The Role of Explicit Metacognitive Strategy Intervention in the Promotion of Declarative, Procedural, and Conditional Knowledge of Reading Heuristics amongst Moroccan EFL University Students

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Abstract

This quasi-experimental study investigates Moroccan English department university students' overall mastery of the declarative, procedural, and conditional knowledge of the text-processing strategies that facilitate textual comprehension at both the pre- and post-intervention levels. For examining this postulate thoroughly, two EFL first-semester groups pursuing their studies in English Language and Literature were randomly opted for as the informants for this study. The experimental group (n=63) received explicit training related to the declarative, procedural, and conditional knowledge of reading strategies, whereas the control group (n=50) took their normal classes. The two groups were presented with two

reading texts (narrative & expository) at both the outset and the end of the metacognitive strategy intervention. This was accompanied by a 'retrospective questionnaire' at each stage (pre-intervention & post-intervention). The results indicate that the experimental group exhibited more substantive enhancement in metacognitive strategy knowledge than the control group did. Thus, the recommendation that instruction in the declarative, procedural, and conditional knowledge of reading heuristics be integrated in the Reading Comprehension Course at the university level is to be imparted utmost value in the sphere of academia.

Keywords: Cognition, cognitive reading, metacognition, metacognitive knowledge, metacognitive training, strategy use

1. Introduction

The investigation of English as a foreign language (EFL) reading through a metacognitive lens has witnessed incremental waves of research endeavors initiated by a group of academic scholars (e.g., Gelderen, Schoonen, Glooper, Hulstijin, Simis, Snellings, Smith, & Stevenson, 2003;Huou& Cho, 2020; Morshedian, Hemmati, &Sotoudehnama, 2017; Stewart &Tei, 1983; Zhang & Wu, 2009). In considering the explicit conception that metacognition is an essential construct exclusively couched within the cognitive theory, it is noteworthy to posit that the conduct of textual reading in a metacognitive mode assists learners to competently synthesize, decipher, and reason about the content declared by the author(s)/writer(s). In this context, owing to its key viability in achieving an efficiency-based kind of reading, metacognition is deemed to be the mental capability of the learners to reflect upon, rethink, rationalize, and perceive the effectual processes and heuristics involved in any learning endeavor.

Assuming the premise that most previously undertaken studies dealt with the skill of reading from a general standpoint (e.g., Afflerbach, 1990; He, 2008), the present study is situated within the scope of the metacognitive theory framework. In effect, it tackles the extended extent to which the learners' declarative, procedural, and conditional consciousness of reading strategies (RSs) can be fruitfully optimized through metacognitive training. This plainly unearths that EFL learners' conceived awareness and accomplished use of a diversity of RSs with the overall purpose of comprehending the meaning of the text constitute the fulcrum of academic success. The implementation of strategies is deemed necessary in coping with different types of written texts as McLain, Gridely, and McIntosh (1991) maintain that "in the construction of textual meaning, readers' awareness of strategies for monitoring the comprehension process is critical". Hence, learners can only keep track of the progressive development of understanding while being involved in textual reading if they are acutely self-aware of the critical text-processing strategies.

Basically, it is plausible that the cognitive reading literature abounds with a panoply of seminal, groundbreaking studies attesting to the vital efficiency of metacognitive reading as a core prerequisite for textual comprehension (e.g., Gelderen, et al., 2003; Huou& Cho, 2020; Hussain, Hashmi, &Mehboob, 2019; Jincheng &Rahmat, 2022; Miholic, 1994; Mokhtari&Reichard, 2002; Morshedian, et al., 2017; Zhang & Wu, 2009). Yet, there is a stark dearth of scholarly research probing into the interactive interplay between the delivery of metacognitive strategy training and the acquisition of the declarative, procedural, and conditional knowledge regarding EFL strategic reading, especially within the Moroccan higher education context. It is obvious that the perceived awareness of what, how, when, where, and why to use effectual RSs is part of the essential key to the attainment of improved, successful comprehension of the writer's/ author's set forth views and conceptualizations. This postulate prototypically represents the central pivot around which the current study revolves. It is a potential endeavor to corroborate the feasibility and efficacy of the explicit metacognitive strategy intervention in promoting Moroccan EFL university learners' metacognitive knowledge (declarative, procedural, and conditional knowledge) needed to self-regulate and self-direct the reading act in an accomplished fashion.

