Multiple Choice Test-Taking Strategies, Test Anxiety, and EFL Students' Achievement

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Abstract

Successfully taking a multiple-choice test requires understanding the testing situation and knowing how to take the test efficiently. This study analyses the relationship between multiple-choice test-taking strategies (MCTTSs), test anxiety and the English language achievement of English as a Foreign Language (EFL) students. A mixed-methods approach – quantitative and qualitative – is used by collecting data using a questionnaire and interviews, to increase the research validity. The MCTTS questionnaire of Nguyen (2003), and the test anxiety scale of Aydin et al. (2006) and Burgucu et al. (2011), were used. A total of 727 male and female students from different academic levels and tertiary colleges at an English language centre were chosen as samples. The results broadly show a positive correlation between MCTTSs and English language achievement and a negative relationship between MCTTSs and test anxiety. However, the results revealed significantly higher English language achievement by the female students than the male students. However, there was no difference in the MCTTSs and the degree of test anxiety according to gender. The results suggest raising teachers' and students' awareness of the importance of using test-taking strategies. Furthermore, the results can help English language instructors to explain test scores from a different viewpoint, to provide a reliable assessment of language students' true competence and to reduce the likelihood of measurement errors.

Keywords: multiple-choice test-taking strategies, test anxiety, EFL students' English language achievement, gender differences

1. Introduction

Tests are regularly used as evaluation tools in virtually all educational systems and academic organisations. Their importance extends beyond the classroom, because they are the sole basis of some crucial decisions that affect students' lives including postgraduate admissions and employability preferences (Butler, 2018; Takallou et al., 2016). Therefore, enhancing students' performance in tests has become important for educators and students. Cohen (1998) asserted that for language tests, linguistic competence is not the only determinant of students' success; appropriate test-taking strategies also play a significant role. Indeed, Hambleton et al. (1991) and Roberson (2020) pointed out that one of the cognitive and psychological factors of student performance is test-taking skills or 'test-wiseness'. Hence, the importance of research on test-taking strategies as a way to help students perform well seems indisputable.

Cohen (1998) added that a vital issue in the use of test-taking strategies is learners' awareness of these strategies; if learners cannot identify any associated strategy because it is done unconsciously, the action is not a strategy but a usual process. Ellis (1994) further argued that strategies lose their value as learning tools when they become so habitual that students are unaware that they are using such strategies.

For language exams, even though there are different test formats, multiple-choice questions are where test-taking strategies are most often used (O'Grady, 2021; Susanti et al., 2018). Especially in second or foreign language programmes, multiple-choice exams are often used to evaluate several areas of language learning due to their high reliability, ease of scoring, efficiency and economy. Numerous studies have also demonstrated that multiple-choice items are where test-taking tactics are most crucial (e.g., Gebril, 2018, p. 13; Geiger, 1997; Katalin, 2000). This is because multiple-choice questions are frequently problematic due to their emphasis on measuring salience, segregation of important elements, neglect of less important aspects and analysis of language.

Thus, although a variety of strategies for taking tests in diverse formats are worth investigating, this study investigates the strategies used to answer multiple-choice questions not only because, as stated, multiple choice is the most frequently used test format for high-stakes reading and comprehension exams (Phakiti, 2003), but also because scant research, if any, has been done on strategies for answering multiple-choice questions.

This study particularly elucidates the issues that English as a Foreign Language (EFL) test-takers at different academic levels encounter when responding to multiple-choice tests and the strategies they use to address such problems.

2. Problem Statement

While teaching English language courses, I noticed that the students may interact well in the classroom, but many of them get low marks

in the tests held over the semester, in which 80% of the questions are multiple-choice. This indicates the students' weakness in using strategies for taking multiple-choice tests. I also observed that students are becoming increasingly anxious during English language examinations, which may hamper their academic achievement and may lead them to use ineffective test-taking strategies. Thus, this study aims to determine whether multiple-choice test-taking strategies can help alleviate students' test anxiety.

3. Research Questions

1. What are the teachers' perceptions of test-taking anxiety and their classroom practices to support students experiencing it?

2. What is EFL students' level of use of multiple-choice test-taking strategies? And are there any relationships between multiple-choice test-taking strategies (and their dimensions), test anxiety and students' English language achievement?

3. Are there any dissimilarities between students in terms of test-taking strategies, test anxiety and English language achievement according to gender and course specialisations (i.e., medical, science and humanities courses)?

