-assessment of multiple intelligences. The study sample consisted of (242) male and female students. The results of the study found out that there were significant differences between them in accordance with gender; where the males assessed themselves higher than females in the logical-mathematical, spatial, spiritual, and naturalistic intelligences.

Nofal and Al-Heeleh (2008) investigated the differences in Gardner's multiple intelligences among the 1st academic year in UNRWA/Jordan higher education institutions. The sample of the study consisted of (515) male and female students, distributed into two groups; (103) males and (412) females. The findings showed that there were statistically significant differences attributed to gender on the logical-mathematical, visual-spatial, and interpersonal intelligences in favor of females and in the musical intelligence in favor of males. The results also indicated that there were no significant differences between males and females on the linguistic, bodily-kinesthetic, intrapersonal, and naturalistic intelligences.

Golam (2011) carried out another study to investigate the professional tendency and the multiple intelligence among 3rd secondary graders and to identify the relationship between the professional tendency and the multiple intelligences and the differences in professional tendency between males and females. The study sample consisted of (360) male and female students. The results of the study revealed that the most dominant intelligences among males and females were interpersonal and existential intelligences, and there was a significant relationship between multiple intelligences and professional tendency. Moreover, the study findings indicated that there were differences on scientific tendency in favor of science and mathematics group and significant differences in technical tendency in favor of languages and humanity sciences and finally there were differences on scientific tendency attributed to the specialization.

Finally, Yamin (2013) conducted a study to investigate the types of mathematical thinking and its relationship with some variables to identify the relationships between the intelligences among 10th graders in Toolkarem governorate. The study sample consisted of (395) male and female students in the second semester 2012/2013. The results showed that the participants possess all the intelligences in varied levels. The interpersonal intelligence ranked first, while the spatial intelligence ranked last. The ratio of the students chose the scientific stream was 35% while the ratio of those who chose the humanity sciences was 65%.

From the review of the related literature, it is obvious that there are many studies that have addressed the multiple intelligences theory in varied topics, levels and cultures. Some of these studies focused on the effectiveness of multiple intelligences-based teaching, training and strategies on some variables such as achievement, creative thinking, science skills, and tendency towards some school subjects. The results of these studies confirmed the effectiveness of these programs and strategies such as Al-Ahdal (2009), Khataybeh and Al-Bdor (2006), and Al-Aslani (2010), whereas, other studies focused on the relationships between multiple intelligences and some variables such as grade level, achievement, gender, mathematical thinking, professional tendency (Yamin, 2013), (Wiseman, 1997), (Gogebanakan, 2003), and (Golam, 2011).

In the context of the growing interest in applying multiple intelligence theory in the educational settings, this study aims to investigate these types of intelligences and their dominance among undergraduate students in Yarmouk University in Jordan and to identify the relationship of these types with gender, academic level, and the college variables. Therefore, this study is different from other studies because it could be one of the few Arab studies that have addressed the types of multiple intelligences and their relationships with some variables on the university level in the Jordanian context.

Statement of the problem

Those interested in the educational process in the higher education institutions, especially universities notice the scarcity of interest in developing study programs and teaching methodologies in accordance with students' learning styles and their preferences in processing, storing, and retrieving information in spite of the fact that educators stress the importance of taking into consideration the individual differences between learners, and in spite of the results of the scientific studies that support the notion of variations among learners, and their ability to learn better if the study programs, courses and methodologies were designed in accordance with their own types of intelligences.

Most educators agree that all students with their different levels and intelligences are able to learn but in varying degrees and they believe that the quality of this learning depends on providing students with appropriate learning opportunities that suite their abilities and their types of intelligences and varying preferences. Due to the diversity of intelligences that individuals have and due to the importance of exploring and identifying these abilities, and benefitting from recognizing them, and their distribution among students at the university level, this study attempted to investigate the types of intelligences among undergraduate students at Yarmouk University in light of Gardner's theory and its distribution in light of the variables of gender, college and academic level.

