

CRITICAL THINKING DISPOSITIONS OF UNDERGRADUATE
STUDENTS AT AN EMI FOUNDATION UNIVERSITY IN TÜRKİYE:
PERCEPTIONS OF STUDENTS AND CONTENT PROFESSORS

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A THESIS SUBMITTED
FOR
THE DEGREE OF MASTER OF ARTS
IN

TEACHING ENGLISH AS A FOREIGN LANGUAGE

İHSAN DOĞRAMACI BILKENT UNIVERSITY
ANKARA

AUGUST 2025

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2025

Critical Thinking Dispositions of Undergraduate Students at an EMI Foundation

University in Türkiye: Perceptions of Students and Content Professors

The Graduate School of Education

of

İhsan Doğramacı Bilkent University

By

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In Partial Fulfilment of the Requirements for the Degree of

Master of Arts

in

Teaching English as a Foreign Language

The Department of English Language Teaching

Ankara

August 2025

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GRADUATE SCHOOL OF EDUCATION

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July 2025

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Teaching English as a Foreign Language.

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ABSTRACT**CRITICAL THINKING DISPOSITIONS OF UNDERGRADUATE STUDENTS AT
AN EMI FOUNDATION UNIVERSITY IN TÜRKİYE: PERCEPTIONS OF
STUDENTS AND CONTENT PROFESSORS**

Nicole Ayça Kassas Elmas

MA in Teaching English as a Foreign Language

Advisor: Asst. Prof. Dr. Tijen Akşit

July 2025

This study investigates the critical thinking disposition (CTD) of undergraduate students at an EMI foundation university in Türkiye, as perceived by the students themselves and by their content professors. A survey was used to collect quantitative data from undergraduate students and content professors using the University of Florida Engagement, Maturity, Innovativeness (UF/EMI) critical thinking disposition instrument. Descriptive and inferential statistical analyses were used to explore and compare students' and content professors' perceptions of students' CTDs overall and in terms of the subconstructs *Engagement*, *Cognitive Maturity*, and *Innovativeness* according to various demographic variables. Students (N = 82) reported moderate CTDs, and no overall significant difference was observed with regard to the demographic features of the students, although attendance in the pre-sessional English preparatory program was significant in terms of students' Innovativeness. Content professors (N = 50) reported low moderate perceptions of student CTDs. No significant differences were observed for overall disposition. Most notably, significant differences emerged between student and professor perceptions, with professors perceiving students significantly lower than the students perceived themselves for overall CTD, and all three sub-constructs. These findings highlight potential mismatches between student self-perceptions and faculty expectations regarding critical engagement and suggest areas for context-aware approaches to fostering critical dispositions in EMI higher education.

Keywords: Critical thinking, critical thinking dispositions, English for academic purposes, English medium instruction

ÖZET

TÜRKİYE'DE EĞİTİM DİLİ İNGİLİZCE OLAN BİR VAKIF ÜNİVERSİTESİ LİSANS ÖĞRENCİLERİNİN ELEŞTİREL DÜŞÜNME EĞİLİMLERİ: KENDİLERİNİN VE ÖĞRETİM ELEMANLARININ ALGILARI

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Yabancı Dil Olarak İngilizce Öğretimi Yüksek Lisans Programı

Tez Danışmanı: Dr. Öğr. Üyesi Tijen Akşit

Temmuz 2025

Bu çalışma, Türkiye'de eğitim dili İngilizce olan bir vakıf üniversitesi lisans öğrencilerinin eleştirel düşünme eğilimlerinin kendileri ve alan öğretim elemanları tarafından nasıl algılandığını araştırmaktadır. Florida Üniversitesi Katılım, Bilişsel Olgunluk, Yenilikçilik (UF/EMI) eleştirel düşünme eğilim ölçeği kullanılarak lisans öğrencileri ve alan öğretim elemanlarından nicel veri toplanmıştır. Öğrencilerin ve alan öğretim elemanlarının çeşitli demografik değişkenlere göre öğrencilerin genel eleştirel düşünme ve *Katılım, Bilişsel Olgunluk, Yenilikçilik* eğilimlerine ilişkin algılarını keşfetmek ve karşılaştırmak için tanımlayıcı ve çıkarımsal istatistiksel analizler kullanılmıştır. Öğrenciler orta düzeyde eleştirel düşünme eğilimleri bildirmiş ve öğrencilerin demografik özelliklerine göre genel olarak anlamlı bir fark gözlenmemiştir, ancak İngilizce hazırlık programına katılım öğrencilerin Yenilikçiliği açısından anlamlı olduğu belirlenmiştir. Alan öğretim elemanları, öğrencilerin eleştirel düşünme eğilimlerine ilişkin düşük orta düzeyde algılar bildirmiş ve genel eğilim için anlamlı bir fark gözlenmemiştir. En kayda değer bulgular ise öğrenci ve öğretim elemanı algıları arasında çıkan anlamlı farklar olmuştur. Alan öğretim elemanları, öğrencilerin genel eleştirel düşünme eğilimi ve üç alt yapısı için öğrencilerin kendilerini algıladıklarından önemli ölçüde daha düşük algılamıştır. Bu bulgular, eleştirel katılıma ilişkin öğrencilerin öz algıları ile alan öğretim elemanlarının beklentileri arasındaki olası uyumsuzlukları vurgulamaktadır ve eğitim dili İngilizce olan yüksek öğretimde eleştirel eğilimleri teşvik etmek için bağlamsal yaklaşımlar önerilmiştir.

Anahtar kelimeler: Eleştirel düşünme, eleştirel düşünme eğilimleri, akademik amaçlı İngilizce, eğitim dili İngilizce

ACKNOWLEDGEMENTS

Nothing worth doing is done alone, and that is what makes every accomplishment worthy of a collective sigh of relief followed by hearty celebration. This thesis is truly the result of the contributions, motivations and support provided by others.

First and foremost, I would like to express my deepest gratitude to my advisor, Asst. Prof. Dr. Tijen Akşit, for her invaluable guidance, constant support, and unwavering encouragement throughout this research process. Her insightful feedback, academic expertise, and genuine care have been instrumental in shaping the direction and quality of this work.

I am also sincerely thankful to Asst. Prof. Dr. Necmi Akşit, Director of the MA TEFL program, for guiding me through very unfamiliar waters and addressing my tireless questions with thoughtful patience, regardless of how off the mark some of my queries may have been; his leadership and encouragement have played a crucial role in shaping my academic growth.

To all my friends in the MA TEFL program, thank you. I have learned and received so much from you, and I feel privileged to have shared this experience with you.

Finally, I extend my heartfelt thanks to my family for their love, support and patience through the various challenges we found ourselves up against. Their belief in me kept me going, even during the most difficult moments.

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LIST OF ABBREVIATIONS

CEAP	Critical English for academic purposes
CT	Critical thinking
CTD	Critical thinking disposition
EAP	English for academic purposes
EGAP	English for general academic purposes
ESAP	English for specific academic purposes
EMI	English medium instruction
TMI	Turkish medium instruction

CHAPTER 1: INTRODUCTION

Introduction

Critical thinking (CT) is forefront among the skills that are considered essential for educational, professional and social life in the 21st century (Luna Scott, 2015). Consequently, great emphasis is placed on it globally by educators and employers alike, despite reports of varying success (Davies & Barnett, 2015). Though the concept of CT as an educational objective has existed since the beginning of the last century, a universally accepted definition has been elusive, and its different conceptualisations continue to spark debate.

Nevertheless, there appears to be general agreement that CT is a composite of cognitive skills (abilities that can be learned and demonstrated) and affective dispositions (psychological tendencies to act in certain ways), the combined effect of which enables the effective practice of CT (Facione, 1990).

In an increasingly globalised world, this growing emphasis on the importance of CT has coincided with the massive increase in educational institutions around the world offering English medium instruction (EMI). With English increasingly becoming the “language of international communication” (Richard & Pun, 2022, p. 24), addressing the language needs of students studying in EMI institutions has emerged as a priority. Thus, English for academic purposes (EAP) gained momentum as a means of providing language instruction alongside academic skills and literacies.

The development of students’ CT skills is frequently cited among the main objectives of EAP programs (Moore, 2017). However, there is as yet little consensus

as to whether and how dispositions can be developed, whether they are subject-specific or applicable across different contexts, and what factors may encourage or hinder their development.

This study aims to investigate the critical thinking dispositions (CTDs) of undergraduate students as perceived by themselves and their content professors at an EMI higher education institution that emphasises the importance of CT in tertiary education as expressed in its mission statement and evident in its approach to both EAP instruction and teaching across all disciplinary subjects. The examination of the differences and similarities in perceptions also provides a greater understanding of the factors that may play a role in the cultivation of CTDs.

Background

In the 21st Century, the skill sets that are required of individuals are markedly different from those expected just decades before, and great emphasis is being placed by educators, prospective employers, and policymakers on the necessity of cultivating these skills (Kocak et al., 2021; Liu et al., 2014). In particular, CT has been highlighted as being crucial to the success of individuals in both academic and social settings (Dwyer et al., 2014), and as central to becoming self-confident, self-reliant, and efficient when manoeuvring through the challenges and complexities of all aspects of life (Njiraini, 2016).

The concept of CT is often attributed to Dewey (1910), who used the term ‘reflective thinking’ to mean “judgment suspended during further inquiry”, which “involves overcoming the inertia that inclines one to accept suggestions at their face value” (p. 13). Later coined ‘critical thinking,’ the concept was not emphasised as a necessary skill in education until the 1980s (Ennis, 2015). Today, the need for highly developed CT skills can be attributed to globalisation and the unprecedented speed of

technological change; the realities of our world are changing, making it necessary for us to adapt to the new ways of interacting with and experiencing the world (Njiraini, 2016).