2. Review of Related Literature

2.1. Cognitive Psychology & Cognition

Prior to providing an elaborate, succinct definition of the concept of cognition, it is crucial to refer to the field of cognitive psychology. The latter, as noted by Matlin (2005), has a huge impact on a wide variety of areas pertaining to educational psychology (e.g., Halpern &Hakel, 2002; Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001), social psychology (e.g., Kunda, 1999), and clinical psychology (e.g., Corrigan & Penn, 2001). In essence, cognitive psychology, as an influential domain, dates back to the period of the fifties during which many educational psychologists and theorists became disappointed with the behaviourist approach which does not adequately account for someprocesses such as the thoughts and strategies used to solve a problem(Bechtel, Abrahamsen, & Graham, 1998). In this respect, cognitive psychology is associated with the study of the major processes that are involved in any learning endeavor.

Obviously, as a perceptual, mental process, cognition, which constitutes a substantial part in cognitive psychology, refers to the act of gaining knowledge and achieving comprehension. This is emphasized by Wood (1983) who states that cognition is "the act or process of knowing, a property of the individual"(p.4). It essentially allows learners to perceive and conceive the underlying meaning of the ideas and concepts. Further, cognition enables learners, while being engaged in a learning task, to process, analyze and acquire information for the primary purpose of constructing a sufficient understanding. This, indeed, entails a great amount of attention and thinking on the part of the learner as an active recipient of knowledge. Thus, cognition can be described as the acquisition, storage, transformation and use of knowledge (Matlin, 2005).

As a matter of fact, many cognitive scientists and educational psychologists view cognition as "a clump of mental acts or processes that come under broad headings such as remembering, perceiving, learning and reasoning" (Menary, 2007, p.10). These processes, which are purely cognitive, increasingly require from learners a high degree of critical thinking to efficiently analyze and synthesize the content, namely when it comes to the comprehension of a particular written discourse. This apparently evinces that the human mind, which represents cognition in many various aspects, "is conceptualized as a complex system of interacting processes that generate, code, transform, and otherwise manipulate information of diverse sorts" (Flavell, Miller, & Miller, 1993, p.20). Within this framework, it can be assumed that the achievement of an adequate textual comprehension, as a cognitive task, is closely interrelated to and highly dependent on the use of effective processes and strategies.

2.2. The Cognitive View of Reading

Many reading scholars maintain that reading entails a potential corpus of cognitive processes that enable textual comprehension (e.g., Kendeou, Van Den Broek, Helder, &Karlsson, 2014). In the same spirit, Haas and Flower (1988) state that reading is conceptualized as a constructive rather than receptive process (p.167). This explicitly put cognitive view of

reading discloses that the actual construction of textual meaning depends, to a certain extent, on the readers' complete ability to predict, infer, and interpret the content in a substantially critical manner. In fact, when engaging in the reading process, readers can establish "multifaceted, interwoven representations of knowledge" (Haas & Flower, 1988) which refer to what readers already know about the text content under focus, what they purposefully intend to understand and what effective strategies they should implement to meet the reading goals set. In this sense, readers can play a key role in the process of meaning building by drawing upon various cognitive mechanisms and strategies that facilitate the way of assimilating the content.

Apparently, granted that reading is "cognitively demanding" (Kern, 1989, p. 135), it can be acknowledged that it involves the utilization of cognitive and metacognitive reading strategies (RSs). This perspective unveils that reading, which entails a great amount of mental efforts and focal concentration on the part of the learners, is systematically strategic, for learners make use of both cognitive strategies to understand the meaning of the written text and metacognitive strategies to ascertain that the process of understanding is effectively attained. In this respect, strategic reading, as a cognitive undertaking, can be considered as "planful, conscious, and flexible, involving actions intended to achieve a particular purpose or goal"(Pressley, Johnson, Symons, McGoldrick, & Kurita, 1989). It allows learners to comprehend the target content fully and assess their progress in the process of comprehension carefully. This necessitates cognitive abilities and procedural steps that occupy an indispensable part in textual understanding.

In effect, the interactive process of textual reading, as a cognitive enterprise, involves "an integration and combination of both top-down and bottom-up approaches" (Celce-Murcia &Alshtain, 2000, p.119). It requires learners to rely on two essential and diverse knowledge sources (e.g., background knowledge, textual information). This set fact is espoused by Anderson and Pearson (1988) who posit that during the process of reading, the reader is expected either to find a mental 'home' for the textual information or to alter an existing mental 'home' in order to understand the new information (p.37). In this respect, reading written texts for attaining comprehension entails that readers match up what they already know with the text content (Msaddek, 2015). Thus, the process of depending on what is stated in the text and activating prior knowledge is the main principle upon which the interactive approach is strongly based.

