

## METACOGNITIVE SKILLS LEVEL AMONG THE STUDENTS OF SCHOOLS OF KING ABDULLAH II FOR EXCELLENCE

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### Abstract

The study aimed to recognize the Metacognitive skills level among the students of Schools of King Abdullah II for Excellence, the sample of the study consisted of (123) students (males & females). From Schools of King Abdullah II for Excellence in AL Zarqa Governorate, They were chosen by the class randomly sample. Descriptive statistics (mean & SD), and the Independent sample T-test, and The One Way ANOVA test, were used. The results of the study revealed that there is high level of metacognitive skills at the total score level, and at the domain Knowledge of cognition, a very high level of regulation of cognition and finally a moderate level of the domain cognition processing. The results also indicated that there were no statistical differences in metacognitive skills level and its domains due to the gender, and there were statistical differences in metacognitive skills at the total score and at the level regulation of cognition domain due to the studying level in the favor of tenth grad, meanwhile there were no statistical differences in metacognitive skills at the level of Knowledge of cognition and cognition processing domain due to the studying level.

**Keywords:** Metacognitive skills. Knowledge of cognition. Regulation of cognition. Cognition processing.

### Introduction

The concept of metacognition appeared in the early seventies of the last century to add a new dimension in the field of cognitive psychology (Jarwan, 2012). Metacognition is one of the topics addressed in contemporary studies focuses on how a student can be his/her self-directed learner (Filbmany, 2011). Metacognition represents the individual's awareness of their own pattern of thinking (Sonowal and Kalita, 2017). Flavell (1979) pointed out that in order to distinguish between metacognitive thinking and other types of thinking, we must care about the source of metacognition, which related to the internal representation of individual, and thus metacognition involves effective individual monitoring. There are many definitions of metacognition including: thinking of thinking, knowledge of knowledge, knowledge about phenomena of knowledge, or being able to understand and monitor an individual's ideas and hypotheses (Al Otoum, AL Jarrah & Bishara 2017). Jarwan (2012) defines metacognition as complex mental skills which represent the most important components of intelligent behavior in information processing. According to Duman and Semerci (2019) metacognition is a person's ability to plane, observe or arrange, control over, direct, evaluate, and reflect on his/ her own cognitive processes.

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### Theoretical Framework

Metacognition today is considered as an Umbrella term structuring individuals' thinking processes and information (Akturk and Sahin, 2011). A metacognitive skill is a high ranking pattern which has a role in improving the way learners think. It increases their awareness of what they are learning. A learner who practices metacognitive skills has many roles including: generating ideas, planning, monitoring improvement, and organizing (Al Jarrah and Obeidat, 2011). Metacognition may be defined as a one's observing his/her own thinking processes and have the ability to control these processes (Flavell, 1979; Wellman, 1985). Metacognitive skills are the ability to develop and control cognitive performance so students with good metacognitive skills, often have feelings of self-efficacy and self-confidence. This situation has a positive influence on motivated learning and success (Gencel, 2017; Eisenberg, 2010; Hacker, Keener and Kircher, 2009).

From the point of view of Esteki and Moimkehr (2012) metacognition skills generally represent a part of individual cognitive abilities, which mean that metacognitive skills are completely independent of intelligence and giftedness. The relationship between metacognitive skills and giftedness as pointed by Shavinina (2009) is that the gifted specific cognitive experience provides a basis for three characteristics of giftedness which included: intellectually creative, metacognitive, and extra cognitive skills.

The National Association for Gifted Children in Britain has identified a set of characteristics of a gifted child that he can be able to understand and make abbreviations in earlier time, and have a sense of the relationships between things. For instance, cause-and-effect relationship, evaluating facts, and these characteristics associated with metacognitive. (Larkin, 2010). According to Heshmait and Maanifar (2018) who state that many research findings have found that what gives importance to metacognitive skills and strategies is that they can be learned at different stages of education. Al-Obthani and Burqan (2014) point out that the metacognitive skills are important because they increase the level of academic achievement of learners, as they increase the student's ability to think creatively and solve problems he faces in the classroom, or in the areas of his daily life. Regulating learning is one of the necessary skills that teachers can't help students acquire, only by encouraging them to use metacognitive skills in the classroom.

