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Abstract :

The purpose of this study was to investigate the effectiveness of using meta comprehension strategies for enhancing pupil's writing performance skills and reduce writing apprehension among primary school pupils. The participants were forty pupils in the fifth year from El-Shobban Al-Muslimeen Language School in Benha at Quliobeya Governorate. The participants of the study were divided into two groups, the experimental group (N=20) and the control group (N=20). The pre writing performance skills test was administered to the participants before the treatment. Then, the experimental group was taught using meta comprehension strategies while the control group was taught using the regular method. Then the post writing performance skills test was administered to both groups. Results of the study revealed that using meta comprehension strategies was effective in enhancing pupil's writing performance skills and reduce writing apprehension among primary school pupils.

Key words: metacomprehension strategies, writing performance and writing apprehension

الملخص:

هدفت الدراسة الحالية لتحديد فاعلية استخدام استراتيجيات ما وراء الفهم لتنمية مهارات الأداء الكتابى باللغة الإنجليزية وتقليل القلق الكتابى لدى تلاميذ المرحلة الإبتدائية . تكونت عينة الدراسة من ٤٠ طالباً بمدرسة الشبان المسلمين للغات بينها بمحافظة القليوبية. تم تقسيم العينة إلى مجموعة تجريبية وعددها ٢٠ طالباً ومجموعة ضابطة وعددها ٢٠ طالباً. إستخدمت الدراسة الحالية الأدوات الآتية: شكلان متكافئان من إختبار مهارات الأداء الكتابى باللغة الإنجليزية (من إعداد الباحثة) ، وأداة لتصحيحه. تم تطبيق إختبار مهارات الأداء الكتابى باللغة الإنجليزية قبل وبعد تطبيق استراتيجيات ما وراء الفهم .

أظهرت نتائج الدراسة فاعلية استخدام استراتيجيات ما وراء الفهم لتنمية مهارات الأداء الكتابى باللغة الإنجليزية وتقليل القلق الكتابى لدى تلاميذ المرحلة الإبتدائية ، حيث أن نتائج المجموعة التجريبية كانت أفضل من نتائج المجموعة الضابطة فى مهارات الأداء الكتابى باللغة الإنجليزية.

الكلمات المفتاحية : *استراتيجيات ما وراء الفهم ، مهارات الأداء الكتابى ، القلق الكتابى .*

Introduction:

Though not explicitly stated, both the CI (The Construction-Integration) and EI (The Event-Indexing) theories of comprehension imply that metacognitive monitoring occurs when new information is evaluated in relation to the existing situation model. One possible point at which monitoring could occur in the CI model is when the model determines whether the result of the integration phase is a coherent representation. In this evaluation, the model must determine when the activation vector (situation model) has reached a stable point. Therefore, there must be some process that determines whether the activation vector is stable. This process would be a monitoring process because it evaluates the current representation of the text. If the activation vector does not reach a stable point, then repetition of the construction phase with additional representations is performed (Kintsch, 1988). Kintsch (1988) mentions that after a failure in reaching a stable point, additional processes are required to correct the representation, but does not discuss the details of the processes. The processes that correct the representation would then be the result of the metalevel controlling the processes at the object-level.

Unlike the CI model, the EI model claims that a reader's situation model is maintained in terms of the indices. As readers read a text, new information is checked for consistency with old information based on the five indices and then the appropriate action is determined. The process that determines whether new information is consistent with old information would fit Nelson and Narens' (1990) description of a monitoring process. When inconsistent information is encountered, readers must resolve the differences to create a coherent representation (Zwaan et al., 1998). Once the new information has been deemed consistent or inconsistent, control processes are performed that activate or deactivate information in the situation model. Though not explicitly stated, the theories of comprehension imply that metacognitive monitoring occurs when new information is evaluated in relation to the existing mental representation. Validation processes are used when determining whether new information is consistent

with the situation model and must be performed in order for updating to occur (Ferretti, et al., 2008). These processes are theorized to be automatic, a result of performing comprehension processes (Singer, 2013). However, studies have shown that monitoring processes can be controlled by readers and are not only used when evaluating integration processes (Thiede et al., 2009). Depending on the outcome of the monitoring processes, control processes are then performed. However, neither the CI nor EI models explain what monitoring processes are performed. For comprehension theories, it is important to understand what monitoring processes are performed because of the influence these processes have on determining the subsequent comprehension processes that will be performed.

Comprehension theories have focused on the processes by which a situation model is constructed during the reading of a text. These models mainly address the processes that occur at the object-level. Both the CI and EI model imply that monitoring does occur through automatic processes that enable a reader to detect difficulties in processing text. However, they fail to explain the role of the metalevel and its controlling of subsequent comprehension processes. Research in the domain of metacomprehension has aimed to understand how the performance of comprehension processes influences the metalevel. Metacomprehension theories originally started out as an application of theories from the domain of metamemory, one's awareness of their own memory (Glenberg, et al., 1987; Maki et al., 2009; Maki, et al., 2005). However, one problem with applying metamemory theories to metacomprehension is that the processes for learning texts differ greatly from learning the paired associates that are generally used in metamemory studies. Unlike paired associates, learning of texts requires additional processes to construct a mental representation of the text (Thiede, et al., 2009). Due to the differences between texts and paired associates, metacomprehension theories have begun to integrate comprehension theories in their explanations (Wiley,et al.,2005). One metamemory theory that has been applied in the metacomprehension domain is the cue-utilization approach. According to the cue-utilization approach, people can use three types of cues that can be made before, during, or after reading a text in order to make judgments of learning (Koriat, 1997). Intrinsic cues involve the characteristics of the study items, extrinsic cues involve the learning conditions and the encoding operations used by the learner, and mnemonic cues involve how well a study item has been learned and can be retrieved in the future. People use these cues as a basis when making metacognitive judgments. As a result, metacognitive accuracy depends on

the types of cues that people use. If people use cues that are predictive or appropriate, then their metcognitive accuracy will be good. If a person relies on cues that are not predictive or inappropriate, then their metacognitive accuracy will be poor

The situation model approach attempts to bridge the gap between comprehension and metacomprehension domains by integrating Kintsch's (1988) CI model with Koriat's (1997) cue-utilization approach. When making metacomprehension judgments, there are three possible routes consisting of different cues that people can use as shown in figure 1 (Griffin, Jee, & Wiley, 2009). In the heuristic route, readers use information already available to the reader prior to the reading of the text and unrelated to text comprehension, such as domain knowledge or test expectancy. In the representation-based route, readers use cues that are a result of reading the text, such as the coherence of the text representation. These cues may be created during or after reading. Both the heuristic route and representation-based route can be used when readers make predictions of future test performance. The postdiction route differs from the other two routes in that it is used to make evaluations of performance, not predictions of performance. In this route, readers use information about their test performance to make judgments.