However, while the development of CT skills was and still is frequently cited as a primary objective across the curriculum in higher education contexts, it has been reported that educators are unclear about the exact definition of CT and are unsure of how to foster and measure it (Bissell & Lemons, 2006). Consequently, a disparity has been encountered between the stated need for CT and what is practised at higher education institutions (Dwyer et al., 2014; Kocak et al., 2021), with very small gains being measured in the generic and CT skills of students during their time in higher education (Van Damme et al., 2023).

This growing emphasis on CT has coincided with the rise in EMI institutions across the world. In an increasingly globalised world, English has emerged as the lingua franca of education (Galloway & Rose, 2021), and with it, a rapid growth in the number of EMI institutions has been witnessed globally. Türkiye is no exception to this trend, with a noteworthy increase in institutions at all levels of education offering EMI being witnessed in recent years (Tezcan-Ünal & Schmitt, 2022).

This expansion of EMI has also foregrounded the role of EAP programmes tasked with addressing the language and academic skills needs of students for whom English is not their first language (Bell, 2024). Alongside the requisite language skills, the development of critical and higher order thinking skills is often among the curricular objectives of many EAP programs, in order to prepare them for the many facets of higher education (Hyland & Hamp-Lyons, 2002).

However, despite its central place in the curricula of educational institutions, it has been suggested that there is a lessening concern with CT in practice (Davies &

Barnett, 2015), and that the increased decontextualization of the teaching of CT skills has led to the detachment of the practice of CT from its purpose of personal and social transformation (Kincheloe, 2000). This has become particularly evident with what Giroux (2009) describes as the increasing corporatisation of higher education and the resulting threat to its role as a site of critical and social engagement. Such criticisms of “mainstream” approaches to CT foreground the joint goal of critical pedagogy and critical thinking, which is the development of autonomous thinking for the purpose of the empowerment of the individual (Duhan-Kaplan, 1991; Kincheloe, 2000).

Within this context, Davies and Barnett (2015) identify three interconnected perspectives of critical thinking: philosophical (“rigorous thinking”), educational (“critical attitude”), and socially active (“societal critique” and “critical action”) (p. 6). In short, they distinguish between CT and criticality, with the former describing a level of awareness and the latter a combination of “thinking, being, and *acting*” (emphasis in original, p. 15). In this model, it is not sufficient to simply think; one must also be *disposed* to think and act critically.

In 1990, an inquiry by an interdisciplinary panel of experts resulted in the “Delphi Report” (Facione, 1990), which both defined CT and highlighted the importance of the combined effects of CT skills and dispositions. Other scholars have since stressed the necessity of CTDs, a disposition being the tendency or inclination to do something under certain conditions (Ennis, 1996). The Delphi Report later led to the development of the California Critical Thinking Disposition Inventory (CCTDI), and some years later, researchers at the University of Florida developed the UF/EMI scale, which measured CTD in terms of ‘Engagement’, ‘Cognitive Maturity’, and ‘Innovativeness’ (Lamm, 2016). These, among other

scales, have been used to measure the CTDs of different stakeholders in various contexts.

Statement of the Problem

It is widely accepted that the acquisition and employment of CT skills are essential, yet there does not appear to be a consensus on how this should be achieved (Davies & Barnett, 2015). What many researchers do agree on, though, is that explicit instruction is necessary for their effective development (Abrami et al., 2008; Hitchcock, 2017). Of equal significance are CTDs, which have been recognised as playing a mutually supportive role alongside CT skills (Abrami, 2008; Facione, 1990). As a necessary factor in developing the critical individual and enabling critical engagement in social practices, CTDs should be included in any conceptual model of CT (Davies & Barnett, 2015).

The incorporation of CTDs into educational programs is thus of paramount importance, and a better understanding of CTDs is needed for their explicit and effective inclusion. However, despite consensus among educators and employers about the importance of critical thinking, its development to date has been seen to be insufficient at all levels of education in the United States (Davies & Barnett, 2015; Tsui, 2002).

This has also been shown to be a concern in Europe, where an OECD report showed significant variation in the literacy skills of higher education graduates (Van Damme, 2022). The data from Türkiye, which placed last on the list, reveals a concerning picture. On the adult literacy scale of 1 to 5 (with 1 being lowest and 5 highest), only 2.5% of Turkish graduates were able to score 4 or 5, while 20% scored below 1, a percentage far higher than the 5% average across OECD countries (Van Damme, 2022).

In another OECD report about assessment practices in Türkiye, Kitchen et al. (2019) indicate teachers' insufficient understanding of the curriculum as a possible reason for the low CT levels of students. Although the question of teacher preparedness to tackle CT in the classroom has been investigated by several researchers, no definitive conclusion has been reached. A meta-synthesis study of qualitative research on CT skills in Türkiye by Polat (2015) revealed that even though the curriculum at almost every level of education placed sufficient emphasis on critical thinking, and pre-service teachers displayed higher than average awareness of the concept, they did not feel confident in their ability to effectively teach it in an educational setting.

Conversely, in a study investigating the CT levels of pre-service teachers and their attitudes towards and self-efficacy beliefs about teaching for critical thinking, Akdere (2012) found that despite moderate attitudes and self-efficacy beliefs, participants had a below-average level of critical thinking. A systematic review of research examining the CT skills and dispositions of pre-service teachers in Türkiye concluded that, in most studies, the concept of CT was considered only in its most traditional, skills-based understanding, with a much smaller proportion approaching it in terms of its socially transformative potential (Yıldırım-Taştı & Yıldırım, 2022).

In addition to the cultural context, the role of language proficiency in CT skills and dispositions has also been examined. While Alagözlü & Süzer, (2010) found no significant difference between Turkish and English texts produced by English language instructors in Türkiye in terms of evidence of critical thinking, a study conducted with first- and second-year Japanese university students concluded that both explicit instruction for critical evaluation and higher language proficiency were positively correlated with critical evaluation skills (Manalo & Sheppard, 2016).

These findings have significance when considered in terms of the growing trend of English medium instruction (EMI) in higher education across the world. Today, there is an unprecedented global increase in EMI (Richards & Pun, 2022), consequently, in order to take into account the contextual factors at play, there is a need for research on CTDs conducted in non-Anglophone educational contexts where language proficiency and previous exposure to academic language and skills instruction may be a major influencing factor.

EMI is also being implemented by an increasing number of tertiary-level institutions in Türkiye. In response to this growing trend, a baseline study of English language provision in universities across Türkiye was conducted jointly by the British Council and the Economic Policy Research Foundation (TEPAV) in 2015 (British Council & TEPAV, 2015). The resulting report drew attention to various issues with regard to EMI in Türkiye. Among these concerns was the low English language proficiency of both academic staff and students, with recommendations being made for raising the entry and exit levels of English preparatory programs, and shifting from general English classes to more academically oriented English for general academic purposes (EGAP) courses that include CT components (British Council & TEPAV, 2015).

In response to the increasing language demands of EMI policies in higher education, Turkish universities began to offer English language preparatory programs to incoming students whose English proficiency was insufficient for academic study (Tezcan-Ünal & Schmitt, 2022). While the primary goal of these classes is to advance the academic English skills of the students, they are also potential sites for the development of CT skills and dispositions due to their openness to interdisciplinarity and the introduction of cultural and social issues into course

content (Glynn & Spenader, 2020, p. 73). However, the question remains as to the transferability of these skills, their evolution through the course of the degree, and expectations across disciplines following their initial acquisition.

Previous studies conducted in Türkiye have examined the CTDs of pre-service teachers (Aybek, 2018; Bakır, 2015; Çevik, 2013; Coşkun & Karahan, 2023; Kutluca, 2018; Taşkesen, 2019), undergraduate students (Beşer & Kıssal, 2009; Karahan & İskifoğlu, 2020; Karakoç, 2021; Loomis, 2024; Özyurt, 2015; Tümkaya, 2009), and preparatory program students (Alpat, 2019; Çam, 2023; Genç, 2017; Güncü, 2018; Gündüz, 2017; Kök, 2020) with varying findings.

Purpose

The purpose of this study is to examine the CTDs of undergraduate students studying in an EMI foundation university in Türkiye as perceived by themselves and by their content professors (members of the teaching faculty teaching disciplinary content as opposed to language instruction). As English is the medium through which teaching, learning, and academic interaction take place, the university places great importance on addressing the language needs of students through EAP courses, including required freshman year EGAP courses as well as elective discipline-specific and joint language and content courses.

Hyland (2016) describes EAP as “a means of *empowering* students with the knowledge and skills they need to succeed in their studies and professional careers” (p. 23, emphasis added), thereby highlighting the role of EAP as extending beyond simply language and study skills instruction. Rather, EAP is considered a means of initiating students into the culture of academia and academic language use. Thus, students are taught specific skills related to academic reading, writing, listening and

speaking, which target the development of thought processes rather than just language competency (Flowerdew, 2019).

To this end, compulsory EGAP courses are offered to all students in their freshman year (ENG 101 and ENG 102). The content of these courses is ‘common core’ in that their basic features are considered to be relevant and transferable to all disciplines, and include such language skills as listening to lectures, note-taking, reading academic texts, and writing essays and reports (Flowerdew & Peacock, 2001; Hyland & Hamp-Lyons, 2002; Johns & Dudley-Evans, 1991).

Increasingly, CT has also become a component considered essential to such courses (Moore, 2017), and these EGAP courses are no exception with their clearly defined additional goal of developing student criticality in addition to language and academic skills, with an emphasis on argumentative speaking and writing (Aksit & Aksit, 2021).

Using the UF/EMI, this study aims to examine the CTDs of undergraduate students, according to the perceptions of the students and the content professors from the disciplines. The study further investigates whether the CTDs as perceived by the students differ according to their a) discipline of study, b) academic semester enrolled in, c) attendance in pre-sessional language preparatory program, d) letter grade received from the EGAP courses ENG 101 and ENG 102, e) cumulative grade point average (CGPA), and f) gender. The differences in the content professors’ perceptions are also examined in relation to their a) disciplines, b) years of experience teaching at the tertiary level, c) academic rank, d) age, and e) gender. Finally, possible differences in the perceptions of students and content professors will be investigated.