The importance of metacognitive skills is that it seeks to educate the learner about the different types of thinking he practices in the light of his

understanding of the methods of control, and control of learning processes or guide or organize those processes, in order to understand the contents of learning. (Henson and Eller, 1999). The process of evaluating what has been accomplished is a complement to metacognitive skills, and the internal language that is thought to be necessary for metacognitive skills begins to appear in children at the age of five, yet it can be formed and thrives around the age of 11. (Sassi and Qureshi, 2013).

Schraw and Dennison (1994) argue that metacognitive components, i.e., Firstly: knowledge of knowledge which has several dimensions: (1) Reporting knowledge: knowledge of the individual skills and abilities and sources of knowledge. (2) Procedural knowledge: an individual's knowledge of how to use a strategy or perform a task. (3) Conditional knowledge: knowing the individual about when to use a strategy. Second: knowledge organization: This includes planning, information management, understanding and comprehension, error correction, and evaluation. According to Snyder et al., (2011) Metacognitive has two main components:

(1) Knowledge of knowledge: It includes the knowledge stored by the individual about knowledge processes, strategies, awareness of the individual's abilities, what strategies will be used, how to use it, and when it will be used. (2) Organization and control of knowledge: It means the activity carried out by the individual to monitor the knowledge processes, skills and strategies used by him, and includes elements such as planning, information management, correction and evaluation.

Shamout (2015) reports that metacognitive skills are: awareness of the individual's understanding of the problem, his strengths and weaknesses, awareness of his ability to solve problems, the organization of the individual's prior knowledge to use in similar situations, and the organization of actions and decisions to conform to new problem plans, and evaluate the plans used to solve the problem. Duman and Semerci (2019) emphasize that student who having metacognitive skills at a good level can solve problems, think critically, and made decisions better than those who don't have these skills.

### The Present Study

The importance of the present study based on coping with contemporary global trends that call for the importance of metacognitive skills, and the awareness need. Moreover, the use of these skills in developing learners' abilities and prepare them to be able to meet the requirements of the current

era, and highlighting the category of gifted and excellence students and the need to invest. Their mental energies are best served by identifying and taking into account the different aspects of their programs.

Due to the lack of specialized studies on the subject of metacognitive skills of gifted and excellence students at the Arab world and local level, the results of the study may draw the attention of officials, teachers, and students of gifted and excellence education programs. Therefore, point out the need to pay attention to different forms of thinking, including metacognitive skills among students because of its importance in rising and development their abilities,

The study provides theoretical literature at the Arab world and locally with the subject of metacognitive skills among gifted and excellence students. Therefore, it may contribute to open the way for other studies in the field of metacognitive skills and linking it with other variables in the target group of the study. Students of King Abdullah II Schools of Excellence (KAIISE) are subjected to this investigation.

The present study aimed to: (1) Identify the level of metacognitive skills among students in KAIISE and (2) To reveal the differences in the metacognitive skills among students in KAIISE that are attributed to the variables of gender (male, female) and the academic grade (Seventh, Eighth, Ninth, Tenth). To be more specific, the current study will examine the metacognitive skills amongst the Students of KAIISE in terms of the following study questions:

- 1: What is the level of metacognitive skills among KAIISE students?
- 2: Are there any statistical significant differences in metacognitive skills among KAIISE attributed to the gender variable?
- 3: Are there any statistical significant differences in metacognitive skills among students of KAIISE due to the variable study grade?

**Methods**

**Participants**

The overall study population consisted of all (419) students enrolled in KAIISE at Zarqa Governorate, distributed among the basic grades (7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup>) during the 2020/2021 academic year. To conduct the current study, 123 students have been selected as stratified random sample. The study conducted on (70) male, (53) female from different grades, i.e., (38) 7<sup>th</sup> grade, (40) 8<sup>th</sup> grade, (25) 9<sup>th</sup> grade, and (20) 10<sup>th</sup> grade students from (KAIISE).