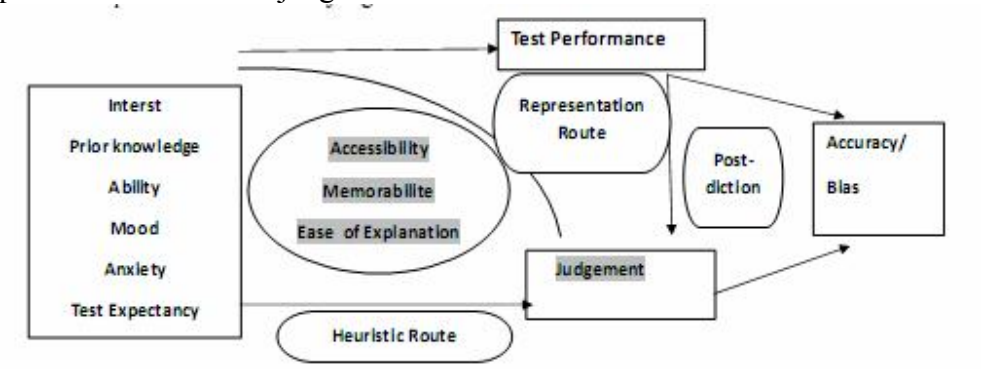


Figure 1. Possible routes for making metacomprehension judgements (Adapted from Griffin et al., 2009)

The situation model approach focuses on the use of the representation route to make metacomprehension judgments. The situation model approach assumes readers create a textbase and situation model when reading a text, which is consistent with Van Dijk and Kintsch's (1983) levels of representation. In addition, it is assumed that comprehension processing resources are initially allocated to construction of the textbase and then to the situation model (Rawson, Dunlosky, & Thiede, 2000). This assumption

is based on the finding that during an initial reading, readers spend more time constructing a textbase, but during rereading, more time is spent on constructing a situation model (Millis, Simon, & tenBroek, 1998). Because the situation model constructed during reading is respentative of one's comprehension, cues at the situation model level are the most predictive of future performance on comprehension tests (Dunlosky & Rawson, 2005). Therefore, the situation model approach aims to increase the usage of situation model level cues to improve metacomprehension accuracy.

Rawson and colleagues (2000) demonstrated that one way to improve metacomprehension accuracy is to reread a text. In the study, participants either read texts once or reread the texts. After reading a text, participants made a prediction of performance. The researchers found a rereading effect in which participants in the reread condition had higher relative metacomprehension accuracy than the participants in the read once condition. The researchers claimed that during rereading, participants had more resources to construct the situation model. As such, any difficulties encountered during the construction of the situation model provided a cue that one could use when making metacomprehension judgments. These situation-model cues were more predictive of comprehension than the textbase cues made when the text was initially read. As a result, basing metacomprehension judgements on situation-model cues resulted in greater metacomprehension accuracy. Other studies using the situation model approach have found that difficulties encountered during reading can be used as a cue when making metacomprehension judgements (Dunlosky & Rawson, 2005; Rawson and Dunlosky, 2002). Rawson and Dunlosky (2002) provided evidence that the ease of processing of a text affected metacomprehension judgements. In the study, participants read coherent or incoherent texts. After reading a text, participants made a judgement of performance on a future test. After all texts had been read, participants then took a multiple-choice test about each text and made a confidence judgment for each question. The researchers found that as text coherence or ease of processing increased, the magnitude of performance predictions also increased. As a result, the researchers concluded that readers were using ease of processing as a cue when making metacomprehension judgments.

Consistent with the situation model approach, the level-of-disruption hypothesis claimed that judgments based on disruptions during situation model processing are predictive of future test performance and would result in improved metacomprehension accuracy (Dunlosky & Rawson, 2005). To test hypothesis, Dunlosky and Rawson (2005) had participants read texts

and take tests. Participants in the single-read condition read a text and made a prediction of test performance for that text. Participants in the immediate reread condition read each text once and then reread the texts in the same order, making predictions of test performance after each text. Participants in the delayed reread condition read each text once and then after a one-week delay, reread the texts in the same order making predictions of test performance after each text. After all texts had been read, participants took a test containing inference and memory-based questions and made a confidence judgment for each question. The researchers found that participants in the immediate reread condition had greater metacomprehension accuracy than participants in the single-read and delayed reread condition. In addition, participants in the immediate reread condition had greater metacomprehension accuracy when basing test performance on only inference questions than the other two conditions, but the groups did not differ in metacomprehension accuracy when basing test performance on only memory-based questions. The researchers claimed that during immediate rereading, processing at the situation model was greater for the reread than the initial read. In addition, when participants reread the texts in the delayed rereading condition, they were processing the text at the textbase level instead of the situation model. Therefore, disruptions encountered in the immediate rereading were situation model level cues and disruptions encountered in the delayed rereading and initial readings were textbase level cues. As a result, participants in the immediate rereading condition had greater metacomprehension accuracy than the single-read and delayed reread conditions.

Griffin, Wiley, and Thiede (2008) presented a stricter version of the situation model approach arguing that metacomprehension accuracy is dependent on attention to the metalevel during reading. This metalevel approach is based on the assumption that monitoring processes are separate and secondary to comprehension processes. In addition, there is a limited amount of attentional resources that is distributed between the object-level and metalevel, with priority for the object-level. This prioritization is because for monitoring to occur at the metalevel, processes must first occur at the object-level. Therefore, the more attention that is given to comprehension processes, the less attention that can be given to monitoring processes. If all of a reader's attention is used on performing comprehension processes, then no attention can be given to the metalevel. Attending to the metalevel allows readers to encode comprehension cues created during reading (Griffin et al., 2008). If a reader is unable to attend to the metalevel,

then the reader would be unaware of situation model level cues. Unlike the situation model level approach that assumes the use of any situation model level cue is beneficial for metacomprehension accuracy, the metalevel approach assumes that only situation model level cues created during reading are useful. In addition, these cues must be representative of the entire reading process. If readers do not attend to the metalevel throughout reading, then their judgments will be based more on metalevel information from only the end of the text, which may not be representative of comprehension of the whole text.

Both the situation model approach and metalevel approach argue that the ability to monitor comprehension processes during reading affects a person's metacomprehension cues and metacomprehension accuracy. However, because studies using these approaches use judgments made after reading, the studies are unable to determine whether the cues being used for metacomprehension judgments are the ones created during reading or after reading. It is possible that metacomprehension processes during reading are monitoring different information than metacomprehension processes after reading. Readers may base their judgments on the final state of the situation model rather than the intermediate states that are created during reading. Both the CI and EI model of comprehension theorize that the structure of the situation model is constantly updated as the text is read. As a result, the possible set of situation model level cues that a person can use will vary depending on the reader's progression in the reading process. The metalevel approach also assumes that monitoring processes are independent but secondary to comprehension processes. When reading, readers initially allocate most of their attention to the construction of a situation model and some, if any, resources to the evaluation of the situation model. The metalevel approach does not specify when or why the transition of attention from the object-level to the metalevel occurs. Nelson and Narens (1990) claimed that the object-level and metalevel are constantly influencing one another. However, the metalevel approach suggests that the object-level influences the metalevel and does not mention how the metalevel affects the object-level.