In so doing, the findings are examined in light of how perceptions of the disposition to think critically may be related to various demographic factors, and whether they evolve over time and in response to students' extended exposure to discipline-specific requirements. The findings are also examined for any significant differences between students' and content professors' perceptions of students' CTDs.

Research Questions

The research questions guiding this study are:

1. What critical thinking dispositions do undergraduate students have at an EMI foundation university in Türkiye
 - a. as perceived by themselves?
 - b. as perceived by the content professors?
2. Do the critical thinking dispositions as perceived by the students differ according to their
 - a. discipline of study?
 - b. academic semester enrolled in?
 - c. attendance in the pre-sessional language preparatory program?
 - d. letter grade received from EGAP courses
 - i. ENG 101?
 - ii. ENG 102?
 - e. Cumulative grade point average (CGPA)?
 - f. age?
 - g. gender?
3. Do content professors' perceptions of their students' critical thinking dispositions differ according to their
 - a. discipline?

- b. years of teaching experience?
 - c. academic rank?
 - d. age?
 - e. gender?
4. Is there a significant difference between students' perceptions of their critical thinking dispositions and professors' perceptions of student critical thinking dispositions?

Significance of the Problem

The tremendous global increase in EMI highlights the need to consider the CTDs of students from a perspective that takes into account demographic, social, and language-related factors.

In this context, the role of EAP gains prominence in the cultivation of CTDs of students. EAP entails the teaching of English for use in an educational context and, as such, one of its major goals is to facilitate the academic practice of students by simultaneously addressing their language needs and teaching them the research and study skills that will help them succeed (Hyland & Hamp-Lyons, 2002). Though EAP was originally aimed at non-native speakers of English to help them engage effectively in higher education, it has evolved to encompass language and academic literacy skills based on competencies rather than linguistic form, thereby becoming as relevant for native speakers of English entering higher education for the first time as for non-native speakers of English (Hyland, 2006).

Empowering students to critically engage with the world around them is also increasingly becoming one of the objectives of EAP programs as practitioners have begun to question the wider social, cultural, and political implications of its purpose and implementation (Macallister, 2016).

The context for this study was selected specifically for its emphasis on excellence in EAP instruction as well as the value it places on critical thinking. The pre-sessional English language program is amongst the most reputable in the country, and the in-sessional EGAP courses are unique in their curriculum design, purposefully incorporating progressivist and reconstructionist ideologies to encourage higher-order thinking skills and an aspiration for social transformation while still developing necessary academic skills (Aksit & Aksit, 2021). Few, if any, other Turkish higher education institutions have a program of such breadth and depth with goals that address the language needs of students while simultaneously encouraging the development of their CT skills and dispositions. Consequently, an examination of student and content professor responses to items pertaining to communication and language use is particularly important for informing EAP instructional methods in both the English language preparatory program and EGAP courses.

The results of the study are of value in terms of examining the perceptions of students and content professors of students' CTDs with regard to the variables being examined, as well as in light of any disparities that can be seen between the two, which may be addressed at a curricular and pedagogical level. Furthermore, this study contributes to the literature in terms of the EMI-specific contextual factors that may warrant further research.

Definition of Key Terms

Critical thinking: “purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based” (Facione, 1990, p. 2)

Critical thinking disposition: An affective state that signifies an attitude and readiness towards engaging in critical thinking (Davies & Barnett, 2015)

English for academic purposes: the teaching of English as a second/foreign language for use in academic settings (Hyland & Hamp-Lyons, 2002)

English for general academic purposes: The teaching of the English language and general academic skills that are applicable across disciplines to speakers of other languages so that they are able to function in an academic environment (Aksit & Aksit, 2021)

English medium instruction: “the use of the English language to teach academic subjects (other than English itself) in countries or jurisdictions in which the majority of the population’s first language is not English” (Macaro, 2022, p. 534).

Content professors: Members of the teaching faculty at the tertiary level who are “generally only committed to the teaching of their academic subjects” and “do not regard the students’ use or learning of English as their responsibility” (Richards & Pun, 2022, p. 23).

UF/EMI: An instrument designed by researchers at the University of Florida to measure the critical thinking disposition constructs of Engagement, Cognitive Maturity, and Innovativeness (Irani et al., 2007).

The Engagement disposition: A subscale of the UF/EMI measuring the “predisposition to looking for opportunities to use reasoning; anticipating situations that require reasoning; and confidence in reasoning ability” (Ricketts & Rudd, 2004, p. 24).

The Cognitive Maturity disposition: A subscale of the UF/EMI measuring the “predisposition to being aware of the complexity of problems; being open to

other points of view; and being aware of their own and others' biases and predispositions” (Ricketts & Rudd, 2004, p. 24).

The Innovativeness disposition: A subscale of the UF/EMI measuring the “predisposition to be intellectually curious and desire to know the truth” (Ricketts & Rudd, 2004, p. 24).



CHAPTER 2: REVIEW OF THE LITERATURE

Introduction

This study investigates the critical thinking dispositions of undergraduate students studying at an EMI university in Türkiye, both in terms of how they perceive themselves and how they are perceived by their content professors. The study further explores how the perceptions of the students may differ based on the variables of their discipline of study, academic semester, attendance at the pre-session English language preparatory program, letter grades they received from the EGAP courses ENG 101 and ENG 102, CGPA, age, and gender. Content professor responses are also examined in terms of differences across content professors' disciplines, years of teaching experience, academic rank, age, and gender. Finally, the perceptions of students and content professors are compared, and differences between the two are examined.

An overview of critical thinking and critical thinking dispositions as discussed in the literature will be provided in this chapter, including how they have been defined and their significance in educational, social, and professional spheres. The chapter will also examine the relevant literature on EMI education, its development and the various benefits and challenges associated with it. Next, the increasingly central role of EAP in the context of the internationalisation of education will be considered, as well as its role in enhancing critical thinking in students. Finally, research on the critical thinking dispositions of students in higher education contexts globally and in Türkiye is examined for further insight.

Critical Thinking

Over the past few decades, CT has emerged as one of the core skills that is commonly considered an essential outcome of all levels of education. In today's fast-paced, diverse, and dynamic world, CT is consistently cited as one of the 21st century skills that are vital for social, professional, and civic life (Luna Scott, 2015; Njiraini, 2016). However, despite its professed importance, CT has proven to be somewhat elusive both in terms of its definition and its cultivation in learners (Davies & Barnett, 2015).

Although it is possible to trace the history of CT as far back as ancient Greece and the teachings of Socrates (Lampert, 2007), the more contemporary conceptualization of critical theory is attributed to Dewey, the philosopher and educational reformer, who used the term “reflective thinking” to describe the process of delaying judgment until after purposeful consideration of beliefs or knowledge (Dewey, 1910).

CT received much attention from proponents of the progressive education movement over the next half-century and was considered essential in terms of students' engagement with wider social issues (Little, 2013). During this period, Glaser (1941) described CT as being composed of a disposition to consider problems thoughtfully, knowledge of inquiry methods, and skills in applying these methods. Criticising American education for failing to develop CT in students, he developed an instructional program and the Watson-Glaser Critical Thinking Appraisal to test its outcomes (Sanders & Moulenbelt, 2011).

Over a decade later, Bloom (1956) proposed a classification of observable educational goals that ranged from lower to higher order thinking skills with increasing complexity: knowledge, comprehension, application, analysis, synthesis,

and evaluation. With the aim of assisting educators in assessment and curriculum design, the higher order thinking skills are seen as being closely associated with the cognitive aspect of CT (Davies, 2015).

In the 1970s and 1980s in North America, a surge in interest in CT was witnessed, with many new theories and conceptualisations of CT emerging alongside an effort by universities to offer courses to support its development in students (Hitchcock, 2017). This growing attention placed on CT only served to make a universally accepted conception of CT more difficult to achieve. In his examination of the place of CT in education, McPeck (1981) even lamented that the phrase itself was so “over-worked and under-analysed” (p.2) that little attention was being paid to what the concept actually means.

This growing interest in CT and the resulting uncertainties regarding what it meant and how it was to be taught and assessed prompted the American Psychological Association to establish an interdisciplinary committee to conduct a systematic inquiry, which culminated in the Delphi Report (Facione, 1990). The report defined CT as “purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based” (Facione, 1990, p. 2). In addition to providing a definition for critical thinking, the report also highlighted the importance of affective dispositions alongside cognitive skills for fully and effectively engaging in critical thinking.

Today, more than ever, CT is considered an essential component for achieving success in education, the workforce, and social life in general (Ennis, 2018; Thonney & Montgomery, 2019). Despite general agreement about its importance and major

features, a lack of consensus regarding specific characteristics and competencies continues to persist (Hart, 2021; Liu et al., 2014).

This is due in part to the fact that research on CT comes from the three distinct fields of philosophy, cognitive psychology, and education (Thonney & Montgomery, 2019). Consequently, any initial agreement on the definition of CT along conceptual lines frequently results in disagreements when attempts are made to define more concretely what CT is and what it entails (Bailin et al., 1999), which has been shown to present a hurdle in interdisciplinary collaborations (Sanders & Moulenbelt, 2011).

Despite some disparities in approaches from different disciplines, CT maintains its importance as an essential facet of education. In addition to its mediating role in such processes as problem-solving and decision-making (Butler & Halpern, 2020), CT is considered to be crucial for processing and evaluating new information, the proliferation and dissemination of which has reached new and unimaginable heights (Dwyer, 2014). Ultimately, if people are not equipped to approach this information overload critically, then, as Halpern (1998) aptly observes, “they are in danger of having all of the answers but still not knowing what the answers mean” (p.450).