4. Study Significance

1. Most educational systems across the world use multiple-choice tests as their primary means of assessment.

2. The results of this study can be used to evaluate the strategies that students employ in multiple-choice tests and to more effectively design multiple-choice tests.

3. Training students on multiple-choice test-taking strategies, especially those who perform poorly in such tests, reduces their level of anxiety in taking such tests and improves their learning achievement.

4. Multiple-choice tests that meet the requirements for good testing are highlighted.

5. The findings contribute to the field of test-taking strategies in particular and have implications for both language instructors and test takers.

5. Literature Review

5.1 Multiple-Choice Test-Taking Strategies (MCTTSs)

Multiple-choice questions are a frequently used assessment style because of their practicality and scoring efficiency, with a measurable number that enables simple comparison of test takers, particularly in large-scale standardised tests. Moreover, multiple-choice test answers can be scored automatically, unlike assessment procedures that require subjective rating (Campbell, 1999; Singh & Shaari, 2019).

The absence of test-taking strategies or the use of inadequate ones can make it difficult for students to perform well in tests. Thus, these strategies can affect their performance both directly and indirectly. These strategies directly assist students in improving their test scores by allowing them to efficiently use their time, work and testing environment. On the other hand, utilising effective test-taking techniques indirectly influences other closely linked and significant factors of test performance. For example, it reduces test anxiety and enhances students' perspectives of tests (Dodeen, 2015; Holmes, 2021).

Test-taking skills are as vital as having the content knowledge needed to answer test questions, and teaching methods are vital since they help EFL students to consciously control the ways in which they can complete a reading task (Holmes, 2021; Langerquist, 1982; Pour-Mohammadi & Abidin, 2018). This does not imply that test-taking skills are more important than content knowledge or test preparation, but rather, that having these skills helps test takers improve their grades and performance as well as identify effective strategies that they prefer, while encouraging them to incorporate strategic behaviours into their learning schema (Holmes, 2021). Some studies (Chiu, 2011; Dolly & Williams, 1986; Sweetnam, 2002) have shown that teaching EFL students test-taking skills improved their test scores.

5.2 Relationship of Test-Taking Strategies to Test Anxiety and Achievement

Anxiety is a heightened subjective feeling of unease, apprehension or acute fear caused by the expectation of a potentially harmful occurrence (Houghton Mifflin Company, 2001). A person may experience it despite the absence of any genuine, tangible danger (Cizek & Burg, 2006). Cizek and Burg (2006), Zeidner (1998) and Holmes (2021) found that students with test anxiety tend to perceive general evaluation circumstances as scary. Chang (1986) discovered that test anxiety is a prevalent issue among students, especially at the college level. Hembree (1988) found that more than 20% of college students suffer from anxiety or stress before, during or after an examination. As test anxiety frequently involves fear and unnecessary thoughts, it can cause a cognitive burden and trigger numerous physiological, emotional and behavioural responses (Carter et al., 2008).

Numerous studies have suggested that excessive levels of anxiety significantly affect a student's capacity to benefit from teachers' instruction much earlier than in the actual testing situation (Tobias, 1979). A meta-analytic literature review on test anxiety concluded that 'test anxiety was significantly and negatively related to a wide range of educational performance outcomes, including [outcomes of] standardised tests, university entrance exams, and grade point average' (von der Embse et al., 2018, p. 483). Takallou et al. (2016) found a relationship between students' grade point average (GPA) and the test-taking strategies they adopted. Several studies have found that lower second-language (L2) achievement is linked to higher levels of test anxiety and is associated with 'deficits in listening comprehension, impaired vocabulary learning, reduced word production, low scores [in] standardised tests, low grades in language courses or a combination of these factors' (Gardner et al., 1997, p. 345). Students with test anxiety manifest their anxiety through

procrastination and ineffective academic and test-taking skills. According to Zeidner (1998), students who suffer from test anxiety have difficulty processing their course material and organising it into bigger patterns of meaning. In addition, some students may experience physical fatigue or exhaustion during exams due to their unhealthy diet, bad sleeping habits and lack of regular exercise. While there may be instances in which anxiety improves performance (Naylor, 1997) and in which a moderate level of test anxiety motivates students to perform better in exams, it has been established that a high level of anxiety during tests is negatively correlated to performance (Cassady & Johnson, 2002; Strnad, 2003).