**Instrument**

To achieve the objectives of the study, the researcher used the metacognitive skills scale prepared by Schraw and Dennison (1994), which has been developed on the Jordanian environment by (Al Jarrah and Obeidat, 2011). The scale of the study consisted of three sub- dimensions: Knowledge Organization (KO), Knowledge of Knowledge (KK) and Knowledge Processing (KP) which are distributed into (42) items.

In order to achieve the purpose of present study, the adopted scale of metacognitive skills has been checked to extract the reliability and validity by applying it in a pilot sample that consisted of (30) students selected randomly from KAIISE students. To verify the constructive validity of the scale a person correlation coefficient value was assumed for the sub-dimensions together and with the overall score on the scale, as in table (Table 1).

As observed through Table 1, the values of person correlation coefficients between the sub-dimensions of metacognitive skills with each other and with the overall score on the scale are all statistically significant and acceptable for the purposes of the present study. In order to verify the reliability of the scale, the coefficient of internal consistency of Cronbach's alpha was calculated for the sub-dimensions of metacognitive skills and the overall score on the scale, the values ranged from (0.688-0.868). The value of the Cronbach's alpha coefficient for the overall score on the scale was (0.928), all are high and

acceptable for the purposes of the study.

In order to correct the scale, the five-point Likert scale was adopted so that responses (always, often, sometimes, rarely and absolutely) were given the following scores (5, 4, 3, 2 and1), respectively. To determine the level of metacognitive skills, the range is calculated by (5-1 = 4) then divided by (5) as it is the greatest value in the scale (4 ÷ 5 = 0.80) afterwards, number (1) which is the least value in the scale was added in order to identify the upper limit of the category and therefore determine the importance of the category as following: From 1 to 1.80 represent very low level; from 1.81 until 2.60 represent low level; from 2.61 until 3.40 represent medium level; from 3.41 until 4.20 represent height level and from 4.21 until 5.00 represent very height level.

**Statistical Methods**

Statistical methods were used to suit the questions and objectives of the study and the nature of its variables. Data were entered and an appropriate analysis was carried out using the Statistical Packages for Social Sciences (SPSS, 19). Means and standard deviations were used to measure the level of responses of the study sample to the items of the study scale, in addition to using the T-Test and the One Way ANOVA test.

**Results**

The results of the study are presented below by answering the questions of the study:

**First**, the results related to the first question: What is the level of metacognitive skills among KAIISE students? To answer this question, means and standard deviations (SD) of the students' scores were calculated on the scale as a whole, and on each sub-dimension of the scale as shown in table (Table 2).

As noted from Table (2) that the overall score of metacognitive skills is at a high degree with a mean (3.41) and SD (0.274), and it is noted that (KO) came in a very high degree, with a mean (4.29) and SD (0.287), followed by (KK) mean (3.45) and SD (0.354) finally (KP) came in a medium degree with mean (3.30) and SD (0.399).

**Second**: Results related to the second question: Are there any statistically significant differences in metacognitive skills among students of KAIISE attributed to the gender variable?

To answer the second question, means and standard deviations were calculated, and a T-test for independent samples was used to examine the differences between the mean responses of the study sample on the sub - dimensions of metacognitive skills and the overall score on the scale and table shows that (Table 3).

It is clear from Table 3 that there are differences between the male and female averages on the dimensions of metacognitive skills and also on the overall score on the metacognitive skills scale. The mean of (KO) was (54.34) for males, (54.66) females, and for (KK) mean of Males is (41.51) while for females (41.11) as for (KP) mean of Male is (36.43) while for females (36.25) finally the mean of the overall score on Metacognitive skills was for Males (132.29) while for females (132.02), it is noted that the differences between the means of the males and females in the study sample are very simple differences. The results of examining the differences between means using the T-test for independent samples showed that there is no statistically significant difference attributed to gender on metacognitive skills and its sub-dimensions.