Current theories of metacomprehension use aspects of comprehension theories in their explanations (e.g., the situation model). However, a key aspect of Nelson and Narens' (1990) framework that is neglected by the metacomprehension theories is metacognitive control. Though the situation model approach and the metalevel approach show that comprehension processes can affect monitoring processes, both approaches do not explain

how monitoring processes exert control. One possible reason is that the situation model level approach and the metalevel approach are theories focused on how explicit, offline metacomprehension judgments are made. Therefore, metacomprehension theories need to account for how online monitoring processes affect comprehension processes. Theories of metacomprehension assert that monitoring of the object-level is important for metacomprehension. However, these theories have been used to explain metacomprehension judgments after reading and not the interaction between the object-level and metalevel during reading. Because comprehension and metacomprehension theories tend to examine only one direction of the interaction between object-level and metalevel, little is known about their online interaction. In addition, further understanding of the relationship can be gained by examining individual differences that affect both the object-level and metalevel.

An individual difference that has been shown to affect comprehension and metacomprehension is working memory (Chiang, Therriault, & Franks, 2010; Daneman & Merikle, 1996; Griffin et al., 2008). Unsworth (2016) theorized that memory is divided into two parts: primary memory and secondary memory. The purpose of primary memory is to maintain representations of information for online processing. In addition to item representations, primary memory can maintain additional information, such as goal states and action plans. The information contained in primary memory is affected by attentional control, the ability to select and maintain information in the presence of distractions. Primary memory is limited in the number of information units that can be actively attended to and maintained. If information cannot be maintained in primary memory, then it must be retrieved from secondary memory when needed. Secondary memory is where information not actively being processed is stored. Unlike primary memory, secondary memory can hold information for long periods of time and is not limited in the number of units of information that can be maintained. Unsworth (2016) argues that there are three sources of individual differences in working memory. The first is differences in primary memory capacity. The second is differences in attentional control processes that maintain in formation in primary memory. The third is differences in control processes that encode and retrieve information in secondary memory. Research has shown that individual differences in working memory can be due to one or more of these sources (Unsworth, Fukuda, Awh, & Vogel, 2014, Unsworth & Spillers, 2010). Current theories of comprehension and metacomprehension fail to integrate processes from

the other domain, though the existence of the processes is accepted. Comprehension theories suggest that monitoring does occur, but they fail to describe the monitoring processes. Metacomprehension theories argue that comprehension processes are important in creating cues appropriate for metacomprehension accuracy, but they fail to determine when the cues are created during comprehension processes and which ones are used. Therefore, research is needed to examine how online comprehension and monitoring processes interact.

One attempt to examine the interaction of the processes at the object-level and metalevel was done by Yang (2006). In the study, participants read an article and performed a think-aloud task in which they verbally reported their comprehension processes. Afterward, a tape of the think-aloud task was replayed and participants had to explain how they comprehended the story and what strategies were used when they faced comprehension difficulties. The researcher claimed that reading strategies (processes at the object-level) were used to gain an understanding of the text and comprehension monitoring strategies (processes at the metalevel) were used to evaluate reading strategies. Therefore, though both comprehension and monitoring processes aid in reading comprehension and may be performed simultaneously, the two processes perform different purposes. Ozuru and colleagues (2012) used a paradigm involving verbal protocol to assess moment-by-moment monitoring. In the experiment, participants read a text one sentence at a time. After each sentence, participants in the prediction of performance group were asked to make a prediction of how likely they would be able to answer a question about the sentence they had just read. Participants in the judgment of sentence difficulty group were asked to rate the difficulty of the sentence. Participants in the read-only condition did not make any judgments. The researchers found that participants in the two verbal protocol groups differed in the cues used to make the judgments. Though the study was able to observe how moment-by-moment monitoring processes affected metacomprehension, the paradigm introduced an atypical reading behavior. When reading, it is uncommon for readers to stop at every sentence and make an explicit judgment of comprehension (Ozuru et al., 2012). Though the researchers were able to observe monitoring processes, they did so by interfering with comprehension processes.

One method that could be used to analyze the interaction between comprehension and metacomprehension processes without interfering with reading behavior is by tracking eye movements. Eye tracking has been used

in several domains and has been used to infer moment-by-moment cognitive processes in reading (e.g., Just & Carpenter, 1980; Spivey, Richarardson, & Dale, 2009). Eye movements can be broken down into saccades (periods of movement) and fixations (periods of no movement). Regressions are a special type of saccade characterized by backward eye movements and are believed to occur due to difficulties in integrating new information with the existing situation model (Frazier & Rayner, 1982; Rayner, 1998). Studies have used regressions as an indicator that readers are having difficulty comprehending text and are trying to resolve the difficulties (Rayner, 1998; Rayner et al., 2006). Regressions also play an important role in comprehension as an inability to make regressions negatively affects a person's comprehension (Schotter, Tran, & Rayner, 2014). Without the ability to look at previous text, readers are unable to find information that could be used to resolve difficulties in understanding. Rayner and colleagues (2006) provided evidence that metacognitive monitoring is needed for regressions to occur. The researchers presented participants with texts that either had inconsistencies or did not. While participants were reading texts, the researchers measured eye movements to determine how the characteristics of the text affected eye movements. The researchers found that texts that were rated more difficult by participants had a greater number of fixations and longer fixation durations. Participants also fixated longer on inconsistencies encountered in the text. These findings are consistent with comprehension theories as inconsistent information results in difficulties in integrating the information with the existing situation model (Gernsbacher, 1991; Zwaan & Radvansky, 1998). In addition, participants were more likely to make a regression when an inconsistency in the text was noticed than when there was none. However, if participants did not notice an inconsistency, then the likelihood of a regression did not differ. Therefore, regressions were being made due to awareness of an inconsistency suggesting that metacognitive monitoring occurred.

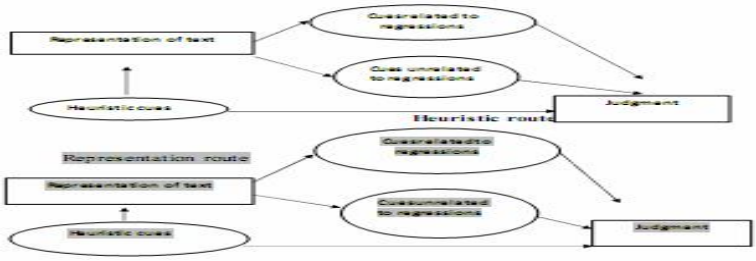


Figure 2. Visual representation of the effect of increasing attention to comprehension processesNote.