Since excessive levels of test anxiety can hinder optimal test performance, the ability to suppress, minimise or cope with anxiety is vital for test takers' success. If they possess or learn test-taking strategies or skills, their testing competency and, consequently, their academic achievement will improve. Sweetnam (2002) found that even students who are well versed in a subject may perform poorly in exams due to a lack of test-taking skills. On the other hand, Igwe and Orluwene (2019) found that the use of a test-taking strategy is a predictor of achievement. In essence, students who learn test-taking methods have lower levels of test anxiety, improved attitudes towards tests and higher achievement.

In addition, existing studies have demonstrated that there appear to be gender disparities in reported anxiety, with females experiencing more anxiety than males (Cassady & Johnson, 2002; Naylor, 1997). Although studies like (Akbayir, 2019) have found that there were no statistically meaningful differences in the anxiety levels of female and male students, other studies (Brandmo et al., 2019) have shown that female students reported higher anxiety levels that are related to their self-efficacy beliefs.

These findings offer empirical evidence of the importance of providing test-taking strategy instructions in language courses, particularly by teachers who aid students in stressful exam settings.

6. Methodology

6.1 Procedure

To answer the research questions, a mixed methods design was used to collect and analyse data. First, semi-structured interviews were conducted to explore the teachers' perceptions and observations regarding test-taking anxiety and test-taking strategies to avoid test anxiety in their classes.

Second, the background and MCTTS questionnaires and the test anxiety scale were administered, in that order, before the mid-semester exams of first to sixth-year male and female students from the medicine, science and humanities colleges of an English language centre. In addition, two achievement tests were administered: one in the middle of the semester (before the midterm exam) and the other, at the end of the semester (before the final exam).

6.2 Data Analysis

The statistical procedures used in this study were Cronbach's alpha formula, split half, descriptive statistics, MANOVA, exploratory factor analysis and confirmatory factor analysis using the 24th version of AMOS.

6.3 Pilot Study

To detect possible problems with the quantitative data collection methods and to check their validity and reliability, the study instruments and procedures were assessed by conducting a pilot study. The questionnaires were piloted by 250 undergraduate students (97 male and 153 female) at the university that participated in this study. They had different fields of specialisation (medicine, science and humanities) and academic levels (years 1–6) and were aged 18–30 years (M = 19.748, SD = 1.313). All of them were notified about the study's objectives and possible impact of improving the test quality in their university.

6.4 Participants

The study's qualitative results are based on interviews with 18 male and female teachers from three colleges: the colleges of medicine, science and humanities at a tertiary level. All the 18 teachers voluntarily participated in this study. The quantitative results included 727 medical, science and humanities student participants (392 male and 335 female) aged 17–30 years (M = 19.454, SD = 1.308) and in the academic levels 1–6. Table 1 explains the sample distribution.

Table 1. Sample Distribution

Variable		Value label	N
Major	1	Medicine	130
	2	Science	184
	3	Humanities	413
Gender	1	Male	392
	2	Female	335

6.5 Study Instruments

In this study, three main data collection instruments were used to answer the three research questions: The semi-structured interview, the MCTTS questionnaire and the test anxiety questionnaire.

6.5.1 Test Anxiety Interview for Teachers

The researcher used semi-structured interviews to report teachers' observations regarding students' test anxiety and the teachers' classroom practices to support students.

6.5.1.1 Teachers' Interview Questions

1. What is anxiety?

2. Based on your classroom observations, do you think students experience anxiety before or during tests?

3. What student behaviours indicate that they are anxious?

4. Prior to a test, do you try to help students overcome test anxiety? If so, what do you do?

5. What would you advise other teachers dealing with students experiencing test anxiety?

6.5.2 Multiple-choice Test-Taking Strategies Questionnaire (MCTTSQ)

This study used Nguyen's (2003) MCTTSQ. It had 78 items categorised into 11 sub-dimensions: knowing how multiple-choice tests work (9 items), optimising time efficiency and effectiveness (13 items), avoiding clerical errors (5 items), using physical cues (4 items), using grammatical and contextual cues (7 items), deductive reasoning (10 items), guessing (5 items), changing answers (3 items), working carefully and thoroughly (7 items), staying in control (8 items) and troubleshooting and using recall aids (8 items). The questionnaire generally takes around 45 minutes to complete. The questionnaire uses a four-point Likert scale (1 = *I never use it*, 2 = *I sometimes use it*, 3 = *I often use it* and 4 = *I always use it*). The Cronbach's alpha for the entire questionnaire was 0.95. This implies that the instrument's reliability is high. As all the participants were native Arabic speakers, two bilingual professionals translated the English questionnaire to Arabic.