**Third**: Results related to the third question: Are there any statistically significant differences in metacognitive skills among students of KAIISE due to the variable study grade? To answer the third question, means and standard deviations of the study sample were calculated according to the study grade variable (Table 4).

The results of Table 4 show that there are differences between the means of

**Table 1:** The person correlation coefficient values for sub- dimensions with the overall score on the scale.

Sub Dimensions	Ko	Kk	Kp	Over all
KO	--	*0.93	*0.80	*0.96
KK	--	--	*0.77	*0.95
KP	--	--	--	*0.88

**Table 2:** Means and SD for the students' scores on the dimensions and overall score on the scale.

Sub Dimensions	Mean	SD	Level
KO	4.29	0.287	very high
KK	3.45	0.354	high
KP	3.30	0.399	medium
The Overall	3.41	0.274	high

**Table 3:** Results of T-test for independent samples.

Source	Gender	Number	Mean	SD	T-value	df	Sig
KO	Male	70	54.34	6.041	0.298	121	0.766
	Female	53	54.66	5.605			
KK	Male	70	41.51	4.555	0.501	121	0.617
	Female	53	41.11	4.168			
KP	Male	70	36.43	4.386	0.228	121	0.820
	Female	53	36.25	4.442			
The Overall	Male	70	132.29	12.364	0.127	121	0.899
	Female	53	132.02	10.414			

**Table 4:** Means and SD for the study sample according to the study grade variables.

Source	Study Grade	Number	Mean	SD
KO	7 <sup>th</sup>	38	53.97	5.070
	8 <sup>th</sup>	40	53.85	5.659
	9 <sup>th</sup>	25	52.55	6.411
	10 <sup>th</sup>	20	57.80	5.766
KK	7 <sup>th</sup>	38	42.32	4.515
	8 <sup>th</sup>	40	40.92	4.827
	9 <sup>th</sup>	25	41.80	2.446
	10 <sup>th</sup>	20	39.75	4.767
KP	7 <sup>th</sup>	38	37.21	4.154
	8 <sup>th</sup>	40	35.88	4.077
	9 <sup>th</sup>	25	36.76	4.876
	10 <sup>th</sup>	20	35.15	4.738
The Overall	7 <sup>th</sup>	38	133.50	8.934
	8 <sup>th</sup>	40	130.65	12.510
	9 <sup>th</sup>	25	127.45	14.391
	10 <sup>th</sup>	20	136.36	9.473

**Table 5:** Results of One Way ANOVA.

Source		Sum of Squares	df	Mean Squares	F	Sig
KO	Between Groups	375.676	3	125.225	3.943	0.01
	Within Groups	3779.024	119	31.757		
	Total	4154.699	122			
KK	Between Groups	98.923	3	32.974	1.751	0.160
	Within Groups	2240.736	119	18.830		
	Total	2339.659	122			
KP	Between Groups	70.167	3	23.389	1.219	0.306
	Within Groups	2283.801	119	19.192		
	Total	2353.967	122			
The Overall	Between Groups	1044.105	3	348.035	2.735	0.047
	Within Groups	15145.310	119	127.272		
	Total	16189.415	122			

responses of the study sample on the sub - dimensions of metacognitive skills and the overall score on the scale. In order to examine these differences a One Way ANOVA assumed as in Table illustrates that (Table 5).

Table 5 shows that the statistical value (F) of the skill of KO was (3.943) which is statistically significant at the level of significance ( $\alpha \leq 0.05$ ), which means that there are differences between the mean responses of the study sample in the skill of KO due to the variable study grade. The results of table (5) show that the statistical value (F) of the KK skill reached (1.751), while the skill KP (1.219), which are not statistically significant at the significance level ( $\alpha \leq 0.05$ ). Regarding to the differences in the mean of the study sample on overall score on the scale, it was found that the statistical value (F) of the overall score on the metacognitive skills scale was (2.735) which is a statistically significant value at the significance level ( $\alpha \leq 0.05$ ). In order to reveal the location of the differences between the means shown by the results of one way ANOVA analysis on the KO skill and the overall score on the scale according to the variable study grade. A test of LSD for post-comparisons extracted as table shows that (Table 6).