Even though the importance of CT is professed and its inclusion in educational curricula across contexts is all but guaranteed, it has been suggested that students at both the secondary and tertiary levels still do not display the necessary CT competencies (Ennis, 2018; Luna Scott, 2015), and there is evidence that graduates’ CT skills are not sufficiently developed for effective functioning in the wider world. A recent OECD report (Van Damme, 2022) found that although the automation of most routine job-related tasks has led employers to place greater value

on skills such as critical thinking, problem-solving, and creativity, higher education graduates do not display the necessary mastery of these skills. In fact, looking at the general trend, over the past 20 years, skill levels have either been maintained or have declined even among the highest-scoring countries (Van Damme, 2022).

It is, however, worth noting that Türkiye places last among 29 countries, with almost 20% of its university graduates receiving the lowest possible score for literacy proficiency (Van Damme, 2022). It is clear from the report that a tertiary level education does not guarantee high literacy levels, nor does it ensure uniformity in the skills attained. Significantly, the authors indicate that “foundation skills ... are not primarily supposed to be acquired in higher education” (Van Damme, 2022, p. 21). This means that these skills signalling readiness for participation in civic and professional life should normally be acquired in the earlier stages of education. In the case of Türkiye, it has been suggested that the secondary school system in its current form is not equipped to do so; due to the emphasis placed on the national exams, the type of learning, classroom practices and assessments employed for students to achieve success in these examinations do not favour the development of competencies such as CT (Kitchen et al., 2019). However, studies of middle school (Meral & Taş, 2017) and high school (Demir, 2022; Orhan, 2022) students in Türkiye report moderate to high CTDs in students, which appears to dispute this position.

Nevertheless, the general decrease in these essential skills, as presented in the report, is undeniable and appears almost universal. Ultimately, education at all levels is the prime context where this trend can be addressed and, hopefully, reversed.

Abrami et al. (2008), following their meta-analysis of teaching interventions for critical thinking, report that explicit teaching is necessary for students to develop the required skills. However, it has been reported that content professors from different

disciplines have differing conceptions of critical thinking (Tang, 2023), and it has further been suggested that they may not have sufficient understanding of CT and how it is to be cultivated and recognised (Choy & Chea, 2009). Davies and Barnett (2015) argue that the problem may be a broader one, stemming from the absence of a model for teaching CT which also extends into social and professional life.

Furthermore, conceiving of CT as simply a set of skills to be learned at school and then demonstrated in the workplace ignores its potential for ethical and social action. Bailin (1994) reminds us that its “fundamental commitment is to responsible belief and action rather than to particular principles of good thinking” (p. 294), and this apparent dissociation of the CT movement from a socially grounded and transformative critical orientation has been critiqued by various others (Barnett, 2015; Duhan-Kaplan, 1998; Kincheloe, 2000). Kincheloe (2000) argues against this trend of “uncritical critical thinking”, which he claims is simply a collection of skills that is divorced from the realities of our lives, and asserts that “this separation of various contexts from cognition” is one of the underlying reasons for why CT programs are largely ineffective.

In their model of critical thinking, Davies and Barnett (2015) adopt a similar stance by emphasising the existence of both the individual and sociocultural dimensions of critical thinking. Their argument rests on the premise that the skills and dispositions making CT possible relate to the development of the individual dimension, whereas the moral and cultural aspects of CT are associated with the sociocultural dimension, which is where critical citizenship emerges (Davies, 2015).

Thus, Davies and Barnett’s (2015) proposed model incorporates the multiple and interconnected axes of critical thinking, critical doing, and critical participation. In this model, students must do more than display the ability to think critically, they

must also be able to act ethically based on the conclusions they come to, thereby elevating the role of higher education to one “of enabling students to reach a level of ‘transformatory critique’” (Davies & Barnett, 2015, p. 17).

This perspective is supported by Scott (2009), who maintains that “a fundamental purpose of schools is to prepare our future citizens to be stakeholders in society” and posits that teaching and modelling democratic values at schools are the necessary foundations for the development of critical individuals. The link between democratic education and CTDs was investigated by Uluçınar and Aypay (2018), who reported that the critical dispositions of pre-service teachers predicted democratic values, while Gültekin (2024) found that CTDs in undergraduate students predicted social justice.

Critical Thinking Dispositions

CT has become associated not only with a set of necessary skills to be developed but, just as essentially, with the *disposition* to use those skills (Bailin et al, 1999; Ennis, 1996; Facione, 1990; Glaser, 1941; McPeck, 1981; Perkins et al, 1993).

According to various scholars, the CT skills possessed by an individual must necessarily be complemented by an affective disposition to use those skills. Indeed, it is these dispositions that are the driving force behind the impetus to think critically in any given situation. McPeck (1981) emphasizes that having CT skills alone would be insufficient and that “[o]ne must also develop the disposition to use those skills” (p. 19), while the Delphi Report (Facione, 1990) likened it to watering a thirsty plant, wherein “the affective dispositions are necessary for the CT skills identified to take root and to flourish in students” (p. 11).

These affective states, or habits of mind, indicate an inclination or “psychological readiness” to engage with something critically (Davies & Barnett,

2015, p. 13) and are further described by Facione (2000) as the “consistent internal motivation” (p. 64) to think critically. Various scholars thus distinguish between being *able* and being *willing* to be critical, arguing that although both are necessary for CT to take place, one does not necessarily preclude the other (Ennis, 1996, 2018; Facione, 2000; Hamby, 2015).

The foregrounding of motivation in the conceptualisation of the disposition to think critically plays a central role in various subsequent theories and studies.

Perkins et al. (1993) proposed a dispositional model of “good thinking”, arguing that skills and abilities alone do not automatically result in certain behaviour, and that dispositions (which they associated with motivation) were required to spur us into action. Hamby (2015) has further emphasised the dual roles of motivation and CTD, and contends that “regardless of the CT skill, without a motivation to use it and a tendency to actually employ it in a process of inquiry, I will either not employ it at all, or not employ it appropriately” (p. 82). Following their study of CTDs, Nieto and Valenzuela (2012) also drew the conclusion that dispositions are a combined effect of motivation and mental habits, whereby the relative contribution of both depends on how practised a person is in critical thinking: motivation contributes more where practice is deficient, and mental habits increase with motivated practice.

These discussions of the distinctions between the skill and dispositional aspects of CT have also raised questions about their general applicability across disciplines. McPeck (1981) argues that all thinking is *about* something, and in order for someone to engage in critical thinking, they must have the subject- or discipline-specific knowledge and skills to think critically about related issues. In his discussion of infusion (discipline-specific CT skills) and stand-alone (generic CT skills) models of CT instruction, Hitchcock (2017) also voices concern about the ability to transfer

CT skills across domains, arguing that the lack of knowledge about a subject would make critical evaluation of it difficult. However, Ennis (1996) cautions that a distinction must be made between dispositions and skills, and that CTDs are tendencies that are considered generally desirable and should thus be more subject-neutral. Giancarlo and Facione (2001) further emphasise that CTDs are “a relatively stable and enduring aspect of one’s personality” and are therefore not constrained by context, making them more widely applicable.

After the publication of the Delphi Report, the focus that had previously primarily been on the skills associated with CT began to also take into account its dispositional aspects. The California Critical Thinking Disposition Inventory (CCTDI) was thus developed using the Delphi Report as a framework. Designed to assess a person's disposition towards CT, it purports to measure 7 different dispositions associated with CT: “truth-seeking, open-mindedness, analyticity, systematicity, [critical thinking] self-confidence, inquisitiveness, and maturity of judgment” (Facione, 2000, p. 74).

Some years later, researchers at the University of Florida began working on a new instrument they claimed would measure CTD more accurately (Lamm, 2016). The result of their efforts was the “UF/EMI”, which was also based on the Delphi Report framework and measured the constructs of “*Engagement*, [cognitive] *Maturity*, and *Innovativeness*” (Ricketts & Rudd, 2004, p. 24).

The intended dispositions to be measured by each construct are described by early developers, Bisdorf-Rhoades et al. (2005):

- The engagement disposition measures people’s predisposition to looking for opportunities to use reasoning, anticipating situations that require reasoning, and confidence in reasoning ability.

- The cognitive maturity disposition measures predisposition to being aware of the complexity of problems, being open to other points of view, and being aware of their own and others biases and predispositions.
- The innovativeness disposition measures predisposition to be intellectually curious and desire to know the truth. (p. 4)

The UF/EMI and CCTDI have since been used to examine the CTDs of stakeholders across diverse higher educational contexts and demographics, with varying results. The CTDs have thus been measured in undergraduate students in China (Zheng, 2021), Thailand (Boonsathirakul, J., & Kerdsoomboon, 2021), and Türkiye (Karakoç, 2021; Loomis, 2024; Özyurt, 2015); agriculture students (Bisdorf-Rhoades et al., 2005; Lamm et al., 2011; Ricketts & Rudd, 2004), nursing students (Beşer & Kıssal, 2009; Boso, 2021; Wangenstein et al., 2010), in-service ESP teachers (Dwee, et al; 2016), pre-service teachers (Bakır, 2015; Çevik, 2013; Kutluca, 2018; Taşkesen, 2019), and English language preparatory program students (Genç, 2017; Kök, 2020).

English Medium Instruction

Over the past few decades, many education systems have made a move towards internationalisation, both for the purpose of attracting foreign students and as a means of keeping pace with the increasingly dominant place of English within academic and professional environments (Dafouz & Smit, 2016; Galloway & Rose, 2021). This development has resulted in an increase in the number of institutions (particularly in higher education) with English medium instruction (EMI) in both post-colonial countries and other countries where English is taught as a foreign language (Richards & Pun, 2022).

