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Predictive Validity of the CU-TEP as an Indicator of Students' Academic Achievement in English

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Abstract

The Chulalongkorn University Test of English Proficiency (CU-TEP) is an institutional standardized English proficiency test designed to measure students' ability to use English for academic purposes. It is required for admission to graduate programs and undergraduate English programs at Chulalongkorn University and some other educational institutions. This study examined how accurate CU-TEP was as a predictor of the academic achievement of a total of 520 first-year Chulalongkorn University students as measured by three compulsory English course results and two English writing task scores. The participants were selected from a cohort of 5,564 freshmen taking CU-TEP in 2014, using the systematic random sampling technique. To analyze the data, multiple regression analysis was applied to assess the relationship between the CU-TEP scores and students' English course results, whereas Pearson's correlation was used to explain the correlation of CU-TEP writing scores with the writing task scores. The findings exhibited significant evidence for the validity of CU-TEP as an effective indicator of students' academic success. Also, although the predictive validity of CU-TEP was found to

vary marginally according to different academic disciplines as indicated by their similarly high correlation coefficients, the discipline-specific correlations revealed a clear distinction in the predictive power of individual CU-TEP sections. Finally, correlations between the CU-TEP writing scores and the two English writing task scores confirmed the CU-TEP writing section as a relatively good predictor of students' writing ability.

Key words: CU-TEP; predictive validity; academic achievement; writing tasks

Introduction

Of all the global languages, English has long been one of those most preferred foreign languages in Thailand. However, despite the 2001 Basic Education Curriculum placing English at the core of the foreign language curriculum from the primary to secondary school levels (Punthumasen, 2007), the average English proficiency level of the Thai public remains relatively low compared to other Asian counterparts. According to the 2020 EF English Proficiency Index (Education First, 2020), Thailand ranks 20th out of 24 participating countries in Asia and 89th out of 100 in the world.

In an attempt to improve the English proficiency of Thai students, the Thai government formulated the Strategic Plan for Reforming the English Learning Process to Accelerate National Competitive Ability (2006-2010). Chief among its efforts is the implementation of the English curriculum, allowing all schools to teach English beginning at Grade 1 level, and granting permission for the opening of English Program (EP) schools as well as more English-language international schools across Thailand (Office of the Permanent Secretary, 2006). At the higher level, the Office of Higher Education Commission in 2015 announced the policy of upgrading English education standards of higher education instruction. In essence, it is imperative that universities set forth policies and goals to develop graduates to achieve working knowledge of the English

language and streamline the teaching and learning of English to realize such goals. In addition to providing extracurricular activities and environments conducive to the learning of English, universities should encourage students to take an in-house English proficiency test or any other applicable examinations that can be mapped onto the Common European Framework of Reference for Languages (CEFR) to track students' language competence (Office of the Higher Education Commission, 2015).

For its part, Chulalongkorn University has resolved to constantly develop the English skills of students from the very first days of their enrollment. All freshmen are required to take CU-TEP, an in-house general proficiency test of English, to measure students' English levels in their first and third years of study at Chulalongkorn University. Although the test plays no role in university admission for undergraduates in the Thai programs, first-year students who score below 45 are required to engage in 50 hours of activities at the Self-Access Learning Center of Chulalongkorn University Language Institute (CULI) to improve their English skills through self-directed learning. It is worth noting at this point that the numbers of test takers in the third year are normally very small as students are not strictly obliged to take the test as in the first year. Apart from that, all first-year students except for students of the Faculty of Arts, which has its own English department, are required to take the following four compulsory English courses offered by CULI:

- Course 1: Experiential English I (Exp Eng I)
- Course 2: Experiential English II (Exp Eng II)
- Course 3: English for Academic Purposes I / English for
Occupational Purposes I (EAP I / EOP I)
- Course 4: English for Academic Purposes II / English for
Occupational Purposes II (EAP II / EOP II)

Experiential English I and II are general introductory courses for freshmen. They are formulated to prepare students for more advanced English courses in different faculties with the focus on

developing students' transferable skills including oral and written communication, problem-solving, and teamwork among others. Freshmen from all faculties except the Faculty of Arts are required to take Exp Eng I and Exp Eng II in the first and second semesters, respectively, using the same learning materials, the same syllabus, and the same examinations. A norm-referenced system is thereby adopted as it is a large course involving over 5,000 students in more than 170 sections. Based on a university-wide grading scale, the CULI's Academic Committee determines the percentage of students assigned each grade (A, B+, B, C+, C, D+, D, and F).

The EAP/EOP courses, on the other hand, are designed to address the needs of each faculty, equipping students with competence and skills that can be used in different employment settings in the future. While the EAP I/EOP I courses mainly focus on reading and writing, the EAP II/EOP II courses place their emphasis on listening and speaking. For management purposes, all the EAP/EOP courses offered by CULI fall under the supervision of three teaching divisions: Social Science and Humanities, Science and Technology, and Business. Unlike Exp Eng I and Exp Eng II, the EAP/EOP course for each faculty is assessed differently through various tasks, assignments, and examinations appropriate for the nature of each course. Most courses, nevertheless, use a norm-referenced system as they are multi-section courses.

As for CU-TEP, this is a standardized English proficiency test developed by Chulalongkorn University. The test has been equated with TOEFL with a high correlation co-efficiency ($r > .80$) (Prapphal, 2003). It is required for admission to graduate programs and undergraduate English programs at Chulalongkorn University and some other institutions (Chulalongkorn University Academic Testing Center, 2007). In the recent past, the test has been required for all first-year students prior to the start of their first semester. The test consists of three parts: listening comprehension, reading comprehension, and writing for a total of 120 test items, all in the multiple-choice format. Unlike the receptive skills of listening and reading which are assessed directly, the productive skills of speaking

and writing are assessed indirectly via multiple-choice and error identification, respectively.