2.3. Metacognitive Knowledge of Reading

Metacognition is construed as a mode of reflective and critical reasoning about the cognitive processes required in learning. It was initially introduced in the field of educational and cognitive psychology by Flavell (1971) whose outstanding, rigorous research targeted not only the sophisticated thinking mechanisms and higher-order meta-skills involved in language, but also the perceptual awareness of information processing as well as the meta-comprehension of the conceptual ideas and views that are shaped in the human mind. Under this account, metacognitive knowledge, which is referred to as knowledge of cognition,

denotes an awareness of one's cognitive processes in executing tasks (Hill &Hannafin, 1997; Pintrich, 2002).

As an essential construct expatiated upon by many researchers within the vast realm of cognitive literature (e.g., Flavell, 1971; Garner, 1987; Harris, Graham, Brindle, &Sandmel, 2009; Msaddek, 2016; Pei, 2014; Pintrich, 2002; Schraw &Moshman, 1995; Stewart &Tei, 1983), metacognitive knowledge holds pivotal potential in assisting learners to undertake any textual processing in an efficiency-bound fashion. Actually, considering the perceptual, demanding nature of reading, it is explicit that astute consciousness of the mental capabilities, the difficulty/ easiness of the task, and the strict set of strategies constitutes the overarching grounding for analyzing, synthesizing, and grasping the ideational content of the text. More explicitly, this type of knowledge, which learners can potentially apply to any reading task and text type, "grows in a slow and gradual fashion through years of experiences in the 'domain' of cognitive activity"(Flavell, 1985). In fact, learners acquire it through exposing themselves to the process of critically reading a series of written discourse on a regular, ongoing basis.

In an attempt to clarify the role of metacognitive knowledge in reading, some researchers (e.g., Brown, 1987; Jacobs & Paris, 1987; Schraw &Moshman, 1995) posit that metacognitive knowledge is made up of declarative, procedural, and conditional knowledge. These three kinds of knowledge substantially assist EFL learners in tackling the reading texts more effectively. The first type, declarative knowledge, which "refers to knowing what or knowing that"(Schmitt, 2005, p. 102), is closely related to the reader's perception of his/her cognitive capacities, the requirements of the reading task and the potential RSs. In other terms, being aware of one's reading abilities, the text difficulty/easiness, and the importance of RSs (e.g., inferring, monitoring, self-questioning, evaluating) can be a facilitating factor for undertaking the reading process and synthesizing the content in a proper way. In fact, the development of this type of knowledge is a basic foundation upon which readers depend to trace the path that they can follow in their reading of the text, and thereby improving their performance at the level of comprehension and meaning analysis.

The second type,procedural knowledge, denotes "the knowledge needed to carry out procedures, including strategies in order to apply declarative knowledge and reach goals"(Harris, et al., 2009, p.113). In more explicit words, it refers to 'knowing how' to tackle the written text by drawing upon diverse strategies with a view to attaining a complete understanding of the content. This reflects that student-readers, equipped with this type of knowledge, are supposed to put both their task and strategy knowledge into actual practice. Hence, knowing how to implement (meta) cognitive RSs in processing the meaning can enable learners to have a full grasp of the text passage. Indeed, if learners are instructed in how to apply these types of strategies in reading different text types (e.g., narrative, expository), they can be more strategic and 'self-regulated'.

Concerning the third type, conditional knowledge, it pertains to 'when', 'where' and 'why' to use particular strategies to construct the meaning inherent in the text. It is conceived of as the

knowledge about "the relative utility of cognitive procedures"(Schraw &Moshman, 1995). In this regard, the learners need to know when certain strategies can be effective in approaching a given text and where other strategies have to be made use of in order to remedy the comprehension failure that is, at times, encountered during textual reading. To put it differently, readers are meant to develop the basic potential to select the suitable strategies that readily facilitate and contribute to textual understanding. Actually, the interaction between the 'declarative', 'procedural', and 'conditional' knowledge is of higher significance to the building of an effective comprehension of the written input. This will be wholly covered by exposing the EFL learners to the declarative, procedural, conditional knowledge of RSs in the current empirical investigation.

