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The Effect of Summarization Strategy on Metacomprehension among Al-Qassim University Students

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Abstract The present experimental study aimed at identifying the effect of summary strategy (no summary, immediate summary and delayed summary) on metacomprehension. A sample of 240 students from Al-Qassim University participated in the study; they were divided into three groups. All groups had a pre metacomprehension test before reading unfamiliar texts. Then all groups read the texts, group 1 was instructed to do no summary after reading; group 2 was instructed to summarize the texts immediately following reading; and group 3 was instructed to summarize the texts after a delay of 24 hours. Post metacomprehension test was administered on all groups, which was developed from Al-Bargesstudy [1]; it includes 22 items distributed on 7 dimensions. Validity and reliability of the test are insured. Results indicated statistically significant differences between students' scores in the metacomprehension posttest due to summary strategy in favor of delayed summary. Results also revealed statistically significant differences between metacomprehension tests due to summary strategy in favor of delayed summary.

Keywords Metacomprehension, Summarization, Immediate Summary, Delayed Summary, No Summary

1. Introduction

Reading is very important in acquisition knowledge; it aims at comprehension i.e. to develop meanings about the read text. The reader may read a text and finds difficulty in assimilating its meaning or recognizing its content. Such difficulty might be caused by the writers complicated style of writing, or by deficiency in assimilating, or because the text meanings and ideas are beyond the readers intellectual or cognitive level in terms of depth, mode of expression and unfamiliarity. This difficulty may also be due to text peculiar words, reader's unfamiliarity with the words, meanings, concepts, ideas and readers lack of ability to understand the context and recognize the content. Badran [2].

2. Review of Literature

The purpose of the review is to provide a synthesis of the literature on writing summaries supporting learners' understanding of what is read and the effect of writing summaries on metacomprehension. Many researchers dealt with reading strategies to enhance comprehension that improves metacomprehension. For instance, Thompson and Taymans [3] developed a reading strategies program; they wanted to involve third-grade students in reading strategies to enable them to better understand and comprehend texts. The results showed that the students who were divided into two categories of readers; beginner and independent, used reading strategies to process comprehension problems, but there was a difference between the two categories. Beginners did not recognize when a certain text was incomprehensible; they were aware of reading comprehension problems; and did not know that they had to self-assess their comprehension; they couldn't fill meaning gaps resulting from unknowing certain words appropriately. While independent readers used reading strategies to process the whole text, they developed their own awareness and monitored metacomprehension during reading, and they assessed what they understand of reading. The strategies that independent readers used are known as "cognition of metacognition."

Since metacomprehension involves several dimensions not just one, researchers refer to it as a "skill". Researchers gave metacomprehension different definitions according to the dimensions they tackle; the multifold foundation of metacognitive theory; measuring metacomprehension; and metacomprehension and strategic reading.

Robeck and Wallace [4] on one hand considered comprehension as "an invariant condition of reading" (p.25), it involves awareness of the thinking processes while reading.

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Metacomprehension is a unique form of metacognition taken always in respect to reading, and to the author's metacomprehension refers to the ability to monitor thinking to better achieve understanding of the text. Brown [5] on the other hand furthered the previous definition of metacomprehension and mentioned; it is the learners' awareness of mental processes used in reading, studying or problem solving. This awareness means that learners understand their own characteristics as learners, characteristics of the read texts and the appropriate strategies to monitor metacomprehension, one of which is summary strategy.

Abromitis [6] considered monitoring the main dimension in metacomprehension. She defined metacomprehension as "aware control and monitoring the process of learning." Monitoring means that the learner knows when a failure in comprehension happens and what remedial strategy should be used to correct such a failure. Fitzgerald [7] agreed with Abromitis and saidthat metacomprehension refers to the learners monitoring of his own cognition, and his awareness of the strategies that facilitate comprehension. In other words the learner knows when he knows and when he doesn't know, what to understand and what is the strategy that enhances comprehension or understanding.

Thiede and Anderson [8] said that metacomprehension refers to self-regulation in learning and reducing cognitive dissonance; according to this strategy the learner recognizes a certain criteria to master the educational material by monitoring learning mastery, then the output of self-monitoring for learning as a base to decide whether to stop or continue studying. This means if the current learning situation achieves the desired; the learner stops studying, but if it doesn't achieve the desired the learner continues studying by allocating more study time or choosing some material to restudy it. Self- monitoring continues until the cognitive dissonance between the current learning situation and the desired situation score zero, consequently, the close self-monitoring of learning and effective regulation of study improves learning, and hence increases metacomprehension.

Despite the apparent difference between the definitions they have much in common in the meaning of metacomprehension as "awareness of cognitive processes of comprehension, the knowledge of how a text is comprehended, and comprehension retention" to detect failure then to use cognitive strategies to treat such a failure. Osman and Hannafin [9].

