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Level of Metacognitive Skills of a Sample of Talented Students in Jordan

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Abstract

This study aimed at identifying the metacognitive skill level of a sample of talented students in Jordan, and whether the level is affected by the difference of a number of variables. The sample consisted of (256) male and female students who were chosen by the random stratified method. Out of them were (101) male and female students from the Jubilee School, and (155) from King Abdullah II School for Excellence, during the academic year 2018-2019. To achieve the study objective, the metacognitive thinking scale was applied after verifying its validity and reliability. The results showed that the total degree of the metacognitive skill level of a sample of talented students in Jordan was high. The results did not show statistically significant differences in the metacognitive skill level attributable to the gender variable. Meanwhile, there were statistically significant differences at ($\alpha \leq 0.05$) level attributed to the grade level variable.

Keywords: metacognitive skills, talented students, thinking skills

1. Introduction

Metacognitive thinking is an essential requirement to achieve effective learning, as this type of thinking provides the learner with deeper knowledge and better performance. Furthermore, it assists him/her overcome many problems that face the students during the learning process and transference of its effects.

The metacognitive thinking concept emerged in the 1970s by John Flavell, which was as a result of his research on the memory and remembering. Flavell sees that the memory development processes are mostly the results of the development of the intelligence and smart control structure of the information storage and retrieval processes (Bin Sasi, 2018). There are multiple definitions of the metacognitive thinking concept that emerged in this regard. Flavell (1976) defined it as thinking about the thinking processes, and full awareness of the cognitive processes the individual uses in processing the information. Sternberg (1994) defined it as knowledge about cognition, knowledge about the cognitive processes, knowledge about the weaknesses and strengths of the cognition the individual owns, in particular, and knowledge about how to monitor, control and evaluate the individual in the cognitive skills. Al-Jarrah & Obaidat (2011) defined it as the individual's knowledge of his/her cognitive processes and cognitive structure, employing this awareness in the management of this cognition through the use of a pool of knowledge, such as planning, evaluation, and choosing the suitable strategies. Jarwan (2017) indicated that the metacognitive thinking processes are complicated mental skills, which are deemed the most important components of the smart behavior in information processing that grows with age and experience, and is tasked with controlling all the working thinking activities that are directed to problem solving.

There are multiple models that dealt with the metacognitive thinking components, such as Flavell's (1985). He provided that the metacognitive thinking consists of two main components. The first is the metacognitive knowledge, which consists of three types. The first is knowledge of the individual's variables, which are his/her intrapersonal beliefs, interpersonal beliefs, his/her relations with the cognitive activities and tasks. The second is knowledge about the task variables, which is linked with the knowledge and information about the nature of the task assigned to the individual that leads this knowledge to the performance. The third type is knowledge about the strategy variables, which includes what the individual owns of information about the metacognitive strategies, through which he/she successfully accomplishes cognitive objectives that are important to him/her. It also includes the situational information related to ***when, where and why this strategy is used***.

The second component is the metacognitive experiences that help the individual to choose the best strategies

while he/she faces the task, so that he/she can choose from multiple strategies to approach the correct answers, such as reconsidering the problem from other perspectives, or rereading the headlines to define whether there is something that contributes in the removal of ambiguity. Brown (1987) provided a model in which he divided metacognitive thinking into two main sections. The first, which is related to knowledge about awareness, refers to the individuals' knowledge about their mental processes. The second refers to the awareness regulation that includes planning, prior understanding of the problem, surveillance and evaluation. Brown asserts that the cognitive activities, such as planning, verification, control and surveillance are themselves the metacognitive skills, which are measurable and transferable characteristics. Accordingly, when the individual works on a certain problem solving, he/she carries out cognitive activities that process his/her cognitive systems continuously. He/she tests his/her decisions and continuously amends it to approach the decision that is deemed the problem solution (Rasheed, 2013).