6.5.2.1 Internal Consistency of the MCTTSQ

The internal consistency of the MCTTSQ for the pilot study that involved 250 participants was high for the total scale ($\alpha = 0.95$). The mean total score was 281.600 ($SD = 54.748$). The means and standard deviations for the subscales were as follows: for subscale 1, $M = 26.024$ and $SD = 6.752$ ($\alpha = 0.87$); for subscale 2, $M = 36.928$ and $SD = 10.007$ ($\alpha = 0.89$); for subscale 3, $M = 18.248$ and $SD = 079$ ($\alpha = 0.82$); for subscale 4, $M = 9.404$ and $SD = 3.788$ ($\alpha = 0.82$); for subscale 5, $M = 18.768$ and $SD = 5.749$ ($\alpha = 0.85$); for subscale 6, $M = 27.904$ and $SD = 8.19827$ ($\alpha = 0.87$); for subscale 7, $M = 13.220$ and $SD = 4.235$ ($\alpha = 0.88$); for subscale 8, $M = 7.924$ and $SD = 2.374$ ($\alpha = 0.71$); for subscale 9, $M = 20.264$ and $SD = 5.932$ ($\alpha = 0.85$); for subscale 10, $M = 22.876$ and $SD = 6.787$ ($\alpha = 0.86$); and for subscale 11, $M = 17.044$ and $SD = 5.024$ ($\alpha = 0.83$). All the coefficients were over 0.7, which means that the questionnaire had high reliability.

6.5.3 Test Anxiety Scale

In this study, the test anxiety scales of Aydin et al. (2006) and Burgucu et al. (2011) were adapted to come up with a 22-item questionnaire that measured each student's perceived test anxiety level on a five-point Likert scale (in which 5 = *always*, 4 = usually, 3 = sometimes, 2 = *rarely* and 1= never). To obtain reliable answers from the students, as they were not proficient in English, the researcher translated the questionnaire into Arabic.

6.5.3.1 Validity of the Scale

A sample of 250 male and female students was used to conduct the exploratory factor analysis, and another sample of 250 male and female students was used to conduct the confirmatory analysis.

6.5.3.1.1 Exploratory Factor Analysis

Quartimax with the Kaiser normalisation rotation method was used on a sample of 250 male and female students. Table 2 shows that all the items had high loadings.

Table 2. Test Anxiety Scale: Item Loadings and Their Communalities

Item	Factor 1	Communalities	Item	Factor 1	Communalities
1	.715	.572	12	.796	.646
2	.693	.593	13	.778	.629
3	.770	.626	14	.816	.716
4	.669	.596	15	.627	.626
5	.756	.679	16	.681	.603
6	.782	.727	17	.641	.559
7	.754	.557	18	.578	.524
8	.773	.692	19	.753	.610
9	.567	.455	20	.735	.665
10	.777	.663	21	.601	.634
11	.791	.627	22	.729	.745

Table 2 shows that all the 11 items of the anxiety scale had high loadings. Thus, no item was deleted. The one extracted factor accounted for 52.132% of the total variance. Equamax with Kaiser normalisation was then used with an initial eigenvalue of 11.496.

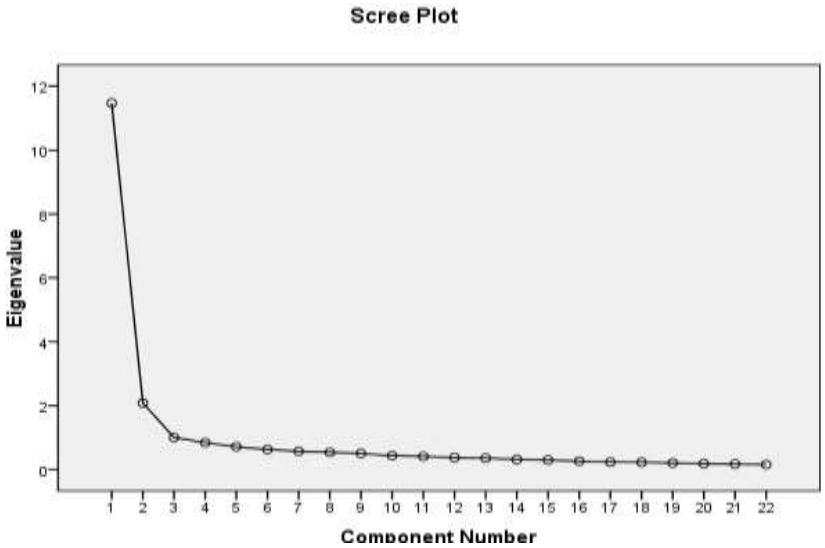

Figure 1. Test Anxiety validity scale

Figure 1 shows that the anxiety scale had 22 items that were loaded on one factor, which indicates that the scale has high validity.