The top part shows the possible routes and cues that could be used to make judgments of learning. The bottom part shows how increased attention to cues related to regressions would increase the usage of these cues when making metacomprehension judgments.

An evidence-based practice is teaching students to use self-questioning to monitor their reading comprehension (Joseph & Ross, 2017). Self-questioning is a reading comprehension strategy that requires students to stop periodically while reading, and to ask and answer questions about the content they read. The self-questioning strategy was created to help students with the complex reading demands in elementary, secondary, and post-secondary settings to improve students' comprehension and retention. The strategy allows students to actively interact with the material rather than passively reading it to promote intrinsic motivation by helping them identify their own reasons for reading a passage. The self-questioning strategy was developed by Schumaker, Deshler, Nolan, and Alley from The Center on Research for Learning at the University of Kansas in 1994. Self-questioning assists students in building their own motivation for reading. Students formulate their own questions, predict the answers to those questions, search for the answers to those questions as they read, and summarize the answers to themselves (Clark, et al., 1984). Students remember new information better if they connect it to old information, thus, using the self-questioning strategy enables students to make connections between new information and what they already know. Additionally, students remember new information if they translate it into their own words. Using this strategy enables students to talk to themselves about the information.

Several research studies have been conducted using the self-questioning strategy to improve students' reading comprehension. The majority of the studies resulted in positive effects of the self-questioning strategy. According to Rouse (2014), "The self-questioning strategy with a fading prompt procedure has been proven effective to increase the reading comprehension of at-risk fourth grade learners". In this study, students were able to show improvement from their baseline measures to intervention measures. She further added that the strategy has potential of not only improving the reading comprehension of students with varying abilities, of different ages, but can also easily be implemented with a variety of genre. The use of self-questioning strategy in the process of reading comprehension of five semester students in English education study program, have resulted in the students having a pattern effective and interrelated activities and influence. The form of self-questioning in the

process of understanding the reading of students is characterized by the many types of questions generated by students during the process of reading comprehension. Daniel and Williams (2019), found the outcomes of the self-questioning strategy on students' reading comprehension were mixed. There were no distinct learnings of the effects of self-questioning strategy intervention associated with participants' grade level and type of instruction, explicit or nonexplicit instruction.

Theoretical support used as background for this study was metacognition. Developed as a theory by Flavell in the 1970s, metacognition differs from cognition, thinking skills, in that metacognition is one's ability to control their own thinking; to reflect on what thinking strategies were used to succeed in a task (Flavell, 1985). Metacognition is thinking about your own thinking processes which include study skills, memory capabilities and the ability to monitor one's own learning-which are all important for both teaching and learning. This study examined the relationship between self-questioning strategy, a metacognitive skill, and reading comprehension within a single-group design. Encouraging students to ask themselves better questions while they are learning something is one of the most effective ways to improve their understanding of the topic. This technique falls under the umbrella of metacognition. The science behind metacognition has been comprehensively researched, and recent evidence suggests that strong metacognitive abilities can change from one grade reading level to nearly the next grade reading level. One way that metacognition can be enhanced is when you activate prior knowledge and combine it with a new one. Flavell (1979) had claimed that metacognitive experiences are conscious cognitive and effective experiences which take place during the enterprise and any concern of it-often, how well it is going. When it comes to reading, it may involve planning how to approach the reading of a text, testing, and revising according to purpose and time available. If cognitive reading strategies involve knowing what strategy to use and how to apply it, metacognitive strategic knowledge on the other hand involves understanding the rationale for applying a specific strategy in a specific context, and evaluating its usefulness with the appropriacy and effectiveness for that contect.

Research studies have shown that better comprehension occurs when students are engaged in activites that tie together their old knowledge with the new. This will help them connect the current reading to their already existing knowledge and make the new reading more stimulating and engaging. The technique allows students to work their way up from an

already existing schema, instead of starting a new one. According to Elbro and Buch-Iversen (2013), poor reading comprehension may be brought about by an individual's failure to make active an existing and significant background knowledge. This failure may trigger specific problems with inferences that could be profoundly contingent on prior knowledge. The authors further added that reading comprehension could improve when students are taught how to use background knowledge in the context of gap-filling inferences. A critical review conducted by Smith, et al. (2021) determined the influence of background knowledge has on the reading comprehension of primary school-aged children. Twenty-three studies were identified which qualified the criteria and focused on the links between background knowledge and reading comprehension of children in the mid to late primary years.

One of the findings indicate that background knowledge impacts differentially on stronger and weaker readers. Readers with lower background knowledge appear to benefit more from text with high cohesion, while weaker readers were able to compensate somewhat for their relatively weak reading skills in the context of a high degree of background knowledge. O'Reilly, et al., (2019) found a "knowledge threshold" when it comes to reading comprehension. They claimed that when students were unfamiliar with 59% of the terms in a particular topic, their ability to understand the text was "compromised". The study involved 3,534 high school students who were presented with a list of 44 terms and asked to identify whether each term was related to the topic of ecology. Researchers analyzed the responses generating a background-knowledge score, which represented familiarity with the topic. No interventions were utilized, the students were then asked to read about ecosystems and took a test to determine how well they understood the text. Students who scored less than 59% on the background-knowledge test performed relatively poorly on the subsequent test of reading comprehension. However, researchers noted a sharp improvement in comprehension above the 59 percent threshold-indicating that both that a lack of background knowledge can be an obstacle to reading comprehension, and that there is a baseline of knowledge that rapidly accelerates comprehension.

The positive results of self-questioning may be attributed to learning a strategy that required students' active responding to the text they are reading. Training students to ask and answer questions has most likely helped them identify and remember relevant information that indicates comprehension skills. Comprehension happens because of the skills and

actions taken before, during and after reading by a reader. For some, these happen automatically, but for some students with learning disabilities, these active processes need to be taught explicitly. Self-questioning is a process in which students strategically ask and answer questions while reading. Using this as a strategy to increase comprehension allows students with learning disabilities to engage with text in ways that are similar to the ways in which good readers engage with it. In addition, teaching this technique has proven to be easy, cost-effective, time-efficient, and most importantly, it teaches students to be accountable for their own learning.

Direct Instruction (DI) is a model for teaching that emphasizes carefully designed lessons with small learning increments and clearly defined teaching tasks (NIFDI, 2015). The primary goal of DI is to accelerate learning by reducing or eliminating any student misunderstandings and controlling the teaching tasks (Engelmann & Carnine, 1982). DI is a trademarked curriculum and is the reading program currently used in the district in which this study took place. There are five key philosophical principles of DI:

- All children can be taught.
- All children can improve academically and in terms of self-image.
- All teachers can succeed if provided with adequate training and materials.
- Low performs and disadvantaged learners must be taught at a faster rate than typically occurs if they are to catch-up to their higher-performing peers.
- All details of instruction must be controlled to minimize the chance of students' misinterpreting the information being taught and to maximize the reinforcing effect of instruction.