Schraw & Dennison (1994) introduced a metacognitive model in two main domains, where the first model refers to knowledge about cognition. It includes: the declarative cognition that relates to the individual's knowledge about a certain content, and consists of the facts and concepts; the procedural cognition that relates to the individual's knowledge about how to do a certain thing; and, the situational cognition that relates to the individual's knowledge about the associated conditions of a certain procedure. These conditions are linked to when something or some procedure are used, and what is the aim of using them. The second domain includes cognition regulation, which includes the metacognitive thinking skills. These skills, in turn, include: planning skill, which contains the conscious choice of certain strategies to achieve certain objectives, assessment skill, which includes assessing the current progress in certain processes that occur during learning, and the regulation skill, which includes revision of the progress toward achieving the key and subsidiary objectives, and behavior amendment, if necessary.

Costa & Kallick (2001) underline the importance of the metacognitive thinking in teaching, as it enables the learners to develop a workplan in their minds for a period of time, then they meditate on and evaluate it after being completed. In addition, the metacognitive thinking facilitates issuing the temporary judgments and comparing and evaluating the learner's readiness to carry out other activities. It also renders the learner more aware of his/her acts and their effects on the others and the environment he/she lives in.

Flavell (1979) finds that the metacognitive thinking includes effective surveillance and the related regulation and coordination of the cognitive processes to achieve the desired cognitive objectives. In other words, it is an intentional thinking, planned and directed toward a certain objective. Therefore, it is a mental behavior employed to achieve future cognitive tasks.

In the matter of the importance of the metacognitive thinking, Al-Hammouri & Abu Mukh (2011) indicated that metacognitive thinking is the cause of the high achievement of talented students, as compared with the untalented and low achievement students. Bin Sasi (2018) emphasized that metacognition develops in an earlier stage with the talented students, contrary to the untalented. There are studies that showed that the talented fifth and sixth graders scored higher degrees on the scales of metacognitive planning than those of the untalented.

Mohammad (2016) ensured that many studies asserted that students could be trained on metacognition and gaining its skills, so that the individual becomes an effective thinker by enhancing his/her learning through perceiving his/her own thinking when solving the problems, and through discussing the properties of this thinking.

1.1 Previous Studies

Many previous studies that tackled the metacognitive thinking were conducted, whether those of the school students or the university students, in different environments. These studies explored multiple variables, such as student's gender, major, accumulative average and intelligence. For instance, studies of Al-Hayek, & Khuwaila (2017), Al-Shaikh (2016), Al-Qasem (2016), Abdulhafeth (2016), Al-Hadidi (2016), Ali (2014), Otoom (2014), Carlo (2010), Stewart (2007), Downing (2009), and (Nguyen, & Godwyll (2010). Nonetheless, there are rare studies that explored the metacognitive skills and their relationship to the grade level and parents' educational level.

Al-Zboun (2019) made a study aimed to identify the metacognitive skill level of the students with disabilities, ordinary and talented students in the Jordanian universities, which was conducted on a sample of (528) male and female students, using the metacognitive skill scale. The results showed differences in the metacognitive skill level among the three student categories, in favor of the talented. The results further showed statistically significant differences in the metacognitive skill level attributable to the gender variable, in favor of the females.

Bin Sasi (2018) conducted a study aimed at identifying the validity extent of the metacognitive thinking in mathematics as a determinant of talented students in math, and revealing the metacognitive thinking level in mathematics with these students. The study sample consisted of 35 ninth graders, who are characterized as talented students in mathematics. The study instruments consisted of Raven test and metacognitive thinking scale in mathematics. The results showed the validity of the metacognitive thinking scale in mathematics, and that talented students achieved higher metacognitive thinking level in mathematics both on the total degree and the subsidiary dimensions of the scale.

Heilat (2017) conducted a study that aimed to explore the relation between the effectiveness of the creative self and metacognitive thinking of the vocational diploma female students in Abu Dhabi University. The study was conducted on (135) students using Schraw & Dennison (1994) metacognitive thinking scale, and Abbott (2010) creative self effectiveness scale. The results did not show differences in the metacognitive thinking ascribed to the different specializations, but there was a predictive relation between the creative self effectiveness and the metacognitive thinking.

Study of Abu Lateefa (2015) aimed at identifying the metacognitive thinking level of the faculty of education students in Al-Baha University, Saudi Arabia, and the difference degree of this level by both the academic year and the academic achievement variables. The study was conducted on a sample of 150 students, using the metacognitive thinking scale. The results showed that the metacognitive thinking level was medium, and there were no statistically significant differences attributed to the academic achievement and academic level.