Notwithstanding having long been used for such academic purposes, no existing research has examined the degrees to which students' CU-TEP scores are related to their performance in English courses offered by CULI. Previous studies related to CU-TEP focused on the realms of TOEFL equivalent scores (Prapphal, 2003), the English proficiency of graduate students based on CU-TEP (Prapphal, 2003), and mapping CU-TEP to CEFR (Wudthayagorn, 2018). None of these specifically touch upon the issue of the predictive validity of CU-TEP on students' academic performance, leaving a gap in research to be filled. This study thus aimed to investigate the predictive validity of CU-TEP as an indicator of students' academic achievement as measured by their writing tasks and the grades of the three compulsory English courses. The study could help verify the continued use of CU-TEP for admission and other academic purposes. Furthermore, it would provide useful information for CULI tasked with offering a broad array of courses in streamlining its courses and extracurricular activities to better hone students' academic English skills relevant to their fields of study.

Literature Review

Multiple standardized English proficiency tests such as TOEFL iBT and IELTS are required for non-native English speaking (NNES) students applying to English-medium universities in countries across the world. Despite the fact that these language tests are designed primarily to determine a language threshold for learning academic content, the test scores are widely used for admission purposes to decide whether a NNES applicant has sufficient English proficiency to achieve academic success in a setting where English is used for teaching and learning. This has resulted in a score of predictive validity studies dedicated to examining the relationship between English proficiency measured by standardized proficiency tests and future academic performance (Cho & Bridgeman, 2012).

It is worth noting that for the purpose of this study, the notion of “predictive validity” is considered in its more specific meaning as the degree to which test scores accurately predict performance on a criterion (Chemens et al., 2018). This is consistent with the definition given by Swift (2012) that in the context of English Language Teaching (ELT), a test is considered having predictive validity if the results can accurately predict how well a test-taker can perform an assigned task. Since university admission is said to be one of the most common uses of predictive validity (Glen, 2015; Shuttleworth, 2009) in which schools rely on criteria such as GPAs and English proficiency test scores among other things to predict a student’s likely academic achievement, it is hardly surprising there have been numerous studies carried out to investigate the predictive validity of two of the world’s most popular English language tests like TOEFL and IELTS.

Research findings are mixed. On the one hand, several studies suggest that English proficiency is only one of the many important factors contributing to academic success. For instance, a small-scale study conducted by Dooley and Oliver (2002) investigating how accurate IELTS was as a predictor of academic success for 89 students at Curtin University of Technology in Western Australia found little evidence for the validity of IELTS as a predictor of academic success. These findings concur with the results of a more recent study by Ly (2020) which took as its sample 150 undergraduates studying English at Thai Nguyen University, Vietnam. Although the study revealed there seemed to be an existing relationship between the IELTS test scores and GPA, the correlation was weak. Similarly, consistent with other studies on the validity of TOEFL, Al-Ansari and Al-Musawi (2003), who conducted a study on TOEFL and FCE tests as predictors of academic success, concluded that TOEFL was not an effective indicator. Vu and Vu (2013) also found there was no or very low significant correlation between TOEFL scores and academic performance as measured by GPA. In other words, “TOEFL scores cannot be regarded as an effective predictor of academic success.” This aligns with a study by Cho and Bridgeman

(2012) showing the predictive validity correlation coefficients of TOEFL iBT to be fairly small.

Nevertheless, a number of studies have otherwise reported a more favorable predictive correlation between English proficiency test and academic achievement. Several studies have found a positive correlation at various degrees of significance, and they seem to outnumber those showing no link (Cloate, 2016). One study, using a sample of 953 undergraduate students at an English-medium university in the United Arab Emirates by Schoepp (2018), identified IELTS scores as a meaningful predictor of academic success. This is supported by a recent study conducted by O'Dwyer et al. (2018) which suggested clear evidence of the predictive validity of the TOEFL iBT for the academic performance of students at an English-medium university in Turkey. Both studies confirm previous findings by Tonkyn (1995) as cited in Dooley and Oliver (2002) that it is evident that language proficiency is an important issue when it comes to academic performance of overseas students, and that students who score higher on a standard English test have a greater chance of future academic success. This view is consistent with a study by Oliver et al. (2012) which found that in spite of having low predictive validity overall, IELTS and TOEFL are the best indicators of future academic success.

Despite the controversial stances on the relationship between English proficiency tests and academic achievement, the literature on predictive validity studies has evolved over the years in terms of the methodologies adopted. One study differentiated between lower and higher scoring groups in a proficiency test prior to assessing academic performance (Cho & Bridgeman, 2012). For higher scoring students, a positive relationship was established between language proficiency and academic performance; however, the correlations were significantly smaller among students with lower language scores. Others have investigated the relationship among different language skills, using proficiency test data. Bozorgian (2012), for example, collected data from over 700 IELTS test-takers and found the scores from the four skills to be moderately correlated.

Several studies have focused on the predictive validity of subskills on proficiency tests and found that some of the subskills of language proficiency might be better predictors of academic outcomes (Golder et al., 2009). This corresponds to previous studies by Dooley and Oliver (2002) and Ly (2020) that the IELTS reading module was the best predictor of academic success. In their study on the comparability of non-native English speaking undergraduate students' performance on TOEFL writing tasks and actual academic performance in required writing courses, Llosa and Malone (2018) found correlations of the scores to be moderate and significant.

In line with the notion that "English proficiency is only one among many factors that affect academic success" (Graham, 1987, p. 515), it is advisable that other indicators of academic performance be included in a study regarding the predictive validity of a language test because the use of several sources of information can contribute to more trustworthy decisions (Powers, 2010). Harsch et al. (2017) incorporated questionnaires and follow-up interviews with students and tutors in the predictive study of TOEFL and found small but significant correlations for all TOEFL scores. Fox (2004) included information from various sources to measure students' academic performance such as average grades, EAP teacher evaluation of the students' language ability, attendance rates, and comments from field-specific professors. Other studies suggest that students' own self-evaluation of their language levels was a better predictor of academic success (Dooley & Oliver, 2002). Likewise, it is pointed out that achievement tests whose marking criteria reflect the real-life skills necessary for the academic environment can provide a more accurate measure of readiness to study in an English-medium university than a proficiency test (Gochev, 2013).

