The Effect of Summary Strategy and Information Amount in Developing Metamemory among a sample of Al-Qassim University Postgraduates

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ABSTRACT

The study aimed at finding the effect of summary strategy and information amount in developing metamemory among a sample of al-Qassim university postgraduates. The sample included (240) postgraduate registered in a psychology course for the academic year 2014/ 2015, they were allocated randomly into four equal groups. The students were told to answer the metamemory pre-test questions, then the first group was exposed to a little amount of information and told to summarize the information immediately after reading; the second group received a large amount of information and summarized it immediately; the third group received a small amount of information and was told to summarize it after a (24) hour delay; the fourth group received a large amount of information and summarized it after a (24) hour delay. All groups received instructions to complete the metamemory posttest.

Significant differences at (α=0.05) were found between delayed summary of the small amount of information and both of immediate summary for a large and a small amounts of information, in favor of delayed summary of a small amount of information. Statistical significant differences at (α=0.05) were also found between immediate summary of a large and a small amount of information in favor of immediate summary of a large amount of information in the ability to recall.

Keywords: Delayed Summary, Immediate Summary, Large Amount of Information, Small Amount of Information, Metamemory

INTRODUCTION

Remembering is mentioned in the holy Qur'an in surah (Az-Zumar: 9): "Are they equal, those who know and those who do not know?' Only those with minds remember", and surah (Ibrahim; 25): "Allah gives parables to mankind so that they might remember". The process of remembering occurred a lot in the holy Qur'an in different formats; in an evidence of its importance for human, it also means that remembering is not just memorizing and repeating but includes the process of knowledge, learning, thinking, self-review, and self-assessment learning awareness.

Educational literature witnessed a huge movement that took interest in learning various mental processes such as thinking, concluding, memory, and recalling in addition to studying subjects such as metacognition out of which several related concept emerged such as metacomprehension, metamotivation and metamemory.

Perhaps the concept of metamemory is more prevalent and interesting for readers and scholars. Metamemory has become a major issue recently; it occupied interest of knowledge domains (Al-Tobasi, 2004). Scholars in cognitive, developmental, educational, social, personal and neuropsychology and every issue related to individual cognitive system took interest in metamemory. In other words metamemory captured interest of cognitive psychology recently because of its importance in cognitive development and psychological

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and social adjustment which enables us to confront learning situations in education and real life.

Studying the concept of metamemory in psychological literature started in early seventies, when it was first introduced by Flavell (1979) and until the present day, so we conclude that metamemory is a component of metacognition. Many definitions of the concept emerged, of which is Flavells' (1979) definition: metamemory is the individual knowledge of his memory ability and functions. what is remembered depends on three factors;

1. The individual who stores information in terms of his awareness of his beliefs about his memory, self-efficacy, nature, capacity and ability to recall.
2. Appropriate strategy, i.e. awareness of choosing strategies suitable to individuals potentials and the task requirements. Repeated use of a certain strategy leads to excellence in performing the task. The individual may discover the importance of the strategy when performing another task in a way that proves his awareness of the strategy influence on the task and why it influences it? This is called metamemory.
3. The task intended to be accomplished, that is individual awareness of task requirements and factors affecting coding and recalling negatively and positively, and the task nature in terms of difficulty.

Nelson and Narens (1990) define metamemory as "knowledge and self-control of the memory while performing remembering tasks", they point out that metamemory has two levels: monitoring which means individual knowledge of information being processed, and control which means individual awareness of available strategies to improve the ability of information processing.

Abdel-Fattah and Jaber (2005) refer to metamemory as "learner awareness of his memory and awareness of its processes, and organization which involve awareness of the strategies and implications and control of its effectiveness and cognitive activity efficacy completing tasks.

Kayal (2006) defines it as "self-awareness of the individual of his memory capacity and the diagnoses of tasks difficulty and requirements, selecting matching remembering strategies and implementing it in a way to achieve increased judgment accuracy on control, organization and self-assessment of the memory.

Darwaza (2004) defines metamemory as a derived composite from metacognition and means awareness of remembering strategies and the things the individual remembers, controls and monitors.

The author believes that metamemory is the individual cognition and beliefs of his own memory in terms of storing, processing, capacity, strengths and weaknesses, times of efficient functioning and what comes with knowledge as emotions and the use of proper remembering strategies for certain tasks.

Educational literature suggests that there are many theoretical models that explain metamemory components.

Metamemory judgments may be categorized into;

Ease of learning Judgments, these come before knowledge acquiring, they are considered deductive judgments, and also considered predictors of difficulty in recalling process, which elements are easier and which strategies makes learning easier especially the strategies of coding and recalling (Issa, 2004).

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Judgments of learning, means the individual judgment that he mastered in learning intended material, this procedure occurs while acquiring the information or after it.

Judgments of feeling of learning, means the individual feeling of knowing the information and that he will remember it, this also happens while acquiring the information or after it. These judgments are about a certain information we know but is not needed currently and we know that we can recall it when needed (Nelson and Narens, 1990)

Memory models

First: models dealing with metamemory as a cognitive component.

Siegler (1996) agrees that this component includes: individual self-awareness of memory, abilities, assessment of memory capacity, awareness of tasks requirements and processing difficulty, as well as awareness of different strategies and choosing suitable ones for different tasks.

Second: models dealing with metamemory as a monitoring component.

Gaultney (1998) and Parkin (1993) explain metamemory as the ability to assess current situation of the memory, self-monitoring and self-control sources, self-assessment and self-organization. These components are responsible for determining memory task, provide feedback about difficulty of tasks and suitability and efficacy of the strategies.

Pressley and Meter (1994) and Goawami (1998) present two components of metamemory:

1. Knowledge affecting the efficacy of recalling and effective or non-effective strategies.
2. Self-monitoring of recalling processes through self-organization, ability to plan guide and assess behavior in recalling, ability to distinguish knowledge patterns that may be trained on in order to use them for guidance later in cognitive processing.