Ali (2014) conducted a study that aimed at identifying the metacognitive thinking level of the female students of Princess Nourah Bint Abdulrahman University, Saudi Arabia, which was carried out on a sample consisted of (200) female students, using the metacognitive skill scale. The results showed that the metacognitive thinking level was high, and there were no statistically significant differences in the metacognitive thinking level ascribed to the academic level and the academic major.

Aydin & Coskun (2011) made a study aimed at identifying the metacognitive awareness level of the students of Dokuz Eylul University, Turkey, which was conducted on a sample comprised (200) female students. The results indicated that the students' awareness of the metacognitive skill importance was high and medium, and there are no statistically significant differences in the metacognitive thinking ascribed to the gender and academic level variables.

The study of Carlo (2010) aimed at identifying the relationship between metacognitive thinking and the critical thinking skills of a sample comprised (200) male and female students in Philippines. The results showed that the metacognitive thinking had a significant effect on the critical thinking skills, so that the more the metacognitive skills, the more the development and increase of the critical thinking skills are.

From the review of the previous studies, it is clear that they tackled the metacognitive skills either of the school students or the university students in different environments. Some of these studies attempted to explore the metacognitive skills of the students with special needs, using many scientific instruments. These studies explored the relationship of the metacognitive skills with many variables, such as gender, achievement, intelligence, and critical thinking. Our current study is similar to previous studies in exploring the metacognitive skills, but it is different from them in dealing with variables not dealt with in these studies, in addition to the different environment and sample.

1.2 Study Problem and Questions

The study problem emerged through the revision of the educational literature of the metacognitive skills. It is clear that the metacognitive thinking is of great importance to the student's awareness and ability to know his/her feelings and understand him/herself. This provides the student ability to manage and regulate the cognitive self, ability to plan and approach solutions of the problem he/she faces, which, in turn, will be reflected on the student's performance and achievement. Due to the importance of metacognitive thinking, this study was made to seek answers to the following questions:

First question: What is the metacognitive skill level of a sample of talented students in Jordan?

Second question: Are there statistically significant differences at ($\alpha \leq 0.05$) level in the metacognitive skill level of a sample of talented students in Jordan, attributable to the gender (males, females) and grade level variables?

1.3 Study Significance

The significance of this study is apparent through the following:

The theoretical significance, as it tackled the metacognitive skills in the light of a number of variables, due to

their importance in the teaching process and students' achievement. The applied significance, which will be clear through the results of the study. In this concern, if the metacognitive skill level was found low, then we have to reconsider the whole teaching process, and direct the teachers to use teaching methods that assist in the development of the metacognitive thinking, which will be positively reflected on the students.

1.4 Procedural Definitions

- **Metacognitive skills**: the degree the student obtains on the study instrument, i.e. the metacognitive skill scale.
- **Talented students**: all talented students officially enrolled in the academic year 2018/2019, who are distributed over two schools: Jubilee School and King Abdulla II School for Excellence.

1.5 Study Limits and Determinants

This study was limited to a sample of Jubilee School and King Abdullah II School for Excellence in Jordan in the academic year 2018/2019. The determinant of the study is the extent of the sample participants' cooperation in their response to the requirements of this study.

2. Method and Procedures

2.1 Methodology

The researcher applied the descriptive analytic method as it most fits the study subject.

2.2 Study Population and Sample

The study population consisted of all the male and female ninth, tenth, eleventh graders of the Jubilee School (n=247), as well as all the male and female ninth, tenth, eleventh and twelfth graders students of King Abdullah II Schools for Excellence in Ajloun Governorate, Jordan (n=267), who are officially enrolled in the academic year 2018/2019, bringing about the total to (514) male and female students. The sample participants (n=256) were chosen by the stratified random manner. Out of them are (101) students from the Jubilee School of the ninth, tenth, eleventh and twelfth graders, and (155) students of King Abdullah II Schools for Excellence in Ajloun governorate of the same grade levels of the Jubilee School students (50% of the study population), as per the distribution illustrated in Table 1.