In brief, it is crucial to state that metacognitive knowledge can be an important medium for learners to perform successful, efficient textual reading at the university level. Therefore, this sort of knowledge occupies so important a role in making the process of comprehending the written discourse more meaningful. In actuality, the interrelatedness existing between the reading ability and metacognitive knowledge is corroborated by many researchers (e.g., Carnoldi, 1990; Cross & Paris, 1988; Guo&Roehrig, 2011; Jincheng &Rahmat, 2022). Granted this, the present study will try to find out to what extent this claim holds true and whether the sampled EFL learners will exhibit a strategic, metacognitive reading behavior.

3. Research Objectives & Research Questions

The present quasi-experimental study under investigation probes into the conceived impact of strategy intervention on Moroccan EFL first-semester university learners' metacognitive knowledge of reading strategies (RSs). It seeks to feature the quality and quantity of the learners' declarative, procedural, and conditional knowledge of RSs at both the pre-intervention and post-intervention levels. For the purpose of gaining insightful, compelling data, the implementation of such research tools as reading comprehension texts (i.e., narrative, expository), a retrospective questionnaire, and metacognitive strategy intervention was effected to fulfill the overriding objective that underpins the empirical frame of this undertaken study. Thus, two pivotal research questions have been constructed for a thorough investigation of the set forth research issue:

a. Do Moroccan EFL university learners possess declarative, procedural, and conditional knowledge of metacognitive reading heuristics?

b. In what ways does explicit metacognitive strategy intervention promote Moroccan EFL university learners' declarative, procedural, and conditional knowledge of the text-processing heuristics?

4. Research Hypotheses

In light of the research questions postulated above, two prime research hypotheses have been formulated. These hypotheses, serving as clear-cut guideposts for the conduct of the current study, are spelt out as follows:

a.Moroccan EFL University learners do not own declarative, procedural, and conditional knowledge base of metacognitive reading heuristics.

b. Explicit metacognitive strategy intervention can be an influencing variable on the learners' declarative, procedural, and conditional knowledge base of the reading heuristics.

5. Methodology

5.1. Participants

This quasi-experimental study involved an experimental group and a control group. The experimental group (n= 63) was instructed in the deployment of metacognitive knowledge in textual reading for a semester-long period, while the respondents of the control group (n=50) took their regular classes in reading comprehension without being exposed to the training that targets metacognitive knowledge of RSs. These two groups are of intermediate and advanced level with regard to reading achievement.They were first-semester students undertaking their studies in the English language department. The rationale behind the purposeful selection of the first-semester learners is that it is assumed that their metacognitive knowledge pertaining to academic reading is typified by inadequacy and ineffectiveness.

5.2. Procedure

This quasi-experiment is premised on a pre-post-intervention design. At the pre-intervention stage, both the experimental group and the control group were assigned two reading comprehension texts (narrative and expository) which include four sections. The first section incorporates four wh-questions that entail the use of metacognitive and critical thinking on the part of the participating groups (control & experimental). As for the second section, it requires from the respondents to make use of inferential thinking for deciphering the meaning of the listed words and opting for the correct synonyms. The third section is bound up with paraphrasing in that the respondents were expected to rephrase three sentences taken from the assigned text. As regards the last section, it targets the usage of summarizing skills amongst the targeted groups. After completing the reading act and setting forth the responses, the participants in each group were asked to fill out the retrospective questionnaire in an endeavor to assess their metacognitive knowledge regarding textual analysis and synthesis.

Following this, the experimental group was initiated into metacognitive strategy knowledge instruction. They were furnished with the declarative, procedural, and conditional knowledge of reading heuristics that are deemed to be the crucial guideposts for the attainment of an efficiency-based textual comprehension. In effect, throughout the training sessions (14 sessions), a panoply of reading comprehension texts of narrative and expository type were presented to the experimental group. During each intervention session, the treatment group was instructed in metacognitive knowledge of strategies and encouraged to put into practice the enabling reading strategies whilst processing and analyzing the assigned text to reach sufficient comprehension of the content. The control group was only exposed to the analysis of the reading comprehension texts without any metacognitive training related to reading strategy use.