Rosenshine and Chapman [10] distinguished between cognitive and metacognitive strategies. They mentioned that a cognitive strategy assist students in information processing; in writing notes, setting questions, and filling gaps with data or graphs, and these serve specific assignments. Metacognitive strategies are rather used by students in planning, monitoring or learning. Cognitive strategies are used to help the learner to achieve a certain goal. Cognitive and metacognitive strategies intersect in one strategy depending on the aim of usage.

Phrasing and structuring words differently, processing thoughts and reaching main ideas, generating main ideas, dropping details and reorganizing information to serve the individual and the situation are some cognitive strategies that may be taught to students to enhance metacomprehension, and these are called summary strategies by which a learner organizes ideas and information during learning. This in turn indicates that the learner has high structural and analytical skills. Nasr [11].

Applying the summarization strategy is important because it contributes in developing learning and improves the learners' ability to analyze, discriminate and criticize. When readers comprehend a text they compose a perception that represents their comprehension of the text. The text summaries that the learner writes represent what he has comprehended. So, summarizing is an image of text comprehension, this was evident in many studies conducted on using summarization strategies for effective comprehension by students. Head [12].

Many researchers studied summarization and provided recommendations. Summary strategies are divided into two categories according to the time of employing it into: immediate summary and delayed summary, and it have captured researchers' interest. Ma [13] for instance, found that delayed summary is more effective, and its effect is deeper, because the learner recalls information from his memory after reading the text, while immediate summary was less effective, in other words delayed summary improves learning more compared to immediate summary. Justifications for delayed summary effectiveness over immediate summary are according to Baddeley [14] explained by the idea that the working memory is the cognitive component responsible for momentary processing and storing of information. The working memory retains the read text in the verbal storage until it is stored in the long term memory. Thiede and Anderson [8] also justified effectiveness of immediate summary over delayed summary, by saying that the learner depends on the information stored in the short term memory, in which information is retained for a short period and might not be accessible when lost. If the text is not comprehended the learner may depend on information activated during reading in the working memory. Summarizing a comprehended versus uncomprehended texts are exactly the same following reading immediately, as a result the learner predicts his metacomprehension accuracy poorly, that is to say he is not certain of comprehension when summary is carried out immediately after reading.

While in delayed summary, the learner retrieves information from long term memory. The learner owns little information to depend on in summarizing a text; he can retrieve more information in summarizing a comprehended text. Which in turn sheds the light on well comprehended and less comprehended texts in increasing accuracy judgments of texts comprehension, text quality, the ability to organize learning more effectively. Thiede and Anderson [8].

According to what has been mentioned before summarizing and metacomprehension are correlated in an overlapping process. Summarizing is considered an effective

cognitive strategy used by learners to achieve the goal of understanding texts, and metacomprehension is considered a metacognitive strategy used by learners to be certain of reaching the goal, as in self-questioning to assess understanding, the difference between cognition and metacognition is very little; both intersect to a large extent, and both depend on each other. For example summarization strategy aids the learner in his task and goal achievement as understanding a text, but metacomprehension is used to make sure that the procedure of competing a task is on the right course and that the goal is accomplished. Thiede and Anderson [8].

Az-Zayat [15] mentioned that a learner may learn summary strategies, by taking notes during reading, but the cognitive strategies are the procedure that helps the learner in self-assessment as assessing the effectiveness of using summary strategies. Az-Zayat also assured that self-assessment depends on self-questioning; is summarizing the text comprehensive for all important and necessary points? Is rewriting important points successful, clear and brief?

The bottom line is; summarization is important in remembering text ideas because it changes the structure of the text and rebuilds it according to the readers' ability, to be remembered with ease. When readers generate ideas, write ideas in brief, and correlate it in special correlations, it will make them easy to remember and comprehend. Metacomprehension is used to assure that the task is on the right course. The current studyis limited in examining the effect of a cognitive strategy (no summary, immediate summary and delayed summary) on metacomprehension.

Thiede, Anderson, and Therriault [16] conducted a study to find if metacognitive monitoring affects regulation of study, and overall learning. The authors instructed participants to generate 5 keywords that capture the essence of texts presented to them, assuming that generating key words is a sort of a summary. Sixty-six students enrolled in a psychology or educational psychology courses at the University of Illinois at Chicago were randomly assigned to three groups (delayed keyword, immediate keyword, or no keyword). Results revealed that accuracy in metacomprehension was greater for the group that wrote keywords after a delay (delayed-keyword group) than for the group that wrote keywords immediately after reading (immediate keyword group) and the group that did not write keywords (no-keyword group).

Regular and poor readers were the sample chosen by Anderson [17], whotried to explain the effect of generating delayed summaries on improving metacomprehension accuracy for the chosen sample, by means of two interventions: one investigated differences in metacomprehension accuracy between capable and poor readers, the other, summarization, was investigated to assess its contribution to improving metacomprehension accuracy. Eighty-nine students from a community college near Chicago participated in the study. Each subject completed each condition of the comprehension monitoring tasks: no-summary, immediate summary, and delayed summary. Results revealed an improvement in metacomprehension accuracy by regular and poor students in the delayed summary condition compared with the no summary and immediate summary conditions. Results also revealed that both regular and poor readers had the same level of metacomprehension accuracy on the delayed summary condition.