Table 1. Distribution of Study Sample by Study Variables

Variable classification		School			
		King Abdullah II Schools for Excellence		the Jubilee School	
		count	Ratio	count	Ratio
class	Ninth	25	9.8%	40	15.6%
	Tenth	61	23.8%	31	12.1%
	Eleventh	40	15.6%	30	11.7%
	Twelfth	29	11.3%	0	0%
Gender	Male	87	34.0%	49	19.1%
	Female	68	26.6%	52	20.3%

2.3 Study Instrument

The researcher applied Schraw & Dennison (1994) metacognitive thinking scale, which was developed by Al-Jarrah & Obaidat (2011). Initially, it consisted of (52) items, but ten items were excluded as their correlation with the domain they belong to was (0.30) or less, rendering the scale to be of (42) items in its final Arabized form. The items were distributed over three dimensions: cognition regulation, cognition knowledge, and cognition processing. Schraw & Dennison (1994) developed this scale relying on several theories, as cognition regulation dimension was based on the theory of Jacobs & Paris (1987), and cognition knowledge was based on theories of Brown (1987) and Jacobs, & Paris (1987).

2.4 Scale Validity and Reliability

The researcher verified the scale validity and reliability indications in its foreign shape. As for the Arabic form, Al-Jarrah & Obaidat (2011) verified its validity and reliability by presenting to eight arbitrators, who are specialized in education and psychology in Al-Yarmouk University. The scale was modified based on the remarks and requirements of the arbitrators, and its validity was also verified by the structure validity, through

application to an exploratory sample of (49) students from outside the sample. Pearson correlation coefficient was calculated, and ten items with (0.30) or less correlation coefficients were deleted. As for the reliability, Al-Jarrah & Obaidat (2011) verified it through Cronbach Alpha measure for internal consistency of the dimensions and the instrument as a whole. The reliability was further verified by reapplication two weeks after the first application. The resulting values ranged between (0.62) and (0.73).

2.5 Scale Validity and Reliability in the Current Study

The researcher verified the scale validity by presenting it in its initial form to the arbitrators, who were 10 university professors working in the Jordanian universities. They made their opinions and remarks about the suitability of the items and clarity of their wording. In the light of their views, the items were amended. On the other hand, the scale reliability was verified by test-retest, which were applied on an exploratory sample of (30) students from outside the study, with two-week interval between the two application times. The reliability coefficient was calculated using Pearson correlation coefficient, and the total reliability coefficient was (0.91). Cronbach Alpha measure for internal consistency was also used, which produced (0.93) reliability coefficient, as shown in Table 2 that includes the domain reliability coefficients of both methods.

Table 2. Evidence of consistency for the study scale

No.	Domain	Cronbach Alpha	Pearson correlation coefficient
1	Cognition Regulation Dimension	0.78	0.85
2	Cognition Processing Dimension	0.82	0.90
3	Cognition Knowledge Dimension	0.92	0.81
	Total Degree	0.93	0.91

2.6 Procedures

The psychometrics of the study instrument were obtained through the scale, which validity and reliability were verified.

- The researcher defined the study population and sample, and requested the school administrators to provide official statistical data about the Jubilee School and King Abdullah II School for Excellence, which they officially provided. Thereafter, the researcher chose a random sample that included 50% of the study population.
- The researcher distributed the instrument over the sample and explained its objectives and how to respond to its items.
- The instrument return rate was100%.
- The data were entered to the computer and were statistically processed.

Responses means were classified into three categories (high, medium, low) according to the following equation: scale range/ number of categories = (5-1) /3 = 1.33

The categories are as follow:

- 1- 2.33 Low.

- 2.34- 3.67 medium.

- 3.68- 5 High.

2.7 Study Variables

1- Independent variables: This study included the following four independent variables:

- Gender: 1- Male - 2 female.
- class level: 1- Ninth 2- Tenth 3- Eleventh 4- Twelfth.

2- Dependent Variable: Level of Metacognitive Skills.

2.8 Statistical Analysis

Researcher used the statistical package for social sciences (SPSS) to perform the necessary analyses and statistics for the collected data, adopting the five-point estimates as follow (very low, low, moderately low, high, and very high). The following values were given (1, 2, 3, 4, 5), respectively.

To answer the first question, means, standard deviations, rank and Level were used. To answer the second

question, means, standard deviations, (T-Test) (One way ANOVA) and the Schiffe test for dimensional comparisons.

3. Results and Discussion

This section includes the results of the study through answering its question, as follows:

First question: What is the metacognitive skill level of a sample of talented students in Jordan?