6.5.2.1.2 Confirmatory Factor Analysis

AMOS version 24 was used to check the proposed model, which assured the test anxiety scale consisted of 22 items that were loaded on only one factor.

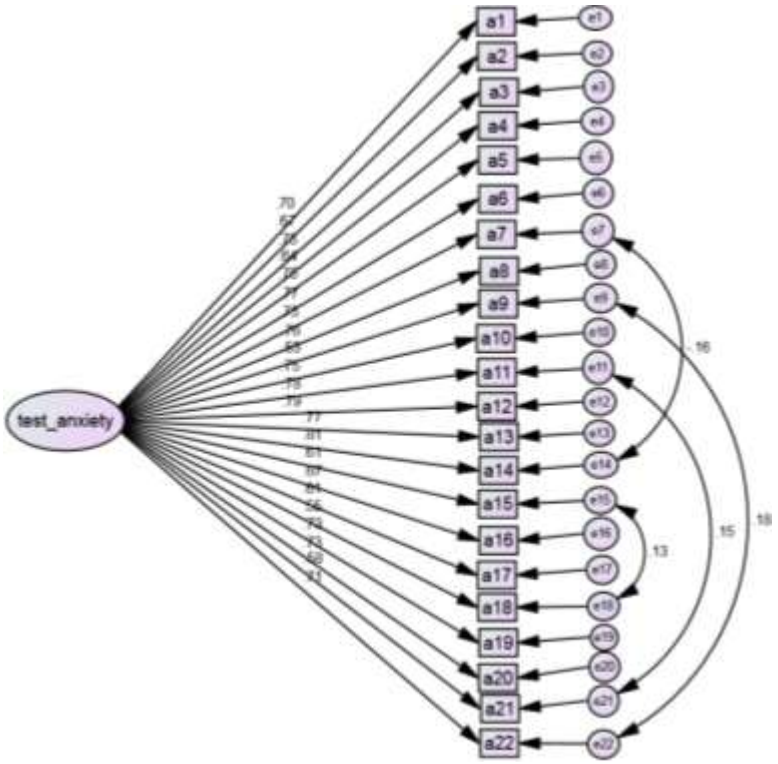

Figure 2. Test Anxiety validity scale

Figure 2 shows that the loadings of the test anxiety items ranged from 0.55 to 0.81, which implies that the scale has good and adequate validity.

6.5.4 Achievement Tests

Two achievement tests were administered: one hour in the middle of the semester (before the midterm exam) and the other, at the end of the semester (before the final exam). The time given to complete the tests were 1 h and 2 h, respectively. The tests measured four language skills in four sections (reading comprehension, writing, grammar and vocabulary).

7. Results and Discussion

7.1 Qualitative Data

To answer the first research question, the researcher used the open-ended interview technique to explore the problem of test-taking anxiety and the teachers' awareness of it. The interview also investigated the teachers practices and instructions to help students overcome this problem. The study's qualitative results are based on interviews with 18 male and female teachers from three colleges: the colleges of medicine, science and humanities at the university. All the 18 teachers voluntarily participated in this study.

7.1.1 Teachers' Responses

For the first question, "What is anxiety?" all the teachers who were interviewed said anxiety is a feeling of tension and fear. All of them admitted that anxiety is a serious problem that affects learners' academic achievement. They also asserted that highly anxious learners perform poorly, and learners with low levels of anxiety absorb more inputs.

With respect to the second question, "Do students in your classroom become anxious prior to or while taking a test?" 17 of the teachers strongly agreed that most of their students manifested pre-exam nervousness and worry about how they would fare in their exams. While most of the learners overcome their fear, some develop anxiety. One teacher said that his students face anxiety, but only during the exam and not before.

For the third question, "What behaviours do you observe in your students that signal to you that they are anxious?," all the teachers presented some common symptoms related to anxiety, such as paleness and tension, hand twisting, body tremor, shortness of breath, crying, leg shaking, laying of the head on the arms, sweating, fidgeting, headache, nervousness, anger and poor sleep. Other teachers observed different signs, such as asking questions to which they already knew the answers. Some students start a conversation with the teacher to relax, while others sit back and do not write.