At the conclusion of the training period, two reading comprehension texts (i.e., narrative, expository), as well as a retrospective questionnaire, were administered to the participants (control & experimental) with the intent to assess the conceived efficiency of the training in declarative, procedural, and conditional knowledge among the treatment-group learners compared to their counterparts (the control group). In effect, the post-intervention phase is deemed the instrumental determinant of either the marked efficacy or the utter inefficiency of the strategy intervention that was intended for promoting the metacognitive knowledge of the text-analysis heuristics deployed in EFL reading within the confines of tertiary education.

The designed retrospective questionnaire assigned to both groups (i.e., control, experimental) included a range of pertinent questions for the main goal of eliciting definite responses that are germane to the metacognitive knowledge of reading strategies (RSs). It prompted the targeted subjects to immerse themselves in reflective, analytical thinking vis-à-vis the (meta) cognitive mechanisms that facilitate the comprehension procedure. Indeed, the incorporated questions tapped not only into the target groups' perceived awareness of the strategies made use of in reading texts, but also into their knowledge of how, when, where, and why strategies are resorted to and employed during the cognitive and proactive act of making efficient sense of the content embedded in the written discourse (narrative & expository).

The reached data were submitted to statistical analysis by means of the SPSS Software Program (version 26). Actually, both descriptive and inferential statistics were depended upon for analyzing the differences at the level of the means related to each typology of metacognitive knowledge (i.e., declarative, procedural, and conditional knowledge) amongst the control and experimental groups. More specifically, a thorough, meticulous analysis of variance (One-way ANOVA) was run to determine whether the obtained means between and within groups are equal at the pre- and post-intervention levels. The statistical test performed for the treatment of the data revealed the means, standard deviations, F values, and mean squares that plainly account for the effect of the conducted metacognitive strategy intervention on such variables as declarative, procedural, and conditional knowledge pertaining to textual reading.

6. Results

6.1. The EFL Learners' Metacognitive Knowledge State at the Pre-intervention Stage

The results of the one-way ANOVA test, as an effective statistical tool, reveal that the difference between the status of the control group's perceived metacognitive knowledge pertaining to reading strategies (RSs) and that of the experimental group is manifestly non-significant at the pre-intervention level. The following six tables shown below foreground the output pertaining to the one-way ANOVA test conducted for gauging the declarative, procedural, and conditional knowledge of reading strategies (RSs) among the targeted groups (i.e., control group, experimental group) at the pre-treatment stage.

Table 1. Descriptive Statistics on Declarative Knowledge at Pre-intervention Level

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
Control Group	50	.26	.443	.063	.13	.39	0	1
Experimental Group	63	.13	.336	.042	.04	.21	0	1
Total	113	.19	.391	.037	.11	.26	0	1

Table 2. Control and Experimental Groups' Declarative Knowledge State at Pre-intervention Level

One-way ANOVA					
Declarative Knowledge					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.493	1	.493	3.297	.072
Within Groups	16.604	111	.150		
Total	17.097	112			

Note. **P< .05.**

As featured above, it is noteworthy to claim that, despite the slight differences between the group means regarding the declarative knowledge of the text-processing strategies, there is no typically seeming statistical significance at the level of the mean variance before the metacognitive strategy intervention. Obviously, the mean of the declarative knowledge dependence exhibited by the control group is 0.26 (SD=0.443), whereas the mean attained by the treatment group as to the declarative knowledge of RSs is 0.13 (SD=0.336). This plainly yields an F-value of (3.297) with an apparently insignificant level of (0.072).

As for the procedural knowledge of the strategic reading processes involved in textual analysis, it is plausible that this sort of metacognitive knowledge is not typically characterized by adequacy as the resultant output reveals in the two tables below.

Table 3. Descriptive Statistics on Procedural Knowledge at Pre-intervention Level

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
Control Group	50	.10	.303	.043	.01	.19	0	1
Experimental Group	63	.19	.396	.050	.09	.29	0	1
Total	113	.15	.359	.034	.08	.22	0	1

Table 4. Control and Experimental Groups' Procedural Knowledge State at Pre-intervention level

One-way ANOVA					
Procedural Knowledge					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.228	1	.228	1.782	.185
Within Groups	14.214	111	.128		
Total	14.442	112			

Note. **P< .05.**

By drawing a comparison between the obtained means of the comparison group (M=0.10; SD=0.303) and those of the experimental group (M=0.19; SD=0.396) at the pre-treatment level, it is of particular relevance to state that the mean square between and within groups (between groups=0.228; within groups=0.128) yields an F-value of (1.782) with a non-significance level of (0.185). This is explicitly indicative of the fact that the observed difference across the means of the control and experimental groups' use of the procedural knowledge is not of any statistical significance.