The researcher, for answering this question, got the means (M's) and standard deviations (SDs) of the metacognitive skill level of a sample of talented students in Jordan, in general, as well as these values for each of the instrument domains, as shown in Table (3).

Table 3. M's and SDs of the Metacognitive Skill Level of a Sample of Talented Students in Jordan, Arranged in a Descending Order

No.	Domain	M	SD	Rank	Level
1	Cognition Regulation Dimension	3.75	0.53	1	High
2	Cognition Processing Dimension	3.71	0.56	2	High
3	Cognition Knowledge Dimension	3.65	0.42	3	Medium
	Total Degree	3.70	0.46		High

Table 3 shows that the metacognitive skill level of the sample of talented students in Jordan was generally high, with (3.70) M and (0.46) SD. The domains were within the high and medium levels, and their M's ranged between (3.75) and (3.65). The cognition regulation dimension ranked first with (3.75) M, (0.53) SD, and high level, followed by the cognition processing dimension, which ranked second with (3.71) M, (0.56) SD, and high level. On the other hand, cognition knowledge dimension came third and last with (3.65) M, (0.42) SD, and medium level. Meanwhile, the items of the domains were as follows:

1-Cognition regulation dimension:

The M's and SDs of the metacognitive skill levels of the sample of talented students in Jordan were calculated, as shown in Table 4.

Table 4. M's and SDs of the Metacognitive Skill Levels of the Cognition Regulation Dimension of the Sample of Talented Students in Jordan, in a Descending Order

No.	Item	M	SD	Rank	Level
1	I take into account many alternatives to solve a problem before I give the answer.	4.24	1.07	1	High
2	I am aware of my strengths and weaknesses in my mental abilities.	4.16	0.61	2	High
5	I ask myself whether I took into account all the alternatives to solve the problem.	4.05	0.77	3	High
15	I stop and reread when I find myself confused.	4.02	0.95	4	High
3	I set up defined objectives before starting the task.	3.97	0.85	5	High
12	I revalue my hypotheses when I am confused.	3.76	1.22	6	High
14	I stop and review the new information when they are unclear.	3.73	1.15	7	High
6	I focus on the valuable and important information.	3.71	0.81	8	High
8	I employ my mental abilities to compensate for my weaknesses.	3.70	0.82	9	High
7	I know which strategies I shall use when I take the decision.	3.62	0.64	10	Medium
10	I posit questions by my own to make the information valuable.	3.52	0.84	11	Medium
11	I evaluate well how far I understand things.	3.48	1.12	12	Medium
13	I try to subdivide the work into small tasks to deal with them easily.	3.48	1.14	13	Medium
9	I focus on the meaning and importance of the new information.	3.46	0.94	14	Medium
4	I know the important information for decision making.	3.38	1.15	15	Medium
	Cognition Regulation Dimension	3.75	0.53		High

Table 4 shows that the metacognitive skill level of the cognition regulation dimension of the sample of talented students in Jordan was high, with (3.75) M and (0.53) SD. The items came with high and medium levels, with M's were between (3.38 -4.24). Item (1), providing, "I take into account many alternatives to solve a problem

before I give the answer", ranked first with (4.24) M, (1.07) SD, and high level. Item (2), providing, "I am aware of my strengths and weaknesses in my mental abilities", came second with (4.16) M, (0.61) SD, and high level. Item (9), providing, "I focus on the meaning and importance of the new information. came in the penultimate rank with (3.46) M, (0.94) SD, and medium level. Finally, Item (4), providing, "I know the important information for decision making", ranked last with (3.38) M, (1.15) SD, and medium level.

2-Cognition processing dimension:

The M's and SDs of the metacognitive skill levels of the sample of talented students in Jordan for this domain were calculated, as shown in Table 5.