Muller (2006) indicates that metamemory is comprised of: awareness, diagnosis and monitoring. Awareness refers to individuals awareness of his needs to remember as an important requirement for the effective memory, his own memory strengths and weaknesses and awareness of appropriate strategies for easy and difficult tasks. Diagnosis refers to required strategies and skills to deal with certain situations, that is the learners' awareness of the skills and strategies qualities that insure overcoming the situation. Monitoring refers to the strategies the learner uses to monitor implementing the plan and follow it up to achieve cognitive goals, it is believed to occur when the learner inputs information in his memory to be stored and retrieved. The learner may produce a model on monitoring by using supporting skills such as guiding the learner to ask self-questions and summarize.

Some of the cognitive strategies that may be taught to students to enhance metamemory are: main ideas extraction, details projection and reorganizing information to suit the individual and situation, or what is called summarization strategy with which a learner can organize his thoughts and information while learning. This may be an indicator of having analytical and synthetic upper skills (Nasr, 1990).

Because summarizing is important many scholars tackled it and provided recommendations. Summary procedures that captured interest of scholars is; timing i.e. summarizing immediately of after some delay of reading.

Ma (2008) said delayed summary in more effective and deeper, because the learner extracts the information after reading from the long-term memory, while immediate summary is less effective. Baddeley (2002) explains that by saying the working memory is the cognitive

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component responsible for processing and temporary storing of information, its role manifests in retaining the text in the long-term verbal memory storage. This means for Thiede and Anderson (2003) that in immediate summary the learner depends on information stored in short term memory where information lasts for a brief time, and it may be impossible to reach this information after losing it. Thus summary of a little information volume compared to a lot of information is quite similar after reading immediately.

Accordingly, the author believes that summary and metamemory are associated in overlapping processes. Summary is considered an effective cognitive strategy and metamemory is considered a metacognitive strategy that the learner uses to insure reaching the goal of learning, the difference between cognitive and metacognitive is very slight; the two terms interact to a large extent and depend on each other, summary strategy helps the learner in performing the task and achieving the goal such as understanding a certain text, while metamemory is used to insure that the procedure of accomplishing the task is done correctly and that the goal is achieved.

Literature Review

As far as the author knows studies on summary strategy effected by the amount of information on metamemory among postgraduates are not available. However, there are some studies that have an indirect relevance of the topic.

Obwitz (1990) revealed the effectiveness of the strategy of self-questioning in developing awareness of metamemory. The strategy focuses on the main idea in the text and is composed of a group of questions the learner asks himself before reading the text, while reading and after reading, which makes him more involved with the material. The results proved superiority of the experimental group over the controlled one in metamemory development. Learners also had tendency toward using self-questioning strategy and showed willingness to apply it in future.

El-Hindi and Childers (1997) tried to reveal the effect of teaching summary strategy and self-assessment on developing awareness of metamemory. Low achievers postgraduate (No. 87) participated in the study. Results showed a significant difference in the development of metamemory awareness among the participants after using summary strategy and self-assessment strategies.

Shaddock and Carroll (1997) aimed to explore factors affecting judgments of learning, by experiencing the effect of the context on judgments of learning; the three variables are the amount of learning, delayed judgments of learning and the retention interval of the material. Metamemory performance was better in the large amount of information, delayed judgments of learning after a delay of 24 hours compared with learning after a delay of 4 weeks proved that memory performance in leaning after 4 weeks delay was better in large amount of information and retention.

Keleman (2000) explored the relation between using metamemory cues and metamemory monitoring accuracy. Immediate and delayed (30 minutes interval) Judgments of learning were obtained from postgraduates after exposing them to texts. It appeared that timing and expressing the cues of judgments of learning for delayed judgments interaction is important, and delayed judgments of learning where more accurate compared with immediate judgments of learning.

Kayal (2006) explored the effect of metamemory information amount in effectiveness of learners use of cognitive learning strategies. The participants were postgraduates (No. 46) registered in a psychology course; they were allocated into two groups, each group received a

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program including a large amount or a little amount of information. They completed two tests; metamemory awareness and cognitive learning situated strategies. Statistical significant differences were found in posttests between the means of the two groups in favor of the group receiving a large amount of information.

Bsharah and atteyat (2010) examined the effect of the information amount in developing metamemory among postgraduates. Ninety student taking the course of fundamentals of psychology participated in the study, they were allocated into three groups; a controlled group of (30), first experimental group of (30) which was exposed to a little amount of information and second experimental group of (30) which was exposed to a large amount of information. Statistical significance of the information amount on the performance of the students appeared in the metamemory overall test and its three dimensions (memory satisfaction, ability and strategy) in favor of the second experimental group.

Al-Shmiese (2012) studied the effectiveness of a training program in the development of metamemory skills among preparatory school students. The sample consisted of (120) students (60 male and 60 female) allocated to two control and two experimental groups. The two experimental groups (one male and one female) were exposed to the training program. Posttest results between the control and experimental male groups proved statistical significant differences in favor of the experimental group on overall test and dimensions. Posttest results between the control and experimental female groups showed statistical significant differences in favor of the experimental group on overall test and dimensions.

From the previous literature it is summed that some studies focused on metamemory and its relation with cognitive variables as remembering, means of enhancing memory and cognitive learning strategies. But the educational domain lacks attempts to develop metamemory components among postgraduates based on educational programs build on different amounts of information except for two studies; Kayal (2006) and Bsharah and Atteyat (2010) which were conducted in a Jordanian environment. Therefore, the author attempted to study her own Saudi environment and conducted her study in Al-Qassim university.