A significant amount of research has shown that explicit teaching techniques like those used in the Direct Instruction method are also very effective for comprehension strategy instruction. In explicit instruction, students are told by teachers why and when they should use specific strategies, what strategies to use, and how to apply them. According to Jitendra and Gajria (2011), "Cognitive strategies, single or multiple, have been shown to help students with LD learn from text. Single strategies reported in the literature include recognizing text structure, cognitive mapping, questioning, identifying main ideas, and summarization". They further added that, "Multiple strategies develop different kinds of thinking and include Reciprocal Teaching and its variants such as Collaborative Strategic Reading (CSR) and POSSE (Predict, Organize, Search,

Summarize, Evaluate), as well as SQ3R (Survey, Question, Read, Recite, Review)". These strategies may promote varied comprehension skills, but they take account of common goals and components. One common goal for cognitive strategies is to teach students how to interact with the content so that learning becomes more purposeful, self-directed, and self-regulated. Cognitive strategies also necessitate the student to read the text, ask questions, draw connection, find main ideas, clarify meaning, reread, paraphrase or summarize key information (Jitendra & Gajria, 2011). The direct instruction used in cognitive strategy focuses on effective principles of instructional design such as clear description of the strategy, teacher modeling, corrective feedback, guided and independent practice. According to Zorfass, Weinbloom, and PowerUp What Works (2014), proficient readers typically engage with a text by asking themselves questions as they read. In contrast, struggling readers, and those with disabilities, are not likely to pose questions before, during, or after reading. These students need direct instruction and practice in self-questioning. In an article by Simonsen, Fairbanks, Briesch, Myers, and Sugai (2008), of the 20 practices identified as having sufficient evidence to be considered for classroom adoption, direct instruction was included. Direct instruction principles being effective in supporting students with varied achievement levels and can be used to enhance comprehension among students at very different points in reading development were also claimed by Coyne and Coauthors (2009). They emphasized that direct instruction as evidence-based strategy can be designed to support complex learning and the development of higher order cognitive strategies. Flores and Ganz (2009) also used direct instruction as an evidence-based strategy in their study of its effects on the reading comprehension of students with autism and developmental disabilities.

The earliest studies that used and established the typical relative metacomprehension-accuracy research paradigm were conducted by Maki and Berry (1984) and Glenberg and Epstein (1985). In this paradigm, participants read several texts, predict their comprehension of each text, and complete a test on each text. Relative metacomprehension accuracy is then operationalized as the in traindividual correlation between a participant's predictions and actual test performance scores across the set of texts. Typically, Gamma or Pearson correlation coefficients are computed. These coefficients range from -1.00 to +1.00, with stronger positive correlations indicating greater accuracy (see, e.g., also Griffin et al. 2019a).

Research has demonstrated that learners are typically poor at accurately discriminating between more and less well-understood texts. A

recent meta-analysis showed that relative metacomprehension accuracy is on average as low as +.24 (i.e., without any intervention or support; Prinz et al., 2020). This is in line with previous narrative reviews suggesting that the average level of relative metacomprehension accuracy is between +.20 and +.30 (Dunlosky and Lipko 2007; Lin and Zabrucky 1998; Maki 1998; Thiede et al., 2009; Weaver et al., 1995). However, it is important that learners accurately judge their comprehension of texts because it enables them to effectively regulate their studying by devoting time and resources to where they are needed (e.g., De Bruin et al., 2011; Schleinschok et al., 2017; Thiede et al., 2003, 2012). Consequently, to support text-based learning, it is crucial to discover ways to improve relative metacomprehension accuracy.

The cue-utilization framework provides an explanation for why relative metacomprehension accuracy is commonly poor (Griffin et al., 2009; cf, Koriat, 1997; for an overview of constraints on relative metacomprehension accuracy, see Thiede et al., 2009). This framework supposes that learners do not have direct access to their cognitive states but have to infer their level of comprehension based on cues. In doing so, they can use a variety of cues, and judgment accuracy depends on how strongly the cues used are tied to the mental text representation that determines performance on the respective comprehension test. Heuristic cues, such as domain familiarity (e.g., Glenberg et al., 1987) or topic interest (e.g., Lin et al., 1996), are available whether or not a text has been read and are therefore insensitive to idiosyncrasies of a specific mental text representation. Hence, they typically yield inaccurate judgments. Representation based cues, such as ease of processing (e.g., Maki et al., 1990) or accessibility of textual information (e.g., Baker and Dunlosky 2006), become available only during or after reading and are therefore more closely related to a particular mental text representation. Thus, they generally yield more accurate judgments. Potential explanations for why learners often focus on heuristic and memory-based cues are provided by the effort monitoring and regulation framework (De Bruin et al., 2020). For one, this framework suggests that monitoring and regulation can be impaired through unnecessary cognitive load imposed by the learning task or the inadequate distribution of load between the task and metacognitive processes. Such resources constraints might force learners to draw on more easily available heuristic and memory-based cues (cf. Griffin et al., 2009). In addition, the framework suggests that learners sometimes misinterpret cues, in particular, their invested mental effort. Research has indicated that, although high mental effort does not

necessarily indicate that learning is ineffective, learners tend to judge their learning as low when they experience high mental effort (e.g., Baars et al., 2014, 2018, Experiment 2; Dunlosky et al., 2006; Koriat et al., 2009; Schleinschok et al., 2017; see also Baars et al., 2020; Carpenter et al., 2020). Hence, learners are confronted with the difficulty that their invested mental effort is a salient but not necessarily predictive cue of their actual learning and particularly their deeper comprehension.

- **Situation-Model-Approach Interventions to Improve Relative Metacomprehension Accuracy**

Following the situation-model approach, interventions have been developed to increase relative metacomprehension accuracy by encouraging learners to use cues that are related to their situation model. More precisely, these situation-model-approach interventions are designed to help learners generate, attend to, or select situation-model cues (see, e.g., Griffin et al., 2013; 2019a; Wiley et al., 2016b).

- **Cue-Generation Interventions**

Some situation-model-approach interventions support the generation of situation-model cues. They do so either by requiring encoding on the situation-model level, as is the case for self-explaining and concept mapping, or by requiring retrieval of the situation model, as is the case for delayed-generation tasks (Thiede et al., 2019).