It is noted from Table (6) about KO skill as the result of LSD test for post comparisons that there are statistically significant differences at the level of significance ( $\alpha \leq 0.05$ ) when comparing the means of students of grades (7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup>, 10<sup>th</sup>) and in favor of students from the tenth grade level. The mean score for the tenth grade students was (57.80) while the means of other grades

was respectively; for the seventh grade (53.97) and for the eighth grade (53.85), while the ninth grade reached (52.55). Tenth grade are more likely to have the (KO) skill more than their peers.

With regard to the overall score on the scale, which reflects the study sample possess the skills of metacognitive thinking as a whole, the results of the comparative results showed that there are statistically significant differences at the level of significance ( $\alpha \leq 0.05$ ) also for students from the tenth grade level with a mean (3.24), while the mean of students from the seventh grade level (3.17), and students in the eighth grade (3.11). Finally the ninth grade students with a mean (3.03), which indicates that the tenth grade students are the most possessed metacognitive skills compared to peers from other classes.

**Discussion**

This study which researched the level of metacognitive skills among students in KAIISE and to reveal the differences in metacognitive skills among students in KAIISE that are attributed to the variables: gender and the academic grade. The results thought to contribute to the literature.

The level of metacognitive skills have a high degree, which is similar to Bakli and Sassi (2018), Al Youssef (2017), Bukaiei, (2014) and Al Jarrah and Obeidat (2011), who emphasizes that a high level of metacognitive skills as a result of their researches, in addition this result can be interpreted due to the specialized

**Table 6:** Results of (LSD) post-comparisons test.

Variables	Source	Mean	7 <sup>th</sup> grade	8 <sup>th</sup> grade	9 <sup>th</sup> grade	10 <sup>th</sup> grade
KO	7 <sup>th</sup> grade	53.97	-	0.923	0.009	0.362
	8 <sup>th</sup> grade	53.85	-	-	0.007	0.401
	9 <sup>th</sup> grade	52.55	-	-	-	0.002
	10 <sup>th</sup> grade	57.80	-	-	-	-
Overall score	7 <sup>th</sup> grade	133.50	-	0.267	0.327	0.055
	8 <sup>th</sup> grade	130.65	-	-	0.049	0.302
	9 <sup>th</sup> grade	127.45	-	-	-	0.010
	10 <sup>th</sup> grade	136.36	-	-	-	-

academic educational services for students in KAIISE to meet their different needs, and its endeavor to develop the school environment and classroom to achieve the development of talent and creativity among students and invest their potentials, in addition to the efforts of the Ministry of Education in providing Enriching curricula for the students in KAIISE, and provide practical experiences for students by providing schools with laboratories and scientific trips, in addition to the presence of a distinguished teaching strategies that focus on discussing and interacting with students in a positive way. During the classroom issues, KAIISE also provide various sources of information such as books, documents, internet services, and search engines for students that encourage them to research and exert self-effort in acquisition knowledge and information.

The results showed that there is a very height level of KO this can be interpreted with regard to the KO skill, which includes the activity carried out by the learner to monitor the cognitive processes, skills and strategies used by him/her, this sub - dimension includes elements, such as: planning, information management, correction, evaluation, and this is what is focused on the educational programs of students in KAIISE to allow students to plan their educational work, and the practice of managing and organizing the information they get, and helps them in addition to the feedback they receive from teachers, as well as the various and different assessment methods applied to them, makes this a great opportunity for students to practice their KO skill as a fundamental sub - dimension of metacognitive skills.

As for KK the results revealed that it has a high level, this result is in line with Hauck (2005) who pointed out that knowledge of knowledge KK as it represents of the metacognitive skills has an essential role in the effective usage of learning strategies and so in self-regulated or self-directed learning. According to Bukaiei, (2014) and Al Jarrah and Obeidat (2011), the KK includes the knowledge stored within individual about the processes of knowledge, strategies, and awareness of the individual's abilities, as well as the individual's knowledge of what strategies to use, how to use and when to use. In another word KK is a core element for students to learn because learning as a process needs to be connected to a rich Knowledge base.