STUDY PROBLEM

Metacognition in general and metamemory in particular received interest of educational scholars because of its importance in developing cognitive, academic and personal aspects of the learner such as improving memory, self-organization, self-monitoring, effective strategic behavior and psychological adjustment.

Effective learning basic principle exists in being a strategic learner, this occurs by educational and training programs of metamemory components that provide information about memory and learning systems and how to use a certain strategy such as the summary strategy, metamemory satisfaction, awareness of potential memory mistakes, all of which help to organize information and retrieve it. Lack of literature urged the author to address the issue and provide factual study away from speculations and expectations. Therefore, the current study attempted to explore the effect of summary strategy and amount of information on developing metamemory among a sample of postgraduates by answering the following two questions:

- What is the level of metamemory among Al-Qassim university postgraduates?
- Are there statistical differences at (α=0,05) between the means of students responses on metamemory test based on the summary strategy and information amount?

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IMPORTANCE OF THE STUDY

The study may develop learners awareness of metamemory importance by using cognitive strategies. The study explores metamemory among Al-Qassim university postgraduates. This group requires more abilities to deal with learning material by having metamemory skills.

The study is believed to be a part of the theoretical and practical literature that highlights metamemory, theoretically it may add new knowledge to the educational thought, and is believed to be the core for further studies in future. Lack of Arabic and local studies examining the level of metacomprehension, urged the author to undertake the current study.

STUDY LIMITATIONS

Generalization of the results may be inhibited by the following:

Validity and reliability of the test, the participants from Al-Qassim university postgraduates. It is also limited to explore the effect of summary strategy from two angles; immediate and delayed and information amount; little and large. Hence the results are valid to generalize only on the population of this study (No. 240 female student) in the academic year 2014/2015, and similar populations.

PROCEDURAL DEFINITIONS

For the purpose of the study, the following definitions are used:

Information amount, a group of various cognitive expertise taught to the students related to the metamemory concept in educational sessions designed by the author including (6) sessions for the first experimental group and (11) sessions for the second experimental group. The amount is identified by two levels; little amount where no in-depth or additional information is provided, the awareness of the simple information held in the metamemory is sufficient. A large amount of information includes deep and additional information that enhances awareness of metamemory.

Metamemory, means the extent of satisfaction of ones metamemory, the daily function of the memory, the extent of using different remembering strategies measured by the scores achieved on Troyer and Rich (2002) test ranging between (0- 228) degrees.

Summary, exclusion of minor information, processing of concepts and ideas with the learner own language to derive the main ideas and reform the text in a brief way.

Immediate summary, performing a summary immediately after reading the text.

Delayed summary, making a summary after a delay (interval of 24 hours) after reading the text.

METHODOLOGY

An experimental approach is employed for its appropriateness to the nature and objectives.

Sample

The sample consists of (240) female student registered in the course of fundamentals of psychology at Al-Qassim university for the academic year 2014/2015.

Table 1 shows repetitions and percentages based on groups

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Table 1. Repetition and percentage based on the study variables.

categories	*repetition*	*Percentage*
delayed summary of a large amount of information	60	25%
delayed summary of a little amount of information	60	25%
immediate summary of a large amount of information	60	25%
immediate summary of a little amount of information	60	25%
Total	240	100%

Instrument

The author build a test to measure "metamemory". The test consisted of six dimensions to measure metamemory in learning educational situations while providing participants with different amounts of information, participants were asked to summarize the information given to them either immediately or after a delay. The participants completed the pre and posttests. Psychometric characteristics of the test were insured, test items final number was (60) distributed on six dimensions; these dimensions are defined procedurally as:

i. Ability to recall information. The degree obtained on answering (10) items in the metamemory test, the items refer to a response acquired from previous stimulus.
ii. Familiarity (Prior knowledge). The degree obtained by answering (9) items in the metamemory test and these items refer to previously learnt material from educational situations and life experiences that are not subject to distraction or forgetting.
iii. Organization. The degree obtained by answering (9) items in the metamemory test and these items refer to the learners' control of the process of learning by using few strategies such as goal setting, planning, monitoring, activating the relationship between prior and new experience and assessment.
iv. Interest. The degree obtained by answering (10) items in the metamemory test and these items refer to the degree of attention that the learner gives to the subject.
v. Surface text features. The degree obtained by answering (8) items in the metamemory test and these items refer to the apparent text format without looking deep into the meanings.
vi. Strategy. The degree obtained by answering (14) items in the metamemory test and these items refer to searching for new ways to increase remembering such as self-questioning while processing information or summary…etc.

The test was established by considering previous tests from the literature to benefit from the ideas, style and some items that are appropriate for the Arabic environment and age group. Of the tests consulted Dixon et al (1988) metamemory in adulthood questionnaire which was Arabized by Sayed (2000); Troyer and Rich (2002) New Metamemory Questionnaire for Older Adults which was Arabized by Abo Ghazal (2007); and the study of Shimizu et al (2007) that compared metamemory adult tests. Based on the above the author constructed the items of the test used in the current study. Validity of the test was verified through;

Surface validity. Professors majoring in educational psychology, measurement and evaluation, and learning and development from King Saud University, King Feisal university, Al-Qassim University and Hail University in Saudi Arabia reviewed the initial version of the test. The professors provided some remarks on the test items in terms of dimension

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representation, suitability to the age group, and structure. Based on these remarks, three items are excluded (80% of the reviewers agreed on their unsuitability) the total final number of items was (60).

Construct Validity. The test was administered on a pilot sample of (50) students to verify the construct validity. Correlation coefficients were calculated for each item with the total score and dimensions, as well as for each item with total score of the test, as seen in Table (2).