XuFuming and Shi Jiannong [18] conducted a study entitled "Metacomprehension accuracy and its relation to self-regulated learning" the sample consisted of (96) students from Huazhong Normal University/China students', they were divided into three groups (no summary, immediate summary and delayed summary) equally. The results revealed metacomprehension accuracy was reliably greater for the delay-summary groupthan for the immediate summary group and the no summary group.

ZengXu Li [19] conducted a study entitled "Effects of Summarizing and Self-Questioning on Metacomprehension Accuracy". Ninety (43 female and 47 male) students enrolled in Zhejiang Normal University/ China participated in the study and they were assigned into three groups (no summary, immediate summary and delayed summary). Results revealed that summarization enhanced metacomprehension accuracy among the students of delayed summary group compared with the groups of no summary and immediate summary.

De Bruin etal. [20] evaluated whether generating delayed keywords or main ideas, that are considered summaries, improved metacomprehension accuracy for children. Secondary education students (N. 94) ages12-13 years old either generated key words or main ideas after some time following reading the texts provided (group 1), or just read the texts (group 2). It was found that metacomprehension improved for the students in group (1) compared with group (2).

Thiede, Griffin, Wiley, and Anderson [21] conducted a study entitled "Poor Metacomprehension Accuracy as a Result of Inappropriate Cue Use." One hundred and six individual participated in the study, they were divided into three groups (no summary, immediate summary and delayed summary). It was found that metacomprehension accuracy improved in the delayed summary group compared with the other two groups.

Linden, Schneider, and Roebers [22] conducted a study to explore the effect of using cognitive strategies to improve children's metacognitive judgments. A total of 70 students (35 female and 35 male) were recruited from six primary schools in Switzerland and were assigned into two age groups (7 and 9 years), then each group was divided into two subgroups randomly. First groups was instructed to summarize after 70 minutes following seeing a film, the other group was a control one and did nothing. It was found that metacomprehension improved in the delayed summary group in comparison with the control group.

In sum, from the previous literature it is found that metacomprehension improved significantly in all the above

mentioned studies in the delayed summary groups compared with immediate summary and no summary groups. hence, there is a relation between metacomprehension and immediate, delayed and no summary strategies. As far as the researcher knows there is a gap in this domain in Arab societies, for that I present this humble work in an effort to fill this gap.

3. Study Problem

Metacomprehension received attention from cognitive psychologists because it is correlated with being successful in the dimensions that require ability to use strategies affecting educational and behavioral habits, so that these habits become subject to organization by using cognitive strategies.

I have noticed, being a lecturer, educational weakness that was accompanied by complaint from other colleague lecturers stating the lack of students' ability to use cognitive strategies that help in monitoring learning, monitoring progress in comprehension of read texts, and accurately distinguish between well learnt and poor learnt materials. One of the strategies that help to achieve comprehension is summarization. Many students lack the skill of summarization; they do not master the summary mechanism, or even aware of its role in highlighting main ideas, this may be due to not knowing the rules of summarization, or how it is accomplished (immediately or after some delay), or it is due to teachers neglecting the importance of summary, accordingly, affecting the development of metacomprehension passively. In immediate summary the learner depends on the information stored in short term memory and as a result metacomprehension prediction may be weak. While in delayed summaries the learner retrieves information from long term memory, this increases the accuracy of comprehension monitoring judgments, quality judgments and the ability to organize learning effectively.

This experimental study is carried out to find the effects of the cognitive strategy of no, immediate and delayed summary on metacomprehension development.

3.1. Study Question

Are there statistical differences at (α=0.05) between means of the subjects performance on metacomprehension test due to summary strategy?

3.2. Importance of the Study

The importance of the current study is apparent in the field of learning and in teachers' awareness of strategies that help learners develops metacomprehension skills. Learners are encouraged to use certain strategies (e.g. summarization) to facilitate organization of study information. The study is also important because participants are university students, and this stage requires more ability to handle written material by metacomprehension skills. It may also be considered a stone in the theoretical and practical literature that heightens metacomprehension, it may also add new knowledge to the educational thought, and be the core of further studies in future.

Lack of Arab and local studies examining the effect of cognitive strategies, one of which is summarization impact on metacomprehension, provoked the researcher to undertake the current study in this domain.

3.3. Limitations of the Study

The researcher believes that generalizing the results of the study is limited by few limitations, namely:

1. The results are limited by the available validity and reliability of the scale.
2. It is limited by the impact of summarization (immediate, delayed and no summary) strategy.
3. It is limited by the study sample (al Qassim university students) total number (240) for the academic year 2013/2014; hence the results are valid to generalize on the statistical community of al Qassim university students and similar communities.

3.4. Procedural Definitions

Metacomprehension: refers to the learners' ability to monitor self-learning, review self-development or failure in comprehending texts, and the use of remedial strategies to address comprehension failure. It is measured by the scores the learners achieve on metacomprehension scale, which is utilized in this study. Metacomprehension scale includes the following dimensions; anxiety, achievement, organization, task, capacity, strategy, locus of control.