Table 5. M's and SDs of the Metacognitive Skill Levels of the Cognition Processing Dimension of the Sample of Talented Students in Jordan, in a Descending Order

No.	Item	M	SD	Rank	Level
32	I try using strategies that were proven successful in the past.	4.16	0.61	1	High
35	I ask myself questions about the easiest ways to complete the task.	4.05	0.77	2	High
33	I own a defined objective for every strategy I have.	3.97	0.85	3	High
42	I ask myself whether I learnt what should be learnt when I complete the task.	3.76	1.22	4	High
36	I summarize what I did when I complete the task.	3.71	0.81	5	High
38	I try phrasing the new cognition by my own words.	3.70	0.82	6	High
37	I use the useful strategies timely.	3.62	0.64	7	Medium
40	I learn more when I am interested in the topic.	3.52	0.84	8	Medium
41	I ask myself questions about accuracy of what I do when I learn new things.	3.48	1.12	9	Medium
39	I carefully read the instructions before starting the task.	3.46	0.94	10	Medium
34	I use different strategies that depend on the situation.	3.38	1.15	11	Medium
	Cognition Processing Dimension	3.71	0.56		High

Table 5 shows that the metacognitive skill level of the cognition processing of a sample of talented students in Jordan was high, with (3.71) M and (0.56) SD. The items were within the high and medium levels, and their M's ranged between (3.38-4.16). Item (32), providing, "I try using strategies that were proven successful in the past", ranked first with (4.16) M. (0.61) SD, and high level. It was followed by item (35), providing, "I ask myself questions about the easiest ways to complete the task", with (4.05) M, (0.77) SD, and high level. Item (39), providing, "I carefully read the instructions before starting the task", ranked penultimate with (3.46) M, (0.94) SD, and medium level. Finally, item (34), providing, "I use different strategies that depend on the situation" came last with (3.38) M, (1.15) SD, and medium level.

3-Cognition knowledge dimension:

The researcher calculated the M's and SDs of the metacognitive skill levels of the sample of talented students in Jordan for this domain, as shown in Table 6.

Table 6. M's and SDs of the Metacognitive Skill Levels of the Cognition Knowledge Dimension of the Sample of Talented Students in Jordan, in a Descending Order

No.	Item	M	SD	Rank	Level
31	I ask myself whether what I am reading is related to my prior knowledge.	4.24	1.07	1	High
22	I ask myself questions about the decision before decision taking.	4.13	0.63	2	High
17	I think about what I need to learn before starting a certain task.	4.00	0.79	3	High
16	I think deliberately when taking a decision, to give myself sufficient time.	3.97	0.79	4	High
25	I find myself using new strategies automatically.	3.79	0.99	5	High
27	I ask myself about how far I accomplished the objectives when I complete the task.	3.66	0.93	6	High
28	I ask myself whether I took into account all the available choices after solving the problem.	3.65	0.83	7	Medium
23	I think in multiple ways to solve the problem, then I choose the best one.	3.59	0.79	8	Medium
30	I use information in a regulated manner to help me solve the problem.	3.59	0.80	8	Medium

18	I give myself more time when I encounter important information.	3.54	1.17	10	Medium
21	I make a periodical review because this helps me understand any important relations	3.54	1.21	10	Medium
19	I can regulate the information well.	3.53	1.14	12	Medium
26	I regularly stop to check my understanding.	3.41	0.63	13	Medium
29	I change my strategies when I cannot understand the topic well.	3.41	0.77	13	Medium
20	I have good control ability in decision-making.	3.22	0.77	15	Medium
24	I can stimulate myself to learn when so I need.	3.19	1.04	16	Medium
	Cognition Knowledge Dimension	3.65	0.42		Medium

Table 6 indicates that the metacognitive skill level of the cognition knowledge of a sample of talented students in Jordan was medium, with (3.65) M and (0.42) SD. The items were within the high and medium levels, and the M's ranged between (3.19-4.24). Item (31), providing, "I ask myself whether what I am reading is related to my prior knowledge" ranked first with (4.24) M, (1.07) SD and high level, followed by item (22), providing, "I ask myself questions about the decision before decision taking", with (4.13) M, (0.63) SD, and high level. Item (20), providing, "I have good control ability in decision-making", ranked penultimate with (3.22) M, (0.77) SD, and medium level. Finally, item (24), providing, "I can stimulate myself to learn when so I need", came last with (3.19) M, (1.04) SD, and medium level.

