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Qualifying Method-Centered Teaching Approaches through the Reflective Teaching Model for Reading Comprehension

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Abstract: The purpose of this study was to qualify method-centered teaching approaches by investigating the effects of the reflective teaching model for reading comprehension (RTMRC) on ninth-grade students' English reading comprehension achievement in Myanmar. Three kinds of method-centered teaching approaches, namely reciprocal teaching, interactive teaching, and questioning, were qualified, compared, and examined while using the RTMRC. A quasi-experimental research design was used. The participants included 458 ninth-grade students, five English teachers, and 10 peer observers. Pre- and post-tests, a student questionnaire, and an observation scheme were used to assess the effectiveness of the RTMRC over 15 weeks. Structural equation modeling, Rasch analysis, analysis of covariance (ANCOVA), effect size (Cohen's d), and various descriptive statistics revealed that the teachers' reflections on the instructional context were very effective for student reading comprehension achievement, the students appreciated interactive teaching the most, students' achievements for the literal, inferential, and evaluative comprehension questions were the highest, and the RTMRC was more effective than other traditional teaching methods. In essence, the RTMRC can assist English language teachers in improving their students' reading comprehension.

Keywords: reflective teaching; reading comprehension; reciprocal teaching; interactive teaching; questioning

1. Introduction

Reflective teaching has become increasingly popular in teacher education. Teachers' reflections are essential for their professional development and their students' optimal educational development [1]. Reflections help teachers understand complexities and troublesome experiences and subsequently transform them into more enhanced, new understandings and experiences [2]. Without reflections on classroom practices and actions, teachers may struggle to bridge the gap between their planned theory and practical experiences in classroom settings [3]. Therefore, reflective teaching is imperative for all teachers to enable them to teach effectively.

Various studies have shown that different teachers employ various teaching strategies to teach reading comprehension effectively. For example, studies have been conducted on methods such as reciprocal teaching [4], interactive teaching [5], and questioning [6]. The results of these studies have concurred that the particular teaching method employed had a significant effect on students' reading comprehension. However, it is noteworthy that there is no perfect teaching method because "there are many factors that influence how teachers approach their work and which particular strategies they employ to achieve their goals" [7] (p. 97). Therefore, Aliakbari and Adibpour [8] have suggested that teachers should consider reflective practices to support their method-centered teaching. Valdez et al. [9] further asserted that reflective teaching is a post method, allowing teachers to continually revise and modify their teaching strategies.

The political system in Myanmar has a considerable impact on its educational system, which is based on centralization. Teachers' instructional strategies are teacher-centered, and school buildings and classroom settings have poor structures [10]. However, in an endeavor to enhance its education system, Myanmar is upgrading teachers' skills and curriculum development by cooperating with multiple English-speaking countries and many international organizations [11]. As part of this effort, the United Nations Educational Scientific and Cultural Organization (UNESCO) organized a project to strengthen pre-service teacher education in Myanmar [12]. The project noted that the new curriculum in upper secondary schools is developed by reflection and practice and thus, "more support is needed to embed reflection in each lesson---teacher educators have acknowledged that reflection is the first element to go if they do not have enough time for the lesson" (p. 72). This encouraged us to apply the reflective teaching approach in that context. Accordingly, the purpose of this study was to qualify method-centered teachings such as reciprocal teaching, interactive teaching, and questioning through the framework of the reflective teaching model for reading comprehension (RTMRC) so as to examine its effectiveness for student reading comprehension achievement.

2. Literature Review

2.1. Method-Centered Teaching Approaches for Reading Comprehension

Method-centered teaching refers to an approach in which specific methods or techniques are emphasized in the classroom. In reading comprehension, recent research has identified several examples of method-centered teaching approaches; reciprocal teaching [13], interactive teaching [14], and questioning strategy [15].

2.1.1. Reciprocal Teaching

Reciprocal teaching, which was elaborated by Palincsar and Brown [16], is an instructional reading strategy based on the four reciprocal dialogs of predicting, questioning, clarifying, and summarizing so as to enhance students' reading comprehension skills [17].

When predicting, students predict what will happen next by connecting their prior knowledge with the new information they glean from the text [18]. When questioning, students ask questions about puzzling information, confusing words, difficult words, and phrases they do not understand, as well as key concepts from the text, which may assist them in comprehending the whole text [19]. When clarifying, students clarify and/or answer confusing words, ideas, concepts, and questions posed by other students. Clarifiers can employ additional resources such as dictionaries and thesauri to explain the meaning of difficult words [20]. Summarizing encompasses students summarizing the general idea of a text by comparing the main points and highlighting the key concepts of the whole text [21].

Recent meta-analytical research [13] has shown that reciprocal teaching had a significant and positive effect on reading comprehension outcomes, with a moderate effect size (Cohen's d = 0.42). Furthermore, Bounouh and Merzoug's [22] study also pointed out that reciprocal teaching had significantly positive impacts on student reading comprehension achievement, with a moderate effect size (Cohen's d = 0.47). In a study of a systematic review about reciprocal teaching, the authors [23] concluded that reciprocal teaching is a promising approach supported by multiple learning theories and that it has consistently shown positive effects on reading comprehension outcomes. These reported studies showed the moderate effect size of reciprocal teaching on students' reading comprehension. The effect size reported in these studies is generally moderate, indicating that this intervention has a noticeable impact on student reading comprehension performance.

2.1.2. Interactive Teaching

Interactive teaching may be defined as "a hybrid model that harnesses the comparative advantages of the bottom-up and top-down approaches, in order to facilitate the reading process by encouraging readers to interact with texts so as to extract the meaning of

written language or symbols" [5] (p. 126). Baker and Boonkit [24] further noted that reading is an interactive, top-down, and bottom-up process. They added that students acquire knowledge from texts via the interaction (interactive approach) between identifying meanings based on grammatical knowledge about words, phrases, clauses, sentence syntax, and texts in detail (bottom-up approach) [25]. Then, students interpreted meanings by integrating the background schema of the texts they read and knowledge obtained from reading the texts (top-down approach) [26]. According to Khaki [27], the most effective approach for teachers to promote student reading comprehension achievement is to use an interactive teaching approach that combines both bottom-up and top-down processing. This approach involves utilizing various teaching aids to stimulate and integrate students' background knowledge into the reading text, thus enhancing their understanding of it. To stimulate students' background schemas, Anyiendah et al. [5] proposed the following three methods: carousel brainstorming, which encompasses group work and/or writing information on charts about the topic in order to discuss, recall, and relate to the new learning; pre-teaching vocabulary; and K-W-L, that is, what they *know,* what they *want* to know, and what they *learned.*

Karimi and Jafari's (2019) study [28] found that interactive instruction had a significant effect and moderate effect size (Cohen's d = 0.56) on student reading comprehension achievement. Another experimental study [29] found that interactive teaching (combining bottom-up and top-down approaches) had a significant and positive effect on reading comprehension outcomes, with a moderate effect size (Cohen's = 0.45). Moreover, Zhang and Wu's [30] comparative study of two interactive reading teaching methods (bottom-up and top-down) had a significant and positive effect on reading comprehension outcomes, and its effect size was moderate, with Cohen's d = 0.50.

2.1.3. Questioning Strategy

Questioning, which originated from Socrates more than 2000 years ago, is a teacher's questioning strategy that is based on the initiate–response–evaluate model in which the teacher first asks (initiates) the students questions related to the text, the students answer (respond) to the teacher's questions, and the teacher assesses (evaluates) the students' responses or gives them feedback so as to enhance their reading comprehension [31]. If teachers cannot formulate good questions, this questioning strategy may lead to students only acquiring factual knowledge. Therefore, teachers should ask higher-order questions to help students think on a deeper level [32]. Reeves [33] recommended Barrett's taxonomy of reading comprehension questions for language teachers (Table 1) by distinguishing five levels of questions, namely literal, reorganizational, inferential, evaluative, and appreciative.

Table 1. Barrett's taxonomy of reading comprehension levels.

Level	Reading Comprehension Question-Levels	Call for Students' Skills	Example Questions
1	Literal (recognition or recall of) - Details - Main ideas - A sequence - Comparison - Cause and effect relationships - Character traits	To locate or identify any kind of explicitly stated fact or detail (for example, names of characters or places, likenesses and differences, reasons for actions) in a reading text	- Name the ------. - List the -------. - Identify the -------. - Describe the -------. - Compare the two ----. - Relate the -------.
2	Reorganizational - Classifying - Outlining - Summarizing - Synthesizing	To organize, sort into categories, paraphrase, or consolidate explicitly stated information or ideas in a reading text	- Summarize the main ideas --. - State the differences ----. - Describe the similarities. - Classify the same ------. - Outline the key -------.