Table 2. Correlation Coefficient of Metamemory Based on Test Dimensions and Overall Test

Dimension	*Item Direction*	*N.*	*Item*	*Item Correlation*	
				Dimension	*Overall*
Ability to recall	-	1	I can organize what I learn in my mind in a descendent order.	0.41	0.41
		2	I can remember the important ideas we concluded in the last lesson.	0.48	0.37
		3	I depend on writing notes more than depending on my memory	0.49	0.39
		4	If the information is important I can easily remember it.	0.47	0.44
		5	I have my own strategies in remembering what I read.	0.5	0.49
		6	I think of existing events always while reading which enhances recalling.	0.42	0.45
		7	I believe my memory is better that my counterparts.	0.33	0.49
		8	I am proud about my memory ability to memorize and recall.	0.45	0.36
	-	9	I get upset when confronted with a problem because I believe stored memories will not help to solve it.	0.49	0.32
		10	Remembering the main idea means that information is organized in my mind.	0.36	0.43
		11	I remember the text well because am familiar with it.	0.52	0.47
		12	I understand the text associated with what I learned more than other texts.	0.43	0.36
Familiarity (Prior Knowledge)	-	13	I understand the topic little, if the text is new and I haven't heard about it before.	0.27	0.2
		14	I think about how to use prior knowledge to ease recalling.	0.43	0.21
		15	I can recall a topic studied the moment the teacher hints to it.	0.55	0.22
		16	If I read or hear a summary for a previously learnt lesson I can recall most of its information.	0.27	0.26

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		17	I can provide creative ideas based on what I learnt.	0.35	0.27
		18	I can give examples related to a previously learnt lesson.	0.54	0.45
		19	I can add to what the others have written after reading it.	0.41	0.33
		20	I evaluate myself while reading to ensure understanding.	0.43	0.41
		21	I divide the text before reading; this helps in better understanding	0.51	0.46
		22	I look up words that I don't understand when reading to make remembering it easier.	0.38	0.29
		23	I reread topics that I do not understand several times to make remembering it easier.	0.4	0.36
Organization		24	I check the words that are effective in the meaning of the text.	0.47	0.31
		25	I look for missing information while reading a text.	0.51	0.33
		26	I define the goal of reading before reading the text.	0.54	0.37
		27	I connect new information in the text with prior knowledge.	0.54	0.45
		28	I choose information that helps to draw a mental plan that helps to remember.	0.4	0.36
		29	Being interested in the topic makes me ready to remember ideas.	0.37	0.35
		30	Being interested to remember the text increases my focus while reading.	0.31	0.2
	-	31	Not being interested in the topic decreases my focus on it.	0.5	0.35
		32	I think of the output of reading which encourages me to remember it later.	0.49	0.37
		33	When the topic is interesting my remembering increases.	0.45	0.32
Interest	-	34	When the topic is not interesting my remembering decreases.	0.42	0.39
		35	The thematic text makes it interesting and helps to remember.	0.31	0.29
		36	I distinguish between important and not important related information.	0.47	0.46
		37	I choose the more important information to summarize the lesson.	0.38	0.37
		38	I search for the information that helps me predict to solve encountered problems.	0.34	0.31
Surface	-	39	It is difficult to understand the text that is	0.34	0.32

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Features			full of boring details.		
	-	40	Similar ideas and themes in the text makes it difficult to distinguish between them.	0.47	0.37
	-	41	The text does not have details to explain its ideas.	0.4	0.36
	-	42	Long texts affects my remembering.	0.35	0.28
	-	43	I faced few difficult words in the text and that affected my remembering of it.	0.36	0.33
		44	I look to the text pages number before starting reading.	0.36	0.35
		45	I ask someone to read the text for me; this enhances remembering.	0.57	0.53
		46	The moment the lesson title is written on the board I can judge if it is easy or difficult.	0.47	0.42
		47	Before reading, I usually ask myself questions that have answers in the text am reading.	0.45	0.31
		48	I try assuming what I think will happen in the text am reading.	0.4	0.37
		49	I try to determine the possible events in the text based on its title.	0.47	0.46
		50	I verify my assumptions while reading.	0.38	0.37
		51	I use self-questioning and assumptions to guide remembering in the text.	0.34	0.31
		52	I check the possibility of answering the self-questions after reading the text.	0.34	0.31
Strategy		53	I use the monologue in order to direct attention and increase text remembering.	0.47	0.38
		54	I enjoy summarizing the lesson.	0.39	0.37
		55	I use information organized conceptual maps while studying.	0.36	0.31
		56	To recall certain points I repeat them many times.	0.54	0.43
		57	I draw illustrative pictures of the topic to help recalling it.	0.42	0.33
		58	I draw imaginative pictures of the information I study.	0.52	0.48
		59	I add details to the information in order to understand and recall it.	0.42	0.36
		60	I invent a story to connect the information that I wish to remember.	0.29	0.27

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In table (2) it is noticed that the correlation values between items and dimensions are high, ranging between (0.27- 0.55), while correlation value of overall test ranged between (0.20-0.53), indicating an acceptable construct validity.

Internal consistency of the test is calculated using Cronbach correlation coefficient by implementing the test on a pilot sample of (50) students. Internal consistency total score was (.91), while test-retest of an interval of (21) days yielded (.84) as seen in table (3).

Table 3. Internal Consistency and Repetition Based on Metamemory Overall Test and Dimensions

Metamemory and dimensions	*Internal consistency*	*Repetition*	*Items No.*
Familiarity (Prior Knowledge)	0.81	0.90	9
Ability to Recall information	0.88	0.85	10
Organization	0.86	0.88	9
Interest	0.87	0.84	10
Surface text Features	0.82	0.88	8
Strategy	0.73	0.92	14
Overall Test	0.91	0.84	44

Table (3) illustrated that the highest score was for ability to recall (0.88), and the lowest was for strategy (0.73), overall test value scored (0.91). Pearson correlation highest value was for strategy (0.92), lowest value was for interest (0.84), overall test value scored (0.84). it is revealed, upon the above results, that the test is valid for the purpose of the study.