Results of this question showed that the metacognitive skill level on the total degree was high. This result could be interpreted in the light of the vast developments that occurred on the educational system inputs, such as school environment, classroom climate, teaching methods, teachers with higher university degrees. In addition, there are large developments that occurred on the curricula, which encouraged the higher thinking processes. The education and culture levels of the parents also contributed to this result, as well as the effects of technology and internet with their contents of programs and software, which further contributed to the development of the student's mental processes. This result is in line with that of Ali's study (2014), which indicated that the metacognitive skill levels were high, but is not in line with that of Abu Latifa (2015), which showed that the metacognitive skill level was medium.

The second question: Are there statistically significant differences at ($\alpha \leq 0.05$) level in the metacognitive skill level of a sample of talented students in Jordan, attributable to the gender (males, females) and grade level variables? This question was answered as follows:

Gender Variable:

M's and SDs of the metacognitive skill level of a sample of talented students in Jordan were obtained according to gender variable. T-Test was also applied, as illustrated in Table 7.

Table 7. M's and SDs of the Metacognitive Skill Level of a Sample of Talented Students in Jordan, and T-Test, As Per Gender Variable

Domain	Gender	No.	M	SD	T. Value	Sign. Level
Cognition Regulation Dimension	Males	136	3.72	0.53	-1.081	0.281
	Females	120	3.79	0.52		
Cognition Knowledge Dimension	Males	136	3.63	0.46	-1.158	0.248
	Females	120	3.69	0.39		
Cognition Processing Dimension	Males	136	3.68	0.57	-0.918	0.360
	Females	120	3.74	0.54		
Total Degree	Males	136	3.67	0.48	-1.132	0.259
	Females	120	3.74	0.44		

The results of Table 7 did not show statistically significant differences at ($\alpha \leq 0.05$) level in the metacognitive skill level of a sample of talented students in Jordan, as per gender variable. This result is based on the value of the calculated (T) that amounted (-1.132) with (0.259) significance level of the total degree. It further did not show statistically significant differences at ($\alpha \leq 0.05$) level for all the domains, based on the value of the calculated (T) (between -0.918 and -1.158), and (0.360 – 0.248) significance level. This result could be attributed to the fact that the students, whether males or females, receive the same teaching, and live in the same school and family

environments. Since this environment works toward developing the metacognitive skills, it reflects on the male and female students. This result is in harmony with the previous question, and in harmony with the study of Aydin & Coskun (2011), but not in agreement with the study of Al-Zboun (2019).

Grade Level Variable:

M's and SDs of the metacognitive skill level of a sample of talented students in Jordan were obtained according to the grade level variable, as illustrated in Table 8.

Table 8. M's and SDs of the Metacognitive Skill Level of a Sample of Talented Students in Jordan, As Per Grade Level Variable

Domain	Grade Level	No.	M	SD
Cognition Regulation Dimension	Ninth	65	3.28	0.26
	Tenth	92	3.66	0.56
	Eleventh	70	4.17	0.32
	Twelfth	29	4.08	0.09
	Total	256	3.75	0.53
Cognition Knowledge Dimension	Ninth	65	3.26	0.19
	Tenth	92	3.57	0.43
	Eleventh	70	3.99	0.27
	Twelfth	29	3.99	0.06
	Total	256	3.65	0.42
Cognition Processing Dimension	Ninth	65	3.21	0.27
	Tenth	92	3.64	0.59
	Eleventh	70	4.14	0.37
	Twelfth	29	4.03	0.17
	Total	256	3.71	0.56
Total Grade	Ninth	65	3.25	0.12
	Tenth	92	3.62	0.48
	Eleventh	70	4.10	0.27
	Twelfth	29	4.03	0.06
	Total	256	3.70	0.46

Table 8 shows apparent differences between the means of the metacognitive skill levels of a sample of talented students in Jordan according to the grade level. The eleventh graders obtained the highest mean (4.10), while the twelfth graders ranked second with (4.03) M. The tenth and ninth graders ranked third and fourth and obtained (3.62) and (3.25) M's, respectively. To determine whether these differences were statistically significant at ($\alpha \leq 0.05$) level, One-Way ANOVA analysis was applied and results were as illustrated in Table 9.