EMI has been defined as “the use of the English language to teach academic subjects (other than English itself) in countries or jurisdictions in which the majority of the population’s first language is not English” (Macaro, 2022, p. 534). Despite attempts to include universities in English-speaking countries within the EMI definition, there has been resistance to this (Galloway & Rose, 2021). Although the challenges experienced by L2 speakers of English in both Anglophone and non-Anglophone EMI contexts cannot be denied and may be comparable on some levels, Macaro (2022) maintains that viewing both contexts through the same lens dismisses the role of policy decisions taken at the national and institutional levels.

Research in EMI, once highly concentrated in Europe, has since begun to appear from other, emerging contexts, such as Asia and the Middle East, with studies from Türkiye making up a large proportion of the latter (Curle et al., 2024). The language policies in Türkiye have been impacted by increasing globalisation and the resulting prominence of English as a lingua franca and its consequent association with “global competitiveness, connectedness, and participation” (Selvi, 2014, p. 141). In fact, its effect on national educational policy is so pronounced that English has become the only foreign language in Türkiye that is required to be taught at all levels of education (Kırkgöz, 2009) and consequently, alongside a number of policy measures, EMI is increasingly being adopted by a growing number of tertiary-level institutions (Tezcan-Ünal & Schmitt, 2022).

EMI in Türkiye is not a new phenomenon, but with the increasing internationalisation of higher education triggered by globalisation, a growing number of universities, especially foundation universities, have adopted an EMI policy in recent years with expectations that the efforts at internationalisation at Turkish higher education institutions will be advantageous, especially in areas such as faculty

development, knowledge production, and increased revenue from international students (Akar, 2010; Akşit & Kahvecioğlu, 2022; Tezcan-Ünal & Schmitt, 2022).

Nevertheless, controversy regarding EMI continues, with arguments ranging from concerns regarding the cultural devaluation of the Turkish language to those questioning the quality of instruction in EMI contexts (Akşit & Kahvecioğlu, 2022; Aslan, 2018). Such developments have led to studies investigating the impact on both students and faculty at EMI universities, with varying findings.

In a large-scale survey of students in EMI higher education across Türkiye, Macaro and Akincioglu (2018) report quite positive responses from students about their experiences and expectations of EMI, despite some concerns and challenges expressed in relation to content comprehension, and females reporting significantly higher hesitancy speaking English in front of others. This is in line with Akşit and Kahvecioğlu (2022), who observed a positive perception of EMI by students, content professors, and English language instructors, citing the higher status of EMI, improvement in their English proficiency, future prospects, and the availability of academic resources as the main reasons. However, despite their general agreement with the advantages of EMI education, some concerns were expressed by both students and content professors regarding lesson effectiveness due to the low proficiency levels of students, though it is worth noting that the content professors were significantly more negative than students about students' language abilities. In another study, Çağatay (2019) found that although they were in support of EMI education in general, a large proportion of students self-reported struggling with involvement in and comprehension of course content.

With regard to the use of L1 in the classroom, in a case study of a state university in Türkiye, Sahan (2021) revealed that practice did not always reflect

policy and that teaching methods and adherence to EMI varied within the same institution. This was also reflected in Özer's (2020) and Yalçın's (2025) studies, where professors indicated some, if limited, use of Turkish during lectures when student comprehension deemed it necessary.

Despite the high self-reported English proficiency of students, Kamaşak et al. (2021) report that students find writing and speaking the most challenging aspects of EMI education. This is supported by Akşit and Kahvecioğlu (2022), who also found high self-reported language proficiency among students and content professors, but with concern expressed by content professors about students' language skills, which they believed was a result of the ineffectiveness of the English preparatory programs.

The quality of the pre-sessional language instruction received has also been found insufficient in other studies by both students (Kirkgöz, 2009) and content professors (Macaro et al., 2016). In particular, students' oral skills have been noted among the major concerns (Macaro et al., 2016; Akşit & Kahvecioğlu, 2020).

English language proficiency has been discussed as one of the most prominent determinants of academic success in various EMI contexts (Feng et al., 2023). Unfortunately, Türkiye consistently ranks poorly in international language proficiency indexes (Tezcan-Ünal & Schmitt, 2022). The value of verbal reasoning skills in particular cannot be overemphasised in an EMI higher education environment, where students are expected to participate in discussions and engage with others in English. Unfortunately, it is "one of the most undervalued and poorly developed set of skills for L2 learners" (Lin et al., 2016). In Türkiye, especially, despite the importance placed by students, EAP instructors, and content professors on speaking skills (Yalçın, 2025), it has been observed that this is frequently the skill that students are weakest at due to a lack of opportunities for practice (British

Council & TEPAV, 2015). Nevertheless, the reports of high perceived competence must not be undermined, as the associated self-confidence has been shown to have a positive effect on the willingness to communicate (Lao, 2020) and to predict language performance (Gutiérrez-Fernández et al., 2025).

EMI content professors have also reported the combined effect of language-related difficulties stemming from teaching content in a foreign language and a lack of pedagogical knowledge as major hurdles (Birgün, 2024; Prabjandee & Nilpirom, 2021), often leading to more teacher-centred instructional methods (Ismailov, 2021). For this reason, it has been recommended that teaching methods in EMI contexts should be reconsidered, with more emphasis placed on student-centred pedagogy with greater interaction between content professors and students (Ismailov, 2021; Sahan et al., 2021), and increased collaboration between content professors and language instructors (Çağatay, 2019; Macaro et al., 2016; Wingate, 2022).

Such issues have led to calls for an EMI pedagogy (Birgün, 2024; Özer, 2022; Prabjandee & Nilpirom, 2021) that takes into account the intersection of academic content and language. In fact, it has been suggested that the internationalisation of higher education in Türkiye, and EMI as its extension, presents a unique opportunity to incorporate new perspectives into existing curricula. Akar (2010) emphasises the value of multi-cultural and critical approaches which are made possible, maintaining that “simply internationalising educational content may remain ineffective if lifelong-learning skills are not integrated into the instructional process” (p. 455).

English for Academic Purposes

The increased internationalisation and marketisation of higher education globally also impacted the growth of EAP (Bell, 2024). Although language learning

is not considered the primary goal of EMI institutions (Curle et al., 2024), improvement of language skills is frequently cited as a reason for enrolment by students and is assumed to be a major factor by policymakers (Akşit & Kahvecioğlu; Galloway & Rose, 2021). For this reason, EAP can be considered an integral facet of EMI, if a somewhat understated one (Wingate, 2022).

English for academic purposes (EAP) entails the teaching of English for use in an educational context. The context is crucial, as a major goal of EAP is to facilitate the academic practice of students by simultaneously addressing their language needs and teaching them the research and study skills that will help them meet the “cognitive, social and linguistic demands” of their disciplines (Hyland & Hamp-Lyons, 2002, p. 2).

EAP first emerged in the mid-1970s as part of the wider movement of the teaching of English for specific purposes (ESP), which purported to meet the distinct academic and professional needs of learners rather than other, more external and general criteria (Ding & Bruce, 2017).

Though EAP was originally aimed at non-native speakers of English to help them engage effectively in higher education, it has evolved to encompass language and academic literacy skills based on competencies rather than linguistic form, thereby becoming as relevant for native speakers of English entering higher education for the first time as for non-native speakers of English (Hyland, 2006).

Due to its context-specific nature, the pedagogical framework of EAP differs markedly from general English courses. Basturkmen (2023) notes that learners in EAP contexts usually, though not always, have some proficiency in English as well as a higher motivation to learn due to the connection between their language studies

and their ultimate academic goals. This emphasis on learners thus makes needs analysis a primary focus of EAP classrooms (Basturkmen, 2023).

Ding and Bruce (2017) also highlight the difference between the teaching of general English and teaching EAP through their recognition of the different research streams that inform EAP practice, such as systemic functional linguistics, genre theory, corpus linguistics, academic literacies, and critical EAP, all of which extend the focus of EAP beyond language instruction.

Furthermore, an examination of the competency framework of the British Association of Lecturers in English for Academic Purposes (BALEAP, 2008) is also revealing in terms of the specific skills and competencies considered desirable for EAP instructors to possess.

Designed to meet the specific requirements of the students for whom they are aimed, EAP programs can take on many forms, and the wide array of skills demanded of students in different disciplines has often led to EAP courses appearing in one of two forms: English for general academic purposes (EGAP) and English for specific academic purposes (ESAP). The former is more interdisciplinary and aims to develop skills that will socialize students into academia and that are transferable across disciplines, the latter, on the other hand, addresses the discipline-specific needs of students (Ding & Bruce, 2017) and is argued by some to be the more relevant and useful approach in the higher-level context (Hyland, 2006, 2016; Hyland & Hamp-Lyons, 2002).

While this stance may have its merits, this is not always possible in the reality of some contexts, where courses are offered in *preparation* for discipline-specific study at the tertiary level (Moore, 2017), as in the Turkish system of pre-sessional

English preparatory programs made compulsory for students who are not considered sufficiently proficient in English to engage in academic study in an EMI context.

EAP courses are also frequently provided to students during their undergraduate studies, and as with pre-sessional courses, students from a variety of different disciplines are often grouped together. For this reason, these courses usually take on the EGAP form and focus on genres, skills and language competencies that are considered to be relevant across disciplines, with the expectation that these will later be used with greater specificity by the student within their disciplines (Basturkmen, 2021). To this end, authentic texts are frequently used as teaching materials that are appropriate for a more generic approach to academic English (Flowerdew, 2019), but which are also open to differentiation to allow for specific focus by students in terms of knowledge or skills gained from their own academic disciplines (Hyland, 2016).

In addition to encouraging students to incorporate discipline specificity to more generic tasks, it has been suggested that general skills can also be taught in a transferable manner. Halpern (2002) contends, “when thinking skills are explicitly taught for transfer, using multiple examples from several disciplines, students can learn to improve how they think in ways that transfer across academic domains” (pp. 69-70), which further amplifies the relevance of EGAP courses.