Correcting the test

Total final number of items was (60). The test items were distributed on (3) dimensions; satisfaction of memory, memory mistakes and strategy. Subjects completed test items on a 5-point Likert scale ranging from (1) to (5). Consequently, the total score of the test as overall ranged between (zero) and (24o).

Theoretical Background

The purpose of the educational sessions was to provide the students with different amounts of information to measure their metamemory ability. The sessions may be described as a comprehensive program that includes awareness of knowledge and information about metamemory in terms of the historical development of metamemory concept, theoretical trends explaining metamemory, metamemory definitions, models studying metamemory (cognitive, monitoring, and cognitive monitoring components) and their relation with metacognition that is awareness of cognitive processes monitoring and controlling it, the correlation with metaattention which means awareness of what attracts the attention and the degree of attention, metacomprehension refers to awareness of ways that guides comprehension and knowing if the learner understands what he reads or not, control and its psychological and educational importance, variables affecting it, developing it, memory mistakes and means of enhancing memory based on relevant theoretical literature.

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Procedure

Data collection went through the following process:

1. Choosing participants from Al-Qassim university female students for the academic year 2014/ 2015.
2. Allocating the participants on four groups, each group of sixty students as the following:
   i. Group one completed the metamemory pretest then they read a little amount of information. They were told to summarize information immediately following reading it then to complete metamemory posttest.
   ii. Group two completed the metamemory pretest then they read a large amount of information. They were told to summarize information immediately following reading it then to complete metamemory posttest.
   iii. Group three completed the metamemory pretest then they read a little amount of information. They were told to delay summarizing (interval of 24 hours) then to complete metamemory posttest.
   iv. Group four completed the metamemory pretest then they read a large amount of information. They were told to delay summarizing (interval of 24 hours) then to complete metamemory posttest.

Study Variables

Independent variables:

Summary which has two levels; immediate and delayed. Information amount with two levels; a large and a little amount.

Dependent variable:

The level of metamemory measured by students achievements on the overall test and its dimensions.

Design of the Study

Groups	*Pretest*	*Educational session*	*Summary*	*Posttest*
Group one	Metamemory dimensions	Little amount of information	Immediate summary	Metamemory dimensions
Group two	Metamemory dimensions	Little amount of information	Delayed summary	Metamemory dimensions
Group three	Metamemory dimensions	Large amount of information	Immediate summary	Metamemory dimensions
Group four	Metamemory dimensions	Large amount of information	Delayed summary	Metamemory dimensions

The study implemented the pre and posttest on four experimental groups. The groups completed the metamemory pretest before starting the educational sessions and completed metamemory posttest. The design was;

Which may explained mathematically as:

amount of information	*immediate summary*	*delayed summary*
little amount	O1 X O2	O1 X O2
large amount	O1 X O2	O1 X O2

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RESULTS

Before answering the study questions, to verify means and standard deviations of the groups responses were calculated on metamemory pretest based on strategy dimension (delayed summary of a little amount, delayed summary of a large amount, immediate summary of a little amount and immediate summary of a large amount), the following table illustrates it.

Table 4. Means and Standard Deviations of Students Performance on Metamemory based on the Strategy

	categories	*No.*	*M.*	*SD.*
Ability to recall pretest	delayed summary/ large amount	60	2.30	0.19
	delayed summary/ little amount	60	2.33	0.16
	immediate summary/ large amount	60	2.25	0.25
	immediate summary/ little amount	60	2.29	0.19
	Overall	240	2.29	0.20
Familiarity (Prior Knowledge) pretest	delayed summary/ large amount	60	2.27	0.28
	delayed summary/ little amount	60	2.33	0.25
	immediate summary/ large amount	60	2.29	0.22
	immediate summary/ little amount	60	2.29	0.22
	Overall	240	2.29	0.24
Organization pretest	delayed summary/ large amount	60	2.22	0.44
	delayed summary/ little amount	60	2.27	0.49
	immediate summary/ large amount	60	2.27	0.46
	immediate summary/ little amount	60	2.33	0.51
	Overall	240	2.27	0.47
Interest pretest	delayed summary/ large amount	60	2.12	0.20
	delayed summary/ little amount	60	2.08	0.22
	immediate summary/ large amount	60	2.11	0.23
	immediate summary/ little amount	60	2.15	0.20
	Overall	240	2.11	0.21
Surface Features pretest	delayed summary/ large amount	60	2.04	0.23
	delayed summary/ little amount	60	2.03	0.19
	immediate summary/ large	60	2.03	0.19

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	amount			
	immediate summary/ little amount	60	2.00	0.16
	Overall	240	2.02	0.19
Strategy pretest	delayed summary/ large amount	60	2.29	0.23
	delayed summary/ little amount	60	2.23	0.25
	immediate summary/ large amount	60	2.23	0.20
	immediate summary/ little amount	60	2.19	0.20
	Overall	240	2.23	0.22
Overall pretest	delayed summary/ large amount	60	2.22	0.16
	delayed summary/ little amount	60	2.21	0.19
	immediate summary/ large amount	60	2.20	0.18
	immediate summary/ little amount	60	2.21	0.19
	Overall	240	2.21	0.18

Table (4) shows apparent differences between means and standard deviation of the subjects responses on metamemory pretest due to variation in strategy, ANCOVA analysis is calculated to find the differences function and the results were as seen in Table (5).