The Purpose of the Study and its Questions

The study aimed to investigate the types of multiple intelligences among undergraduate students in Yarmouk University in light of Gardner's theory. In particular, the study attempted to answer the following questions:

1. What are the types of multiple intelligences among undergraduate students of Yarmouk University?
2. Are there statistically significant differences in multiple intelligences abilities among undergraduate students of Yarmouk University attributed to the gender variable?
3. Are there statistically significant differences in multiple intelligences among undergraduate students of Yarmouk University attributed to the college variable?
4. Are there significant differences in multiple intelligences among undergraduate students of Yarmouk University attributed to the student’s study level variable?

Significance of the Study

This study is quite important because it tackles the types of multiple intelligences among undergraduate students of Yarmouk University in light of the findings of the revolutionary theory introduced by the American psychologist Howard Gardner (1983), which received great attention from all educational circles all over the world, and have been applied almost in all aspects of education. Nevertheless, the interest of the Arab world in this theory is still in its beginnings in spite of its superior importance in developing the educational process in all levels, including the higher education, especially at the university level.

The importance of this study is crucial in providing educators and researchers with field information about the types of multiple intelligences among undergraduate students at Yarmouk University. Especially the study came in a period that witnesses more attention by the higher education institutions in Jordan and greater focus on the quality of its outcomes in accordance with development plans which view the human element as the most critical single factor in the progress and development of the nations to keep pace with the era of globalization and information technology.

As for the practical importance of this study it is expected that it will contribute to increasing awareness of teaching at Yarmouk University and probably in other universities in Jordan or abroad of the types of multiple intelligences of their students, and benefiting from this knowledge in designing their course syllabi and learning/teaching activities commensurate with their students’ preferences. The results of this study may assist students themselves through raising their awareness of the types of intelligences they have, their strengths, and weaknesses, to develop themselves in accordance with their mental traits and intelligence preferences.

This study is also considered of crucial importance to all educators who are involved in the education system either in schools or in the higher education level so they can take into account the varying types of multiple intelligences among male and female students at different levels and colleges.

Limitations of the study

The results of this study could be interpreted and generalized in the light of the following limitations:

1. The sample of the study was restricted to undergraduate students at Yarmouk University during the first semester of the academic year 2010/2011.
2. The indications of effectiveness of the tests used in this study and their items are limited by the psychometric characteristics accepted for the purpose of this study noting that the psychometric features of these tests have been verified and validated.

Operational Definitions

Intelligence type: The kinds of the eighth intelligences and their distribution among the sample of the study. They are identified operationally through means to each of the intelligences, measured by tests implemented for this purpose.

Multiple intelligences: Mental, psychomotor, and emotional abilities defined in light of the concept of multiple intelligences proposed by Gardner.

Undergraduate students of Yarmouk University: Students enrolled in the different study programs at Yarmouk University during the academic year 2010/2011.

Methodology

Population and Sample

The population of the study consists of (24326) undergraduate students from different specializations at Yarmouk University during the first semester of the academic year 2010/2011. The study sample consists of (759) male and female students were selected from the population using the stratified random method representing the different specialties of the university (3% of each level), and was distributed into two levels. While students of the first and second year represent the first level, students of the third and fourth year represent the second level. Table (1) shows the distribution of the study sample in accordance with its variables.

Table 1: Distribution of the study sample according to its variables

Variables	Level/category	Frequency	Percentage
Gender	Male	364	47.96%
	Female	395	52.04%
College	Humanities	452	59.55%
	Scientific	307	40.45%
Study Level	1st & 2nd years	362	47.83%
	3rd & 4th years	396	52.17%
Total		759	100.00%

Study Tool

The authors of this study used the tests of the intellectual abilities in accordance with Gardner's multiple intelligences theory designed by Onouz (2009). These tests are implemented online through the website: www.iqdrsaad.com. They include the following intelligences: Linguistic, logical-mathematical, visual-spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, and naturalistic intelligences. Each test of (15) items measures one certain intelligence ability; therefore, the total items of the tests is (120) distributed into the eight intelligence abilities. The tests are of multiple choice types, whereas each item has four alternatives. The duration of implementing the tests is (60) minutes. To maintain the confidentiality of the tests the authors provide the participants with a user name and a password which were changed after each application.

Tool Validity

The online version was examined by (12) professors of Educational Psychology working at different Jordanian universities to verify the validity of the test items and their appropriateness to measure the intelligence abilities. The reviewers' views were considered and some items were modified accordingly.