The transferability of skills across contexts becomes of paramount importance considering the advances in technology and the changing social and cultural dynamics of our rapidly globalising world. The need for individuals to be more flexible and adaptable in their thinking will likely increase the relevance of more widely applicable approaches for critical engagement in education in general and, by extension, in EAP and EGAP instruction. More specifically, the increase in

interdisciplinary collaborations, expanding use of digital media in academia, and growing acceptance of English as an academic lingua franca have been proposed by Flowerdew (2019) as major factors directing the future course of EAP theory and practice.

Critical Thinking in EAP

The ability to think critically is considered the precursor for acting critically and, therefore, holds great value in any educational context. As such, with growing attention to critical issues within language teaching and learning, fostering CT in students is encouraged by BALEAP (2008) and has become a popular addition to many EAP curricular objectives (Rahimi & Sajed, 2014).

However, despite the increasing association of CT with EAP, concerns were raised early on about its effectiveness in practice. Maintaining that CT is culturally rooted and not immediately accessible to those from other (non-Western) backgrounds, Atkinson (1997) viewed most approaches to CT in EAP courses as “exclusive and reductionist” (p. 72), and questioned whether it could be taught at all and, if so, if it was generalizable and transferable beyond the original context in which it was introduced.

In their study of Asian and New Zealand European students’ CT abilities, Lun et al. (2010) found that the latter outperformed the former on two different measures; however, the researchers concluded that differences in previously learned academic skills and language proficiency accounted for much of the difference. The view that cultural background determines CT ability has also been contested by Liyanage et al. (2021), who contend that this paints a deficit model of students from other cultures. Moreover, EAP instructors have been found to support the inclusion

of CT in EAP curricula and believe that CT can and, indeed, should be developed in the EAP classroom (Toshpulatova & Kinjemuratova, 2020).

The incorporation of CT components into EAP courses, specifically, is intended to improve the academic literacy of students in a more general sense. Although objections have been raised about the domain-specific nature of critical thinking, what Hamp-Lyons (2011) refers to as the “common core of essential skills” (p. 95) is often useful as an introduction to the earlier stages of higher education. The skills that are identified as being applicable across disciplines are recognised as going beyond an understanding of the simple mechanics of a text; they now include a much wider array of literacy skills that students need in order to be able to engage effectively in a variety of academic activities.

The purposefully general applicability of such courses is considered to provide a critical basis for the course materials while simultaneously teaching the skills considered essential for students to meet academic requirements. This is also the goal of the EGAP courses ENG 101 and ENG 102 (examined as variables in the current study), which have a common core function while also featuring progressivist and reconstructionist goals that aim to engage students with the wider world as critical beings (Aksit & Aksit, 2021).

The critical turn in EAP, which has its roots in critical pedagogy, can be dated back to the late 1980s and has led practitioners to question the wider social, cultural, and political implications of the purpose and implementation of EAP (Macallister, 2016). Thus, critical EAP (CEAP) emerged from the problematization of the neutral stance taken by practitioners and highlights the inherently political nature of EAP.

Among the most prominent CEAP writer-practitioners, Benesch (1993) maintains that all teaching is ideological because all choices that are made regarding what is to be taught, how, and by whom are ideologically charged, and for this reason, all education is necessarily political. Arguing that the “accommodationist” approach of some EAP practitioners is akin to endorsing existing power relations, Benesch (1993) calls for the inclusion of issues of social justice in the classroom for the purpose of critical examination and, ultimately, social transformation. In a similar vein, drawing attention to the potential of language to spur social change, Norton and Toohey (2004) emphasise its role in constructing “the ways language learners understand themselves, their social surroundings, their histories, and their possibilities for the future” (p. 1).

Despite the recognition of language as a stimulus for social change, this has not always been evident in practice. In his critique of the approach to EAP in which the language is seen as a neutral medium for language learning purposes, Pennycook (1994) argues that the result is frequently a combined one of futility (materials are tools for language learning and are devoid of meaning) and utilitarianism (EAP courses function to fulfil a service industry role). This “futilitarianism” can only be avoided if EAP is viewed less as “English *for* academic purposes” in which language is simply a medium, and more as “English *as* academic purposes”, wherein language is recognised as carrying social, cultural, and political weight (Pennycook, 1994, pp. 13-14). In recognising the influence of these power dynamics in shaping and changing student identities, Pennycook (2000) urges for confrontation through action and suggests a critical approach of “inclusivity”, “issues”, and “engagement” (p. 100), whereby diversity is represented in course materials, and issues relevant to students’ lives are included in course content and are made integral to the curriculum.

To address this multiplicity of needs, Lea and Street (2006) propose a 3-part integrated academic literacies model of three overlapping dimensions: study skills, academic socialisation, and academic literacies. These refer, respectively, to the cognitive skills focusing on the surface features of a text, the acculturation of students in their disciplines, and the critical engagement and meaning-making processes of students that question the situated and dynamic social processes and power relations of their context (Lea & Street, 2006). This more inclusive notion of the academic literacies model overcomes, to a degree, the concerns voiced regarding the efficacy of the skills taught in general EAP courses by laying the foundations for a cross-disciplinary, critically oriented education.

With this shift in the objectives of language classrooms, a space has been created for the cultivation of the critical being, essentially making the boundaries between the classroom and the lived realities of students more permeable so that they are better able to experience “the relevance and value of language in constructing the world they inhabit” (Teo, 2024, p. 10). Many studies have thus focused on CT and the possibilities of cultivating it in the language classroom, through explicit CT strategy training (Alpat, 2019; Çam, 2023; Güncü, 2018; Gündüz, 2019).

This is not to say that such strategies can only be adopted in the language classroom. Tsui (2002) suggests that content professors can also encourage the development of CT skills in students, even if only through simple modifications to their regular classroom teaching. All courses can thus consider integrating materials relevant to students’ daily lives, and focusing on promoting higher-order thinking skills through activities like reading (Çam, 2023; Moore, 2017), writing (Alpat, 2019; Çam, 2023; Coşkun & Karahan, 2023; Lu & Nguyen, 2022; Tsui, 2002),

debates (Çam, 2023; Coşkun & Karahan, 2023), and class discussions (Gündüz, 2017; Lu, & Nguyen, 2022; Toshpulatova, & Kinjemuratova, 2020).

Previous Research

CT skills and dispositions at the tertiary level are a major area of interest for both practitioners and researchers and have been studied in a variety of contexts, and in light of different demographic variables.

Using the UF/EMI, Stedman (2009) studied the CTDs of students with diverse backgrounds enrolled in a leadership course at a higher education institution in the United States. An examination of the differences between the dispositions of the students based on their demographic variables of age, gender, GPA, honours enrolment, and major college classification revealed no significant differences in overall disposition or its subconstructs. However, students scored higher for overall disposition and for each construct, indicating a possible link between academic achievement and CTD. Stedman emphasises the importance of CT instruction and concludes by making recommendations for educators to enhance student CT skills and dispositions through inclusivity practices, open dialogue and discussion, and explicit emphasis on “good thinking” (p. 215).

Broadbear’s (2005) study investigating the CTDs of health education students in the United States found that students generally had low levels of CTDs, with only a very small percentage scoring high on the questionnaire. A comparison across health education majors, minors and other health-related majors showed that health education minors scored significantly lower than the other groups. Broadbear observes that students lack internal motivation to engage with complex problems and that action must be taken to foster their CTDs.

The link between the emotional intelligence and CTDs of first year undergraduate students at a university in India was examined by Sk and Halder (2020). The researchers found that higher emotional intelligence is associated with greater CTD. Among the subconstructs of the UF/EMI, correlation was highest for *Engagement*, followed by *Innovativeness* and *Cognitive Maturity*. A comparison by gender found that there was no significant difference between males and females.

In a study by Laird (2005), the CCTDI is employed to investigate how experiences with diversity influence the academic self-confidence, social agency, and CTD of undergraduate students at a US university. The results suggest that students who engage with diversity academically through course enrolment or socially through interactions with peers were more disposed to critical thinking. The results of the study suggest that incorporating diversity into student experiences may have positive effects on the development of students' self-confidence, social agency, and CTD.

A study by Duncan et al. (2016) comparing the CTDs of students from different countries taking an international course together found that generally students' overall CTDs were weak overall, but that students from the US scored higher for all three constructs of *Engagement*, *Cognitive Maturity*, and *Innovativeness*, and higher than the Austrian students for *Engagement* and *Innovativeness*. However, authors also recognised that a "language bias" (p. 46) may be present due to the differing proficiency levels of the students, affecting their comprehension of the questionnaire items in the UF/EMI.

Giancarlo and Facione (2001) conducted a longitudinal study of undergraduate students at a private liberal arts university in the USA. Using the CCTDI to compare changes in the CTDs of students over time, they concluded that

student dispositions in general were either maintained or improved during the four-year period between tests and that the overall mean score showed a significant increase over time. Analysing the more recently collected data cross-sectionally, they revealed that females scored significantly higher on some of the subconstructs.

The impact of training content professors for the explicit inclusion of CT components and its effect on the CTDs of students studying in the Agriculture Faculty of a US university was examined by Burbach et al. (2012). Using the UF/EMI to measure students' CTDs before and after a semester-long intervention, they found that students displayed significantly higher scores overall and for the constructs of *Engagement*, *Cognitive Maturity*, and *Innovativeness*, suggesting that inclusion of CT into content courses can enhance student CTDs.

Although the CT skills and dispositions of students in EMI contexts have received scant attention, a number of studies have examined CTDs in EAP contexts or with reference to language education and language proficiency.

In a purely qualitative case study examining possible variances across disciplines, Evers (2007) examined approaches to CT in the economics and EAP departments of the same university. She discovered that CT was defined differently by the instructors in the two departments, thus highlighting the lack of consensus across disciplines on a definition of critical thinking. In addition, it was found that the teaching approaches were also markedly different, with an analytic approach being preferred in economics and an explicit and critical approach being taken in the EAP courses.