Table 1. *Cont.*

Level	Reading Comprehension Question-Levels	Call for Students' Skills	Example Questions
3	Inferential - Main ideas - Supporting details - Sequence - Comparisons - Cause and effect relationships - Character traits - Predicting outcomes - Interpreting figurative language	To use conjecture, personal intuition, experience, background knowledge, or clues in a reading text as a basis for forming hypotheses and inferring details or ideas (for example, the significance of a theme, the motivation or nature of a character) that are not explicitly stated in the reading text/material	- Explain the main idea ----. - What is the writer's intention ----? - What do you think ---? - What will be ------? - What will happen -----? - Why has it occurred when ---? - Why did you decide -----?
4	Evaluative (judgement of) - Reality or fantasy - Fact or opinion - Adequacy or validity - Appropriateness - Worth, desirability, and acceptability	To make an evaluative judgment (for example, on qualities of accuracy, acceptability, desirability, worth, or probability) by comparing information or ideas presented in a reading text using external criteria provided (by other sources/authorities) or internal criteria (students' own values, experiences, or background knowledge of the subject)	- Describe your opinion in detail ---. - Do you think that -----? - Discuss critically -------. - Why do you think so ---? - How important is this -----? - What is the moral of the story ----? - How is it appropriate with -----? - Why is this purposeful ----?
5	Appreciative - Emotional response to content - Identification with characters - Reactions to the author's language use - Imagery	To show emotional and aesthetic/literary sensitivity to the reading text and show a reaction to the worth of its psychological and artistic elements (such as literary techniques, forms, and styles)	- Discuss your response ------. - Comment on the writer's use of language -------. - What impression did you get about --? - Do you like this ----? Why?

Source: adapted from Reeves [33].

Recent research [34] showed that a teacher's questioning strategy had a significant effect on EFL student reading comprehension achievement, with a small to moderate effect size (Cohen's d = 0.39). Wang, Zhang, and Qi's [35] study also showed small to moderate effect sizes (Cohen's d ranged from 0.15 to 0.45) and significant positive effects on reading comprehension outcomes. Moreover, in Kim's [36] study, the teacher's questioning strategy also had a significant and moderate effect size (Cohen's d = 0.56) on their students' reading comprehension achievement values.

2.2. Transformative Learning Theory

Madsen and Cook [37] stated that not all learning is transformative, not all schools educate, and possessing information does imply an understanding thereof. Rather, transformative learning facilitates individuals' effective understanding, as it enables in-depth reflection and critical consciousness [38]. The purpose of transformative learning theory is to assist individuals to reflect on the actual events in which they are participating and transform them so they are more effective if necessary [39]. Critical reflection is an essential component of transformative learning theory [40]. Mezirow [41] noted that transformative learning theory has three core components. First, the mental construction of experiences enables students to construct learning in their minds. Second, critical reflection emphasizes that effective learning does not come from all positive experiences but rather from effective reflection, thus enabling students to reflect effectively on what they have learned and/or experienced. Finally, development/action is imperative for true transformation because it is vital that learners try out their new knowledge and skills. Therefore, the purpose of this study was to qualify the three teaching strategies noted previously by employing reflective teaching, which is most important to realize transformative learning.

2.3. Reflective Teaching Model for Reading Comprehension

2.3.1. Reflective Teaching Process

A review of 10 studies revealed that reflective teaching has been explained in various ways. While Taggart and Wilson [42] described reflective teaching as a cyclical process involving the three steps of planning, reflecting, and evaluating, Richards and Lockhart [7] outlined four steps, namely, planning, acting, reflecting, and evaluating. Clarke [43] included the following five steps: identifying a problem, planning, acting, evaluating, and following-up/reflecting. Dennison [44] noted that reflective teaching has four steps: abstract conceptualization, active experimenting, concrete experiences, and reflective observation. While Hulsman et al. [2] stated that reflective teaching comprises the five steps of acting, looking back/reflecting on the action, awareness of essential aspects, creating alternative methods of action (planning), and trial/testing, Pollard et al. [45] explained it as including the five steps of planning, acting, reflecting, analysis, and evaluation. Babaei and Abednia [46] included the three steps of critical inquiry (reflection), analysis, and self-directed evaluation. Garzon [47] explained that reflective teaching comprises the four steps of reflective–collaborative work, namely, engagement in planning, enacting, monitoring, and revising practices. While Kennedy-Clark et al. [48] stated reflective teaching encompasses the three steps of acting, reflecting, and analyzing, Ratminingsih et al. [49] included the five steps of planning, acting, reflecting, evaluating, and feedback. Although these researchers explained the reflective teaching process in different ways, the four following steps are evident in reflective teaching: planning, acting, reflecting, and evaluating.

2.3.2. Factors Influencing the Reading Event

A review of 10 studies revealed that factors have influenced reading events in various ways. Robertson [50] showed that reading events involve the four factors of reader, text, task, and context. Walker [51] found the following five factors: strategy, reader, text, task, and context; van Staden and Howie [52] revealed that three systems, namely, the school, the classroom, and a student's home background, influence their reading achievement; Zhang and Zhang [53] noted the three factors of text, reader, and context interaction; and Suwanto [54] found the five factors of strategy, reader, task, text, and context. Furthermore, Yusuf and Fitrisia [55] revealed the four factors of teacher, strategy, reader, and text; Widdowson [56] found the three factors of strategy, reader, and text; Yang [57] presented the six factors of teacher, strategy, reader, text, task, and context; and Zhang [58] indicated the three variables of reader, text, and context. Finally, Gilbert [59] revealed only two factors, namely, reader and text. An analysis of these factors showed that strategy, reader, text, task, and context are the most common factors.

After considering the reflective teaching process and reading factors, we developed an instructional design called the reflective teaching model for reading comprehension (RTMRC), as shown in Figure 1, which we employed as the conceptual framework in this study.

2.4. Conceptual Framework

The RTMRC proposes that teachers need to follow the following four steps in their instructional periods: planning, acting, reflecting, and evaluating. Furthermore, we adopted three instructional strategies, namely, reciprocal teaching, interactive teaching, and questioning to teach reading comprehension (Figure 1) when employing the RTMRC.
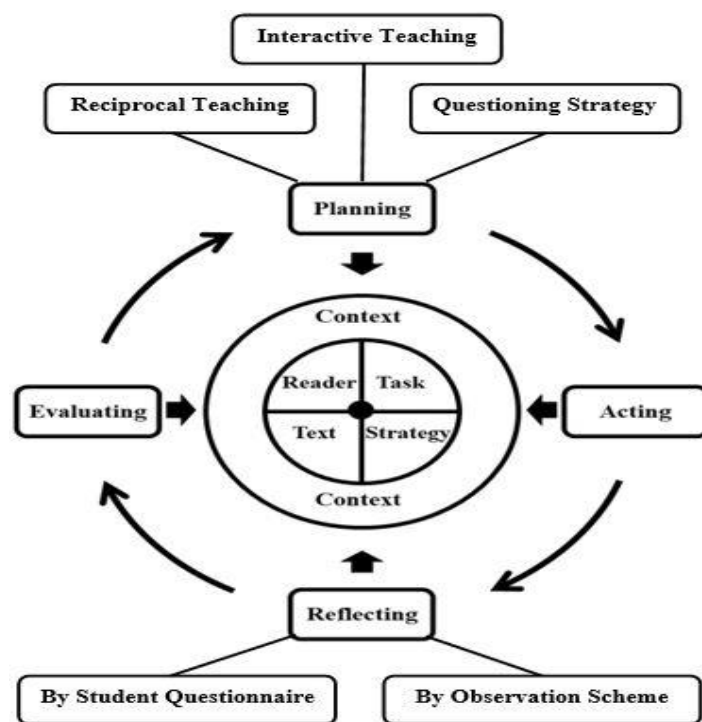
Figure 1. Conceptual framework. Source: adapted from Oo and Habók [60] (p. 133).