Tool Reliability

The tests in their original version enjoy a high level of reliability. The author of these tests verified their reliability through implementing them on an experimental sample using Cronbach Alpha formula. The reliability values ranged between (0.76-0.89). For the purposes of this study, the authors investigated the reliability coefficient through implementing the tests on an exploratory sample. The reliability values ranged between (0.73-0.84), these values are acceptable for the purpose of this study. Table (2) shows the values of reliability coefficients of the mental abilities' tests using Cronbach Alpha formula.

Table 2: Values of internal consistency coefficients of each intelligence ability

No.	Intelligence Abilities	Number of Items	Value of Cronbach alpha coefficient
1	Linguistic	15	0.81
2	Logical-Mathematical	15	0.77
3	Visual-Spatial	15	0.73
4	Bodily-Kinesthetic	15	0.83
5	Musical	15	0.80
6	Interpersonal	15	0.79
7	Intrapersonal	15	0.77
8	Naturalistic	15	0.84

Tests Scoring

Each item of the tests has one score if the selected alternative is correct and the zero score if the selected alternative is wrong. Therefore, the score of each test ranges from 1-15.

Study Procedures

The authors followed the following procedures in implementing the current study:

1. Preparing the intelligences tests in accordance with Gardner's theory.
2. Getting permission from the university and faculty to apply the study.
3. Selecting a stratified random study sample from undergraduate students at Yarmouk University.
4. Applying the eight multiple intelligences tests on the study sample.
5. The statistical processing.

Study Variables

The study includes the following variables:

1. Independent variables
a. Gender (Males, females)
b. College (Humanity, scientific)
c. Study level (First and second years, third and fourth years)
2. Dependent variable: The intelligence abilities of students

Results and Discussion

Upon collecting data using the study tool "Multiple Intelligences Tests" in accordance with Gardner Theory"; the researchers concluded the following results and discussions in light of the questions of the study:

Results and Discussions Related to the First Question

To answer the first question: "What are the types of multiple intelligences among undergraduate students of Yarmouk University in light of Gardner's theory?"

The means and standard deviations of the study sample scores were calculated, Table (3) shows these results.

Table 3: Means and standard deviations of the sample study scores on the eight intelligence abilities in descending order

No.	Intelligence Ability	Means	Standard Deviation	Rank
1	Linguistic	9.97	3.02	1st
4	Intrapersonal	8.34	2.29	2nd
5	Interpersonal	7.99	2.62	3rd
6	Musical	7.76	2.49	4th
7	Bodily-Kinesthetic	7.58	2.84	5th
2	Logical-Mathematical	7.24	2.31	6th
8	Naturalistic	7.05	2.86	7th
3	Visual-Spatial	6.98	3.68	8th

*The maximum score of each ability (15).

Table (3) shows that the linguistic intelligence ranks first with mean scores of (9.97) and SD of (3.02), then came the intrapersonal intelligence with mean scores of (8.34) and a SD of (2.29), while the visual-spatial intelligence ranks last with mean scores of (6.98) and a SD of (3.68). These results could be attributed to the focus of the educational systems in Jordan either in schools or in universities on developing linguistic intelligence among students through using teaching strategies based on exposition, lecturing, questioning, and dialogue as well as using verbal and written language in different types of assessment and evaluation. As for as the intrapersonal intelligence which ranked second; the authors attribute this result to the nature of students at the university level, where they enjoy higher levels of psychological and emotional stability, and become more able to identify their identities including their strengths and weaknesses. Moreover, it is obvious that the features of university life including a diversity of co-curricular activities, selecting preferred courses, holding more responsibility of their own learning, and the nature of relationships and the social interaction at all levels between a wide range of cultures which might support students in developing their personal skills. But, as for the visual-spatial intelligence which occupied the last rank; the authors attribute this result to the focus of most programs' activities at the university level on the linguistic intelligence and the low focus on aspects related to visual-spatial intelligence such as visual imagination, visual symbols, colored slides, mental images, spatial reasoning, tables, paintings, drawings, and illustrations. The results of this study are in harmony with the results of Al-Alwan (2008), Nofal and Al-Heeleh (2008), Gogebanakan (2003), and Net, Ruiz, & Turnham (2008), while disagreed with the study carried out by Golam (2011).