In regard to the conditional knowledge relevant to strategy use, it is conspicuous that stark insufficiency regarding the usage of this sophisticated kind of metacognitive knowledge during textual reading amongst the two groups (control group & experimental group) under focus is an apparent fact. This is obviously illustrated in the ensuing tables.

Table 5. Descriptive Statistics on Conditional Knowledge at Pre-intervention Level

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
Control Group	50	.04	.198	.028	-.02	.10	0	1
Experimental Group	63	.06	.246	.031	.00	.13	0	1
Total	113	.05	.225	.021	.01	.10	0	1

Table 6. Control and Experimental Groups' Conditional Knowledge State at Pre-intervention level

One-way ANOVA					
Conditional Knowledge					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.015	1	.015	.301	.584
Within Groups	5.666	111	.051		
Total	5.681	112			

Note. **P< .05.**

As is shown above (see Table 5 & Table 6), there is an apparently negligible difference between the control and experimental participating subjects in terms of the obtained means relatable to the reliance on the conditional knowledge of reading heuristics. Noteworthy is the fact that at the pre-treatment level, the subjects of the control and experimental groups achieved means of (0.04) and (0.06) respectively. Actually, both the mean squares between and within the two targeted groups (MS=0.015; MS=0.051) are shown to be of no significance (0.584) with an F-value of (0.301).

6.2. The EFL Learners' Metacognitive knowledge State at the Post-intervention Stage

The one-way ANOVA test performed uncovers noticeable disparity between the control and experimental groups with respect to the metacognitive knowledge state at the post-treatment stage. In this context, the six tables presented below plainly feature the adopted profile of the declarative, procedural, and conditional knowledge of reading heuristics among both groups (control and experimental) under study.

Table 7. Descriptive Statistics on Declarative Knowledge at Post-intervention Level

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
Control Group	50	.30	.463	.065	.17	.43	0	1
Experimental Group	63	.89	.317	.040	.81	.97	0	1
Total	113	.63	.485	.046	.54	.72	0	1

Table 8. Control and Experimental Groups' Declarative Knowledge State at Post-intervention Level

One-way ANOVA					
Declarative Knowledge					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.667	1	9.667	64.169	.000
Within Groups	16.722	111	.151		
Total	26.389	112			

Note. **P< .05.**

At the post-test level, there is a marked increase in the experimental group's declarative knowledge of reading techniques with a mean of (0.89). However, the mean that is relatable to the declarative knowledge reliance among the comparison group is (0.30). Clearly, whereas the control group reflected a slight increase from (0.26) to (0.30), the experimental group manifested a substantial increment at the mean level from (0.13) to (0.89) across the pre- and post-intervention phases. Therefore, it is deduced that the one-way ANOVA test indicated a statistically significant difference among the two groups with a significance level of (.000) which is by no means superior to the set probability value (.05). This is attributable

to the efficiency of the explicit metacognitive instruction in the declarative knowledge of reading strategies (RSs) received by the experimental group.

As far as the procedural knowledge base of RSs is concerned, it is worthwhile to declare that this typology of metacognitive knowledge is typified by notable sufficiency among the experimental group compared to the control one. This is plausibly illuminated in the following tables.

Table 9. Descriptive Statistics on Procedural Knowledge at Post-intervention Level

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
Control Group	50	.10	.303	.043	.01	.19	0	1
Experimental Group	63	.95	.215	.027	.90	1.01	0	1
Total	113	.58	.497	.047	.48	.67	0	1

Table 10. Control and Experimental Groups' Procedural Knowledge State at Post-intervention Level

One-way ANOVA					
Procedural Knowledge					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	20.253	1	20.253	305.572	.000
Within Groups	7.357	111	.066		
Total	27.611	112			

Note. **P< .05.**

According to the results obtained via the one-way ANOVA test, it is of note that the status of the procedural knowledge amongst the group exposed to the metacognitive strategy intervention significantly improved at the post-intervention. In particular, the experimental group reached a mean of (0.95) which is higher than the mean (0.19) achieved at the pre-intervention stage, whilst the control group's mean (0.10) remained constant throughout the pre-post intervention. This is explicitly indicative of the fact that the observed difference between the control and experimental groups in terms of the procedural knowledge across the strategy intervention period is of positive and statistical significance (.000).