In the *planning* step, teachers employ three instructional strategies, namely, reciprocal teaching, interactive teaching, and the questioning strategy to plan their respective teaching procedures in detail. In the *acting* step, teachers employ the three strategies to teach their students. The *reflecting* step involves teachers reflecting on the instructional context, which includes reader, strategy, text, and task in accordance with a student questionnaire and observation scheme [61]. In the *evaluating* step, teachers evaluate the student questionnaire and observation scheme as a formative assessment and students' achievements as a summative assessment.

2.5. Uncovering the Contribution of the Current Study

In order to determine the significance of the present study, it is important to re-examine the context in which it is situated. This study consists of two key components: method-centered teaching strategies (reciprocal, interactive, and questioning), and reflective teaching for reading comprehension.

There is no single teaching method that is universally suitable for all students. Each teaching strategy has its own advantages and disadvantages. In the case of reciprocal teaching, Mastropieri et al. [62] found that reciprocal teaching could improve students' reading comprehension, critical thinking, and metacognitive skills. Moreover, it has been found to be particularly effective for students with learning difficulties, such as those with dyslexia. However, there are some limitations to the approach. For instance, it can be time-consuming and may require substantial teacher training and preparation to be implemented effectively [63]. Additionally, some studies [64–66] suggested that the effects of reciprocal teaching may not be consistent across all subject areas or age groups. Overall, while reciprocal teaching has several strengths, it is important to consider the potential limitations and tailor the approach to a specific instructional context. Several studies have also shown that interactive teaching can improve students' academic achievement, motivation, and metacognitive skills [67,68]. However, there are also some limitations to this approach. For example, it can be challenging to design and implement interactive teaching effectively, particularly in large classrooms or with students who have diverse learning needs [69]. Moreover, the success of interactive teaching may depend on factors such as

teachers' training and expertise, as well as students' prior knowledge and motivation. One strength of questioning is that it encourages active engagement and critical thinking, as learners are required to process information, reflect on their knowledge, and articulate their thoughts [70]. Additionally, questioning can help identify knowledge gaps, clarify misunderstandings, and challenge assumptions [71]. However, one limitation of questioning is that it can be time-consuming and may not always result in accurate or complete information. Moreover, some learners may feel uncomfortable or intimidated when asked to respond to questions [72].

To conclude, these method-centered strategies have their respective limitations in teaching reading comprehension. Therefore, it is necessary to find ways of improving these method-centered teachings for effective reading comprehension.

Here, reflective teaching has been recognized as an effective approach to improving teaching practices in various domains [73–76]. According to the above transformative learning theory, reflective practice is very important for students' transformative learning and hence, it also becomes crucial for the teacher to qualify method-centered teachings for their students' transformative reading comprehension [41]. Recent research studies have focused on the importance of incorporating reflective teaching practices in various educational settings, including reading comprehension. For example, a study by Suphasri and Chinokul [77] found that teachers who engaged in reflective practices showed improvements in their teaching strategies and were better able to meet the individual needs of their students. Another study by Lai and Wu [78] demonstrated that reflective teaching helped to enhance students' reading comprehension skills by allowing teachers to better understand their students' learning processes and tailor their instruction accordingly. Moreover, a study by Wang et al. [72] indicated that reflective teaching can promote teacher professional development by providing opportunities for self-reflection, collaboration with colleagues, and ongoing learning. The authors suggest that reflective teaching should be a key component of teacher training programs to prepare educators for the demands of the profession.

In summary, recent research has highlighted the significant benefits of reflective teaching in improving teaching quality and student learning outcomes, as well as promoting teacher professional development. Incorporating reflective practices into method-centered teaching approaches may enhance the effectiveness of teaching reading comprehension and improve educational outcomes for students in the education setting.

2.6. Aim and Research Questions

The purpose of this study was to find ways of improving method-centered teaching approaches by examining the effectiveness of RTMRC on students' English reading comprehension achievement in Myanmar. Accordingly, the following research questions were formulated:

RQ_1: In what type of reading comprehension questions do students enjoy success when RTMRC is employed?

RQ_2: What is the effect of RTMRC on student reading comprehension?

RQ_3: What is the effect of teacher reflections on student reading comprehension achievement?

RQ_4: What are the teachers' reflections on instructional context (reader, strategy, text, and task) when RTMRC is employed?

3. Method

To measure the effect of RTMRC on the reading comprehension achievement of students in Myanmar, a quasi-experimental research design was employed. The study lasted for 15 weeks (75 sessions).

3.1. Participants

Cluster-randomized trials [79] were employed in this study. We first determined that the population should be approximately 1000 ninth-grade students in Sagaing Township, Myanmar. Second, we chose 10 basic education upper secondary schools from Sagaing Township as clusters or groups. Third, we obtained a sample of 5 schools out of the 10 through a process of simple random sampling. Finally, every ninth-grade student (n = 458; aged between 13 and 15 years) from the selected five schools participated in this study. Random sampling was employed to place 228 and 230 students in the experimental and control groups, respectively. Their English language teachers, who also participated, taught both the experimental and control groups. Furthermore, 10 subject deans/peer colleagues, specifically 2 per school, participated as active observers. In total, 458 students, five English language teachers, and 10 observers participated in the study.

3.2. Instruments

3.2.1. Pre- and Post-Tests

Pre- and post-tests, which comprised the same concepts but different types of tasks, were mainly employed to measure the effectiveness of RTMRC. The test questions were based on the content of the ninth-grade curriculum prescribed by the Ministry of Education, Myanmar. In total, there were 27 items: 11 literal comprehension items, 1 reorganizational comprehension item, 6 inferential comprehension items, 5 evaluative comprehension items, and 4 appreciative comprehension items. Barrett's taxonomy of reading comprehension levels was employed to construct these items [80].

3.2.2. Student Questionnaire

While employing the RTMRC, the teachers reflected on their instructional context, specifically reader, strategy, text, and task, by administering the student questionnaire adapted from Richards and Lockhart [7]. Although the original questionnaire comprised 20 items, we could only employ 17 of these, namely, 5 that reflected on the *reader,* 5 that evaluated *strategy,* 4 that assessed *text*, and 3 that measured *task* after being validated in a pilot study. This questionnaire was previously translated into Burmese and confirmed by Burmese language specialists. During this period, the teachers used three teaching strategies: reciprocal teaching, interactive teaching, and questioning. This questionnaire was utilized nine times, that is, three times for each teaching strategy for the experimental groups, but not for the control groups.

3.2.3. Observation Scheme

To assist the teachers' reflections on the instructional context, the 10 observers who were peer colleagues also observed the teachers' instructional context by employing the observation scheme adapted from Richards and Lockhart [7]. The observers randomly observed each teacher's teaching-learning process nine times, specifically, three times for each teaching strategy during the intervention period.

3.3. Procedures

We followed four steps in this study. First, we developed the RTMRC by employing the evaluation of four specialists. Second, we confirmed the content validity of the instruments (pre- and post-tests, student questionnaire, and observation scheme) with the help of six content specialists. Third, we conducted a pilot study for three weeks that included 83 ninth-grade students from one Myanmar High school as participants. Thus, the construct validity of the instruments was confirmed.

The main study was conducted in the fourth step. Before employing RTMRC, both the experimental and control groups completed pre-tests to determine the participants' initial statuses. Subsequently, the experimental groups were taught by employing RTMRC. In accordance with Brookfield [61], we used two instruments, namely the student questionnaire and observation scheme, to enable the teachers to reflect on their instructional processes.

The teachers also gave the revised/reflective questions to the students to allow them to reflect on their own texts. The control groups were taught using only traditional teaching methods. After RTMRC was employed, all the groups completed the post-tests.

3.4. Data Analysis

To investigate the effectiveness of the RTMRC approach on the students' reading comprehension achievement, we conducted an analysis of covariance (ANCOVA), which is a statistical method for controlling the effects of covariates or other factors that could influence the dependent variable [81]. Before performing the ANCOVA analysis, we investigated the normal distribution of the tests to determine which items the students would find difficult or easy [82]. Consequently, we employed item response theory (Rasch analysis) and conducted the Quest program to estimate the students' parameters and the difficulty levels of the items. In the subsequent Rasch analysis, item and person reliability values greater than 0.8 were deemed good, while values between 0.6 and 0.8 were considered fair and acceptable. However, values less than 0.6 were rejected. Additionally, a separation index value of greater than 1 was considered useful for the instrument, and a value greater than 2.0 was seen as good [83]. Regarding the validity studies, different fit statistics parameters were employed such as standardized mean squares (MNSQs-infit/outfit) and standardized z scores (ZSTDs-infit/outfit) to evaluate the data. Based on the recommendations, MNSQ infit and outfit values between 0.6 and 1.5 were accepted as good for both item and person fitness. The ZSTD values ± 2.0 were also accepted as a measure of fitness [84]. Then, to quantify the size of experimental effects by RTMRC, the effect size was also measured by calculating Cohen's d in accordance with the recommendations (d = 0.3, small; d = 0.5, medium; d = 0.8, large) [85].