Additionally the opportunities for students in KAIISE by providing The various scientific sources and references allow them to store knowledge in addition to increasing their awareness of when to use this knowledge and how to use it to meet the requirements of the subjects such as research and scientific projects and experiments, in addition to the use of that knowledge to perform the test. It measures the students' level of knowledge acquisition and utilization of teaching and supplementary materials.

As for KP skill, the results indicated that the students have a medium level of this skill, which is includes the ability of the learner to use and employ the different strategies and skills in management of information and knowledge acquired. This requires him to work on linking previous experiences with new experiences to increase his level of awareness. What can be explained by the medium level of the students of the study sample is that they need more educational experiences, because the nature of the age they are going through did not give them the opportunity to test such skills to allow them to employ them. The results indicated that the students have the KP skill into a medium degree, indicating the need for more experience to raise their level in such a skill.

Results also showed that there is no statistically significant differences in metacognitive skills among students of KAIISE attributed to the gender variable, which mean that males and females are equal in metacognitive skills. And this not consisted with the findings of Bakli and Sassi (2018), Al Youssef (2017), Bukaiei, (2014), this difference may be attributed to the difference of the study sample of these studies which applied on a university students, meanwhile the current study was applied to the students of compulsory education, which indicates a difference in the experiences received by students of university education from the students of compulsory education. This result can be interpret with what pointed by Veenman, et al, (2014) in examining the relationship in metacognitive skills according to gender and age interaction,

females start with a low level of metacognitive skills at the age of 14, and then improved at the age of 15, And reach its best level by the age of 16, Whereas males have an acceptable and positive level of metacognitive skills at the age of 14, then decreases at the age of 15, and then the level of improvement at the age of 16, which reinforces the findings of the current study, which agreed also with the findings of the study of Sonowal and Kalita, (2017), and the Bahrei and Faresi (2014) study which confirmed recent findings on the lack of gender differences in metacognitive skills due to the fact that the differences between males and females in metacognitive skills are highly visible in children, Then its decreased in later stages of age, and there are often no differences between males and females at secondary education students.

This result can also be interpreted according to the data of the current study that the KAIISE are mixed schools, which mean that male and female students are studying together in the same classroom, which indicates that they receive equal access to the same enrichment curricula and practical experience, and that teachers are Common to males and females, which means that both of them have the same experiences that stimulate and develop metacognitive skills.

According to the results of this study related to differences in metacognitive skills due to study grade which point out that the students in 10 grade have the preference in metacognitive skills comparing to other grads, and this consist with what Pazzaglia et al. (1999) reported that improvements in metacognitive skills happened thought upper levels of school, can be explained by the fact that 10 grade students are the most experienced in the use of metacognitive skills in general, due to the different requirements of the courses they study compared to the lower grades and the nature of the activities received by the tenth grade students in KAIISE making them more experienced than their peers in the lower grades in the use of planning skills, taking notes, self-organization in academic aspects as well as in extracurricular activities, this finding was consistent with what is recommended by Al Youssef, (2017) and Bukaiei, (2014).

**Conclusion**

It is concluded from the results of the study that there is a high level of metacognition skills in the overall degree and so to the sub dimensions KO & KK, amongst the students of KAIISE meanwhile a medium level of the Kp sub dimension. There were no significant differences in metacognition skills due to gender. As for students in KAIISE the more they get progress in academic grade they will improve their metacognition skills.

**Recommendations**

In the light of the findings of the present study, the following recommendations may be made:

1. Work to invest the high level of metacognitive skills in students to increase and develop academic and social harmony through methodological and extracurricular activities.
2. Working to increase the level of teachers in the skills of metacognitive skills through qualifying and training courses in relation to the knowledge processing KP skill as one of the metacognitive skills.
3. Work on further studies that examine the relationship of metacognitive skills with other variables such as: self-efficacy, or psychological and social compatibility.

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