In another more recent study by O'Dwyer et al. (2018), which aimed to investigate the predictive validity of the TOEFL iBT in a relatively homogeneous student population, evidence from various sources was collected including scores on the in-house proficiency test and scores from EAP courses among many other things. The study found that correlations between test scores confirmed a

moderate to moderately high predictive validity for content course GPAs and EAP course GPAs, respectively, and for the TOEFL iBT. The perspective adopted in O'Dwyer et al. (2018) has yielded support to this study, focusing on investigating the predictive validity of CU-TEP (The Chulalongkorn University Test of English Proficiency) as an indicator of students' actual writing ability and their academic achievement as measured by the GPAs of three compulsory English courses. The present study aligned with the notion that each institution should conduct its own studies of the connection between the language proficiency measures used and academic outcome (Burns, 1991; Cotton & Conrow, 1998; Graham, 1987) because so many factors play a role in each context (Cloate, 2016; Graham, 1987).

Methodology

Research Questions

A large number of predictive validity studies have been conducted, using TOEFL and IELTS with a heterogeneous population within an English speaking community to predict students' academic success. The inconsistent findings have necessitated the need to take into consideration other variables such as age, educational background, first language, and field of study, and the like in future studies to validate the results.

In Thailand, TOEFL and IELTS have also been adopted for admission purposes at some universities for years. However, at Chulalongkorn University, aside from the TOEFL and IELTS scores, the university also accepts the CU-TEP scores, equated with the paper-based TOEFL, for admission to its graduate schools and undergraduate English programs of various faculties. In recent years, it has been imperative that all freshmen sit the CU-TEP exam a few weeks before their first semester to measure their overall language proficiency.

This study aimed to investigate the predictive validity of CU-TEP in a relatively homogenous student population with respect to age, learning background, first language, and compulsory English

courses taken to validate the continued use of CU-TEP and benefit the curriculum development of CULI. The following questions were addressed in this study:

1. Are CU-TEP scores a good predictor of students' academic achievement as measured by actual writing tasks and their grades in the three compulsory English courses?
2. Does the predictive validity of CU-TEP scores vary according to the disciplines of social science and humanities, science, and business?
3. Are CU-TEP writing scores (indirect writing assessments) a good predictor of students' ability to perform the actual writing tasks?

Participants

A total of 520 students who are mostly monolingual and of the same age group participated in the study. They were selected from a cohort of 5,564 freshmen of Chulalongkorn University taking CU-TEP in 2014. Using the systematic random sampling technique, 30 students in each faculty were chosen based on their CU-TEP scores from the highest to the lowest with a confidence level of 95%, a sampling error of less than 4%, and a selection probability of 50% (calculator.net, 2016; Survey Monkey, 2016). The 520 student participants (approximately 10% of the total population) comprised students from 18 faculties except the Faculty of Arts, which has its own English department. Students grouped under the Chulalongkorn University Language Institute (CULI) were all those missing the first round of CU-TEP and who were later given a make-up test (Table 1). Their CU-TEP score profile by faculty is presented in Table 2.

This study extended over two academic years (2014-2015) to keep track of the students' academic achievement in three compulsory courses: Exp Eng I, Exp Eng II, and EAP I/EOP I. It is worth noting at this point that while most EAP I/EOP I courses were offered in the second year, the EAP I/EOP I course for the Faculty of Pharmaceutical Sciences was offered in the fifth year as requested by the faculty, so the Pharmaceutical Sciences students were excluded.

The EAP II/EOP II grades, on the other hand, were not included as they largely focus on listening and speaking. As a result, the data available for analysis is labeled n3 in Table 1.

To examine whether the predictive validity of CU-TEP scores varies according to the disciplines of social science and humanities, science, and business, the 18 faculties were classified in alignment with CULI's teaching divisions as follows:

The social science and humanities-related disciplines: Education, Law, Communications Arts, Political Science, Fine and Applied Arts, and Psychology

The science and technology-related disciplines: Dentistry, Medicine, Pharmaceutical Sciences, Sports Science, Science, Engineering, Architecture, Allied Health Sciences, Veterinary, and School of Agricultural Resources

The business-related disciplines: Commerce and Accountancy and Economics

Table 1
Breakdown of the First-year Undergraduate Students by Faculty

No.	Faculty	N	n1	Missing1	n2	Missing2	n3
1	Education	377	368	9	29	17	12
2	Dentistry	139	135	4	30	0	30
3	Law	277	274	3	29	4	25
4	Communication Arts	154	149	5	30	1	29
5	Commerce and Accountancy	601	586	15	30	2	28
6	Medicine	299	295	4	30	0	30
7	Pharmaceutical Sciences	179	178	1	30	30	---*
8	Political Science	256	248	8	30	3	27
9	Sports Science	109	95	14	30	5	25
10	Science	897	884	13	30	6	24
11	Engineering	835	825	10	28	9	19
12	Fine and Applied Arts	171	162	9	30	1	29
13	Economics	145	141	4	29	0	29

No.	Faculty	N	n1	Missing1	n2	Missing2	n3
14	Architecture	237	229	8	30	2	28
15	Allied Health Sciences	201	197	4	29	3	26
16	Veterinary	138	135	3	29	8	21
17	School of Agricultural Resources	40	40	0	17	0	17
18	Psychology	99	99	0	30	1	29
19	Language Institute	83	23	60			---
20	Arts	327	327	0			---
Total		5564	5390	174	520	92	428

*Remarks:

- (i) n1 = students taking CU-TEP
- (ii) n2 = students completing the first writing task
- (iii) n3 = the final sample size comprising students completing the first and second writing tasks
- (iv) Students from the Faculty of Pharmaceutical Sciences had not yet taken the EAP I/EOP I at the time of data collection and were thus excluded from the study.