Furthermore, structural equation modeling (SEM) was utilized to measure the effects of the teachers' reflections on their instructional context. Kline [86] suggested three kinds of fit indices for SEM analyses: absolute fit index, comparative fit index, and parsimonious fit index. In this study, the standardized root mean square residual (SRMR) was used for measuring the absolute fit, the comparative fit index (CFI) was employed for the comparative fit, and the root mean square error of approximation (RMSEA) was utilized for the parsimonious fit. According to Kline [87], CFI ranges from 0 to 1 (>0.90 is acceptable and >0.95 is good) and SRMR and RMSEA values less than 0.08 (<0.05 is good) are acceptable.

4. Findings

4.1. Results from the Tests

RQ1: In what type of reading comprehension questions do students enjoy success when RTMRC is employed?

Pre- and post-tests were mainly used to examine the students' reading comprehension achievement. To answer this research question, it was essential to estimate the ability parameters and item difficulty levels in the tests. Therefore, we employed Rasch analysis and used the Quest program to determine the distribution between student achievement and item difficulty levels (Figure 2) [88].

While the students' reading comprehension achievements are depicted on the left side of Figure 2, the item difficulty levels are illustrated on the right [89]. The results of the person–item map depicted in Figure 2 reveal that the students had a low level of achievement in appreciative comprehension (items 16, 19, and 22) and reorganizational comprehension (item 27). Furthermore, they experienced the literal comprehension questions (items 6, and 26) as the easiest. The students found literal comprehension (items 8, 9, 11, 12, and 13), inferential comprehension (items 2 and 4), and evaluative comprehension (items 15, 18, 23, and 24) as neither too difficult nor too easy.
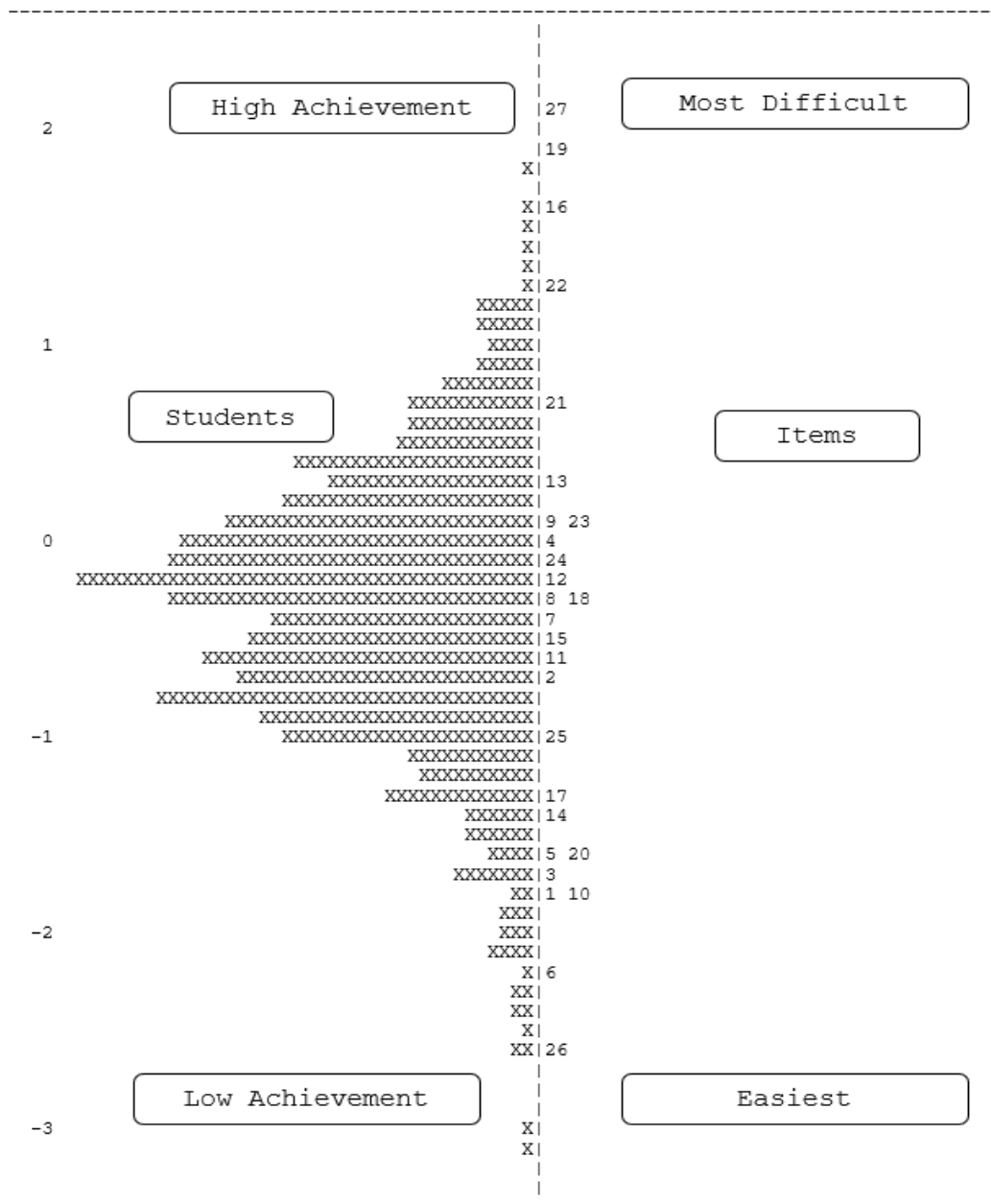
Figure 2. Person–item map indicating persons' ability levels and item difficulties on the same scale (each x represents 2.8 cases).

4.1.1. Reliability and Fit Statistics of the Test

We also conducted a second Rasch analysis to investigate the model reliability and item fits of the test (including 27 items) for both the experimental and control groups. According to the results, the mean measures (logits) were 213.60 from items and 25.10 for persons in the experimental group, and 206.30 for items and 24.50 for persons in the control group, with positive standardized deviation values, which indicate that the data from the sample can be used to investigate the impact of RTMRC on student reading comprehension achievement [90]. Table 2 shows that both the item and person reliabilities are satisfactory. In addition, the values of internal consistency reliability, measured by Cronbach's alpha (KR-20), of both the experimental and control groups were greater than 0.90, indicating that the test items were highly reliable [84]. Item separation index also ranged from 1 to 2 for both the experimental and control groups, meaning the items were useful for the test instrument [83].

Table 2. Reliability and fit statistics of the test for both experimental and control groups.
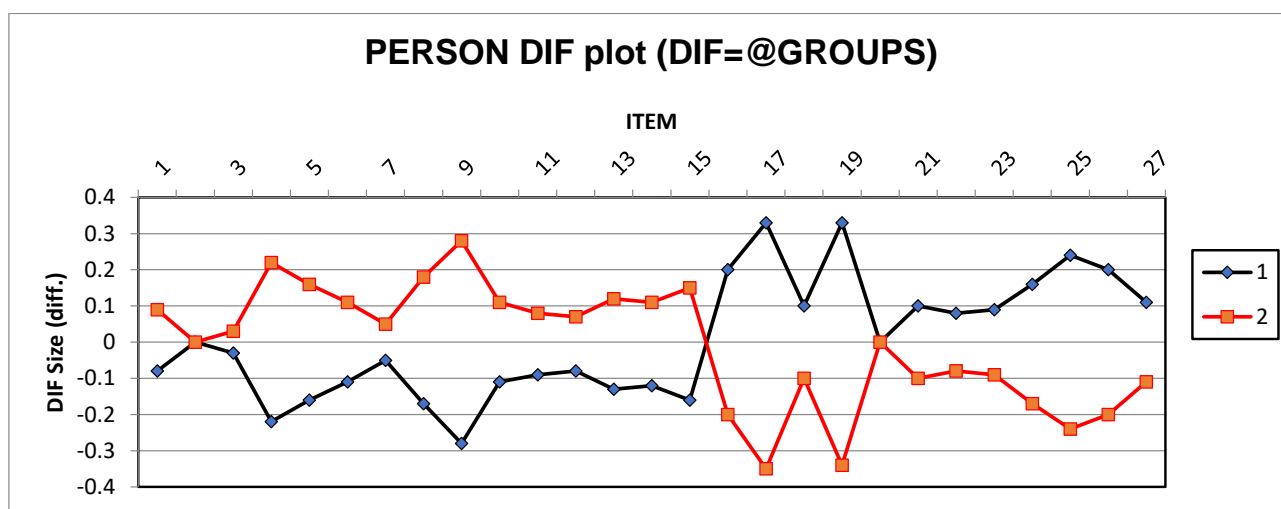
Construct	Experimental Group		Control Group	
	Items	Persons	Items	Persons
Number	27	228	27	230
Mean	213.60	25.10	206.30	24.50
Standard deviation	72.00	3.80	70.30	3.60
Reliability (Cronbach's alpha)	0.93	0.74	0.94	0.70
Separation	1.32	1.80	1.38	1.50
MNSQ (infit)	0.94	0.99	0.98	0.97
MNSQ (outfit)	0.95	0.95	0.96	0.96
ZSTD (infit)	-1.20	-0.10	-1.70	0.00
ZSTD (outfit)	-1.30	-0.30	-1.30	-0.10
Chi-squared (χ^2)	7886.68		8125.11	
df	5953		5901	