Summarization: exclusion of minor information, processing of concepts and ideas with the learner own language.

Cognitive strategy: methods used by individuals in mental processes, that is, ways of perception and thinking, remembering, information formation and problem processing.

No summary: refers to doing nothing after reading a text.

Immediate summary: to perform a summary of the read text immediately after reading it.

Delayed summary: to perform a summary of the read text after a delay (interval of 24 hours).

3.5. Aim of the Study

The study aims at exploring the effect of a cognitive strategy (no summary, immediate summary and delayed summary) on metacomprehension. This will in turn increase accuracy judgments of texts comprehension, text quality, the ability to organize learning more effectively. It also aims to provide experimental evidence of summarization role in developing metacomprehension.

4. Methodology

An experimental approach is employed in the study appropriate to the nature and objectives.

4.1. Population

The study population consists of Al-Qassim university students for the academic year 2013/2014.

4.1.1. Sample

The sample consists of (240) female student chosen in random from al Qassim university for the academic year 2013/2014, from 1st to 4th year, ages ranging between (18-25) years. Subjects are divided into three groups, (80) student in each group.

4.2. Instruments

Two instruments are utilized:

Metacomprehension scale: the scale in its original version is developed by Moore, Zabrucky and Commander [23] was adapted to Arab environment by Al-Barges [1] as follows:

The scale was translated into Arabic language then back to English. Competent professors reviewed and compared the two versions of the scale. Validity of the scale is verified through:

Surface validity: Professors from educational psychology and measurement and evaluation majors from King Saud, King Abdul Aziz and Taybah universities in Saudi Arabia as well as the university of Jordan and Mu'tah in Jordan reviewed the initial version of the scale, to verify compatibility of the scale for the purpose of the study, they provided observations on the scales' items in terms of representation of dimension, suitability to age group, and the structure of each item were considered in modifying the scale. Generally it was agreed that the items verify the purpose of the study, which means the scale has an acceptable validity degree.

Construct Validity: The scale was applied on a pilot sample of (75) students to verify the construct validity. Correlation coefficient was calculated for each item with the total scores the item it belongs to. As well as the coefficient correlation for each item along with total score of the scale as seen in Table 1.

It is noticed from Table 1 that correlation values between items and dimensions are high; it ranges between (0.23-0.81) and that correlation value of the scale as a whole ranges between (0.25-0.66), which indicates that all items share in a score of one dimension referred to by total score.

Table 1. Metacomprehension correlation coefficients according to dimensions and measure a whole

Dimension	Item direction	N	Item	Correlation coefficient:	
				Dimension	Scale
Anxiety	-	1	I feel jittery if I have to explain something that I have just read.	0.48	0.28
	-	3	I would get very anxious if I had to read something new and explain it.	0.64	0.26
	-	7	I do get flustered when I am put on the spot to read and understand something new.	0.56	0.37
	-	13	I get anxious when I am asked to read something and answer questions.	0.41	0.29
Achievement		2	It is important to have good reading comprehension skills.	0.39	0.64
		9	I admire people with good reading comprehension abilities.	0.29	0.47
		12	I think good reading skills are something of which to be proud.	0.3	0.25
Regulation		4	Do you read difficult to understand material slowly and carefully to make sure that you fully understand it?	0.23	0.31
		5	When reading, I usually look up words that I don't understand in the dictionary.	0.25	0.42
		8	When you are reading something that is difficult to understand, do you reread passages that were particularly difficult to get a better understanding of them?	0.34	0.3
Task		6	For most people, it is easier to understand topics they know nothing about than topics they are familiar with.	0.47	0.4
		14	Most people find it easier to understand abstract information rather than concrete information.	0.56	0.25
		16	For most people, reading materials that is not interesting is easier to understand than reading material that is interesting.	0.32	0.25
Capacity		10	I am good at understanding news articles like those found in Time or Newsweek.	0.69	0.48
		15	Whenever I read a news article, I understand most of it.	0.35	0.38
		19	I am good at understanding newspaper articles.	0.81	0.41
Strategy		11	I usually scan difficult material before trying to read it.	0.34	0.29
		17	Before reading difficult material, I usually formulate in my mind the questions that I hope to answer from reading.	0.53	0.66
		22	When reading, do you search for key words or information that you think are essential for understanding?	0.4	0.5
Locus of Control		18	I know that if I keep reading I will never lose my reading comprehension ability.	0.43	0.59
		20	No matter how hard a person works on their reading comprehension ability, it cannot be improved much.	0.3	0.3
		21	It is up to me to keep my reading skills from deteriorating.	0.35	0.45

Reliability coefficient of internal consistency is calculated by Cronbach alpha, from scores of the pilot sample, it scored (0.79), and the repetition coefficient scored (0.82). None of the items was ruled out, it remained in its final version and consisted of (22) items divided on (7) dimensions; Anxiety (4 items), Achievement (3 items),

Strategy (3 items), Capacity (3 items), Task (3 items), Locus of control (3 items) and Organization (3 items).