Results and Discussions Related to the Second Question

To answer the second question" Are there statistically significant differences in multiple intelligences abilities among undergraduate students of Yarmouk University attributed to the gender variable? The means and standard deviations of the study sample on the eight intelligence abilities were calculated as shown in table (4).

Table 4: Means and standard deviations of the sample study scores on the eight intelligence abilities according to gender variable

Intelligence Abilities	Gender	Number of participants	Means	Standard Deviation
Linguistic	Male	364	8.06	2.88
	Female	395	11.73	2.94
Logical-Mathematical	Male	364	8.72	2.44
	Female	395	5.88	2.85
Visual-Spatial	Male	364	8.92	2.69
	Female	395	5.19	2.51
Intrapersonal	Male	364	8.13	2.64
	Female	395	8.53	2.68
Interpersonal	Male	364	6.96	2.40
	Female	395	8.94	2.17
Musical	Male	364	6.81	2.04
	Female	395	8.64	1.99
Bodily-Kinesthetic	Male	364	8.84	2.12
	Female	395	6.42	1.76
Naturalistic	Male	364	7.23	1.84
	Female	395	6.88	1.97

Table (4) shows that there are apparent differences between the mean scores of the study sample on the eight intelligence abilities. To identify the levels of statistical significance of these differences the MANCOVA test was administered in accordance with the gender variable as shown in table (5).

Table 5: The results of MANCOVA test of the differences between the sample scores on the eight intelligence abilities according to gender

Source of Variance	Dependent Variables	Sum of Squares	Degrees of Freedom	Means of Squares	F Value	Statistical Significance
Gender Hotelling$_{= 4.015}$ P= 0.004	Linguistic	8.49	1	8.49	14.947	0.000*
	Logical-Mathematical	1.219	1	1.219	6.772	0.000*
	Visual-Spatial	11.789	1	11.789	17.862	0.000*
	intrapersonal	0.628	1	0.628	1.002	0.382
	interpersonal	11.166	1	11.166	14.731	0.000*
	Musical	6.354	1	6.354	9.064	0.000*
	Bodily-Kinesthetic	14.765	1	14.765	22.037	0.000*
	Naturalistic	12.995	1	12.995	11.510	0.001*

* Indicant on the significant level ($\propto = 0.05$).

Table (5) shows that there are no statistically significant differences ($\propto = 0.05$) between the mean scores of the study sample on the intrapersonal intelligence while there are significant differences ($\propto = 0.05$) between the mean scores of the study sample on the rest of the intelligences attributed to the gender in favor of males on the logical-mathematical, visual-spatial, and bodily-kinesthetic, and naturalistic intelligences, and in favor of females on the linguistic, interpersonal, and musical intelligences. The authors attribute these results to the nature of the cerebral anatomy of males that show superiority over females on the scientific abilities that rely on cognitive style field-independence, while females rely on the cognitive style field-dependence, in addition to the connections of females with interpersonal and musical intelligences (Gardner 1993). These results confirm the findings of many studies (Afanah & Al-Khazendar 2003, Gogebanakan 2003, Net, Ruiz, & Turnham 2008), while these results disagree with other studies such as (Khataybeh & Al-Bdor, 2006) and (Nofal & Al-Heeleh, 2008).

Results and Discussions Related to the Third Question

To answer the third question: "Are there statistically significant differences in multiple intelligences abilities among undergraduate students of Yarmouk University attributed to the college variable? The mean scores and standard deviations of the study sample on the eight intelligence abilities were calculated as shown in table (6).

Table 6: Means and standard deviations of the study sample scores on the eight intelligence abilities according to college

Intelligence Abilities	College	Number of participants	Means	Standard Deviation
Linguistic	Humanities	452	11.09	2.59
	Scientific	307	8.32	2.16
Logical-Mathematical	Humanities	452	6.32	1.87
	Scientific	307	8.59	2.17
Visual-Spatial	Humanities	452	6.38	1.75
	Scientific	307	7.86	2.07
Intrapersonal	Humanities	452	8.27	1.92
	Scientific	307	8.44	2.60
Interpersonal	Humanities	452	8.64	2.75
	Scientific	307	7.03	2.66
Musical	Humanities	452	8.19	2.31
	Scientific	307	7.12	1.98
Bodily-Kinesthetic	Humanities	452	8.26	2.01
	Scientific	307	6.58	1.74
Naturalistic	Humanities	452	6.72	1.66
	Scientific	307	7.54	1.83

Table (6) shows that there are apparent differences between the mean scores of the study sample on the eight intelligence abilities. To identify the levels of statistical significance of these differences, the MANCOVA test was administered in light of the college variable, as shown in table (7).