- **Delayed Generation of Summaries, Keywords, and Diagrams**

Research has shown that delayed-generation tasks, such as writing a summary of each text, listing keywords that capture the essence of each text, and completing a diagram for each text, can lead to enhanced relative metacomprehension accuracy. More precisely, when these tasks were completed after a short delay, that is, after all texts had been read, relative metacomprehension accuracy was higher than when they were completed immediately after reading each text or when no task was completed (delayed-summary writing: Anderson and Thiede 2008; Engelen et al., 2018, Experiment 1; Thiede and Anderson 2003; Thiede and Anderson 2003; Thiede et al., 2010, Experiment 1; delayed-keywords listing; De Bruin et al., 2011; Engelen et al., 2018, Experiment 1; Shiu and Chen 2013; Thiede et al., 2003, 2005, 2012, Study 2, 2017; Waldeyer and Roelle, 2020; delayed-diagram completion; Van de Pol et al., 2019, Experiment 1; Van Loon et al., 2014; see also Van de Pol et al., 2020). It is important to note that neither delayed-nongenerative tasks (i.e., thinking about a text or reading keywords) nor simply delaying predictions affected relative metacomprehension accuracy (/thiede et al., 2005). Consequently, both the

generation and the delay between reading and the task play a crucial role in improving relative metacomprehension accuracy. First, a generation task encourages learners to access a representation of the text from memory prior to making a judgment. Specifically, writing a summary, listing keywords, or completing a diagram functions as a kind of self-test, providing learners with cues such as how successfully they can retrieve textual information. Second, the surface and textbase representations of a text fade quite rapidly, whereas the situation model is more stable over time (Kintsch et al., 1990). Hence, when performing a generation task immediately after reading, learners have easy access to and may primarily use their surface and textbase representations. However, the cues obtained from this experience are of limited predictive validity for later comprehension-test performance, which is largely determined by the situation model. In contrast, performing a generation task after a delay allows for the surface and textbase representations to decay, forcing learners to access and use their situation model. The cues gained from this experience are more predictive of later comprehension-test performance and therefore improve relative metacomprehension accuracy (see, e.g., also Griffin et al., 2013, 2019a).

However, although some studies found that delayed-keywords listing is also effective to increase relative metacomprehension accuracy for primary-and secondary-school students (De Bruin et al., 2011, Experiments 1 and 2; Thiede et al. 2017), some studies did not find benefits for these younger learners (De Bruin et al., 2011, Experiment 2; Engelen et al., 2018, Experiment 1; Pao, 2014). Similarly, for delayed summary writing, one study did not find a benefit for primary-school students (Engelen et al., 2018, Experiment 1). This suggests that the favorable impact of delayed-generation tasks may not consistently occur. Presumably, the quality of the keywords (e.g., whether they refer to central ideas or unimportant facts), summaries (e.g., whether they cover all main ideas), or diagrams (e.g., whether relations are clear) as well as learners' cognitive capacity to generate them plays a role for the tasks' effectiveness (cf., e.g., De Bruin et al., 2011; Roebers et al., 2007).

Self-Explaining is the activity of explaining to oneself the meaning of information presented in a text as well as how it fits together with other information and the overall theme (e.g., Chi, 2000). Self-explaining during reading can increase relative metacomprehension accuracy (Griffin et al., 2008, Experiment 2, 2019b, Experiment 4; Wiley et al., 2016a; Wiley et al., 2008, Experiment 2). By considering the relevance of textual information and trying to make inferences during self-explaining, learners

simultaneously construct and reflect on their situation model, generating situation-model cues. Hence, in contrast to delayed-generation tasks, which prompt learners to draw on an already constructed situation model (i.e., retrieval-based cue-generation intervention), self-explaining encourages learners to focus on their situation model during reading (i.e., encoding-based cue-generation intervention; Thiede et al., 2019). Relatedly, in contrast to delayed-generation tasks, which need to be performed after a time lag to increase access to situation-model cues, self-explaining directly involves the situation model, making a delay superfluous (see, e.g., also Griffin et al., 2019a; Wiley et al., 2016b). Griffin et al., (2008, Experiment 2) found a positive effect of self-explaining on relative metacomprehension accuracy above mere rereading and independent of individual differences in working-memory capacity and reading skill. This finding suggests that the effect of self-explaining is not tied to the alleviation of processing constraints that can impede monitoring but rather attributable to the generation of situation-model cues. However, in a study by Jaeger and Wiley (2014, Experiment 2), self-explaining failed to improve relative metacomprehension accuracy, indicating that the effect of this intervention may be of limited reliability.

Concept Mapping is the activity during which learners visually depict the connections among concepts presented in a text (e.g., Weinstein and Mayer 1986). Concept mapping during reading has been found to enhance relative metacomprehension accuracy (Redford et al., 2012, Experiment 2; Thiede et al., 2010, Experiment 2). Concept mapping may be effective for two reasons. First, the activity yields an external visual representation of a learner's understanding. Thus, when, for example, trying to comprehend later parts of a text, a learner can review earlier content on the concept map. This eases working-memory demands that can be devoted to monitoring. Second, similar to self-explaining, concept mapping promotes learners not only to build a situation model but also to reflect on it, generating situation-model cues (i.e., encoding-based cue-generation intervention; Thiede et al., 2019; see, e.g., also Redford et al., 2012; Wiley et al., 2016b). Supporting this assumption. Thiede et al., (2010, Experiment 2) found that learners used their perception of how many appropriate connections between concepts they could make in a concept map as a situation-model cue for predicting their comprehension, which led to an increased accuracy level. Moreover, Redford et al., (2012, Experiment 2) revealed that only learners who constructed concept maps but not learners who received completed concept maps achieved greater relative metacomprehension accuracy than learners in

a no-intervention control group. This outcome provides evidence that the act of constructing concept maps is critical because it enables learners to generate relevant cues.

A further intervention that can promote relative metacomprehension accuracy is repeated reading, which targets at facilitating the attention to situation-model cues (Dunlosky and Rawson 2005; Griffin et al., 2008, Experiment 1; Rawson et al., 2000). During a first reading, learners may often lack the cognitive resources to concurrently engage in comprehension and monitoring processes and therefore primarily rely on heuristic cues. In contrast, during a second reading, many of the processes involved in comprehension do not have to be re-executed (e.g., Millis et al., 1998). This allows learners to put more resources into careful monitoring (see, e.g., also Griffin et al., 2019a). Accordingly,Griffin et al., (2008) found that the relative metacomprehension accuracy of learners with low working-memory capacity or low reading skill was limited after a single reading. However, after rereading, their accuracy level was increased such that they were as accurate as learners with high working-memory capacity or high reading skill. The authors argued that rereading provides a second chance at monitoring, which is especially beneficial for learners whose limited cognitive capabilities prevent them from thorough monitoring during the first pass (for alternative but empirically less supported explanations for the rereading effect, see also Dunlosky and Rawson, 2005; Rawson et al., 2000). In addition, Rawson et al., (2000) ruled out the possibility that improved relative metacomprehension accuracy after rereading is an artifact of familiarity with all texts prior to providing predictions or of increased test reliability. Furthermore, as indicated previously, when rereading was combined with a self-explanation intervention, both were independently beneficial for enhancing relative metacomprehension accuracy. This outcome supports the theoretical distinction between the two mechanisms: Interventions like self-explaining enable the generation of situation-model cues, whereas rereading enhances the attention to the cues (Griffin et al., 2008, Experiment 2). It should be noted, however, that some studies did not find a benefit of rereading over reading once (Chiang et al., 2010; Margolin and Snyder 2018), and, in some studies, learners exhibited low relative metacomprehension accuracy despite rereading (Bugg and McDaniel 2012; Pao 2014; Redford et al., 2012, Experiment 1).