Table 2. Internal consistency coefficient and repetition of metacomprehension dimensions test

Coefficient of internal consistency and repetition of			
Metacomprehension	Internal	Repetitio	N
Anxiety	0.73	0.63	4
Achievement	0.57	0.63	3
Regulation	0.57	0.64	3
Task	0.63	0.61	3
Capacity	0.76	0.82	3
Strategy	0.61	0.71	3
Locus of Control	0.64	0.58	3
Total	0.79	0.82	22

In Table 2 it is noticed that capacity scored the highest value of alpha (0.76), while achievement and organization scored the lowest (0.57), total alpha score for the whole scale reached (0.79). Pearson correlation coefficient highest score was (0.82) for capacity and the lowest was (0.58) for locus of control. And for the whole scale it scored (0.82). Based on coefficient results metacomprehension scale has validity and reliability for the purpose of the study.

4.2.1. Measuring Metacomprehension Performance

To measure metacomprehension level, subjects answered scales items according to the level of certainty on a 5-point Likert scale ranging from (1) Never, (2) Rarely, (3) Sometimes, (4) Often and (5) Always. Accordingly, the total score for the (22) item scale ranged between (22) the least degree and (110) the highest degree.

Texts were chosen from non-curriculum materials; literary: utmost confidence [24], Qadris' [25] scientific text (the moon between fact and fiction), and Zidanes' [26] historical text (Cornelius Van Dyck).

4.3. Procedures of the Study

For the purpose of data collection:

1. The researcher determined the population of the study, al Qassim university student's year 2013/2014, out of which a sample of 240 participant are randomly chosen.
2. The subjects are divided into three groups equally, (60) student in each group. Texts are distributed among students randomly, and;

Group 1, is instructed to response to metacomprehension pretest, to read the assigned three texts, and to answer the metacomprehension posttest.

Group 2, will response on metacomprehension pretest items, will be instructed to read the texts assigned to it,summarize text immediately following reading, and to take metacomprehension posttest.

Group 3, will response to metacomprehension pretest items, read the three texts assigned to it, make a summary after an interval of (24) hours delay and to response on metacomprehension posttest.

4.3.1. Variables of the Study

- Independent variable: summary strategy; - no-summary, - immediate summary, - delayed summary.
- Dependent Variable; the level of metacomprehension measured by the degree scored on the scales' different dimensions.

5. Results

The study aims at revealing the effect of summary strategy on metacomprehension on the sample through answering the following question: are there statistically significant means differences (α=0.05) of subjects' responses on metacomprehension test due to summary strategy (no summary, immediate summary and delayed summary). Means and standard deviations are calculated for the sample on metacomprehension pre and posttests according to summary strategy as seen in Table 3.

Statistically significant means differences are noticed in Table 3 insubjects performance on metacomprehension posttest as a whole resulting from summary strategy scoring difference, to verify significance of differences the performance of subjects on metacomprehension posttest as a whole according to summary strategy ANCOVA analysis was conducted after ruling out the effect of subjects performance on metacomprehension pretest as seen in Table 4.

As shown in Table 4, there are statistically significant differences at (α=0.05) between means of subjects performance on metacomprehension posttest (as a whole) according to summary strategy; to determine which strategy created the effect revised means and standard errors of subjects performance on metacomprehension posttest (as a whole) according to summary strategy was calculated as seen in Table 5.

Table 3. Means and standard deviations of the subject's performance on metacomprehension pre and posttests according to summary strategy

Summary strategy	N.	Metacomprehension (ANCOVA)	Metacomprehension (posttest)		
		Means	sd	Means	sd
No summary	60	3.361	0.46	3.290	0.41
Immediate	60	3.326	0.37	3.292	0.36
Delayed	60	3.318	0.37	3.639	0.30

Table 4. ANCOVA analysis of subject's performance on metacomprehension overall posttest according to summary strategy after ruling out the effect of subjects performance on metacomprehension overall pretest

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Pretest	19.578	1	19.578	1140.387	0.000	86.63%
t1	5.454	2	2.727	158.826	0.000	64.35%
Error	3.022	176	0.017			
Total	27.432	179				

Table 5. Means and standard errors of subjects performance on metacomprehension posttest as a whole according to summary strategy

Summary strategy	Mean	Std. Error
No summary	3.269	0.02
Immediate	3.299	0.02
Delayed	3.653	0.02

In the light of Table 5 results which aim to determine which strategy created the effect; Bonferroni test is performed on means post comparisons of subjects' performance on metacomprehension posttest according to summary strategy as seen in Table 6.

Table 6. Bonferroni post test results comparisons of subjects performance on metacomprehension scale as a whole according to summary strategy

Summary strategy		No summary	Immediate	Delayed
Bonferroni	Revised means	3.269	3.229	3.653
No summary	3.269			
Immediate	3.299	0.331		
Delayed	3.653	0.384	0.353	

Table 6, shows the difference is in favor of subjects who summarized after a delay compared with the other two groups immediate and no summary, it also shows that Partial Eta Squared of summary strategy on subjects performance on metacomprehension posttest scored (64.35%) indicating a strong correlation.