Note: MNSQ: standardized mean square; ZSTD: z-standardized score; df: degrees of freedom.

To investigate the item fits among the constructs of the tests, the MNSQs-infit/outfit and ZSTDs-infit/outfit measures were also investigated. Table 2 shows that the MNSQs-infit/outfit values and the corresponding ZSTD values were within the acceptable ranges of 0.6 to 1.5 (MNSQ) and ± 2.0 (ZSTD) as specified by [84]. The Chi-square values by the degrees of freedom were lower than 3 (χ^2/df < 3), revealing that the test was almost normal for student reading comprehension assessment.

4.1.2. Differential Item Functioning (DIF) between Experimental and Control Groups

In this study, a type of DIF analysis called uniform DIF analysis was utilized to detect if any item bias of the test existed between the two groups of experimental and control. The DIF analysis involved evaluating participant responses to each item on the test of these two different groups. DIF can be evaluated in two ways: by the probability of significance ($p < 0.05$) and by DIF size, which is classified as negligible DIF < 0.43, slight to moderate (DIF $\geq$ 0.64 logits), or moderate to large (DIF $\geq$ 0.64 logits) [90]. The finding showed that the DIF sizes of the test for both groups were between +0.40 and -0.40, with a significance value that was less than 0.05 (Figure 3). Therefore, we can make the assumption that the test remains invariant and there are no issues with the DIF between the experimental and control groups.

Note: 1 (experimental group); 2 (control group).

Figure 3. Differential item functioning of the test between the two groups.

RQ2: What is the effect of RTMRC on student reading comprehension?

In order to determine if there was a significant difference in student reading comprehension achievement between the two groups following an experimental treatment using RTMRC, we conducted an analysis of covariance (ANCOVA) utilizing student achievement (post-test scores) as the dependent variable, the pre-test scores as covariates, and the treatment using RTMRC (groups) as an independent variable. We also tested the homogeneity of slopes assumption in ANCOVA, and discovered that there was no significant interaction ($p = 0.117$; $p > 0.05$) between the treatment using RTMRC (groups) and the pre-test scores, indicating that the assumption was satisfied. Results from the ANCOVA analysis indicate that after controlling the pre-test differences, there was a significant difference between the experimental and control groups in reading comprehension achievement (($F(1, 455) = 282.72$; $p = 0.000$, $p < 0.001$)) (Table 3). Table 4 also displayed the average values and variation for the experimental and control groups in relation to their reading comprehension performance, both before and after adjusting for differences in pre-test scores. The data show that the experimental group, which had received the RTMRC treatment, performed better in terms of reading comprehension achievement than the control group. We also examined the effect size (Cohen's d) to assess the contrast between the two groups, which indicated a substantial effect size (d > 0.8) due to the RTMRC treatment approach [85].

Table 3. Analysis of covariance for reading achievement (post-test) as a function of groups, using pretest scores as a covariate.

Source	df	Mean Square	F-Value	*p*-Value	η^2 (Eta Square)
Pre-test	1	106.39	3.80	0.052	0.08
Groups	1	7797.71	278.72	0.000 ***	0.38
Error	455	27.97			

Note: *** $p < 0.001$.

Table 4. Adjusted and unadjusted group means and variability for reading achievement (post-test), using pretest values as a covariate.

Groups	Number	Unadjusted		Adjusted	
		Mean	Standard Deviation	Mean	Standard Error
Experimental	228	37.13	5.80	35.20	0.35
Control	230	28.90	4.76	30.45	0.31

RQ3: What is the effect of teacher reflections on student reading comprehension achievement?

When the RTMRC was employed, the teachers reflected on their instructional context by considering the student questionnaire and observation scheme. We used the post-test scores of student reading comprehension achievement and considered two main associations, namely the association between the student questionnaire and student achievement and that between the observation scheme and student achievement.

We used three types of measuring fit indices (absolute index, SRMR; comparative index, CFI; and parsimonious index, RMSEA) to determine the association between the student questionnaire and student reading comprehension achievement. Kline [86] noted that a non-significant Chi-square (χ^2), degrees of freedom (*df*), and ($\chi^2/df \leq 0.5$) are indicative of a model that fits the data well. In this association model, these values ($\chi^2 = 412.87$, $df = 199$, $p = 0.06$) show that the model fit the data values. Other fit-indices (SRMR = 0.04, CFI = 0.90, and RMSEA = 0.04) also confirm that the model fit well. (Table 5). The teachers' reflections on *strategy* and *text* had positive and significant effects ($\beta = 0.15$, $p < 0.01$ and $\beta = 0.26$, $p < 0.05$) on their students' reading comprehension achievement. The teachers' re-

flections on *reader* and *task* had negative but not significant impacts on student achievement ($\beta = -0.01$, $p > 0.05$; and $\beta = -0.02$, $p > 0.05$) (Figure 4).

Table 5. Model fit measures.

Instruments	$\chi 2$	*df*	*p*-Value	Absolute Index, SRMR (<0.05) *	Comparative Index, CFI (≥0.9) *	Parsimonious Index, RMSEA (<0.08) *
Student Questionnaire	412.87	199	0.06	0.04	0.90	0.04
Observation Scheme	164.74	151	0.21	0.03	0.96	0.01