A common feature of the interventions described so far is that they prompt learners to engage in additional tasks as a means of increasing access to situation-model cues. However, even when learners have enhanced

access to such cues, they might not use them if they do not understand that this is the level of mental text representation that will be assessed during testing. Hence, the comprehension-test-expectancy intervention is another effective approach to improving relative metacomprehension accuracy because it guides learners toward selecting situation-model cues: learners are instructed that upcoming tests will assess their deeper understanding and receive respective sample test questions (Griffin et al, 2019b; Thiede et al., 2011; Wiley et al., 2008, 2016a). For example, in a study by Griffin et al., (2019b, Experiment 1), learners in the memory-test-expectancy group were told that their memory of specific details would be tested, and they completed sample memory test questions about practice texts. In contrast, learners in the comprehension-test-expectancy group were told that their ability to draw inferences would be tested, and they completed sample inference test questions about practice texts. Learners in the no-expectancy group were only told that they would be taking tests and did not receive any sample test questions. Concerning the critical texts, all learners completed both memory and inference tests. The results revealed that the learners in the no-expectancy and memory-test-expectancy groups made judgments that were more predictive of their performance on the memory than the inference tests (i.e., greater relative metamemory accuracy). However, the learners in the comprehension-test-expectancy group made judgments that were more closely related to their performance on the inference than the memory tests (i.e., greater relative metacomprehension accuracy).

Prior research has indicated that learners typically view the concept of text comprehension in terms of memory of textual information rather than deep understanding and hence anticipate tests requiring recall (see, e.g., Wiley et al., 2005). Consequently, learners tend to rest upon memory-based instead of situation-model cues to evaluate their comprehension (Jaeger and Wiley 2014, Experiment 2; Thiede et al., 2010, Experiment 1). Thus, poor relative metacomprehension accuracy at least in part results from learners' incorrect assumptions about what comprehension means and what they therefore will be tested on. The comprehension-test-expectancy intervention is useful to override this reading-for-memory mindset so that learners select appropriate cues and make accurate judgments (see, e.g., also Griffin et al., 2019a; Wiley et al., 2016b). The test-expectancy effect even emerged when the intervention was implemented after reading (Griffin et al., 2019b, Experiment 3). This result confirms that test expectancies influence which cues learners select when making judgments rather than learners' access to particular cues. Moreover, when combined with self-explaining, the

comprehension-test-expectancy intervention provided a unique, nonoverlapping benefit for relative metacomprehension accuracy (Griffin et al., 2019b, Experiment 4; see also Wiley et al., 2008, Experiment 2). This finding supports the theoretical distinction between interventions that promote cue generation versus cue selection.

Statement of the problem:

The problem of the present research can be defined in the fifth year primary school pupils' inefficient writing performance skills. Therefore, the present study is an attempt to investigate the effectiveness of metacomprehension strategies for enhancing the pupils awareness of writing performance skills and reducing writing apprehension among fifth year primary school pupils.

Questions of the Study:

To face this problem, the present research is an attempt to answer the following questions:

1- What is the effectiveness of metacomprehension strategies in developing the pupils' writing performance skills and reducing writing apprehension?

2- To what extent do metacomprehension strategies enhance the pupils awareness of writing performance skills and reducing writing apprehension?

Delimitations of the Study:

The current research is limited into the following:

- forty fifth graders of primary school in El-Shobban Al-Muslimeen Language School in Benha at Quliobeya Governorate, Egypt.
- Some writing performance skills required for the fifth year primary pupils.

Hypotheses of the study:

1- There are no statistically significant differences between the mean scores of the experimental group and the control group in the pre-test of the writing performance skills .

2- There are statistically significant differences between the mean scores of the experimental group and the control group in the post test of the writing performance skills**.**

3- There are statistically significant differences between the mean scores of the experimental group in the pre-post test of the writing performance skills.

Instruments and materials:

To achieve the purpose of the study, two equivalent forms of writing performance skills test (prepared by the researcher) were used.

Participants of the study:

The participants of the present study consisted of 40 fifth year pupils from El-Shobban Al-Muslimeen Language School in Benha at Quliobeya Governorate, enrolled in the academic year (2022-2023). Two intact classes were selected for participating in the study; class 5/A (n=20) served as the experimental group and class 5/B (n=20) served as the control group.

Procedures of the study:

After the participants in the research have been selected, The participants of the study were divided into two groups, the experimental group (N=20) and the control group (N=20). The pre writing performance skills test was administered to the participants before the treatment. Then, the experimental group was taught using metacomprehension strategies while the control group was taught using the traditional method. Then the post writing performance skills test was administered to both groups . Results of the study revealed that the program using metacomprehension strategies was effective for enhancing the pupils awareness of writing performance skills and reducing writing apprehension among fifth year primary school pupils through the following steps:

- Reviewing literature related to writing performance skills and metacomprehension strategies.
- Identifying the most important strategies suitable for solving writing problems.
- Focusing on self-monitoring and self-questioning as the most suitable strategies for writing.
- Training the pupils in self-monitoring and self-questioning as follows:

❖ Students classifying and monitoring their texts.

- Pupils are given a writing assignment to write about.
- Pupils write the first draft of the assignment.
- Pupils underline and number the parts of the text which they are dissatisfied with.
- Pupils number their problems with their peers through questions, comments and judgements.

❖ The teacher observes their way of monitoring and tries to support them in solving the problem they face.

❖ The pupils follow the teacher up and present their first draft by rewriting it following the teacher's guide.

- ❖ The teacher asks the pupils to ask each other self-questioning about their second draft.
- ❖ The teacher asks the pupils to summarize each other answers to the questions.
- ❖ The pupils write the final draft and submit it to the teacher.

Findings of the study:

The results of the research will be presented in the light of following hypotheses:

1- Findings of the first hypothesis:

The first hypothesis stated that " There are no statistically significant differences between the mean scores of the experimental group and the control group in the pre-test of the writing performance skills ".