An experimental study by Davidson and Dunham (1997) examining the explicit teaching of CT in a content-based EAP course in Japan found that the treatment group which received training in CT skills scored significantly higher in

the post-test than the control group that had not received training. These results suggest that CT can indeed be taught at the tertiary level through language instruction.

In another study conducted in Japan, Manalo and Sheppard (2016) investigated whether the language structure of students' L1 or proficiency in L2 had any effect on their ability to write evaluative statements. They concluded that language proficiency in both L1 and L2 significantly correlated with students' production of evaluative statements. They further concluded that proficiency alone is insufficient and that explicit instruction in academic discourse is necessary for the development of critical thinking.

The link between language learning and CT was also explored in a correlational study examining the effects of the CTD of language learners at two different universities in China on foreign language proficiency and revealed that CTDs were positively correlated with foreign language proficiency (Xu et al., 2023).

Research in Türkiye

The CT skills and dispositions of students have also been studied in Türkiye, in many cases using the Turkish adaptations of the UF/EMI (Kılıç & Şen, 2014) and CCTDI (Kökdemir, 2003). Although few have addressed the issue in direct relation to EMI, these studies raise important considerations relating to differences in pedagogical approaches in higher education as a whole and across the disciplines.

In a nationwide study examining the CTDs of over 1000 graduating students from various universities across Türkiye, it was revealed that reading habits were the greatest predictor of a strong CTD, followed by the education level of the mother, cumulative grade point average, and grade received at the university entrance exam (Karahan & İskifoğlu, 2020). The language of instruction of the universities where

the students were graduating from was not disclosed and was not considered as a variable during data analysis.

Another study employing the CCTDI to examine the CTDs of more than 1,200 first- and senior-year students across five faculties at a Turkish medium instruction (TMI) state university in Türkiye revealed several differences according to various demographics (Arslan et al., 2014). In particular, female students were found to be more critically disposed, as were students studying in the Faculty of Economics and Administrative Sciences in relation to those in the Faculty of Education and the Faculty of Engineering, and, in some faculties, first-year students showed higher CTDs than senior-year students.

Coskun and Altinkurt (2016) employed the UF/EMI to examine the relationship between the personal values and CTDs of undergraduate preservice teachers from different disciplines at a partial EMI state university in Türkiye. The study concluded that the preservice teachers' CTDs were at a moderate level, and that there was no difference with regard to gender or year of study for any of the constructs. However, the personal values of sensitivity, responsibility, and respect for diversity significantly predicted participants' overall CTDs.

A study conducted with students in an EMI graduate program of a state university enrolled in an EAP class revealed a significant correlation between grammar proficiency levels and overall disposition to critical thinking, while vocabulary size was correlated with the subscales of inquisitiveness and confidence. These findings suggest that CT instruction may be beneficial for language acquisition among adult language learners (Ünaldı & Yüce, 2021).

Tümkiye et al. (2009) examined the relationship between CTD and perceived problem-solving skills among undergraduate students at a partial EMI state

university in Türkiye and investigated differences based on gender, grade level, and field of study. The results of the study showed a positive correlation between problem solving skills and CTDs. Moreover, students in more senior years had higher scores in both areas. Although not significant, the scores of social sciences students were generally higher than those of science students.

Various studies have also investigated the results of incorporating CT training into EAP courses and how these have impacted the CT skills and dispositions of language learners.

In a mixed-methods case study investigating the effects of a CT strategy training on the CTDs of students in a CEFR B1 reading and writing class at an English preparatory program of a partial EMI foundation university, Çam (2023) reported statistically significant gains in the overall critical disposition of students and particularly in the metacognition subconstruct. Qualitative data were also collected in the form of student interviews and the researcher's journal, analysis of which revealed positive responses from students with regard to the effectiveness of the CT training they had received. Debates and collaborative tasks were highlighted as effective in promoting critical thinking. Students also reported perceived improvements in vocabulary and grammar due to their use of English in meaningful contexts.

Using an experimental model, Alpat (2019) investigated the effects of employing a flipped classroom instructional model on L2 writing and CT abilities of students in the English preparatory program of a partial EMI foundation university. The results of the study revealed that, compared to the control group, the experimental group showed a significantly higher increase in CTD. Participants in

the experimental group also reported improvements in their writing and increased responsibility for their own learning.

Ev (2025) used the CCTDI in a mixed-methods experimental design in another study examining the effect of flipped learning on the writing performance and dispositions of first-year English language and literature students at a partial EMI higher education institution. The results of the experiment showed that flipped learning significantly improved writing ability and the self-confidence sub-dimension of the CCTDI. However, despite no other significant change in CTDs being measured, students reported greater awareness of the importance of critical and analytical thinking and reported favourable attitudes towards flipped learning.

These studies suggest that explicit CT instruction in an EAP context through different approaches can have a positive impact on some or all of the CTDs of students while simultaneously developing their various language skills.

Finally, in a study examining the self-reported CTDs of students enrolled in an EMI university's first-year EGAP course with a significant focus on enhancing students' CT skills, Loomis (2024) used the UF/EMI to examine students' CTD and reported high moderate levels overall. However, no significant differences were reported in relation to their demographic data, with the only exception being the level of cognitive maturity in relation to the letter grade received in a first-year English composition course with a goal of teaching CT skills taken the preceding semester. At the time this study was conducted, the students (most of whom were in their freshman year) had not yet completed the EGAP course, which may have had a bearing on the results.

CHAPTER 3: METHODOLOGY

Introduction

This study investigates how students studying at a foundation EMI university in Türkiye perceive their own CTDs. The study also examines how these perceptions differ according to students' discipline of study, academic semester enrolled in, attendance in the pre-sessional language preparatory program, the letter grade they received from their freshman-year EGAP courses, cumulative GPA, age, and gender. The study further investigates content professors' perceptions of these students' CTDs and whether their perspectives change according to their discipline, years of teaching experience and academic rank. Lastly, the study investigates if there is a significant difference between student and content professor perceptions.

Research Design

This study employed a cross-sectional survey design with a bounded institutional context to examine the CTDs of undergraduate students as perceived by themselves and by their content professors. Descriptive statistics were used to summarise overall disposition scores. Causal-comparative analyses were conducted to investigate differences in perceptions across demographic variables such as gender, academic discipline, and attendance in the English preparatory program. In addition, correlational analysis was used to explore associations between students' and content professors' perceptions of student CTDs.

This study is descriptive in its examination of student and content professor perceptions of the CTDs of students who have completed the critically-oriented EGAP courses, and it is exploratory in its examination of the relationship with

multiple variables (Gay et al., 2012). As such, quantitative data were collected and analysed using descriptive and inferential statistics to answer the research questions.

A cross-sectional survey is used to answer the first research question. This design is particularly appropriate as the information collected is primarily used to describe the beliefs and attitudes of the population the participants are a part of at a certain point in time (Fraenkel & Wallen, 2009).

Context

The study was conducted at an English medium instruction (EMI) foundation university in Ankara, Türkiye. There are 10 faculties and three graduate schools, of which only the Faculty of Law and the Faculty of Music and Performing Arts are not fully EMI. Approximately twelve thousand students are enrolled in the university at undergraduate and graduate levels, with an international student body representing 73 countries. Furthermore, the university has around 700 faculty members, of whom a quarter are international.

Proficiency in English is, therefore, essential for students enrolled at the university. On acceptance to their departments, all incoming students must demonstrate a certain level of English proficiency by either passing an in-house CEFR B2-level validated proficiency exam or, alternatively, by submitting a TOEFL iBT score of at least 87 or an average IELTS score of 6.5. Those who are unable to do so are enrolled in the English language preparatory program, which must be completed within a maximum of two years.

A separate EAP program provides support to the faculties and departments in the university and addresses the various EAP needs of students at all levels, from freshman-year content- and skills-based courses to senior-year ESAP courses. The EGAP courses (ENG 101 and ENG 102), which are offered as part of the integrated

academic skills program, are designed to address the language and academic skills needs of students from all disciplines, and are compulsory for students in their freshman year.

This context was selected for its instrumental value (Fraenkel et al, 2009). Specifically, the EGAP courses required to be taken by all freshmen have a unique curriculum design implementing a “four-quadrant pedagogical model” that incorporates pedagogical content knowledge, content-based instruction, differentiated instruction, and critical literacy pedagogy (Aksit & Aksit, 2021, pp. 108-112). This integration of progressivist and reconstructionist ideologies aims to encourage higher-order thinking skills and criticality while still developing academic skills deemed necessary for effectively engaging in tertiary-level education, English being the medium of instruction (Aksit & Aksit, 2021).

The two EGAP courses are designed to enhance students’ critical, analytical, reflective and creative skills. Furthermore, in addition to generic academic writing skills, the course learning outcomes explicitly cover the critical analysis and evaluation of academic texts and the development of well-reasoned written and spoken arguments as objectives of the two courses. It is thus expected that students who complete the freshman-year EGAP courses will have attained study skills, academic socialisation, and a critical mindset as put forth in Lea and Street’s (2006) academic literacies model.

Sampling and Participants

The university was selected through purposive sampling due to its specific curricular emphasis on critical thinking within an EMI-EGAP framework. All undergraduate students were invited to participate. In addition to the students, content professors teaching undergraduate courses in the disciplines across all

university faculties were also contacted to take part in the study. Both groups were sent separate questionnaires for data collection purposes. Participation was voluntary, and all participants were informed that they had the right to leave the study at any time. Furthermore, the anonymity of all participants was maintained, as aside from the demographic data at the start of the questionnaire, no personal information regarding respondents' identity was collected or distributed by the researchers either during or after the study.