From the previous analysis statistically significant differences at (α=0.05) is evidenced between delayed summary and no summary as well as delayed summary and immediate summary, in both cases in favor of delayed summary. In Theide and Anderson [27] this is due to depending on the information activated during reading in the working memory in summarizing, as a result, the accuracy of metacomprehension prediction may be weak, which means subjects are not certain of comprehension when summary is carried out immediately after reading i.e. in both immediate and no summary. While, in delayed summary subjects retrieve information from long term memory. The case is different here, although the subject doesn't have much information to depend on when summarizing a non-understandable text, may be able to retrieve more information when summarizing an understandable text well. This in turn sheds some light on well comprehended and less comprehended texts increase metacomprehension accuracy. Accordingly the current study agrees with Theide and Anderson [8]; Anderson [17]; Ma [13]; and Theide and Anderson [27], which all concluded that delayed summary condition increased metacomprehension compared with immediate and no summary conditions.

Means and standards of subject's performance for metacomprehension dimensions posttest according to summary strategy are calculated as shown in Table 7.

Table 7 shows statistically significant differences between subjects performance on metacomprehension dimensions posttest due to summary strategy used (immediate, delayed and no summary), to verify the significance a ANCOVA analysis of subjects performance on metacomprehension dimensions posttest according to the summary strategy, with ruling out the subjects performance effect on metacomprehension pretest according to summary strategy as seen in Table 8.

Table 8 shows a statistically significant difference at (α=0.05) according to strategy summary in the subjects performance on metacomprehension dimensions posttest accumulated. To determine which strategy was affected by the posttest, an ANCOVA analysis is conducted for the subject's performance on metacomprehension dimensions posttest for each strategy with ruling out the effect of subject's performance on metacomprehension dimensions pretest as seen in Table 9.

Table 9 illustrates statistically significant differences at (α=0.05) in subjects performance means on metacomprehension dimensions posttest according to summary strategy. To determine which strategy was affected means and revised standards are calculated of subject's performance on metacomprehension dimension posttest according to summary strategy as seen in Table 10.

In the light of table 10 results, and to determine which summary strategy affects metacomprehension dimensions posttest, Bonferroni test is conducted on post comparisons between subjects' performance means on metacomprehension dimensions posttest and summary strategy as seen in Table 11.

From table 11 one notices that the results favored:

A) Group 3;made summary after a delay compared with the immediate then no summary groups, on the following metacomprehension test dimensions; capacity, achievement, task and locus of control.

B) Group 3; made summary after a delay compared with no summary then immediate summary groups, on the following metacomprehension test dimensions; anxiety, organization and strategy.

Table 7. Means and standard deviations of subjects performance on metacomprehension dimensions posttest according to summary strategy

Metacomprehension dimensions	Summary strategy	N	Pretest		Posttest	
			Mean	Std. Deviation	Mean	Std. Deviation
Capacity	No summary	60	3.417	0.49	3.433	0.47
	Immediate	60	3.401	0.44	3.373	0.42
	Delayed	60	3.352	0.54	3.737	0.44
Anxiety	No summary	60	3.65	0.53	3.07	0.58
	Immediate	60	3.42	0.48	3.057	0.51
	Delayed	60	3.473	0.52	3.567	0.44
Organization	No summary	60	3.254	0.64	3.231	0.59
	Immediate	60	3.243	0.59	3.269	0.56
	Delayed	60	3.21	0.53	3.558	0.39
Achievement	No summary	60	3.795	0.63	3.733	0.56
	Immediate	60	3.733	0.55	3.679	0.5
	Delayed	60	3.79	0.44	3.914	0.42
Task	No summary	60	2.847	0.57	2.962	0.54
	Immediate	60	2.814	0.67	2.924	0.61
	Delayed	60	2.917	0.58	3.381	0.38
Strategy	No summary	60	3.316	0.62	3.267	0.55
	Immediate	60	3.301	0.63	3.329	0.58
	Delayed	60	3.186	0.63	3.64	0.37
Locus of control	No summary	60	3.363	0.66	3.333	0.62
	Immediate	60	3.477	0.54	3.407	0.52
	Delayed	60	3.39	0.49	3.713	0.46

Table 8. ANCOVA analysis results of subject's performance on metacomprehension dimensions post response accumulated according to summary strategy after neutralizing the impact of their pretest performance

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Capacity	Wilks' lambda	0.397	35.52	7	164	0.000	%60.26
Anxiety	Wilks' lambda	0.978	0.515	7	164	0.822	%2.15
Organization	Wilks' lambda	0.251	70.091	7	164	0.000	%74.95
Achievement	Wilks' lambda	0.233	77.207	7	164	0.000	%76.72
Task	Wilks' lambda	0.271	62.989	7	164	0.000	%72.89
Strategy	Wilks' lambda	0.347	44.14	7	164	0.000	%65.33
Locus of control	Wilks' lambda	0.343	44.781	7	164	0.000	%65.65
Total	Wilks' lambda	0.278	21.032	14	328	0.000	%47.30