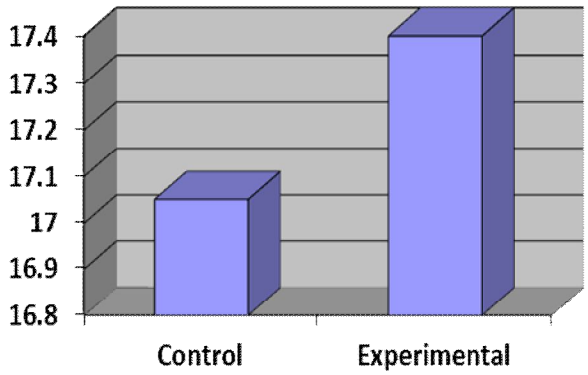
To prove the validity of the first hypothesis, t.test was used to compare the mean scores of the pupils in the pre-test of the writing performance skills test. The following table shows this:

Table (1) T.test between the mean scores of the experimental group and control group in the pre-test of the writing performance skills

Group	No.	Mean	SD.	Df.	t-value	Sig.
Control	20	17.05	6.715	19	678	Not Significant
Experimental	20	17.4	5.12			

It is clear from table (1) above that there are no statistically significant differences between the experimental group and control group in the pre test of the writing performance skills. The following figure shows this:

Figure (3) : The mean scores of the experimental group and the control group in the writing performance skills pre test



2- Findings of the second hypothesis:

The first hypothesis stated that " There are statistically significant differences between the mean scores of the experimental group and the control group in the post test of the writing performance skills ".

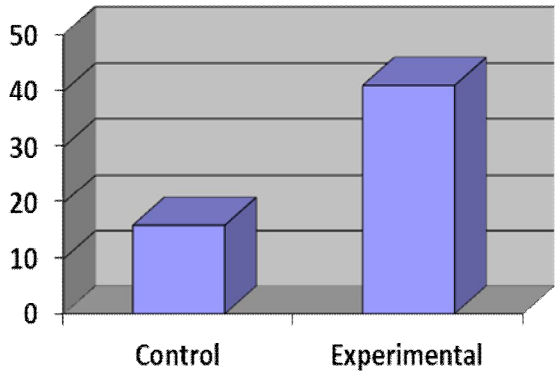
To prove the validity of the first hypothesis, t.test was used to compare the mean scores of the pupils in the post-test of the writing performance skills test. The following table shows this:

Table (2) T.test between the mean scores of the experimental group and control group in the post-test of the writing performance skills

Group	No.	Mean	SD.	Df.	t-value	Sig.
Control	20	15.94	5.123	19	10.591	0.01
Experimental	20	41.02	9.42			

It is clear from table (2) above that there are statistically significant differences between the mean scores of the experimental group and the control group in the post test of the writing performance skills. The differences is in favor of the experimental group. The level of significance is 0.01 which indicate the effectiveness of the metacomprehension strategies in improving the students' writing. The following figure shows this:

Figure (4) : The mean scores of the experimental group and the control group in the writing performance skills post test



3- Findings of the third hypothesis:

The first hypothesis stated that " There are statistically significant differences between the mean scores of the experimental group in the pre-post test of the writing performance skills ".

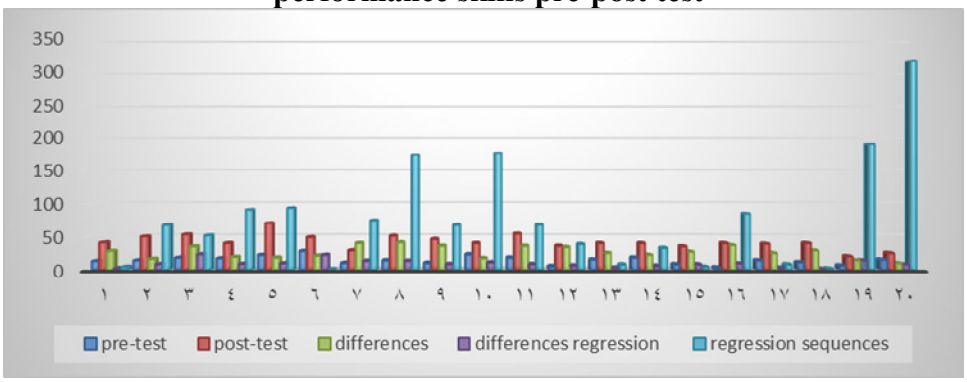
To prove the validity of the first hypothesis, t.test was used to compare the mean scores of the pupils in the pre-post test of the writing performance skills test. The following table shows this:

Table (3) T.test between the mean scores of the experimental group in the pre-post-test of the writing performance skills

Sample	Pre-test	Post-test	differences	Differences regression	Regression sequences
1	13	41	28	2	04
2	14	50	16	8.2	67.20
3	18	53	35	23	51.4
4	17	40	19	8.5	90.4
5	22	70	18	9.3	93.20
6	28	49	21	22	0.34
Sample	**Pre-test**	**Post-test**	**differences**	**Differences regression**	**Regression sequences**
7	10	29	40	13.2	74.20
8	14	51	41	13.2	174.21
9	10	46	36	8.2	67.24
10	23	40	17	10.8	176.74
11	18	54	36	8.2	67.42
12	5	36	34	6.2	38.55
13	15	40	25	2.8	7.84
14	18	40	22	5.8	32.64
15	8	35	27	8	04
16	3	40	37	9.2	84.64
17	14	39	25	2.8	7.86
18	11	40	29	1.2	1.46
19	6	20	14	13.8	190.44
20	15	25	10	7.8	316.84
Total	268	824	556		1597

It is clear from table (3) above that there are statistically significant differences between the mean scores of the experimental group in the pre-post test of the writing performance skills. The direction is for the post testing. The following figure shows this:

Figure (5) : The mean scores of the experimental group in the writing performance skills pre-post test



Discussion of the results:

The results of the present study indicated the improvement of the pupils' writing performance skills specifically in the post treatment of the study. Based on the results of the study, it can be stated that:

- The pupils performance in writing was improved after applying the metacomprehension strategies especially the self-questioning technique. The improvement was in the favor of the post test.
- The training program included teaching and feedback as a form of self-monitoring. This expanded the pupils awareness of writing problems and they tried to overcome such problems.
- Analyzing the comments and drafts written by the pupils, the researcher showed that all drafts and comments are related to the form-organization and mechanics, the case which made the researcher focuses on the self-questioning as a way to go ahead with these problems and give them feedback from time to time during training.
- The pupils performance highly increased in the post testing as a result of extensive training in the metacomprehension strategies especially the self-monitoring and self-questioning. This gave the pupils a chance to express themselves and monitor this writing performance step by step through a dialogue between each pupil and his / her peers as a form of self-questioning and self-monitoring.

Conclusion, Suggestions and Recommendation:

Based on the discussion of the results, it can be concluded that:

- Writing performance by primary stage pupils needed to be discovered early to define the areas of the problems and weakness to help learners overcome it.
- The pupils must be exposed to a variety of learning and teaching techniques related to writing performance.
- In theory and practice, we must give a chance for the learners as pupils to practice the principles of writing at all levels.
- Teacher also must be given the chance to have a full background about the comprehension strategies and metacomprehension strategies to practice advanced writing skills and performed difficult tasks.
- Teacher must expose their pupils to all task-based activities related to writing aspects.
- Textbook should have enough writing games to help pupils comprehend every game requirements.
- Pupils must be trained on how to express themselves freely without hesitation.

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