Table 7: The results of MANCOVA test of the differences between the sample scores on the eight Intelligence abilities according to college

Source of Variance	Dependent Variables	Sum of Squares	Degrees of Freedom	Means of Squares	F value	Statistical Significance
Gender Hotelling$_{= 4..996}$ P= 0.008	Linguistic	6.349	1	6.349	11.178	0.001*
	Logical-Mathematical	2.505	1	2.505	13.917	0.000*
	Visual-Spatial	12.335	1	12.335	18.689	0.000*
	Intrapersonal	1.279	1	1.279	2.040	0.122
	Interpersonal	8.058	1	8.058	10.631	0.000*
	Musical	5.227	1	5.227	7.456	0.000*
	Bodily-Kinesthetic	4.638	1	4.638	6.922	0.000*
	Naturalistic	7.083	1	7.083	6.274	0.000*

* Indicant on the significant level ($\propto = 0.05$).

Table (7) shows also that there are no statistically significant differences between the mean scores of the study sample on the intrapersonal, while there are significant differences between mean scores of the study sample on the rest of the intelligences attributed to the college variable in favor of scientific colleges on the logical-mathematical, visual-spatial, and naturalistic intelligences and in favor of humanity colleges on the rest of the intelligences.

The authors attribute these results to the nature of the scientific colleges which focus on scientific concepts, methodologies, activities and skills through a wide range of tools based on scientific thinking, reasoning, evidence, and experiments. Whereas, the humanities colleges focus on the methodologies, activities, and skills that develop the linguistic, interpersonal, musical intelligences through concentrating on certain strategies such as discussion, dialogue, verbal and written expression, debate, artistic and literary taste. These results are in agreement with the results of many studies mainly: (Yamin, 2013), (Golam, 2011), (Khataybeh & Al-Bdor 2006), (Wiseman 1997), and (Afanah & Al-Khazendar, 2003).

Results and Discussions Related to the Fourth Question

To answer the fourth question: "Are there statistically significant differences in multiple intelligences abilities among undergraduate students of Yarmouk University attributed to academic level variable? The mean scores and standard deviations of the study sample on the eight intelligence abilities were calculated as shown in table (8).

Table 8: Means and standard deviations of the study sample scores on the eight intelligence abilities according to the study level

Intelligence Abilities	Study Level	Number of Participants	Means	Standard Deviation
Linguistic	1st & 2nd years	363	9.82	2.04
	3rd & 4th years	396	10.11	1.98
Logical-Mathematical	1st & 2nd years	363	5.66	1.67
	3rd & 4th years	396	8.69	2.09
Visual-Spatial	1st & 2nd years	363	6.00	1.48
	3rd & 4th years	396	7.88	1.80
Intrapersonal	1st & 2nd years	363	8.24	2.26
	3rd & 4th years	396	8.43	2.61
Interpersonal	1st & 2nd years	363	7.92	2.56
	3rd & 4th years	396	8.05	2.00
Musical	1st & 2nd years	363	7.67	1.76
	3rd & 4th years	396	7.84	2.66
Bodily-Kinesthetic	1st & 2nd years	363	7.73	2.43
	3rd & 4th years	396	7.44	2.38
Naturalistic	1st & 2nd years	363	6.97	1.59
	3rd & 4th years	396	7.12	1.82

Table (8) shows that there are apparent differences between the means of participants' scores on the eight intelligences. In order to identify the level of the statistical significance of these differences in light of the study level variable, the MANCOVA test was administered as shown in Table (9).