Table 5. ANCOVA analysis of strategy effect on subjects responses on the metamemory pretest

	Source	*Sum of Squares*	*df*	*Mean Square*	*f value*	*Sig.*
Ability to recall pretest	Between the groups	0.175	3	0.058	1.471	0.223
	Within the groups	9.363	236	0.04		
	Overall	9.538	239			
Familiarity (Prior Knowledge) pretest	Between the groups	0.141	3	0.047	0.798	0.496
	Within the groups	13.867	236	0.059		
	Overall	14.007	239			
Organization pretest	Between the groups	0.378	3	0.126	0.56	0.642
	Within the groups	53.096	236	0.225		
	Overall	53.474	239			
Interest pretest	Between the groups	0.132	3	0.044	1.009	0.389
	Within the groups	10.298	236	0.044		
	Overall	10.43	239			

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Surface Features pretest	Between the groups	0.053	3	0.018	0.488	0.691
	Within the groups	8.571	236	0.036		
	Overall	8.624	239			
Strategy pretest	Between the groups	0.303	3	0.101	2.085	0.103
	Within the groups	11.437	236	0.048		
	Overall	11.74	239			
Overall pretest	Between the groups	0.009	3	0.003	0.097	0.962
	Within the groups	7.673	236	0.033		
	Overall	7.682	239			

Table (5) shows that metamemory overall scores and dimensions scores differences at (α=0,05) are not functional based on the strategy. This result refers to the equality of the groups

The main question in the study was about the "level of metamemory among Al-Qassim university postgraduates", to answer it means and standard deviations of metamemory pretest among the students of Al-Qassim university students was calculated, table (6) below illustrates this.

Table 6. Means and standard deviations of metamemory level in means descendant order.

Item order	*Item No.*	*Dimension*	*Mean*	*Standard Deviation*	*Level*
1	1	Ability to Recall information	2.29	0.2	Medium
2	2	Familiarity (Prior Knowledge)	2.29	0.242	Medium
3	3	Organization	2.27	0.473	Medium
4	6	Strategy	2.23	0.222	Medium
5	4	Interest	2.11	0.209	Medium
6	5	Surface Features	2.02	0.19	Medium
		Overall Test	2.21	0.179	Medium

It is inferred from Table (6) that means ranged between (2.02- 2.29), the "ability to recall" scored the highest mean (2.29), while "surface features" scored the lowest (2.21). overall mean scored (2.21).

Pertaining to the second question "Are there statistical differences at (α=0,05) between the means of students responses on metamemory test based on the summary strategy and information amount?" the author calculated means standard deviations and revised means of the subjects performance on metamemory test based on strategy (delayed summary of a little amount, delayed summary of a large amount, immediate summary of a little amount and immediate summary of a large amount), the following table illustrates it.

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Table 7. Means, Standard Deviations and Revised Standard deviations of Students Performance on Metamemory Pretest based on the Strategy

	Group	*M.*	*SD.*	*Revised M.*
Ability to recall pretest	delayed summary/ large amount	3.2	0.212	3.30
	delayed summary/ little amount	3.02	0.173	2.99
	immediate summary/ large amount	2.78	0.281	2.77
	immediate summary/ little amount	2.74	0.235	2.69
	Overall	2.94	0.294	2.94
Familiarity (Prior Knowledge) pretest	delayed summary/ large amount	3.16	0.195	3.21
	delayed summary/ little amount	2.89	0.123	2.86
	immediate summary/ large amount	2.69	0.179	2.69
	immediate summary/ little amount	2.78	0.174	2.75
	Overall	2.88	0.244	2.88
Organization pretest	delayed summary/ large amount	3.16	0.182	3.18
	delayed summary/ little amount	2.80	0.179	2.80
	immediate summary/ large amount	2.64	0.165	2.66
	immediate summary/ little amount	2.67	0.158	2.62
	Overall	2.82	0.266	2.82
Interest pretest	delayed summary/ large amount	3.16	0.081	3.21
	delayed summary/ little amount	2.86	0.176	2.86
	immediate summary/ large amount	2.66	0.275	2.67
	immediate summary/ little amount	2.74	0.198	2.68
	Overall	2.85	0.272	2.86
Surface Features pretest	delayed summary/ large amount	3.18	0.272	3.24
	delayed summary/ little amount	2.90	0.269	2.89
	immediate summary/ large amount	2.53	0.313	2.53
	immediate summary/ little amount	2.63	0.211	2.56
	Overall	2.81	0.368	2.81
Strategy pretest	delayed summary/ large amount	3.23	0.124	3.25
	delayed summary/ little amount	2.86	0.046	2.85
	immediate summary/ large amount	2.60	0.148	2.61
	immediate summary/ little amount	2.61	0.117	2.59
	Overall	2.83	0.279	2.82
Overall pretest	delayed summary/ large amount	3.18	0.059	3.18
	delayed summary/ little amount	2.89	0.102	2.89
	immediate summary/ large amount	2.65	0.159	2.65
	immediate summary/ little amount	2.69	0.118	2.69
	Overall	2.85	0.24	2.85

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Table (7) shows apparent differences between means, standard deviations and revised means of the subjects responses on metamemory test due to variation in the strategy variable (delayed summary of a little amount, delayed summary of a large amount, immediate summary of a little amount and immediate summary of a large amount), to find its statistical difference ANCOVA analysis is done to find the differences function and the results are illustrated in Table (8), (9).