Note: * Describes the recommended values; χ^2 (chi-square) tests the extent of misspecification; SRMR indicates the extent of error resulting from the estimation of the specified model; CFI describes the model power when it was compared with the situation without the model; RMSEA indicates how much error remains after fitting the model.
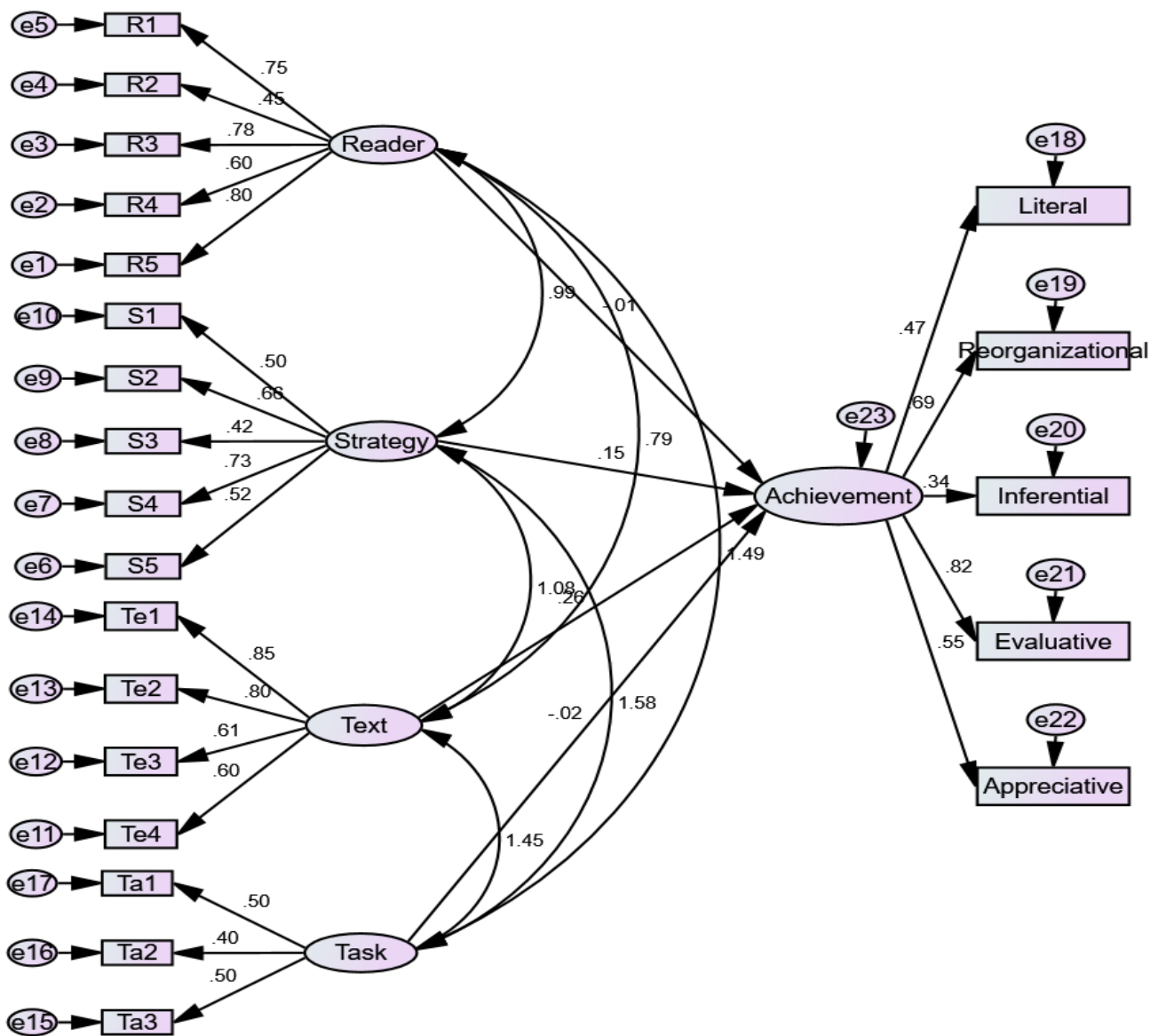

Figure 4. Association model between the student questionnaire and students' achievement (n = 2052).

In relation to the association between the observation scheme and student achievement, the non-significant Chi-square, degrees of freedom, and other approximate model fit measures (χ^2 = 164.74, *df* = 151, *p* = 0.21, SRMR = 0.03, CFI = 0.96, and RMSEA = 0.01) indicated that this association model fit well with the recommended values (Table 5). The teachers' reflections had a positive significant effect (β = 0.27, *p* < 0.01) on their students' achievement, using the observation scheme (Figure 5).
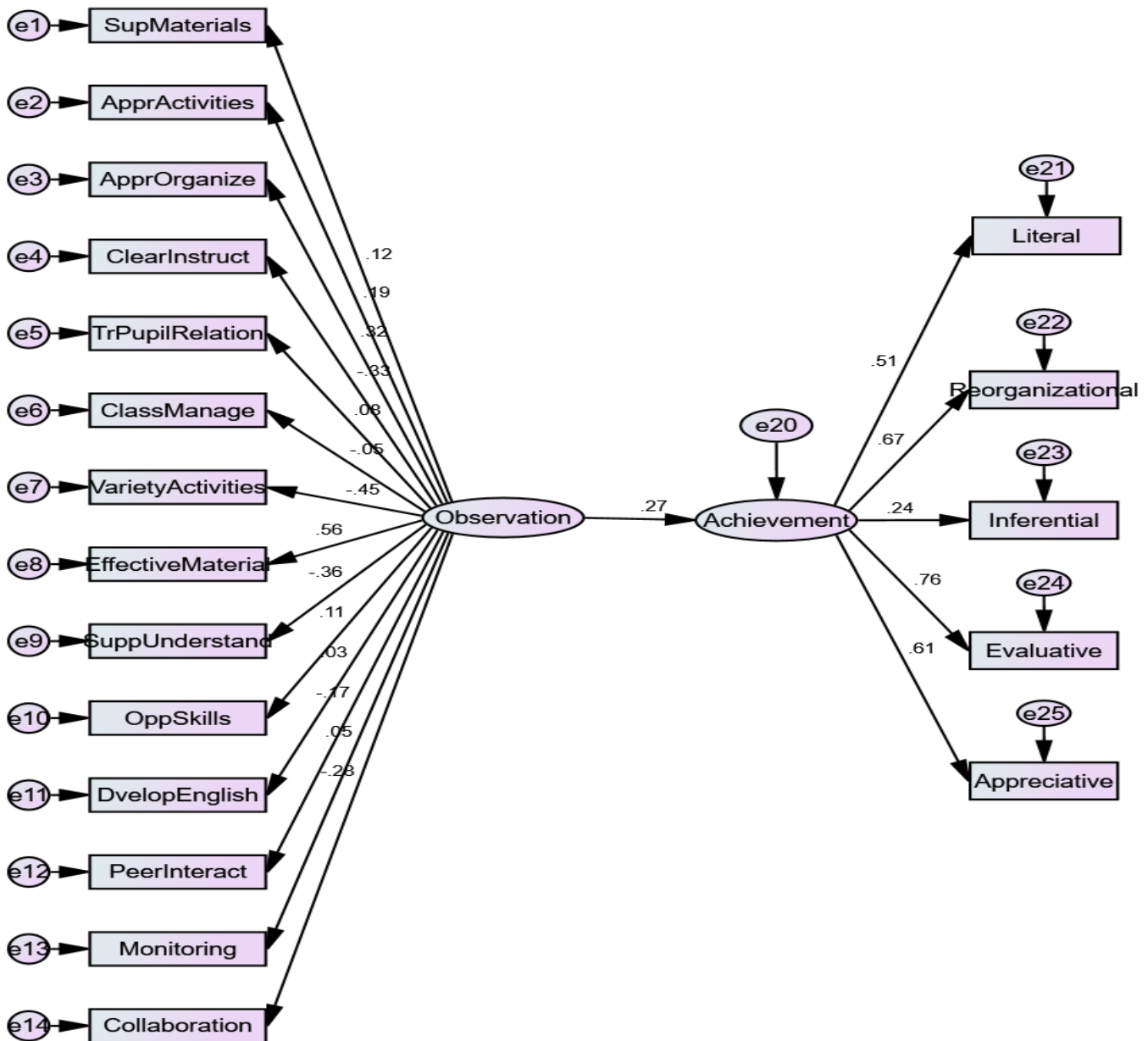

Figure 5. Association model between the observation scheme and students' achievement (n = 90).

From the two association models, one may deduce that the teachers' reflections had a positive and significant impact on their students' reading comprehension achievement.

RQ4: What are teacher reflections on the instructional context (reader, strategy, text, and task) when RTMRC is employed?

The teachers' reflected results were divided into four factors: reflection on the reader, reflection on the strategy, reflection on the text, and reflection on the task in accordance with the instructional context [7]. These are subsequently discussed.

4.2. Results of the Student Questionnaire

The student questionnaire/student feedback was used nine times (three times for each teaching strategy; reciprocal, interactive, and questioning) to reflect the instructional context of the experimental groups. The results were interpreted and described based on the data described in Figure 5.

4.2.1. Reflections on Reader

Most of the students enjoyed the cooperation associated with the reciprocal teaching strategy. The students acknowledged that their English reading improved when they worked with others. They preferred it when teachers used the blackboard to explain the text. Most students felt embarrassed when they were asked to read aloud alone. They did not want to guess the words from the context and wanted their teachers to explain the reading texts.

When the interactive teaching and questioning strategies were employed, only a few students felt embarrassed to read individually. Furthermore, most students were able to interpret the meanings of words from the context. In later sessions, they tended to depend on themselves rather than their teachers.

4.2.2. Reflections on Strategy

Students agreed that when the reciprocal teaching strategy was employed, their teachers' reading techniques helped them remember the vocabulary. The students also appreciated their teachers' strategy of explaining reading texts with relevant questions. It was also evident that the students found it enjoyable to participate in the different components of reciprocal teaching, namely, predicting, questioning, clarifying, and summarizing. However, the students said that a few teachers spoke too softly when engaged in classroom management.