With regard to the fourth question, "Do you do anything to help students to overcome test anxiety before giving them the test? If so, what is that?," all the teachers strongly recommended specific strategies, such as telling the students to breathe deeply and to count as they inhale and exhale, talking to them, telling them that there is nothing to worry about and wishing them good luck, giving them water, motivating and praising them, asking them to think positively, calming them and telling them to focus on positive thoughts, suggesting that they pay attention to their own test and forget the other students around them, and start with easier.

For the last question, "What advice do you have for other teachers who have students experiencing test anxiety?," the teachers gave the following advice for before and during the exam: not to shout loudly; answer the most important questions asked by the students; advise the students to have a positive attitude, study early in the morning, get enough sleep, eat healthy food, take deep breaths before the exam; advise the students on how to study effectively, give the students a few minutes to calm down before the exam, ask them to wash their faces with cold water or drink water or coffee, help them to control their anxiety and increase their confidence, avoid making negative comments even if the student is weak, try to understand the student's feelings and help them to relax, advise them to learn to read their body language and know them.

There were similarities in the teachers' responses to the interview questions. All of them believed that anxiety had a negative effect on students' performance. Most of them also agreed that most students had high anxiety before and during exams. All of them thought that less anxious students perform better and highly anxious learners perform poorly. The teachers reported using different strategies to help their students reduce and overcome their anxiety.

Teachers' insights on students' test-taking anxiety are consistent with the findings of several research papers (Carter et al., 2008; Chang, 1986; Cizek and Burg, 2006; Hembree, 1988; Holmes, 2021; Zeidner,1998). In addition, teachers' responses emphasized the negative effect of test anxiety on students' performance as was found by (Cassady & Johnson, 2002; Strnad, 2003). Furthermore, teachers' perceptions on the importance of test-taking strategies supports the findings of (Holmes, 2021; Igwe and Orluwene, 2019; Pour-Mohammadi & Abidin, 2018; Sweetnam, 2002; Takallou et al., 2016).

7.2 Quantitative Data for EFL Students' Test-Taking Strategies

To answer the first part of the second question, "What is the level of use by EFL students of multiple-choice test-taking strategies?," the researcher used the descriptive statistics of means and standard deviations, as shown in Table 3.

Table 3. Means and Standard Deviations of Answers to Items of the Multiple-Choice Test-Taking Strategies Questionnaire (MCTTSQ)

MCTT strategy	Mean	Std. Deviation	Item Mean	Order
1 - Knowing how multiple-choice tests work	25.477	6.607	2.831	4
2 - Optimising time efficiency and effectiveness	36.674	10.078	2.810	5
3 - Avoiding clerical errors	17.761	5.104	2.960	3
4 - Using physical cues	9.403	3.724	2.351	11
5 - Using grammatical and contextual cues	18.832	5.760	3.138	1
6 - Deductive reasoning	27.666	8.087	2.767	7
7 - Guessing	13.183	4.165	2.637	9
8 - Changing answers	7.856	2.443	2.619	10
9 -Working carefully and thoroughly	20.018	5.900	2.861	2
10 - Staying in control	22.440	6.742	2.805	6
11 - Troubleshooting and using recall aids	16.583	5.046	2.764	8

Table 3 shows that according to the item means, the strategies were ranked in the following order according to frequency of use: using grammatical and contextual cues, working carefully, avoiding clerical errors, knowing how multiple-choice tests work, optimising time efficiency and effectiveness, staying in control, deductive reasoning, troubleshooting and using recall aids, guessing, changing answers and using physical cues.

To answer the second part of the second research question, "Are there any relationships between the students' MCTTSs preferences (and their dimensions) and their test anxiety and English language achievement?," the researcher used Pearson's correlation coefficient among the variables of the study, as outlined in Table 4.

Table 4. Relationships Between the Students' Use of MCTTSs and Their Test Anxiety and English Language Achievement

Study variables	Knowing how multiple-choice tests work	Optimising time efficiency and effectiveness	Avoiding clerical errors	Using physical cues	Using grammatical and contextual cues	Deductive reasoning	Guessing	Changing answers	Working carefully and thoroughly	Staying in control	Troubleshooting and using recall aids	Total score for test-taking strategies	Test anxiety	English language achievement
Knowing how multiple-choice tests work	1													
Optimising time efficiency and effectiveness	.793**	1												
Avoiding clerical errors	.726**	.824**	1											
Using physical cues	.474**	.566**	.407**	1										
Using grammatical and contextual cues	.723**	.811**	.764**	.643**	1									
Deductive reasoning	.725**	.795**	.790**	.603**	.849**	1								
Guessing	.619**	.686**	.648**	.662**	.753**	.793**	1							
Changing answers	.644**	.695**	.629**	.577**	.735**	.751**	.752**	1						
Working carefully and	.696**	.765**	.805**	.462**	.775**	.819**	.694**	.712**	1					
Staying in control	.696**	.751**	.771**	.461**	.741**	.810**	.698**	.705**	.860**	1				
Troubleshooting and using	.689**	.774**	.765**	.482**	.769**	.807**	.686**	.709**	.844**	.854**	1			
Total score for test-taking	.838**	.914**	.875**	.642**	.905**	.929**	.825**	.811**	.897**	.890**	.889**	1		