Table 9. ANCOVA analysis results of subject's performance on metacomprehension dimensions posttest on each dimension according to summary strategy with ruling out the effect of subjects pretest performance scores

Dependent Variable	Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Capacity	Capacity (covariate)	11.593	1	11.593	229.707	0	0.575
	Anxiety (covariate)	0.09	1	0.09	1.782	0.184	0.01
	Organization (covariate)	0.06	1	0.06	1.197	0.276	0.007
	Achievement (covariate)	0.393	1	0.393	7.791	0.006	0.044
	Task (covariate)	0.364	1	0.364	7.203	0.008	0.041
	Strategy (covariate)	0.137	1	0.137	2.713	0.101	0.016
	Locus of control (covariate)	0.002	1	0.002	0.031	0.86	0
	Summary strategy	5.805	2	2.903	57.515	0	0.404
	Error	8.58	170	0.05			
	Total	39.442	179				
Anxiety posttest	Capacity (covariate)	2.878	1	2.878	14.821	0	0.08
	Anxiety (covariate)	0.009	1	0.009	0.046	0.831	0
	Organization (covariate)	0.236	1	0.236	1.216	0.272	0.007
	Achievement (covariate)	0.14	1	0.14	0.721	0.397	0.004
	Task (covariate)	3.902	1	3.902	20.096	0	0.106
	Strategy (covariate)	0.045	1	0.045	0.234	0.629	0.001

	Locus of control (covariate)	0.076	1	0.076	0.392	0.532	0.002
	Summary strategy	9.405	2	4.702	24.217	0	0.222
	Error	33.009	170	0.194			
	Total	56.226	179				
Organization posttest	Capacity (covariate)	0.014	1	0.014	0.359	0.55	0.002
	Anxiety (covariate)	0.059	1	0.059	1.549	0.215	0.009
	Organization (covariate)	17.986	1	17.986	473.737	0	0.736
	Achievement (covariate)	0.274	1	0.274	7.21	0.008	0.041
	Task (covariate)	0.062	1	0.062	1.623	0.204	0.009
	Strategy (covariate)	0.033	1	0.033	0.865	0.354	0.005
	Locus of control (covariate)	0.017	1	0.017	0.448	0.504	0.003
	Summary strategy	4.381	2	2.191	57.695	0	0.404
	Error	6.454	170	0.038			
	Total	51.661	179				
Achievement posttest	Capacity (covariate)	0.031	1	0.031	1.04	0.309	0.006
	Anxiety (covariate)	0.009	1	0.009	0.306	0.581	0.002
	Organization (covariate)	0.179	1	0.179	6.013	0.015	0.034
	Achievement (covariate)	16.101	1	16.101	541.795	0	0.761
	Task (covariate)	0.036	1	0.036	1.201	0.275	0.007
	Strategy (covariate)	0.003	1	0.003	0.096	0.757	0.001
	Locus of control (covariate)	0.01	1	0.01	0.326	0.569	0.002
	Summary strategy	1.481	2	0.741	24.924	0	0.227
	Error	5.052	170	0.03			
	Total	45.389	179				
Task posttest	Capacity (covariate)	0	1	0	0.008	0.931	0
	Anxiety (covariate)	0	1	0	0.002	0.963	0
	Organization (covariate)	0.007	1	0.007	0.102	0.749	0.001
	Achievement (covariate)	0.323	1	0.323	5.084	0.025	0.029
	Task (covariate)	25.924	1	25.924	407.949	0	0.706
	Strategy (covariate)	0.006	1	0.006	0.101	0.751	0.001
	Locus of control (covariate)	0.042	1	0.042	0.663	0.417	0.004
	Summary strategy	5.463	2	2.732	42.985	0	0.336
	Error	10.803	170	0.064			
	Total	55.802	179				
Strategy posttest	Capacity (covariate)	0.064	1	0.064	1.153	0.284	0.007
	Anxiety (covariate)	0.041	1	0.041	0.744	0.39	0.004
	Organization (covariate)	0.066	1	0.066	1.186	0.278	0.007
	Achievement (covariate)	0.109	1	0.109	1.953	0.164	0.011
	Task (covariate)	0	1	0	0.005	0.946	0
	Strategy (covariate)	15.728	1	15.728	282.293	0	0.624
	Locus of control (covariate)	0.018	1	0.018	0.329	0.567	0.002
	Summary strategy	7.21	2	3.605	64.703	0	0.432
	Error	9.472	170	0.056			
	Total	50.46	179				
Locus of control posttest	Capacity (covariate)	0.361	1	0.361	7.025	0.009	0.04
	Anxiety (covariate)	0.014	1	0.014	0.265	0.607	0.002
	Organization (covariate)	0.019	1	0.019	0.372	0.543	0.002
	Achievement (covariate)	0.236	1	0.236	4.59	0.034	0.026
	Task (covariate)	0.005	1	0.005	0.106	0.745	0.001
	Strategy (covariate)	0.095	1	0.095	1.847	0.176	0.011
	Locus of control (covariate)	14.576	1	14.576	283.573	0	0.625
	Summary strategy	5.444	2	2.722	52.953	0	0.384
	Error	8.738	170	0.051			
	Total	55.596	179				