Table 2

CU-TEP Score Profile by Faculty

No.	Faculty	Mean	n	Max	Min	S.D.	CU-TEP Score Levels	CEFR Levels
1	Medicine	74.28	295	108	35	15.055	Low Advanced	B2
2	Arts	68.10	327	109	25	16.445	Intermediate	B1
3	Dentistry	63.43	135	99	37	14.338	Intermediate	B1
4	Communication Arts	63.40	149	100	28	15.628	Intermediate	B1
5	Political Science	58.46	248	109	29	15.243	Intermediate	B1
6	Law	58.37	274	104	22	16.334	Intermediate	B1
7	Commerce and Accountancy	55.26	586	101	24	13.744	Middle Intermediate	B1
8	Engineering	53.53	825	104	20	16.017	Middle Intermediate	B1

No.	Faculty	Mean	n	Max	Min	S.D.	CU-TEP Score Levels	CEFR Levels
9	Architecture	52.48	229	92	25	14.508	Middle Intermediate	B1
10	Psychology	51.00	99	84	27	13.768	Middle Intermediate	B1
11	Veterinary Science	50.19	135	102	28	12.932	Middle Intermediate	B1
12	Pharmaceutical Sciences	49.99	178	88	25	11.459	Middle Intermediate	B1
13	Economics	49.55	141	88	25	13.514	Middle Intermediate	B1
14	Allied Health Sciences	43.25	197	84	23	10.192	Low Intermediate	B1
15	Education	43.02	368	90	20	12.276	Low Intermediate	B1
16	Science	42.35	884	105	19	11.373	Low Intermediate	B1
17	Fine and Applied Arts	38.60	162	96	22	11.822	Low Intermediate	B1
18	Language Institute	38.17	23	71	25	10.530	Low Intermediate	B1
19	Sports Science	34.42	95	70	18	7.696	Low Intermediate	A2
20	School of Agricultural Resources	31.67	40	48	23	4.885	Upper Beginner	A2

Table 2 exhibits the English proficiency levels of the first-year students as indicated by their CU-TEP scores and the corresponding CEFR levels. It is evident that the majority of first-year Chulalongkorn University students are at a B1 level in English, which is generally called “intermediate” (EF SET, 2020). Students from three faculties are the exceptions. While students from the Faculty of Medicine are at a B2 level, students from the Faculty of Sports Science and School of Agricultural Resources are at an A2 level. Notwithstanding the minor discrepancies, it is reasonable to conclude that most freshmen share relatively the same English proficiency level.

Instruments

CU-TEP

Developed by the Chulalongkorn University Language Institute (CULI) and administered by the Academic Testing Center of Chulalongkorn University (CU-ATC), the Chulalongkorn University Test of English Proficiency (CU-TEP) is an institutional paper-based objective test in a multiple-choice format (four choices per question). Designed to assess the students' ability to use English in an academic context (Chulalongkorn University Academic Testing Center, 2007), the CU-TEP consists of 30 listening comprehension questions, 60 reading comprehension questions, and 30 semi-writing questions, totaling 120 questions. The test length is two hours and ten minutes. CU-TEP score and CEFR levels are shown in Tables 3-4.

Table 3

*CU-TEP Score Levels**

No	Levels	All 3 Skills (120 items)	Listening Comp (30 items)	Writing (30 items)	Reading Comp (60 items)
1	Beginner	1-7	0-2	0-2	1-3
2	Middle Beginner	8-17	3-4	3-4	4-7
3	Upper Beginner	18-32	5-7	5-7	8-16
4	Low Intermediate	33-44	8-10	8-10	17-22
5	Middle Intermediate	45-56	11-13	11-13	23-28
6	Intermediate	57-68	14-16	14-16	29-34
7	Low Advanced	69-79	17-19	17-19	35-39
8	Middle Advanced	80-91	20-22	20-22	40-45
9	Advanced	92-106	23-26	23-26	46-52
10	Upper Advanced	107-120	27-30	27-30	53-60

* Chulalongkorn University Academic Testing Center

Table 4
*CU-TEP Score and CEFR Levels**

CU-TEP (Max 120 points)	CEFR Levels
14-34	A2
35-69	B1
70-98	B2
99-120	C1

*Based on the research on Mapping CU-TEP to Common European Framework of Reference (CEFR) (Wudthayagorn, 2018)

Table 4 illustrates CU-TEP scores mapped onto the CEFR levels in alignment with the Office of the Basic Education Commission's policy to adopt CEFR as a framework for learning, teaching, and assessment. It is suggested that grade 12 and vocational college students be at a B1 level (Office of the Basic Education Commission, 2014; Wudthayagorn, 2018), which was the same level as that of the majority of first-year students at Chulalongkorn University at the time of data collection.

Writing Tasks

All the first-year students were given two researcher-generated writing tasks, one in the first week of the Exp Eng I course in August 2014 and the other in the first week of the EAP I/EOP I course in August 2015. For each task, the students wrote a paragraph of at least 100 words in 30 minutes, expressing their opinions on a different topic that were familiar to them, and yet the writing tasks were not part of the students' academic grades. With the same scoring rubric based on IELTS Task 2 Writing band descriptors (IELTS, 2015), the writing tasks were both assessed by two experienced raters who were former qualified IELTS examiners. The correlation coefficients for each of the four assessment criteria, namely, task response, coherence and cohesion, lexical resource, and grammatical range and accuracy, and for the total score of both raters were 0.794-0.840, which is considered highly reliable (Glen,

2017; U.S. Department of Labor Employment and Training Administration, 1999). To represent the students' writing performance, the average of their two writing task scores was calculated to give an overall average.

English Course Results

The scores of the three English courses: Exp Eng I, Exp Eng II, and EAP I/EOP I obtained from CULI's Academic Affairs Department were comprised of several different grade items, especially EAP I/EOP I which varied from one faculty to another, and some might add up to more than 100 as important exams or assignments might be assigned more weights than others. To offset the differences, the weighted system was used to calculate each individual grade item that combined to a weight of 100%. The students' weighted scores on Exp Eng I, Exp Eng II, and EAP I/EOP I as well as the average of the two writing task scores were then added to give a combined total English score.

Data Collection and Analysis

Data used in this study included students' CU-TEP scores obtained from the Academic Testing Center of Chulalongkorn University (CU-ATC), English course results gathered from CULI's Academic Affairs Department, and the two writing tasks given in the first week of the Exp Eng I course and the first week of the EAP I/EOP I course, respectively. To analyze the data, multiple regression analysis was employed, using CU-TEP Listening, Reading, and Writing scores as predictors and students' academic achievement measured by their English course results and the actual writing tasks as dependent variables to answer Research Questions 1 and 2. To address Research Question 3, Pearson's correlation was applied to explain the correlation of CU-TEP writing scores with the writing task scores.

Results

Question 1: Are CU-TEP scores a good predictor of students' academic achievement as measured by actual writing tasks and their English course results?