Table 9. One-Way ANOVA Analysis to Find the Significance of the Differences in the Metacognitive Skill Level of a Sample of talented students in Jordan, According to the Grade Level Variable

Domain	Variance Source	Total Squares	Freedom Degree	Squares Mean	F Value	Sign. Level
Cognition Regulation Dimension	Intergroup	30.839	3	10.28	64.655	0.000*
	Intragroup	40.066	252	0.159		
	Total	70.906	255			
Cognition Knowledge Dimension	Intergroup	21.99	3	7.33	77.237	0.000*
	Intragroup	23.915	252	0.095		
	Total	45.905	255			
Cognition Procession Dimension	Intergroup	32.862	3	10.954	59.417	0.000*
	Intragroup	46.458	252	0.184		
	Total	79.319	255			

Total Degree	Intergroup	27.729	3	9.243	85.877	0.000*
	Intragroup	27.122	252	0.108		
	Total	54.851	255			

* Difference is statistically significant (0.05)

Results of Table 9 indicate the presence of statistically significant differences at ($\alpha \leq 0.05$) level in the metacognitive skill level of a sample of talented students in Jordan according to the grade level, based on the value of the calculated F, which amounted (85.877) with (0.000) significance level for the total degree. The table further shows differences in all the domains, based on the value of the calculated F, which was between 59.417 and 77.237, and (0.000) significance level. To determine the belonging of the differences, Scheffe test was employed, as illustrated in Table 10.

Table 10. Scheffe Test to Find the Belonging of the Differences in the Metacognitive Skill Level of a Sample of Talented Students in Jordan According to the Grade Level Variable

Domain	Grade Level	M	Eleventh	Twelfth	Tenth	Ninth
			4.17	4.08	3.66	3.28
Cognition Regulation Dimension	Eleventh	4.17	-	0.09	*0.51	*0.89
	Twelfth	4.08		-	*0.42	*0.80
	Tenth	3.66			-	*0.38
	Ninth	3.28				-
	Grade Level	M	Eleventh	Twelfth	Tenth	Ninth
			3.99	3.99	3.57	3.26
Cognition Knowledge Dimension	Eleventh	3.99	-	0.00	*0.42	*0.73
	Twelfth	3.99		-	*0.42	*0.73
	Tenth	3.57			-	*0.31
	Ninth	3.26				-
	Grade Level	M	Eleventh	Twelfth	Tenth	Ninth
			4.14	4.03	3.64	3.21
Cognition Processing Dimension	Eleventh	4.14	-	0.11	*0.50	*0.93
	Twelfth	4.03		-	*0.39	*0.82
	Tenth	3.64			-	*0.43
	Ninth	3.21				-
	Grade Level	M	Eleventh	Twelfth	Tenth	Ninth
			4.10	4.03	3.62	3.25
Cognition Knowledge Dimension	Eleventh	4.10	-	0.07	*0.38	*0.85
	Twelfth	4.03		-	*0.41	*0.78
	Tenth	3.62			-	*0.37
	Ninth	3.25				-

* Difference is statistically significant (0.05)

Table 10 shows that the difference was in favor of the (eleventh and twelfth graders) as compared with the (tenth and ninth graders), and in favor of the (tenth graders) as compared with the (ninth graders) in the total degree and all the domains.

The researcher explains this result by that the metacognitive skills grow and develop with higher grade level due to the changes that occur as a result of the natural growth of the student. By its nature, this growth is associated with mental and cognitive maturity due to the age increase, on one hand, or the effects of education, educational environment and school experiences the student encounters, on the other, which improve the metacognitive skills. Therefore, the result was in favor of the higher grade as compared with the lower. However, this result is not in line with that of Aydin & Coskun (2011), and studies of Abu Lateefa (2015) and Ali (2014). In this concern, the researcher did not find previous studies that dealt with this variable.

3.1 Recommendations

The researcher recommends, based on the results of this study, the following:

- Designing certain lessons and Curricula to improve the metacognitive skills for Jordanian Students starting from early classes.
- Providing more support to the school environments and teaching and administrative staff, as well as school curricula providers, to enable them continue attention to the metacognitive skills.
- Conducting more studies about the metacognitive skills on other environments, especially the normal and low achieving students.

4. Conclusion

In conclusion the metacognitive skills are considered very important for effective learning. Such skills could be improved. Education in Jordan should focus on the metacognitive skills. The results showed that there were no differences between male and female students in the metacognitive skills in Jordan, and the metacognitive skills are developed in harmony with the level class of student.

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