Employing interactive and questioning strategies enabled the teachers to project their voices during classroom management. Most of the students enjoyed their teachers' teaching strategies and reading techniques. An analysis of the item *I like the strategy the English teacher uses in teaching the reading passages* revealed that the students liked the interactive teaching strategy the most. While 83.2% enjoyed reciprocal teaching and 89.5% the questioning strategy, 93.2% favored interactive teaching.

4.2.3. Reflections on Text

When reciprocal teaching was being used, the students experienced the reading texts as interesting and easy to understand. Furthermore, they were able to find questions in the text to discuss. In addition, most of the students understood the reading comprehension exercises even though some found the reading passages difficult and could not capture the main ideas so as to summarize the passage. In the later sessions of interactive teaching and reciprocal teaching, the teachers explained the main ideas of the reading passages, which enhanced the students' understanding.

4.2.4. Reflections on Task

Most students agreed that they enjoyed learning by engaging in tasks related to reading texts, including taking notes, underlining, and highlighting. Furthermore, they appreciated the collaborative efforts when reciprocal teaching was employed. Most were able to answer the reading comprehension exercises. Thus, they were happy if their teachers gave them reading comprehension exercises. However, a few students did not like answering the reading comprehension exercises because they found them difficult. In the later sessions, the teachers focused on these reading comprehension exercises and the students' understanding improved.

The responses from the student questionnaire revealed that these three instructional strategies had a profound effect on student reading comprehension. However, some students did not like their teachers' classroom management, teachers' soft voices, reading

aloud individually, and capturing the main ideas of texts. Their teachers' reflections from the RTMRC approach enabled them to improve these aspects in later sessions. Therefore, various improvements in teaching with interactive and questioning strategies were evident (Figure 6).
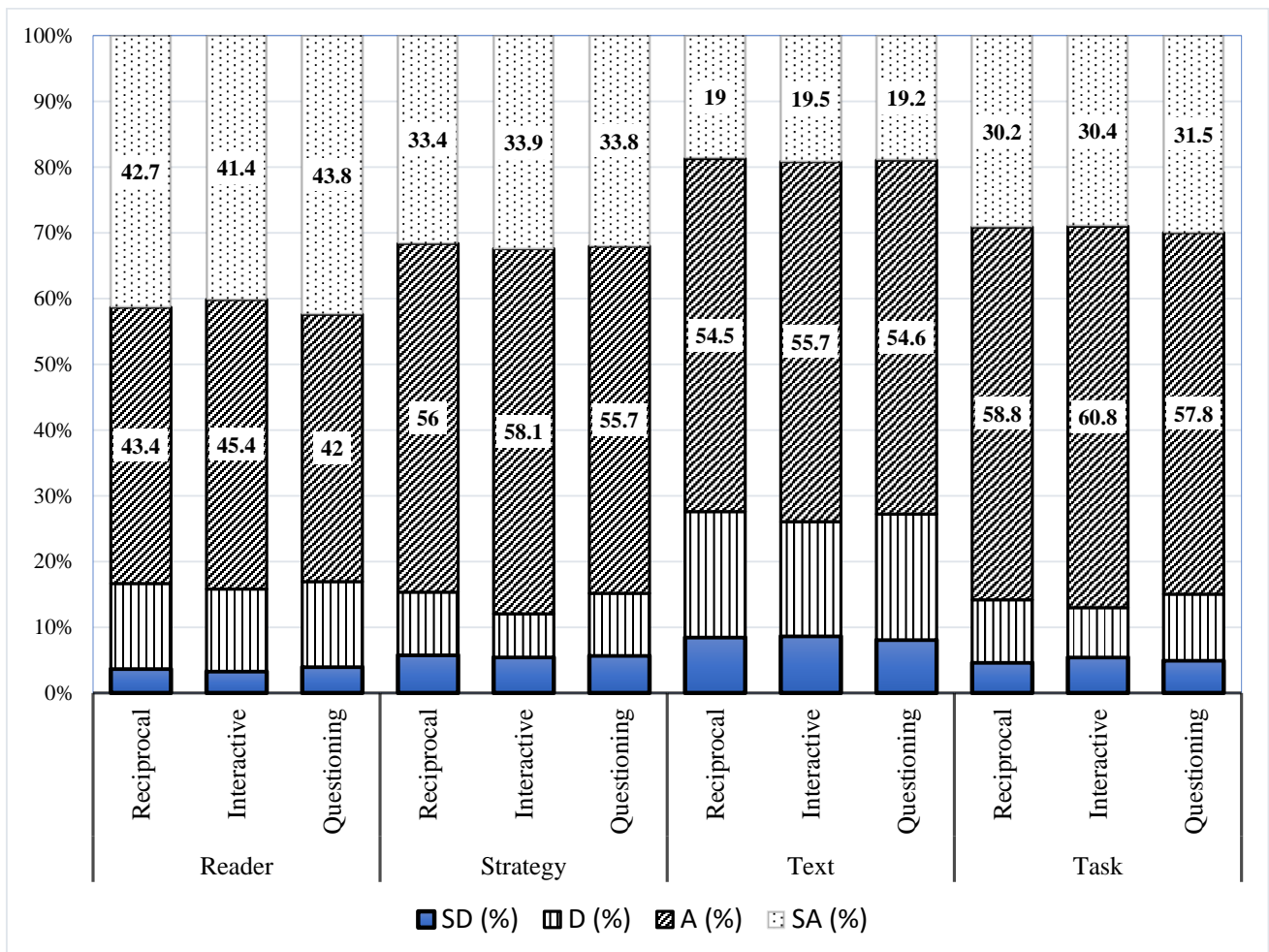

Figure 6. Teachers' reflections on the instructional context from the student questionnaire.

4.3. Results of the Observation Scheme

Ten observers employed the observation scheme nine times so as to observe teacher instruction in classrooms. Descriptive statistics were used to analyze the results from the observation scheme (Table 6). The results are subsequently described in relation to reciprocal teaching, interactive teaching, and the questioning strategy.

4.3.1. Reciprocal Teaching

Most observers believed that the teachers were very successful in providing appropriate learning activities during reciprocal teaching. The students also participated in a variety of activities the teachers created actively. It was evident that the teachers could provide enough opportunities in teaching reading comprehension to enable the students to use their existing knowledge and skills. Most of the observers gave the teachers good or excellent grades for supporting peer interaction among the students. The observers also noted that the teachers created a very sensitive environment for individual students and their communicative needs. However, the teachers were given poor grades for selecting appropriate learning materials. A few teachers also received poor grades for their guidance of related activities with models of English language use.

Table 6. Results of peer observations (n = 90).

Events to Be Observed	Levels	Reciprocal Teaching (%)	Interactive Teaching (%)	Questioning Strategy (%)
Appropriateness of the selection of materials	1	10.0	6.7	10.0
	2	33.3	23.3	33.3
	3	46.7	70.0	50.0
	4	10.0		6.7
Appropriateness of planning the activities	1			
	2	6.7	6.6	6.7
	3	60.0	66.7	63.3
	4	33.3	26.7	30.0
Appropriateness of the organization of the class	1	6.7		6.7
	2	30.0	10.0	33.3
	3	46.7	73.3	50.0
	4	16.7	16.7	10.0
Clear instructions and models of English language use	1	10.0	6.7	6.7
	2	23.3	26.7	26.7
	3	56.7	63.3	63.3
	4	10.0	3.3	3.3
Effective teacher–pupil interaction	1			
	2	10.0	3.3	6.7
	3	53.3	63.3	70.0
	4	36.7	33.3	23.3
Effective organization and management of the whole class	1	3.3	3.3	
	2	30.0	13.3	23.3
	3	53.3	56.7	76.7
	4	13.3	26.7	
Variety of activities	1		10.0	
	2	23.3	30.0	6.7
	3	60.0	46.7	60.0
	4	16.7	13.3	33.3
Effective materials	1			3.3
	2	16.7		3.3
	3	53.3	66.7	80.0
	4	30.0	33.3	13.3
Support for understanding	1	3.3		6.7
	2	16.7	20.0	10.0
	3	60.0	63.3	56.6
	4	20.0	16.7	26.7
Opportunities for learners to apply their existing skills and knowledge	1	3.3	3.3	
	2	16.7	23.3	6.6
	3	53.3	53.3	66.7
	4	26.7	20.0	26.7

Table 6. *Cont.*

Events to Be Observed	Levels	Reciprocal Teaching (%)	Interactive Teaching (%)	Questioning Strategy (%)
Opportunities for developing English language use	1	3.3	10.0	
	2	23.3	20.0	46.7
	3	60.0	56.7	50.0
	4	13.3	13.3	3.3
Opportunities for peer group interaction	1		6.7	
	2	23.3	3.3	20.0
	3	46.7	46.7	60.0
	4	30.0	43.3	20.0
Effective monitoring of learning	1		3.3	
	2	13.3	23.3	16.7
	3	46.7	53.3	63.3
	4	40.0	20.0	20.0
Sensitive environment for individual students and their communicative needs	1	3.3	3.3	
	2	26.7	46.7	16.6
	3	46.7	43.3	66.7
	4	23.3	6.7	16.7

Note: Levels: 1: very poor, 2: poor, 3: good, and 4: excellent.