Tables 5-6 present the correlation of individual sections on the CU-TEP (CU-TEP LRW) with the first and second writing tasks, which were considered highly positive although the first writing task showed a stronger correlation and higher value of coefficient of determination. It was also found that CU-TEP writing had the most significant effect on the first writing task, whereas the second writing task was affected by CU-TEP reading, listening, and writing in descending order ($p = 0.05$). Both writing tasks thus pointed to CU-TEP LRW as an effective predictor of students' academic success at varying degrees of strength.

Table 5
CU-TEP Scores Correlating with the 1st Writing Task

Predictors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 Constant	3.645	0.084		43.194	0.001
CU-TEP Listening	0.030	0.007	0.234	4.295	0.001*
CU-TEP Reading	0.018	0.005	0.203	3.410	0.001*
CU-TEP Writing	0.034	0.007	0.237	4.558	0.001*

$R = 0.602$, $R^2 = 0.363$ and $F(3,511) < 0.05$

* $p < 0.05$

Table 6
CU-TEP Scores Correlating with the 2nd Writing Task

Predictors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 Constant	3.626	0.097		37.527	0.001
CU-TEP Listening	0.031	0.008	0.233	3.875	0.001*
CU-TEP Reading	0.024	0.006	0.250	3.959	0.001*
CU-TEP Writing	0.018	0.009	0.117	2.108	0.036*

$R = 0.533$, $R^2 = 0.284$ and $F(3,507) < 0.05$

* $p < 0.05$

Tables 7-9 display the correlation between individual sections of the CU-TEP (CU-TEP LRW) and the three English courses. A very high and almost identical correlation existed between CU-TEP and Exp Eng I and Exp Eng II scores, whereas a weaker correlation with EAP I/EOP I was observed. The results also indicated significant effects of CU-TEP reading, listening, and writing scores on students' achievement in Exp Eng I and Exp Eng II courses in descending order ($p = 0.05$). However, despite the significant effects of CU-TEP reading and CU-TEP listening scores, respectively, the results revealed insignificant effects of CU-TEP writing scores on students' success in the EAP I/EOP I course. As with the two writing tasks, the findings also pinpointed CU-TEP reading as the best predictor of the success with the English course results.

Table 7
CU-TEP Scores Correlating with Exp Eng I

Predictors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 Constant	33.106	1.065		31.096	0.000
CU-TEP Listening	0.704	0.090	0.301	7.855	0.001*
CU-TEP Reading	0.711	0.067	0.446	10.687	0.001*
CU-TEP Writing	0.442	0.094	0.172	4.700	0.001*
$R = 0.825$, $R^2 = 0.697$ and $F(3,497) < 0.05$					

* $p < 0.05$

Table 8
CU-TEP Scores Correlating with Exp Eng II

Predictors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 Constant	33.268	1.142		29.144	0.001
CU-TEP Listening	0.570	0.095	0.241	5.969	0.001*
CU-TEP Reading	0.724	0.071	0.449	10.235	0.001*
CU-TEP Writing	0.570	0.100	0.218	5.678	0.001*
$R = 0.821$, $R^2 = 0.673$ and $F(3,480) < 0.05$					

* $p < 0.05$

Table 9
CU-TEP Scores Correlating with EAP I/EOP I

	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	Constant	49.027	1.445		33.918	0.001
	CU-TEP Listening	0.476	0.118	0.233	4.024	0.001*
	CU-TEP Reading	0.473	0.088	0.340	5.348	0.001*
	CU-TEP Writing	0.180	0.126	0.080	1.430	0.154

$R = 0.594$, $R^2 = 0.353$ and $F(3,443) < 0.05$

* $p < 0.05$

Table 10 shows the correlation of the individual sections of the CU-TEP (CU-TEP LRW) with the combined total English score of Exp Eng I, Exp Eng II, and EAP I/EOP I, and the average of the two writing tasks. This attested to a very high predictive validity for students' academic achievement with CU-TEP reading, listening, and writing scores having significant effects on the students' English performance in descending order ($p = 0.05$). Their standardized beta coefficients ranged from 0.461 to 0.193, whereas the determination coefficient from the CU-TEP LRW scores was 0.711, an equivalent of 71.10%, which is considered a substantial level (Ben-Shachar et al., 2021). It is noteworthy that when the average of the two writing tasks was entered into the equation, the correlation of CU-TEP LRW to students' academic success was higher. This corresponded to the notion that other indicators of academic performance should be included in a predictive validity study of a language test.

Table 10

CU-TEP Scores Correlating with the Combined Total English Score of Students in All 3 Disciplines*

Predictors		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Students in all 3 disciplines	Constant)	123.176	2.924		42.123	.001*
	CU-TEP Listening	1.754	.237	.283	7.396	.001*
	CU-TEP Reading	1.941	.178	.461	10.931	.001*
	CU-TEP Writing	1.306	.253	.193	5.166	.001*

$R = 0.846$, $R^2 = 0.715$ and $df (3,437) < 0.05$

* $p < 0.05$

* The combined total English score equaled weighted scores on Exp Eng I, Exp Eng II, and EAP I/EOP I, and an average of the two writing tasks

Question 2: Does the predictive validity of CU-TEP scores vary according to the disciplines of social science and humanities, science and technology, and business?

Tables 11-13 demonstrate the correlation of individual sections of the CU-TEP (CU-TEP LRW) on the combined total English score broken down by different academic disciplines. The results in Tables 11-12 confirm the high predictive validity of CU-TEP scores for the combined total English score of students studying both social science and humanities-related ($r = 0.826$) and science and technology-related ($r = 0.867$) disciplines with CU-TEP reading being the best predictor of their academic success followed by CU-TEP listening and CU-TEP writing, respectively. Table 13, in contrast, reveals that despite a similarly strong correlation ($r = 0.823$), the business students' achievement in English was best predicted by CU-TEP listening followed by CU-TEP reading and CU-TEP writing. Of all the three disciplines, the strongest relations between CU-TEP scores and the combined total English score was found in the science discipline ($r = 0.865$). Based on the findings, it stands to reason that the predictive validity of CU-TEP scores varied marginally by the

academic disciplines as expressed by correlation coefficients. The discipline-specific correlations, on the other hand, seemed to distinctively point to the varying predictive power of different CU-TEP sections. Namely, CU-TEP reading was the best indicator of the academic success of students in the social science and humanities and science and technology disciplines, whereas the best predictor of business students' English course grades was CU-TEP listening.