Test anxiety	-.383**	-.342**	-.326**	-.186**	-.297**	-.331**	-.232**	-.314**	-.347**	-.389**	-.315**	-.373**	1	
English language	.512**	.564**	.558**	.251**	.491**	.520**	.421**	.457**	.536**	.510**	.524**	.576**	-.205**	1

*Significant at level l0.05. **Significant at level 0.01.

Table 4 shows that the students' use of the multiple-choice test-taking strategies, their dimensions and their total scores were positively correlated with the students' English language achievement and negatively correlated with their test anxiety.

The findings support the assumption that there is a positive relationship between the use of multiple-choice test-taking strategies and students' achievement in language exams as was also reported by (Holmes, 2021; Langerquist, 1982; Pour-Mohammadi & Abidin, 2018). These findings highlight the importance of teaching students these strategies for the purpose of enhancing their test scores, as was also supported by (Chiu, 2011; Dolly & Williams, 1986; Sweetnam, 2002). These findings also show the negative correlation between the use of multiple-choice test-taking strategies and test anxiety, which could be explained by the sense of control students have by consciously being involved in strategic behaviour (Holmes, 2021; Langerquist, 1982; Pour-Mohammadi & Abidin, 2018).

To answer the third question, "Are there any differences between the students in their preferred test-taking strategies, test anxiety and English language achievements according to their gender and course specialisation (medicine, science and humanities)?", the researcher used MANOVA (2×3). The results are shown in Table 5.

Table 5. Descriptive Statistics for the Students' Use of MCTTSs, Test Anxiety and English Language Achievement

Study variable	Specialisation	Gender	Mean	Std. deviation	Number of students
English language achievement	Medicine	Male	16.506	3.272	112
		Female	17.139	3.395	18
		Total	16.594	3.283	130
	Science	Male	14.433	3.536	52
		Female	16.201	3.439	132
		Total	15.701	3.548	184
	Humanities	Male	14.336	3.746	228
		Female	15.163	3.471	185
		Total	14.706	3.645	413
	Total	Male	14.969	3.710	392
		Female	15.678	3.498	335
		Total	15.296	3.629	727
Test anxiety	Medicine	Male	68.563	19.430	112
		Female	77.389	17.524	18
		Total	69.785	19.357	130
	Science	Male	70.962	22.808	52
		Female	68.985	21.650	132
		Total	69.544	21.938	184
	Humanities	Male	66.618	22.582	228
		Female	68.762	19.589	185
		Total	67.579	21.295	413
	Total	Male	67.750	21.757	392
		Female	69.313	20.362	335
		Total	68.470	21.126	727
Use of multiple-choice test-taking strategies	Medicine	Male	210.710	48.388	112
		Female	229.560	59.115	18
		Total	213.320	50.179	130
	Science	Male	199.440	60.432	52
		Female	217.230	57.183	132
		Total	212.200	58.506	184
	Humanities	Male	220.510	58.372	228
		Female	215.680	52.395	185

		Total	218.350	55.759	413
	Total	Male	214.920	56.341	392
		Female	217.040	54.610	335
		Total	215.890	55.522	727

In Table 5, the researcher verified the validity of the data for MANOVA analysis using Pillai's trace, Wilks' lambda, Hotelling's race, and Roy's largest root for the study variables of specialisation and gender in the multiple-choice test-taking strategies and English achievement; the level of significance was 0.001.