4.3.2. Interactive Teaching

The interactive teaching strategy is highly dependent on appropriate teaching aids to stimulate the students' background schemas to enable top-down learning. The observers generally gave good or excellent grades to the teachers for their endeavors to provide effective materials to teach reading passages. The teachers also constructed good teacher–pupil relationships by organizing their classes very well. The teachers used different teaching aids to stimulate the students' existing skills and knowledge. This helped them support effective understanding of the reading text by creating peer group interaction activities. The students' considerable interest in the teachers' use of appropriate teaching aids enabled the teachers to organize their classes very well. However, some observers believed the teachers were inept at providing different learning activities to enhance students' English language use.

4.3.3. Questioning Strategy

During the questioning strategy, it was revealed that the relationships between the teachers and students were very good. The activities the teachers had planned were also appropriate for their students' learning needs. The observers thought that the teachers could organize the class very well because they stimulated the students by asking questions constantly. Because the questions stimulated the students' metacognitive knowledge, the teachers were able to help them learn new knowledge related to their background schema. The creation of an active learning environment by the teachers successfully addressed their communication needs on an individual level. However, the observers noted that the teachers' selection and provision of different learning materials related to the reading text were poor. The teachers were also inept at providing activities for student English language use.

The RTMRC approach enabled the teachers to reflect on what had occurred during the various strategies. The teachers were also afforded the opportunity to know the strengths and weaknesses of their instructional processes. This enabled them to correct

their weaknesses and improve their instructions in later sessions. Some improvements were noticeable during interactive teaching and the questioning strategy (Table 6).

5. Discussion and Conclusions

In this study, the RTMRC was examined in relation to four research questions. The first question was concerned with the reading comprehension levels the students achieved by employing RTMRC. We employed Rasch analysis and used the Quest program to answer the first question. The results revealed that the students' achievement with regard to answering literal, inferential, and evaluative questions was high. However, they experienced difficulty answering appreciative and reorganizational questions. This result may be due to the Myanmar education system that encourages students' rote memorization of factual information in teaching–learning contexts [91]. Therefore, in the National Education Strategic Plan, it was clearly stated that the Myanmar education system needs a major transformation in the upcoming years that will meet the expectations and aspirations of its citizens, youths, and parents, as well as upcoming global trends [91]. The use of Rasch analysis also allowed us to evaluate the reliability and suitability of the test for both the experimental and control groups, as well as test the measurement invariance across these groups. Our findings show that there was no item bias between the two groups.

The second research question was related to the effectiveness of the RTMRC approach in teaching reading comprehension. We conducted the ANCOVA analysis to be able to control the pre-test scores of students, which is an important factor in interpreting the results. By controlling for pre-test differences, we could isolate the effects of the RTMRC treatment and rule out other possible explanations for the differences in reading comprehension achievement between the two groups. The results from ANCOVA suggest that the RTMRC approach had a significant positive effect on student reading comprehension achievement. These findings are consistent with previous research that has shown the effectiveness of reflective practices on student reading comprehension achievement [88,89]. Moreover, it was clearly seen in this study that reflective teaching, which was to qualify method-centered teaching, had a larger effect size (Cohen's d) in comparison to the small to moderate effect sizes observed in other studies that reviewed reciprocal teaching, interactive teaching, and questioning techniques [23,29,34,35].

The third research question considered how the teachers reflected on their instructional contexts and how their reflections affected their students' reading comprehension achievement. We examined the relationship between student responses to the questionnaire and their post-test achievements. The teachers' reflections on the instructional strategies and reading text had positive and significant effects on student achievement in reading comprehension. Furthermore, the teachers' reflections on the observation scheme had a positive and significant effect on student reading comprehension achievement. This result may be because of the teachers' careful reflections on the instructional strategies and reading context according to the student questionnaire and the observation scheme. Teachers in Myanmar rarely reflect on their teaching strategies due to the enormous workload of many lecture classes and additional complications caused by requests and orders from principals and other seniors at the township and district levels. Furthermore, due to low salaries, teachers have become more interested in private teaching outside of the school [92].

The fourth question focused on the teachers' reflections on the instructional context when RTMRC was employed. The teachers used the responses to the student questionnaire and observation scheme to reflect on the instructional context. Even though the teachers experienced some difficulties in the earlier sessions, they were able to make enhancements in accordance with student responses and observer suggestions. This result of the effectiveness of student questionnaire and observation scheme on student reading comprehension is also in line with other studies such as those of Töman [93], who focused on the importance of observation forms, and Fatemipour [1], who focused on the role of student feedback/a student questionnaire in the instructional context.

Teaching with the RTMRC approach benefits both teachers and students. The questionnaire gave the students the opportunity to give their opinions and learning preferences. They were also able to reflect on their understanding of their teachers' revised questions. Similarly, the teachers also had the opportunity to bridge the gap between their planned instructional context and practical experiences. Students in Myanmar are naturally strongly influenced by their culture and, accordingly, respect their teachers. The students find it very difficult to oppose their teachers. However, the students gave their preferences and opinions when responding to the questionnaire. For instance, they admitted that sometimes they guessed the meanings of words and acknowledged they did not like to read aloud alone. They also related their appreciation of their teachers. Based on their opinions, the teachers were able to modify their actions.

When the three strategies were employed without affording teachers an opportunity to reflect, researchers who have examined these strategies have highlighted weaknesses and made recommendations. Uzaimi et al. [94] recommended that teachers should take care to teach the strategies of predicting, questioning, clarifying, and summarizing to their student groups. Anyiendah et al. [5] suggested that teachers should not use the pre-teaching vocabulary strategy to stimulate student background knowledge to facilitate top-down learning because students showed a preference for other strategies such as the K-W-L strategy and the use of different teaching aids. Barjesteh and Moghadam [6] indicated that teachers should also give students the opportunity to ask teachers questions. However, in this study, the teachers were able to reflect on the students' opinions and observers' suggestions and make modifications. When reflective teaching came to reading comprehension, it could play a crucial role in improving method-centered teaching strategies such as reciprocal teaching [89], interactive teaching [95], and questioning [88]. By engaging in reflective practices, teachers could critically evaluate their teaching methods and adapt them to better suit the needs of their studies [96].

One way in which reflective teaching can improve method-centered teaching strategies is by helping teachers identify their students' learning needs and tailor their instruction accordingly [95]. In our study, by reflecting on their students' responses during reciprocal teaching, teachers could adjust their prompts to address their difficulties and provide targeted feedback. Similarly, through reflective practice, teachers could identify areas where interactive teaching may be more effective and adapt their teaching accordingly.

Moreover, reflective teaching can also help teachers address the limitations of questioning strategies by adapting their questioning techniques to better align with their students' learning needs [88]. In our study, teachers could reflect on the types of questions they ask and adjust them to promote higher-order thinking and critical analysis.

Therefore, reflective teaching could enhance method-centered teaching strategies in reading comprehension by promoting teacher self-awareness, identifying student learning needs, and adapting instruction accordingly. By adopting reflective practices, teachers could improve their teaching strategies, leading to improved learning outcomes for their students.

In essence, the RTMRC approach had a significant and positive effect on student reading comprehension achievement. English language teachers in Myanmar often use conventional teaching methods and most do not have professional development training [10]. Because the RTMRC approach can be employed with every teaching method when teaching reading comprehension, it is of great importance that all English language teachers employ it to teach effectively. It is recommended that the RTMRC model be employed in future research to examine, qualify, and compare various types of teaching methods for ELT teachers. It can also be used to address the limitations of method-centered teaching. To describe its limitations, various types of reflective teaching tools such as portfolios, diary writing, and journal writing can be employed. Furthermore, teachers can use different kinds of technical tools to teach effectively because there is a lack of ICT infrastructure in Myanmar.

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