Table 11

CU-TEP Scores Correlating with the Combined Total English Score of Students in Social Science and Humanities Disciplines

Predictors		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Social Science	Constant	124.261	5.451		22.796	.001*
	CU-TEP Listening	1.432	.382	.255	3.745	.001*
	CU-TEP Reading	1.932	.332	.447	5.817	.001*
	CU-TEP Writing	1.399	.417	.223	3.356	.001*

$R = 0.826$, $R^2 = 0.683$ and $df (3,145) < 0.05$

* $p < 0.05$

Table 12

CU-TEP Scores Correlating with the Combined Total English Score of Students in Science Disciplines

Predictors		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Science	Constant	120.799	3.678		32.840	.001*
	CU-TEP Listening	1.852	.332	.283	5.570	.001*
	CU-TEP Reading	2.049	.227	.503	9.031	.001*
	CU-TEP Writing	1.169	.348	.164	3.357	.001*

$R = 0.867$, $R^2 = 0.751$ and $df (3,232) < 0.05$

* $p < 0.05$

Table 13

CU-TEP Scores Correlating with the Combined Total English Score of Students in Business Disciplines

Predictors		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Business	Constant	132.047	9.660		13.670	.001*
	CU-TEP Listening	2.252	.743	.358	3.033	.004*
	CU-TEP Reading	1.347	.596	.294	2.254	.028*
	CU-TEP Writing	1.733	.776	.267	2.234	.030*

$R = 0.823$, $R^2 = 0.677$ and $df (3,52) < 0.05$

* $p < 0.05$

Question 3: Are CU-TEP writing scores (indirect writing assessment) a good predictor of students' ability to perform the actual writing tasks?

Table 14 presents the correlation of CU-TEP writing scores (an indirect writing assessment in a multiple-choice format) with the writing task scores. The findings reveal that there was a strong and moderate correlation between the CU-TEP writing section and the first and second writing tasks, respectively. However, when the two writing task scores were added together to give a combined total writing task score, the value for the correlation coefficient increased slightly to 0.563, indicating a positive relationship between the CU-TEP writing section and the combined total writing task score. This could be construed as meaning CU-TEP writing scores were a relatively good predictor of students' ability to perform actual writing tasks.

Table 14*CU-TEP Writing Scores Correlating with Writing Task Scores*

	CU-TEP Writing Score	1st Writing Task Score	2nd Writing Task Score	Combined Total Writing Task Score
CU-TEP Writing	--	0.533*	0.441*	0.563*
1 st Writing Task			0.485*	0.852*
2 nd Writing Task			--	0.871*

* $p < 0.05$ **Discussion**

Unlike numerous previous predictive research on IELTS and TOEFL, this study, which aimed to explore the CU-TEP's ability to predict students' academic achievement measured by their performance on English courses, was conducted with a relatively homogeneous group of students with respect to age, first language, and English proficiency levels (Table 2) in an environment where the Thai language was the predominant medium through which most academic courses in the mainstream Thai programs were taught except for the English courses. The results showed a strong and positive correlation between CU-TEP scores and the students' performance on the three compulsory English courses. When each individual course was examined, a very high and virtually identical correlation between CU-TEP and Exp Eng I ($r = 0.825$) and Exp Eng II ($r = 0.821$) was observed. This could be attributable to the fact that both courses are general introductory courses for first-year students that deal with general topics as does CU-TEP. Additionally, despite being taken separately in the first and second semesters, Exp Eng I and Exp Eng II shared the same course book (but made use of different units) as well as the same common components for overall grades, grading rubrics, and the norm-referenced grading system. The EAP I/EOP I courses, on the other hand, varied from one faculty to another across the university. This could contribute, in part, to a lower correlation coefficient with CU-TEP as these courses were designed for each specific discipline with varying language genres. Also, while most EAP I/EOP I courses emphasized reading and writing, a few focused more on listening and speaking.

It was also shown that CU-TEP reading was the best predictor of the students' English course results followed by listening and writing. This could be due to the greater emphasis being placed by the test on reading than listening and writing as the CU-TEP reading section consists of 60 items (out of a total of 120) in the forms of reading comprehension questions and text completion, whereas the listening and writing sections each comprises 30 items. Likewise, the mid-term and final exams for the three English courses, which are generally weighed heavier than other grade components, also focus chiefly on reading. These results concurred with previous studies by Doey and Oliver (2002) and Ly (2020) that the IELTS reading module is the best predictor of academic success.

To further substantiate the predictive validity of CU-TEP on academic achievement, two writing tasks were included as another dependent variable as it was believed that a more reliable conclusion could be made when additional relevant information was available. Although both writing tasks evidently indicated CU-TEP as a good predictor of academic success, the data exhibited a stronger relationship between CU-TEP and the first writing task ($n = 520$), due probably to the missing of the second writing task of approximately 20% of the population including Pharmaceutical Sciences students ($n = 428$), which could have the effect of skewing the figures. Further, while CU-TEP writing was found to be the best indicator of the students' first writing performance, it was CU-TEP reading that best predicted the second writing task, demonstrating that CU-TEP reading could provide an indirect indication of writing ability. The findings seemed to be in line with the view that reading and writing are related as they are built on the same skill (Schoonen, 2019). This was supported by a study by Choi et al. (2018), indicating that reading comprehension and writing performance were significantly correlated with each other. Based on the data analysis, it could be concluded in response to the first research question that CU-TEP scores were a good predictor of students' academic achievement as measured by actual writing tasks and their English course results.

One takeaway from this study is that the use of English writing tasks and English course grades as dependent variables for an English proficiency test like CU-TEP might be more effective than relying on the GPAs of students' academic courses because, as O'Dwyer et al. (2018) have pointed out, language skills represent only part of the skills that students are required to possess to ensure success in academic coursework. This especially holds true in the EFL contexts where English is not the medium of teaching for most academic courses. In addition, a predictive study carried out among a homogeneous student population seems to reveal a significantly stronger correlation coefficient for an English proficiency test and students' academic achievement than several previous research studies conducted with non-native English speaking students with diverse backgrounds. It also helps eliminate the need to take into consideration such factors as language background, age, and nationality of the individual to validate the results.