Table 9: The results of MANCOVA test of the differences between the sample scores on the eight Intelligence abilities according to the study level

Source of Variance	Dependent Variables	Sum of Squares	Degrees of Freedom	Means of Squares	F value	Statistical Significance
Gender	Linguistic	5.328	1	5.328	9.380	0.000*
	Logical-Mathematical	3.261	1	3.261	18.117	0.000*
	Visual-Spatial	2.677	1	2.677	4.056	0.016*
	Intrapersonal	0.319	1	0.319	0.509	0.517
	Interpersonal	0.958	1	0.958	1.264	0.355
	Musical	1.14	1	1.14	1.626	0.191
	Bodily-Kinesthetic	1.066	1	1.066	1.591	0.207
	Naturalistic	1.829	1	1.829	1.620	0.187

* Indicant on the significant level ($\propto = 0.05$).

Table (9) shows that there are no statistically significant differences ($\propto = 0.05$) between the score means of the study sample on all intelligences attributed to the study level variable except on the linguistic, logical-mathematical, visual-spatial intelligences, in favor of third and fourth year students. The authors believe that these intelligences are related to the mental abilities that develop with age and reach up to the functional efficiency at the stage of abstract thinking in accordance with Piaget's perspective. While the differences on the rest of the intelligences in favor of the third and fourth year students may be attributed to the increased number of courses, accumulation of experiences, academic maturation which assist students in building positive self-concept, gain more self-confidence, further abilities to care about the body, development of healthy habits, enhanced relationships with others, exploring the environment and its components and orientation towards arts and music in harmony with the nature of the stage in which students become closer to achieve their goals at the university level. The results of this study agreed with the findings of (Gogebanakan, 2003) and (Al-Alwan, 2008).

Conclusion and Recommendations

In the light of the results of this study the researchers recommend the following:

1. Encouraging faculty at Jordanian universities to design their courses and teaching methodologies in accordance with the dominant multiple intelligences among their students. In particular, they are encouraged to give more attention to the visual-spatial intelligences.
2. Conducting more studies on multiple intelligences and their relationship with other variables such as students' cognitive styles and learning preferences.
3. Using multiple intelligences tests as admission criteria at the human and scientific colleges.

References

Abdel-Samee', A. & Lashin, S. A. (2006). The effectiveness of a programme based on multiple intelligences on developing achievement, mathematical thinking, and tendency towards mathematics among preparatory cycle students. *The Journal of Dirasat in Curricula and Instruction Methodology*. Issue (118), the Egyptian Society of Curricula and Instruction Methodology, Faculty of Education, Ain-Shams University, Cairo, 133-167.

Ahmad, M. A. (2010). *The impact of a program based on multiple intelligences in developing creative thinking and achievement among students of the commercial secondary school.* Unpublished M.A thesis, The Institute of Educational Studies, University of Cairo, Egypt.

Afanah, I. & Al-Khazendar, N. (2003). Levels of multiple intelligences among basic cycle students in Gaza and its relationship with achievement in mathematics and tendency towards it, *Journal of Humanity Research*, Islamic University in Gaza, Vol. 12 (2), 323-363.

Al-Ahdal, A. Z. (2009). The effectiveness of activities and methodologies of instruction based on multiple intelligences theory in improving Geography achievement and learning retention of 1st secondary female students in Jeddah governorate. *The Journal of Um-Alqura for Educational and Psychological Sciences*, Vol. 1 (1), 192-242.

Al-Alwan, A. F. (2008). Identifying the intelligence preferences among 4th and 8th graders in accordance with multiple intelligence theory, *Dirasat Journal*, University of Jordan, Educational Sciences, Vol. 37 (2), 454-474.

Al-Aslani, R. M. (2010). *The effectiveness of a remedial strategy in light of multiple intelligences on developing geometry achievement and attitudes towards geometry among 2nd preparatory slow learners in Jeddah governorate*. Unpublished Ph. D thesis, Females Faculty of Education, Jeddah, Saudi Arabia.

Armstrong, T. (2009). *Multiple Intelligences in the classroom*. (3rd Ed.). Virginia: Association for Supervision & Curriculum Deve.

Black, P. J. (2003). *Testing, friend or foe? The theory and practice of assessment and testing*. New York, NY: Routledge Falmer Press.

Buvoltz, K. A., Powell, F. J., Solan, A. M., & Longbotham, G. J. (2008). Explaining emotional intelligence, learner autonomy, and retention in an accelerated undergraduate degree completion program. *New Horizons in Adult Education and Human Resource Development,* Vol. 22, (3/4), 26-43.