As regards the conditional knowledge of strategies deployed in EFL textual processing, it is apparent that observable enhancement was noted among the treatment group in the use of this kind of metacognitive knowledge. The reached results pertaining to the profile of the conditional knowledge demonstrated by the two groups (control & experimental) at the post-treatment phase are set forth below.

Table 11. Descriptive Statistics on Conditional Knowledge at Post-intervention Level

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min.	Max.
					Lower Bound	Upper Bound		
Control Group	50	.08	.274	.039	.00	.16	0	1
Experimental Group	63	.92	.272	.034	.85	.99	0	1
Total	113	.55	.500	.047	.46	.64	0	1

Table 12. Control and Experimental Groups' Conditional Knowledge State at Post-intervention Level

One-way ANOVA					
Conditional Knowledge					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19.699	1	19.699	263.981	.000
Within Groups	8.283	111	.075		
Total	27.982	112			

Note. **P< .05.**

Given the resultant output shown above, it can be inferred that substantial discrepancy in terms of the reached means was observed among the experimental subjects compared to their control counterparts. While the experimental group's mean relative to the conditional knowledge reliance increased from (0.06) (M=0.06; SD=0.246) to (0.92) (M=0.92; SD=0.272), the control subjects' mean regarding the dependence on this type of knowledge for strategizing the written discourse did not indicate any substantive increase from the pre-intervention (M=0.04; SD=0.198) to the post-intervention stage (M=0.08; SD=0.274). The F value (263.981) yielded by the one-way ANOVA test is significant at a level of (.000) which is lower than the set probability value (P<.05).This is amply indicative of the potential influence of the explicit metacognitive strategy intervention on the experimental groups' methodical recourse to the conditional knowledge for facilitating the reading comprehension procedure.

7. Discussion

Thecurrent study investigated the marked impact of the explicit instruction in declarative, procedural, and conditional knowledge of reading strategies (RSs) on the university-level learners' reading potential. To probe into this manifestly declared postulate, it was crucial that the assessment of metacognitive strategy knowledge be conducted at the pre- and post-treatment levels with a view to validating the extent to which this typology of reading-bound metacognitive strategy intervention is of intrinsic, core importance in tertiary education.

The attained findings indicated a revamped, developmental progress in terms of the tacit acquisition of the metacognitive knowledge of the efficient reading techniques deployed in academic text processing amongst the treatment group. The latter gained significantly higher means of the declarative, procedural and conditional strategy knowledge after a semester-long training (14 weeks) in these sorts of meta-knowledge than the control group did. This validates the first research hypothesis declaring that first-semester university-level students do not exhibit sufficient cognizance of the declarative, procedural, and conditional knowledge of strategies that embody self-efficacy beliefs relatable to the conduct of scholarly textual analysis and synthesis.

It can be proclaimed that the Moroccan EFL learners' dependence on metacognitive knowledge (declarative, procedural, and conditional knowledge) in deciphering the meaning inherent in the written discourse is not typified by adequate efficiency and critical sophistication at the pre-treatment stage. Certainly, though the participating EFL learners of both groups (control & experimental) reported some techniques while attempting to build up the intended textual meaning, their awareness of what (meta) cognitive strategies to use, how to put them in practice, when to resort to alternative strategies, where to orchestrate them, and why to invoke them throughout the reading act remained starkly insufficient. This finding fittingly aligns with those of prior research (Pei, 2014; Pinninti, 2016; Pranowo, 2018; Pressley &Woloshyn, 1995; Sulistyawati&Mbato, 2021) postulating that EFL learners do not indicate metacognitive reading behavior in processing academic texts.

However, this does not negate the probability that some strategies can be unconsciously and automatically implemented by the learners. This postulate was reflected and emphasized in Baker and Brown's (1984) study. More particularly, the cognitive act of reading is governed by the principle of automaticity in what concerns strategy usage, especially in processing some clear, simple statements and ideas of the text. Therefore, despite the overall awareness and diversified use of some RSs declared by the target EFL learners in critically analyzing the assigned written texts at the pre-intervention stage, a lack of conscious knowledge and implementation of other strategies, which are predominantly metacognitive in nature, is really what characterizes the EFL learners' strategic behaviour during textual analysis (e.g., Ghaith& El-Sanyoura, 2019; Shang, 2011; Tabataba'ian&Zabihi, 2011).