To investigate whether the predictive validity of the CU-TEP scores varied according to academic discipline, the 18 faculties and school at Chulalongkorn University were categorized into three disciplines: social science and humanities, science and technology, and business in line with the three teaching divisions at the Chulalongkorn University Language Institute (CULI). The results revealed that the correlation with the CU-TEP scores was strongest for students in the science and technology discipline followed by social science and humanities and business, but their respective correlation coefficients differed only marginally. This was consistent with the findings by Dooley and Oliver (2002) that there was no major differences between IELTS scores and students' academic success across disciplines. Nevertheless, the more pronounced difference rested with the subskills of CU-TEP that best predicted the students' academic results. Unlike CU-TEP reading that played a remarkably determining role in the English success of science and technology as well as social science and humanities students, the subskill of listening was instead the prime indicator of business students' English achievement. This was probably because business students

tend to have more exposure to English in audio and audio-visual forms in their content courses, which could partly contribute to their better listening skills. Given this evidence, it seemed reasonable to draw the conclusion that academic disciplines exerted a marginal influence on the predictive validity of CU-TEP as indicated by correlation coefficients. Notwithstanding the small difference, the discipline-relations clearly exhibited a distinction in the predictive power of individual CU-TEP sections.

Finally, as regards investigation of the predictive validity of CU-TEP writing on students' ability to write, the focus of the third research question of this study, the results were in congruence with previous findings, showing strong correlation between CU-TEP LRW and the two writing tasks (Tables 5-6), more so with the first writing task. Likewise, the CU-TEP writing subskill exhibited a positive relationship with both writing tasks in a similar pattern, testifying that albeit being an indirect writing assessment via error identification questions, the CU-TEP writing scores were a good predictor of students' ability to perform actual writing tasks. Despite the findings, nevertheless, there is still room for argument that even though students could perform well on CU-TEP writing, some might not be able to write as well, especially in academic contexts which are more linguistically demanding. As a consequence, it is advisable that an essay writing component be added to the CU-TEP construct. If so, future research can be geared toward investigating the relationship between the current CU-TEP writing in a multiple-choice format and an added essay writing test. The results could help further confirm the predictive validity of CU-TEP.

Conclusions

This study investigated how accurate CU-TEP is as a predictor of students' academic success as measured by English course performance and writing task scores. As the findings testified, CU-TEP scores, especially CU-TEP reading, were an effective indicator of students' English achievement, and more so with the addition of the writing tasks as another dependent variable. This suggested that

further research on the predictive validity of an English proficiency test would be better off using English course performance or other English assignments rather than students' GPAs which are very much dependent on multiple factors other than English proficiency. When the data were analyzed by fields of study, the results demonstrated the predictive validity of CU-TEP scores varied marginally by academic discipline as indicated by correlations coefficients. Further research is warranted to explore whether and to what extent the predictive validity of the test deviates by faculty. Despite some limitations of the study that fell short of addressing the listening and speaking aspects of CU-TEP and the correlations by faculty, it is hoped the findings could contribute to the literature of the predictive validity of English proficiency tests. From a pedagogical point of view, it is also anticipated that the results could benefit future curriculum development of English courses offered by CULI and provide an initial step toward the development and implementation of policies for exit exams for Chulalongkorn University graduates in the foreseeable future.

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References

- Al-Ansari, S., & Al-Musawi, N. n. (2003). TOEFL and FCE Tests as Predictors of Academic Success for Advanced Students at the University of Bahrain. *Journal of Educational and Psychological Sciences*, 4(1), 8-24. <https://doi.org/10.12785/jeps/040107>
- Ben-Shachar, M. S., Makowski, D., & Lüdtke, D. (2021). *Interpret coefficient of determination (R2)*. Retrieved 1 September 2021 from https://easystats.github.io/effectsize/reference/interpret_r2.html
- Bozorgian, H. (2012). The Relationship between Listening and Other Language Skills in International English Language System. *Theory and Practice in Language Studies*, 2(4), 657-663. <https://doi.org/10.4304/tpls.2.4.657-663>
- Burns, R. B. (1991). Study and Stress among First Year Overseas Students in an Australian University. *Higher Education Research & Development*, 10(1), 61-77. <https://doi.org/10.1080/0729436910100106>
- calculator.net. (2016). *Sample Size Calculator*. Maple Tech. International LLC. <https://www.calculator.net/sample-size-calculator.html>
- Chemens, N. H., Ragan, K., & Prickett, C. (2018). Predictive validity. In B. B. Frey (Ed.), *The SAGE Encyclopedia of Educational Research, Measurement, and Evaluation* (Vol. 1, pp. 1289-1289). Thousand Oaks,, California: SAGE Publications, Inc.
- Cho, Y., & Bridgeman, B. (2012). Relationship of TOEFL iBT® scores to academic performance: Some evidence from American universities. *Language Testing*, 29(3), 421-442.

- <https://doi.org/10.1177/0265532211430368>
- Choi, J., Moon, Y., Paek, J. K., & Kang, Y. (2018). Examining the Relationship between Reading and Writing of Advanced Korean EFL Learners. *Korean Journal of Applied Linguistics*, 34(1), 71-116. <https://doi.org/10.17154/kjal.2018.3.34.1.91>
- Chulalongkorn University Academic Testing Center. (2007). *CU-TEP*. http://www.atc.chula.ac.th/en_html/en_tep.html
- Cloate, R. (2016). The relationship between international students' English test scores and their academic achievements. *Journal of Pedagogic Development*, 6(2), 3-8. <http://hdl.handle.net/10547/611800>
- Cotton, F., & Conrow, F. (1998). *An investigation of the predictive validity of IELTS amongst a group of international students studying at the University of Tasmania*. IELTS Australia.
- Dooley, P., & Oliver, R. (2002). An investigation into the predictive validity of the IELTS Test as an indicator of future academic success. *Prospect*, 17(1), 36-54. <https://doi.org/10.3316/aeipt.124136>
- Education First. (2020). *EF English Proficiency Index*. Education First (EF). <https://www.ef.co.th/epi/>
- EF SET. (2020). *English level B1*. Education First (EF). <https://www.efset.org/cefr/b1/>
- Fox, J. (2004). Test decisions over time: tracking validity. *Language Testing*, 21(4), 437-465. <https://doi.org/10.1191/0265532204lt292oa>
- Glen, S. (2015). *Predictive Validity*. StatisticsHowTo.com: Elementary Statistics for the rest of us! Retrieved December 5, 2021 from <https://www.statisticshowto.com/predictive-validity/>
- Glen, S. (2017). *Test-Retest Reliability*. StatisticsHowTo.com: Elementary Statistics for the rest of us! <https://www.statisticshowto.com/test-retest-reliability/>
- Gochev, N. (2013). *Criterion-related validity of strong and weak second language performance assessments in a University Pathway Programme* [Master's Thesis, Lancaster University]. Lancaster. <https://www.baleap.org/wp->