Table 8. ANCOVA analysis of the Strategy Effect on the Dimensions

Source	*Level*	*Sum of Squares*	*df*	*Mean Square*	*f value*	*Sig.*
Ability to recall pretest	Ability to recall	0.096	1	0.096	4.945	0.027
Familiarity (Prior Knowledge) pretest	Familiarity (Prior Knowledge)	2.161	1	2.161	451.213	0.000
Organization pretest	Organization	1.010	1	1.010	102.304	0.000
Interest pretest	Interest	0.001	1	0.001	0.042	0.838
Surface Features pretest	Surface Features	2.160	1	2.160	57.836	0.000
Strategy pretest	Strategy	0.041	1	0.041	6.549	0.011
Strategy Wilks' Lambda=0.010 P=0.000	Ability to recall	10.628	3	3.543	182.208	0.000
	Familiarity (Prior Knowledge)	7.859	3	2.620	546.913	0.000
	Organization	9.202	3	3.067	310.705	0.000
	Interest	9.029	3	3.010	230.528	0.000
	Surface Features	15.926	3	5.309	142.169	0.000
	Strategy	13.354	3	4.451	704.422	0.000
Error	Ability to recall	4.472	230	0.019		
	Familiarity (Prior Knowledge)	1.102	230	0.005		
	Organization	2.271	230	0.010		
	Interest	3.003	230	0.013		
	Surface Features	8.588	230	0.037		
	Strategy	1.453	230	0.006		
Overall	Ability to recall	20.706	239			
	Familiarity (Prior Knowledge)	14.193	239			
	Organization	16.970	239			
	Interest	17.634	239			
	Surface Features	32.428	239			
	Strategy	18.670	239			

It is inferred from table (8) that there is a statistical significant difference at (α=0.05) due to the effect of the strategy in all the dimensions.

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Table 9. ANCOVA Analysis of Overall Strategy Effect

Source	*Sum of Squares*	*df*	*Mean Square*	*f value*	*Sig.*
Pretest	0.814	1	0.814	82.283	0.000
Group	10.506	3	3.502	353.875	0.000
Error	2.326	235	0.010		
Revised Overall	13.822	239			

In table (9) it is noticed that there are statistical significant differences at (α=0.05) due to the strategy effect, *F* scored (353.875) and a significance of (0.000). To reveal binary differences LSD posttest is used, and the results are as in Table (10).

Table 10. LSD Posttest of the Strategy Effect

	Groups	*M.*	*delayed summary/ large amount*	*delayed summary/ little amount*	*immediate summary/ large amount*	*immediate summary/ little amount*
Ability to recall pretest	delayed summary/ large amount	3.30				
	delayed summary/ little amount	2.99	.31*			
	immediate summary/ large amount	2.77	.53*	.23*		
	immediate summary/ little amount	2.69	.61*	.31*	.08*	
Familiarity (Prior Knowledge) pretest	delayed summary/ large amount	3.21				
	delayed summary/ little amount	2.86	.35*			
	immediate summary/ large amount	2.69	.52*	.17*		
	immediate summary/ little amount	2.75	.46*	.11*	.06*	
Organization pretest	delayed summary/ large amount	3.18				
	delayed summary/ little amount	2.80	.38*			
	immediate summary/ large amount	2.66	.53*	.15*		
	immediate summary/ little amount	2.62	.56*	.18*	0.03	
Interest pretest	delayed summary/ large amount	3.21				
	delayed summary/ little amount	2.86	.35*			

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	immediate summary/ large amount	2.67	.54*	.19*	
	immediate summary/ little amount	2.68	.53*	.18*	0.01
	delayed summary/ large amount	3.24			
Surface Features pretest	delayed summary/ little amount	2.89	.35*		
	immediate summary/ large amount	2.53	.71*	.36*	
	immediate summary/ little amount	2.56	.68*	.33*	0.03
	delayed summary/ large amount	3.25			
Strategy pretest	delayed summary/ little amount	2.85	.40*		
	immediate summary/ large amount	2.61	.64*	.24*	
	immediate summary/ little amount	2.59	.66*	.26*	0.02
	delayed summary/ large amount	3.18			
Overall pretest	delayed summary/ little amount	2.89	.30*		
	immediate summary/ large amount	2.65	.53*	.23*	
	immediate summary/ little amount	2.69	.49*	.19*	.04*

* functional at (α=0.05)

From table (10) we understand:

There are statistical significant differences at (α=0.05) between delayed summary of a large amount of information and delayed summary of a little amount of information, and between immediate summary of a large amount of information and immediate summary of a little amount of information, the difference is in favor of delayed summary of a large amount of information. Statistical significant differences at (α=0.05) exist between delayed summary of a little amount of information with both immediate summary of a little amount of information and immediate summary of a large amount of information in favor of delayed summary of a little amount of information. Statistical significant differences at (α=0.05) between immediate summary of a large amount of information and immediate summary of a little amount of information in favor of immediate summary of a large amount of information in the ability to recall and overall test.

This result is attributed to the fact that activating metamemory skills are deeper and more effective whether delayed summary is carried out for a large amount of information or a little amount, because the student recall information from the long-term memory after reading the text, and the difference between recalling a large amount or a little amount of information means the student uses metamemory skills more when recalling a large amount of information from the long-term memory.

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The case here is different, what happens in immediate summary of a large or a little amount of information might differ from delayed summary. The student depends on the information that have been activated in the working memory while reading and summarizing immediately. Baddeley (2002) says the working memory is the cognitive component responsible of processing and temporary storage of information, its role is to retain the read text in the verbal store until the text is stored in the long-term memory. In Thiede and Anderson (2003) view the student in immediate summary depends on the information stored in short-term memory, which lasts briefly and in this case metamemory skills are not activated. Thus, summary of a large amount of information compared with a little amount are quite similar immediately following reading.

Statistical significant differences at (α=0.05) between immediate summary of a large amount of information and immediate summary of a little amount of information in favor of immediate summary of a little amount of information in familiarity (Prior Knowledge) and in overall test, this is attributed to the little amount being exact and direct which enables the student of finding a complementary correlation between the little amount and familiarity (prior knowledge) so she stops at lower levels and depend on information activated in the working memory while reading thereby reducing the use of metamemory skills.

Statistical significant differences at (α=0.05) between delayed summary of a little amount of information and both of immediate summary of a large amount of information and immediate summary of a little amount of information were found in favor of delayed summary of a little amount of information in organization, interest, surface features and strategy.