Fetsco, T. & McClure, J. (2005). *Educational Psychology: An integrated approach to classroom decisions*. New York: Pearson Education, Inc.

Furnham, A., & Fong, E. (2000). Self-Estimated and Psychometrically Measured Intelligence. *North American Journal of Psychology*, Vol. (2), 1-10.

Gardner, H. (2011). *Frames of Mind: Multiple Intelligences*. (3rd Ed.). New York: Basic Books.

Gardner, H. (2009). Birth and spreading of a "Memo". In J. Chen, S. Moran, & H. Gardner (Eds.), *Multiple Intelligence around the world*. San Francisco, CA: John Wiley and Sons.

Gardner, H. (2000). A case against spiritual intelligence. *International Journal for the Psychology of Religion*. Vol. (10), 27-34.

Gardner, H. (1999a). Are there Additional Intelligences? The Case for naturalist, spiritual and existential intelligences. *Education, Information and Transformation*, (pp. 111-131). Englewood Cliffs, NJ: Prentice Hall.

Gardner, H. (1999b*). Intelligence reframed: Multiple Intelligence for the 21st century*, New York: Basic Books.

Gardner, H. (1993). *Frames of mind: The Theory of Multiple Intelligences* (10th anniversary Ed.). New York: Basic Books.

Gardner, H. (1983). *Frames of mind: The Theory of Multiple Intelligences* (1st Ed.). New York: Basic Books

Gogebakan, D. (2003**).** *How students' multiple intelligences differ in terms of gender and grade level*. Unpublished Master thesis, Middle East Technical University, Ankara, Turkey.

Golam, K. M. (2011). *Professional tendency and multiple intelligences among 3rd secondary graders in Al-Bahrain Kingdom*, Unpublished M. A. thesis, University of Bahrain, Al-Bahrain.

Goleman, D., Barlow, Z. and Bennett, L. (2010). Forging new norms in New Orleans: From emotional to ecological intelligence. *Teacher Education Quarterly*, 87-98.

Johnson, M. (2007*). The effect of multiple intelligences on elementary student performance.* Unpublished master thesis, Dominican University of California, CA, USA.

Kallenbach, S. (2006). Emerging themes in adult multiple intelligences research. *Focus on Basics*, 3, (A), 16-20.

Khataybeh, A. M. & Al-Bdor, A. (2006). The impact of using multiple intelligences in teaching science on acquiring science processes among 7th graders. *The Journal of Arab Gulf Message*, Vol. 85, The office of Arab Education of Gulf Countries, Al-Riyadh, 99-133.

Marlowe, B. A. & Canestrari, A. S. (2006). *Educational Psychology in Context: Readings for Future Teachers*. California: Sage Publications, Inc.

Nofal, M. & Heeleh, M. (2008). Differences in multiple intelligences among 1st year students of higher education institutions at UNRWA in Jordan. *The Journal of Al-Najah for Research (humanities Sciences*), Vol. 22 (5), 1599-1623.

Net, F., Ruiz, F. & Turnham, A. (2008). Sex differences in self-estimation of multiple intelligences among Portuguese adolescents**,** *High Ability Studies*, Vol. 19, No. 2, 189-204.

Onouz, S. M. (2009). Multiple intelligences tests. www.iqdrsaad.com.

Paulus, D., Lysy, D., & Yik, M. (1998). Self-report measures of intelligence: Are they useful as Proxy IQ Tests? *Journal of Personality*, (66), 523-555.

Santrock, J. S. (2008). *Educational Psychology*. (3rd Ed.). New York: McGraw Hill.

Viens, J. & Kallenbach, S. (2006.). *MI Grows Up: Multiple Intelligences in Adult Educatio*n. Boston: National Center for the Study of Adult Learning and Literacy.

Wiseman, K. (1997). *Identification of multiple intelligence for high school students in theoretical and applied science course*. Unpublished PhD dissertation, University of Nebraska, Lincoln, USA.

Yamin, W. A. (2013). *Types of mathematical thinking and its relationship with multiple intelligences and the desire in the specialization and achievement among tenth graders in Palestine*. Unpublished M.A thesis, Al-Najah National University, Nablus, Palestine.