- content/uploads/2016/03/Dissertation_Nikolay_Gochev.pdf
- Golder, K., Reeder, K., & Fleming, S. (2009). 2. Determination of appropriate IELTS band score for admission into a program at a Canadian post-secondary polytechnic institution. *IELTS RESEARCH REPORTS VOLUME 10*, 69.
- Graham, J. G. (1987). English Language Proficiency and the Prediction of Academic Success. *TESOL Quarterly*, 21(3), 505-521. <https://doi.org/10.2307/3586500>
- Harsch, C., Ushioda, E., & Ladroue, C. (2017). Investigating the Predictive Validity of TOEFL iBT® Test Scores and Their Use in Informing Policy in a United Kingdom University Setting. *ETS Research Report Series*, 2017(1), 1-80. <https://doi.org/10.1002/ets2.12167>
- IELTS. (2015). *IELTS scoring in detail*. <https://www.ielts.org/for-organisations/ielts-scoring-in-detail>
- Llosa, L., & Malone, M. E. (2018). Comparability of students' writing performance on TOEFL iBT and in required university writing courses. *Language Testing*, 36(2), 235-263. <https://doi.org/10.1177/0265532218763456>
- Ly, H. H. (2020). The predictive validity of the IELTS test at Thai Nguyen University - Vietnam. *International Journal of Scientific and Research Publications*, 10(6), 793-798. <https://doi.org/10.29322/IJSRP.10.06.2020.p10292>
- O'Dwyer, J., Kantarcioğlu, E., & Thomas, C. (2018). *An Investigation of the Predictive Validity of the TOEFL iBT® Test at an English-Medium University in Turkey* (2330-8516). (ETS Research Report Series, Issue. <https://doi.org/10.1002/ets2.12230>
- Office of the Basic Education Commission. (2014). *Guidelines for practices by Ministry of Education: English education policy reform*. Bangkok, Thailand: Ministry of Education Retrieved from http://old.drs.ac.th/ext/tch_data/tch_02.pdf
- Office of the Higher Education Commission. (2015). *Policy of Upgrading English Education Standards of Higher Education Institutions*. Bangkok, Thailand: Ministry of Education Retrieved from

- http://www.mua.go.th/users/bhes/front_home/Data%20Bhes_2559/04052559.pdf
- Office of the Permanent Secretary, Ministry of Education. (2006). *Strategic Plan for Reforming the English Learning Process to Accelerate National Competitive Ability (2006-2010)*. Bangkok, Thailand: Ministry of Education, Retrieved from http://www.mua.go.th/users/bhes/front_home/Data%20Bhes_2559/04052559.pdf
- Oliver, R., Vanderford, S., & Grote, E. (2012). Evidence of English language proficiency and academic achievement of non-English-speaking background students. *Higher Education Research & Development*, 31(4), 541-555. <https://doi.org/10.1080/07294360.2011.653958>
- Powers, D. E. (2010). *The case for a comprehensive, four-skills assessment of English language proficiency* (Compendium Study, Issue 12). TOEIC Compendium. https://www.ets.org/Media/Research/pdf/RD_Connections14.pdf
- Prapphal, K. (2003). English proficiency of Thai learners and directions of English teaching and learning in Thailand. *Journal of English Studies*, 1(1), 1-6. <https://so04.tci-thaijo.org/index.php/jsel/article/view/21840/18832>
- Punthumasen, P. (2007). *International program for teacher education: An approach to tackling problems of English education in Thailand* The 11th UNESCO-APEID International Conference Reinventing Higher Education: Toward Participatory and Sustainable Development, Bangkok, Thailand. <http://backoffice.onec.go.th/uploaded/Category/EngBook/ProblemEngEd13dec07-03-03-2011.pdf>
- Schoepp, K. (2018). Predictive validity of the IELTS in an English as a medium of instruction environment. *Higher Education Quarterly*, 72(4), 271-285. <https://doi.org/https://doi.org/10.1111/hequ.12163>
- Schoonen, R. (2019). Are reading and writing building on the same skills? The relationship between reading and writing in L1 and

- EFL. *Reading and Writing*, 32(3), 511-535.
<https://doi.org/10.1007/s11145-018-9874-1>
- Shuttleworth, M. (2009). *Predictive Validity*. Explorable.com. Retrieved December, 5 2021 from <https://explorable.com/predictive-validity>
- Survey Monkey. (2016). *Sample Size Calculator*.
<https://www.surveymonkey.com/mp/sample-size-calculator/>
- Swift, S. (2012). *An ELT Glossary: Predictive Validity*. Retrieved December 5, 2021 from <http://eltnotebook.blogspot.com/2012/01/an-elt-glossary-predictive-validity.html>
- U.S. Department of Labor Employment and Training Administration. (1999). *Understanding of reliability and validity*.
https://www.hr-guide.com/Testing_and_Assessment/Reliability_and_Validity.htm
- Vu, L. T., & Vu, P. H. (2013). Is the TOEFL Score a Reliable Indicator of International Graduate Students' Academic Achievement in American Higher Education? *International Journal on Studies in English Language and Literature*, 1(1), 11-19.
https://www.arcjournals.org/pdfs/ijsell/ijsell_3.pdf
- Wudthayagorn, J. (2018). Mapping the CU-TEP to the Common European Framework of Reference (CEFR). *LEARN Journal: Language Education and Acquisition Research Network Journal*, 11(2), 163-180. <https://so04.tci-thaijo.org/index.php/LEARN/article/view/161641/116576>