The results proved that delayed summary of a little amount of information compared with immediate summary of a large amount of information and a little amount of information produces efficacy in using metamemory skills, this is attributed to:

Organization facilitates recalling and information extracting from long-term memory deepens it. Also it leads to self-monitoring and is supposed to produce an increase in metamemory. Interest creates a cognitive gap that guides students to use skills such as predicting which increases metamemory level. Familiarity motivates students to derive implicit and explanatory meanings by deep thinking of the text to form new relations that helps analyzing it and achieve better recalling, while using strategies facilitates time of recalling, material to be recalled, strategies that help to recall which helps to treat recalling failure.

Implications

Based on the results of this study educators are not giving metamemory research enough time and effort. The gap still exists in the literature review of local and Arab studies treating metamemory. So more studies dealing with different age groups such as elementary students are required to fill this gap, and to improve if sessions affect school students. To tackle new variables also such as gender and major, perhaps results agree or disagree based on gender or major.

Guide educational counselors to educate their students about their memories in an attempt to increase awareness of metamemory, especially students confronting educational and adjustment problems. Hold training courses for teachers to familiarize them with ways of activating using metamemory in teaching. Educate teachers about the importance of delayed summary and to encourage students to use this strategy to improve their metamemory skills, because it proved its effectiveness in metamemory.

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REFERENCES

[1]. Abdel-Fattah, Fawqeyah, Jaber, Abdel-Hamid. (2005). *Cognitive Psychology: Theory and Practice.* Cairo: Dar Al-Fekr Al-Arabi.

[2]. Abo Ghazal, M. (2007). The relation between metamemory and academic achievement motivation among Yarmouk University postgraduates. *Jordan Journal of Educational Sciences. 3*(1).89-105.

[3]. Al-Tobasi, F. (2004). *The effect of a number of recalling strategies in recalling information in light of student gender and learning motivation level*.(Unpublished master dissertation). Yarmouk University, Jordan.

[4]. Baddeley, A. (2002). Is working memory still working. *European Psychologist, 7*(2), 85-97.

[5]. Bsharah, M., & Atteyat, K. (2010). The effect of information amount in developing metamemory among a sample of postgraduates. *Najah University Humanities Research magazine. 24 (*3). 693-728.

[6]. Mustafa, S.I. (2000). Attribution style, metamemory and academic motivation. Predictable variables of academic achievement among Domyat educational faculty. *Domyat educational faculty journal. 33 (*1).63-91.

[7]. Darwaza, A. (2004). *Fundamentals in educational psychology: awareness strategies and its activators as a base for education design*. Dar Al-Shorooq: Amman.

[8]. Dixon, R. A., Hultsch, D. F., & Hertzog, C. (1988). The Metamemory in Adulthood (MIA) questionnaire. *Journal of Psychopharmacology Bulletin. 24*. 671–688.

[9]. El-Hindi , A. E. & Childers, K. D. (1997). *Exploring Metacognition awareness and Perceived Attributes for Academic Success and Failure A Study of A risk college students***,** Paper presented at the Annual Meeting of the South Western Educational Research Association, New Orleans.

[10]. Flavell, J. (1979). Metacognition and cognitive monitoring: A new area of cognitive development enquiry. *American psychologist. 34*.906 – 911.

[11]. Gaultney, J. (1998). Metamemory in children cognitive learning. *learning and individual differences. 10 (*1). 13 – 26.

[12]. Issa, Majed Mohammad Othman. (2004). *The impact of a training program of metamemory on the performance of strategy non-producer children*. (Unpublished PhD Thesis). Faculty of Education. Al-Azhar University

[13]. Kayal, M. (2006). *Effect of metamemory level in effectiveness and usage of cognitive learning strategies by learners: pilot study*. The Seventh Congress of the research. University of the United Arab Emirates. AlAyn. 52-65.

[14]. Kelemen, W. L. (2000), Metamemory cues and monitoring accuracy: Judging what you know and what you will know. *Journal of Educational Psychology.* 92 No 4. Dec 2000. P (800-810).

[15]. Ma, M. (2008). *The effects of immediate and delayed summarizing on judgments of learning, studying patterns and achievement.* M.A. dissertation, Simon Fraser.

[16]. Miller, P. (1994). Individual differences in children's strategic behaviors: utilization deficiencies. *Learning and Individual Differences.6*.(3). 285-307.

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[17]. Nasr, H. (1990). *The development of basic reading skills and habits among high school students in Jordan*. (Unpublished PhD Thesis). Ain Shams University: Egypt.

[18]. Nelson, T., & Narens, L. (1990). Metamemory a theoretical framework and new findings. *The Psychology of learning and motivation. (*26). 125 – 322**.**

[19]. Obwtiz, J. (1990). Metacognition Strategy Constructing the main idea of text. *Journal of Reading. 3*3. (620-634).

[20]. Parkin, A. (1993). *Memory phenomena. experimental and theory*. Blackwell. U.S.A.

[21]. Pressley, M., & Meter, P. (1994). *What is memory development of? theory of memory and cognitive development. Theoretical aspects of memory*. Roultedge: London.

[22]. Shaddock, A., & Carroll, M. (1997). Influences on metamemory judgments. *Australian Journal of Psychology ,49*, 21–27.

[23]. Shimizu, H., Takahashi, M., & Saito, S. (2007), Analysis of self-assessment of everyday memory using metamemory Questionnaires. *Article in Japanese* .Retrieved on 16-1-2009 from: www.mem.cog.ja.

[24]. Siegler, R. (1996). *Information processing and children development* (Edit). Academic Press: New York.

[25]. Thiede, K., & Anderson, M. (2003). Summarizing can improve metacomprehension accuracy. *Contemporary Educational Psychology.28*. 129–160.

[26]. Troyer, A.K., & Rich, J.B. (2002). Psychometric properties of a new metamemory questionnaire for older adults. *Journals of Gerontology*: *Psychological Sciences and Social Sciences.*57.19–27.

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