Table 10. Revised means and standard errors of subject's performance on metacomprehension dimensions posttest according to summary strategy

Dependent Variable	Summary strategy	Mean	Std.
		Lower	Upper
Capacity posttest	No summary	3.414	0.03
	Immediate	3.36	0.03
	Delayed	3.769	0.029
Anxiety posttest	No summary	3.061	0.058
	Immediate	3.075	0.058
	Delayed	3.558	0.057
Organization posttest	No summary	3.22	0.026
	Immediate	3.264	0.026
	Delayed	3.574	0.025
Achievement posttest	No summary	3.713	0.023
	Immediate	3.708	0.023
	Delayed	3.905	0.022
Task posttest	No summary	2.966	0.033
	Immediate	2.963	0.033
	Delayed	3.338	0.033
Strategy posttest	No summary	3.234	0.031
	Immediate	3.307	0.031
	Delayed	3.695	0.031
Locus of control posttest	No summary	3.362	0.03
	Immediate	3.358	0.03
	Delayed	3.733	0.029

It should be noted that summary strategy practical significance of strategy summary on subjects performance on metacomprehension dimensions posttest scored: (40.36%) on capacity, (22.17%) on anxiety, (40.43%) on organization, (22.67%) on achievement, (33.59) on task, (43.22%) on strategy, (38.38%) on locus of control, this indicates that the correlation between summary strategy and subjects performance on metacomprehension dimensions posttest.

To sum, statistically significant statistics appeared in delayed summary group compared with groups of no summary and immediate summary on metacomprehension dimensions test. Differences were in favor of delayed summary. Subjects depend on little information when conducting a delayed summary for a certain text, this entails using metacomprehension skills in retrieving information from the long term memory. The result may be interpreted by subjects' exhausted efforts on producing a good summary thathas several characteristics; subjects relied on the self search for information method as well as concentrating on other skills that help students to enhance metacomprehension level. This requires a learner to gather information from experience with existing information in reading content, as well as the ability to infer, explain, generating main ideas, recognizing logical correlations, organization and self-monitoring skills, this might shed some light on well comprehended texts and less comprehended ones, which will increase accuracy of metacomprehension. The case of immediate and no summary is different from delayed summary, in which the learner depends on the activated information during reading in working memory in making summaries, this means summary strategy of comprehended text and non-comprehended text exactly the same following the reading process.

Table 11. Bonferroni test post comparisons of subjects performance on metacomprehension posttest according to summary strategy

Bonferroni test post comparisons of subjects performance on					
Capacity posttest	Summary		Imme	No	Delaye
	Bonferroni	Revise	3.36	3.414	3.769
	Immediate	3.36			
	No	3.414	0.054		
	Delayed	3.769	0.409	0.356	
Achievement posttest	Summary		Imme	No	Delaye
	Bonferroni	Revise	3.708	3.713	3.905
	Immediate	3.708			
	No	3.713	0.006		
	Delayed	3.905	0.197	0.192	
Task posttest	Summary		Imme	No	Delaye
	Bonferroni	Revise			
	Immediate	2.963			
	No	2.966	0.003		
	Delayed	3.338	0.375	0.372	
Locus of control posttest	Summary		Imme	No	Delaye
	Bonferroni	Revise	3.358	3.362	3.733
	Immediate	3.358			
	No	3.362	0.004		
	Delayed	3.733	0.375	0.371	
Anxiety posttest	Summary		Imme	No	Delaye
	Bonferroni	Revise	3.061	3.075	3.558
	Immediate	3.061			
	No	3.075	0.014		
	Delayed	3.558	0.497	0.483	
Organization Posttest	Summary		Imme	No	Delaye
	Bonferroni	Revise	3.22	3.264	3.574
	Immediate	3.22			
	No	3.264	0.045		
	Delayed	3.574	0.355	0.31	
Strategy posttest	Summary		Imme	No	Delaye
	Bonferroni	Revise	3.234	3.307	3.695
	Immediate	3.234			
	No	3.307	0.073		
	Delayed	3.695	0.461	0.389	

6. Recommendations

In light of the results the researcher suggests allocating metacomprehension skills more time and effort within the skills needed to be acquisited to learners. Neglecting the importance of this skill by teachers negatively affects the metacomprehension development among learners. It also emphasizes the importance of acquainting learners in advance with the importance of cognitive strategies amongst which is summary strategy because learners are deficient in summary skill. Curriculum developers should concentrate on using cognitive strategies in general and summary strategy

specifically because it develops metacomprehension better among learners.

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