Table 6. Differences Between EFL Students' Use of MCTTSs According to the Results of Their Course Specialisation and Gender MANOVA (2×3)

Source	Dependent variable	Type III sum of squares	Df	Mean square	F	Sig.
Specialisation	English language achievement	241.263	2	120.631	9.692	.000
	Test anxiety	1789.453	2	894.727	2.007	.135
	Multiple-choice test-taking strategies	11620.732	2	5810.366	1.893	.151
Gender	English language achievement	103.111	1	103.111	8.284	.004
	Test anxiety	800.162	1	800.162	1.795	.181
	Multiple-choice test-taking strategies	10006.095	1	10006.095	3.261	.071
Specialisations * Gender	English language achievement	26.946	2	13.473	1.082	.339
	Test anxiety	1309.705	2	654.853	1.469	.231
	Multiple-choice test-taking strategies	18315.334	2	9157.667	2.984	.051
Error	English language achievement	8974.225	721	12.447		
	Test anxiety	321421.071	721	445.799		
	Multiple-choice test-taking strategies	2212482.874	721	3068.631		
Total	English language achievement	179645.330	727			
	Test anxiety	3732330.000	727			
	Multiple-choice test-taking strategies	3.612E7	727			

It is clear from Table 6 that there were statistically significant differences at the level of 0.001 in the students' English language achievements depending on their specialisation (F = 9.692, Df = 2, P = 0.001), but there were no differences in test anxiety and in the use of the MCTTSs according to the students' specialisations.

Table 6 shows that the female students had significantly higher English language achievements (M = 15.678, SD = 3.498) at the level of 0.001 than the male students (M = 14.969, SD = 3.710) (F = 8,284, Df = 1, P = 0.004). However, there were no differences according to gender in the test anxiety and in the use of the MCTTSs.

Table 6 also shows an interaction between the students' specialisation and their gender that affected their use of the MCTTSs (F = 2.984, Df = 2, P = 0.05).

To determine the differences in the English language achievements according to the specialisation, Scheffe's test for multiple comparisons was used. The English language achievements of the medical students (M = 16.594, SD = 3.283) were significantly higher (P = 0.001) than those of the humanities students (M = 14.706, SD = 3.710). However, there were no differences between the English language achievements of the medical students and the science students (M = 15.701, SD = 3.548). Moreover, as expected from the aforementioned results, the English language achievements of the science students were significantly higher (M = 15.701, SD = 3.548) than those of the humanities students (M = 14.706, SD = 3.645; P = 0.007).

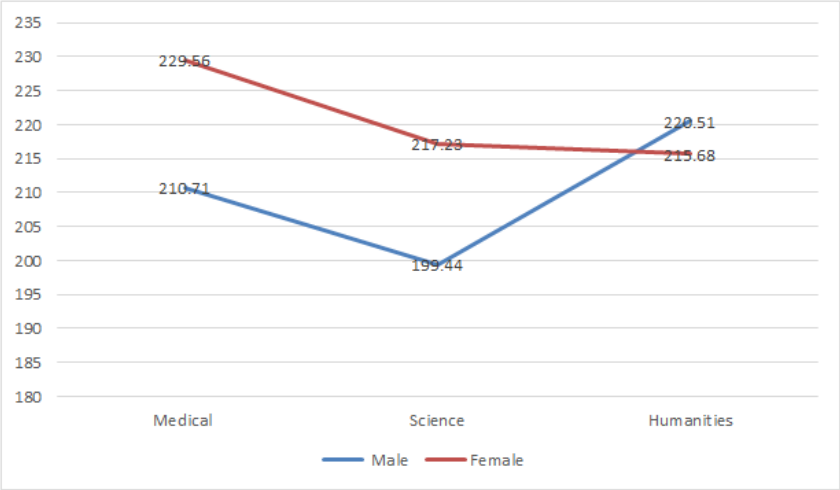

Figure 3. Effect of Gender and Specialisation on MCTTSs

Figure 3 shows that there was an interaction between the students' specialisation and gender that affected their use of the MCTTSs.

8. Study Limitations

Although this study has addressed a number of interconnected variables, the current study has some limitations. The current paper has only included students from one university which limits the testing conditions to one context. Also, since the students' participating in this study did not take a placement test upon their enrolment, this study has not included the students' current language level. In addition, it has not considered students' age as a variable that might be connected to test-taking anxiety.

9. Conclusion

The objective of this study was to investigate the potential relationships between MCTTSs, test anxiety and EFL learners' achievement. Supported by the relevant literature, a positive relationship between the MCTTSs and student achievement was found. Accordingly, teaching test-taking strategies to improve students' performance is recommended.

In addition, the current study emphasised that, regardless of gender, test anxiety affects students of all academic backgrounds, therefore, assisting test takers in learning how to effectively control such fear is difficult and demands genuine collaboration among all stakeholders.

Test-taking skills can be developed through formal workshops or through modules included in the curriculum. Therefore, this research can be empirically or experimentally implemented at all educational levels.

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