At the post-testing stage, it is plausible that whilst the status of the control group's declarative, procedural, and conditional knowledge was imbued with constancy at the level of development, the status of these types of metacognitive knowledge amongst the experimental group advanced to somewhat higher levels. The latter group (experimental group) manifestly exhibited substantial progress at the level of the metacognitive knowledge base by acquiring the critical cognitive capacities deemed essential for digesting the textual meaning in a principled, judicious manner. In fact, the experimental group's cognizance of what, how, where, when, and why to use the reading strategies properly at the post-intervention level reflects the utter efficiency of the delivered intervention designed to elevate the sense of reasoning and strengthen the belief of self-efficacy among learners while being involved in the cognitive reading process.

This state of affairs undergirds the critical essentiality of the metacognitive training offered to first-semester university-level students. In other terms, it did make of them self-efficacious, autonomous readers who can tackle any cognitively demanding reading activity in a tacitly accomplished manner. The principled usage of strategic tactics that are of metacognitive nature gives learners explicit directions toward constructing an effective understanding of the text message. In fact, processing complex academic texts of diverse sorts (e.g., narrative, expository) entails that university learners foster and deploy the efficiency-driven and high-order reading tactics that facilitate high-level textual comprehension.

Thus, the conduct of quality reading act, which is the desired goal within the vast academic universe, is inherently contingent upon the declarative, procedural, and conditional knowledge of the strategic footsteps underpinning the textual interpretation and the meaning-making process. This assumption is underscored by many scholars (e.g., Sulistyawati&Mbato, 2021; Pranowo, 2018; Razi&Çubukçu, 2014) who essentialize the efficacy of the metacognitive knowledge of the text-analysis strategies in comprehension achievement. More explicitly, knowing what, how, when, where, and why to make use of RSs comprises the fundamental precondition to the enhancement of reading potentiality amongst EFL learners. In this regard, the claim articulated in the second research hypothesis that explicit metacognitive strategy intervention can be an influencing variable on the learners' strategy knowledge base (declarative, procedural, and conditional) can be affirmatively substantiated.

8. Conclusion

The present study, falling within the purview of metacognition in particular and within the parameters of cognitive psychology in general, critically examined the extent to which the explicit metacognitive instruction in declarative, procedural, and conditional knowledge of reading heuristics can culminate in an empowered, efficiency-bound sort of academic reading among the EFL learners. The results reached in light of the study underscore the core usefulness and intrinsic vitality of the metacognitively-oriented training in these types of metacognitive knowledge (declarative, procedural, and conditional knowledge) as key variables facilitating the interactive and proactive process of textual reading.

Hence, (meta) cognitive strategy retention and application during the cognitive act of reading are sturdily premised on the purposeful operation of raising the learners' awareness about the declarative, procedural and conditional nature of the basic reading strategies (RSs) aiding the content assimilation in an efficient way. In recognition of this stated fact, it is recommended that a high premium be placed on instructing the EFL learners in effectual RSs which seem to be underused during EFL textual processing. Actually, revamping the learners' (meta) cognitive knowledge of RSs should be maximally targeted and entirely addressed by academics and instructors within the higher education field for optimizing the learners' potential endeavor of making complete sense of any assigned academic written discourse.

More importantly, the explicit view to be heightened is that boosting the university students' metacognitive knowledge base regarding the effective reading heuristics constitutes a

bedrock for the actual fulfilment of the core requirements of sophisticated university-level EFL reading. This stated assumption features that the enrichment of the learners' awareness of a potential set of (meta) cognitive RSs and the ways relatable to how, when, where, and why they are put into practice should be part and parcel of the Reading Comprehension Course at the university level. Thus, the declarative, procedural, and conditional knowledge of the text-based strategies can form the foundational platform for the conduct of successful scholarly reading.

On the whole, even though the study undertaken did foreground some potentially rich findings, it reveals some limitations. One limitation links up with the sample of the EFL learners addressed. Indeed, granted that the current study focused on the learners studying in the English Department at the Faculty of Letters and Humanities in Rabat, future academic research should target larger samples of learners belonging to differing English Departments of the Moroccan Faculties of Letters and Human Sciences for assuring fuller representativeness. The other limitation is embodied in the lack of investigating the interplay between language proficiency and metacognitive strategy knowledge. Researching this postulate at length should be an indispensable part of prospective scholarly research that is exclusively couched within the boundaries of metacognitive theory and EFL university-level reading.

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