Eighty-two undergraduate students volunteered to participate and completed the student questionnaire. Tables 1 to 8 present the characteristics of these students as obtained via the demographic section of the student questionnaire.

Table 1 shows the distribution of students who participated in the study across their disciplines of study.

Table 1

Academic Disciplines of Students

Academic Discipline	Full Sample (N = 82)	
	<i>n</i>	%
American Culture and Literature*	4	4.9
Archaeology*	2	2.4
Architecture	2	2.4
Basic Education (Classroom Teaching)*	4	4.9
Communication and Design*	1	1.2
Computer Engineering	6	7.3
Economics	2	2.4
Electrical and Electronics Engineering	8	9.8
English Language and Literature*	2	2.4
Industrial Engineering	7	8.5
Information Systems and Technologies	2	2.4
Interior Architecture and Environmental Design	2	2.4
International Relations*	4	4.9
Law*	7	8.5
Management*	5	6.1

Academic Discipline	Full Sample (N = 82)	
	<i>n</i>	%
Mathematics	1	1.2
Mechanical Engineering	6	7.3
Molecular Biology and Genetics	3	3.7
Physics	3	3.7
Political Science and Public Administration*	5	6.1
Psychology*	5	6.1
Translation and Interpretation*	1	1.2

*Disciplines categorised as non-STEM

The 22 disciplines in which students were studying were separated into one of two categories: STEM (Architecture, Computer Engineering, Economics, Electrical and Electronics Engineering, Industrial Engineering, Information Systems and Technologies, Interior Architecture and Environmental Design, Mathematics, Mechanical Engineering, Molecular Biology and Genetics, and Physics) and non-STEM (American Culture and Literature, Archaeology, Basic Education, Communication and Design, English Language and Literature, International Relations, Law, Management, Political Science and Public Administration, Psychology, Translation and Interpretation).

As can be seen from the data collected, although the participating students were from a wide range of disciplines that include both STEM and non-STEM, engineering departments had the highest number of participating students with the combined total of Computer Engineering ($n = 6$), Electrical and Electronics Engineering ($n = 8$), Industrial Engineering ($n = 7$), and Mechanical Engineering ($n = 6$), making up close to a third of all participant disciplines at 32.9% of the total. The disciplines with the lowest number of students, with only one participant from each, were Communication and Design, Mathematics, and Translation and Interpretation departments.

For the purpose of statistical analysis, disciplines were categorised and combined as STEM ($n = 42$) or non-STEM ($n = 40$) (indicated with an * in the table), and represented 51.2% and 48.8% of respondents, respectively.

Table 2 below provides information on the semester the participating students were enrolled in. at the time of the study.

Table 2

Students' Enrolment Semester

Semester	Full Sample (N = 82)	
	<i>n</i>	%
1	12	14.6
2	37	45.1
3	2	2.4
4	8	9.8
5	1	1.2
6	9	11
7	3	3.7
8	10	12.2

Looking at the distribution of students across the semesters, it is evident that a very high number of respondents (59.7%) were still in the first or second semester of their freshman year and, as such, were yet to successfully complete one or either of the required EGAP courses offered in the first year. As these students had not yet completed both EGAP courses that aim to provide a critical foundation to students' socialisation into academia, during statistical analysis, students were grouped into semesters 1-2 ($n = 49$, 59.7%) or semesters 3-8 ($n = 33$, 40.3%)

Table 3 shows the distribution of students who had attended the pre-session English language preparatory program before their freshman year.

Table 3*Pre-sessional English Language Preparatory Program Attendance*

English Preparatory Program Attendance	Full Sample (N = 82)	
	<i>n</i>	%
Attended	29	35.4
Did not Attend	53	64.6

As can be seen from the data, just over a third (35.4%) of participating students had attended the English preparatory program prior to starting their departments.

The letter grades received by the participating students from their EGAP courses ENG 101 and ENG 102 are shown in Tables 4 and 5, respectively. Students who were still taking or had not yet enrolled in the courses at the time of responding to the questionnaire and, therefore, had not yet received a letter grade, responded as NA. As can be seen in Table 4, a great majority of the students (91.5%) had already completed the first course (ENG 101).

Table 4*Letter Grade Received from ENG 101*

Letter Grade	Full Sample (N = 82)	
	<i>n</i>	%
A	9	11
A-	19	23.2
B+	18	22
B	11	13.4
B-	7	8.5
C+	8	9.8
C	3	3.7
NA (not yet taken / not completed)	7	8.5

The percentage of students who had completed both of these EGAP courses, on the other hand, was much lower (47.6%) but was still almost half of the population.

Table 5*Letter Grade Received from ENG 102*

Letter Grade	Full Sample (N = 82)	
	<i>n</i>	%
A	9	11
A-	5	6.1
B+	6	7.3
B	10	12.2
B-	5	6.1
C+	2	2.4
C	2	2.4
NA (not yet taken / not completed)	43	52.4

In both Table 4 and Table 5, more than half of the students who received a letter grade from ENG 101 and ENG 102 received a B or higher. For the purpose of statistical analysis, the data in Table 4 were divided as A to B+ ($n = 46$, 61.3%) and B to C ($n = 29$, 38.7%), with the NA respondents ($n = 7$) being removed from consideration.

Following the successful completion of ENG 101 (letter grade C or above), freshman year students are also required to take a second EGAP course, ENG 102. Due to the large number of respondents still in their first or second semester, the NA respondents in Table 5 were 52.4% of the total, either because they had not yet taken the course or were yet to complete it at the time of answering the questionnaire. The remainder of the respondents had received a grade no lower than a C. For this reason, responses were grouped as either having received no grade ($n = 43$) or having received a grade ranging from A to C ($n = 39$).

The CGPA of the participating students is displayed in Table 6. This was the only open-ended question in the questionnaire in order to permit the entry of continuous data as reported by the students themselves. For ease of tabulation and

analysis, the data received were grouped and presented as follows: <2.00, 2.00-2.50, 2.51-2.99, 3.00-3.49, 3.50-4.00. Those who were in their first academic semester responded as NA.

Table 6

Cumulative Grade Point Average of Students

CGPA	Full Sample (N = 82)	
	<i>n</i>	%
<2.00	3	3.7
2.00–2.50	11	13.4
2.51–2.99	17	20.7
3.00–3.49	26	31.7
3.50–4.00	15	18.3
NA (enrolled in 1 st semester)	10	12.2

Students with a CGPA of 3.00 and above are considered honours students at this university. An examination of the data in Table 6 reveals that 50% of all respondents fall into this category. When the 10 students who responded “NA” are taken into account, honours students ($n = 41$) make up more than half of all participants who have a CGPA ($n = 72$). Data was thus divided into two categories of CGPA: 3.00-4.00 ($n=41$, 56.9%) and ≤ 2.99 ($n = 31$, 43.1%).

Table 7 below shows the age distribution of the participating students.

Table 7

Age Distribution of Students

Age	Full Sample (N = 82)	
	<i>n</i>	%
18-20	56	68.3
21-23	23	28
> 23	3	3.7

The large proportion of first-year respondents is also reflected in their age ranges, with more than two-thirds (68.3%) of students belonging to the 18-20 age

group. Due to the low numbers of the 21-23 and >23 groups, these were combined into a single group for analysis purposes ($n = 26$, 31.7%).

Finally, Table 8 shows the gender distribution of the participating students.

Table 8

Gender Distribution of Students

Gender	Full Sample (N = 82)	
	<i>n</i>	%
Female	50	61
Male	31	37.8
Prefer not to Say	1	1.2

A significantly higher proportion of respondents were female (61%), with one participant preferring not to indicate a gender.

Of the content professors teaching at the undergraduate level who had been invited to participate in the study, a total of 51 content professors volunteered. However, one content professor completed the demographic section, but only responded to 6 questions in the second section of the questionnaire. For this reason, this participant was removed and not considered in the data analysis, leaving a total of 50 participants. Tables 9-13 present the demographic data collected from the content professors.

Table 9 shows the disciplines of the content professors who participated in the study.

Table 9

Academic Disciplines of Content Professors

Academic Discipline	Full Sample (N = 50)	
	<i>n</i>	%
American Culture and Literature*	1	2
Archaeology*	1	2
Architecture	3	6
Chemistry	1	2

Academic Discipline	Full Sample (N = 50)	
	<i>n</i>	%
Communication and Design*	3	6
Computer Engineering	3	6
Electrical and Electronics Engineering	1	2
English Language and Literature*	1	2
Fine Arts*	1	2
Graphic Design*	1	2
Information Systems and Technologies	1	2
Interior Architecture and Environmental Design	4	8
International Relations*	7	14
Management*	3	6
Mathematics	1	2
Mechanical Engineering	1	2
Molecular Biology and Genetics	1	2
Music*	1	2
Performing Arts*	1	2
Physics	2	4
Political Science and Public Administration*	2	4
Psychology*	6	12
Tourism and Hotel Management*	2	4
Translation and Interpretation*	1	2
Urban Design and Landscape Architecture	1	2

*Disciplines categorised as non-STEM for the purpose of statistical analysis

The disciplines of the content professors did not correspond exactly with the disciplines of the students who participated in the study, as there were some disciplines that had no participants from either group. Similar to the student data, content professors were from a wide range of disciplines. However, 15 disciplines had only a single respondent each. The department with the most participants was International Relations with 7 (14%) total respondents. In addition, it is noteworthy that while 32.9% of the student participants were from 4 engineering departments, only 2 content professors (4%) were from engineering departments (Electrical and Electronics Engineering, and Mechanical Engineering).

As was done with the student data, content professors' disciplines were also categorised as STEM ($n = 19$, 38%) or non-STEM ($n = 31$, 62%), for analysis

purposes. The ratio of content professors in STEM and non-STEM disciplines differs from that of the students, which was more evenly distributed (51.2% and 48.8%, respectively).

Table 10 displays the years of teaching experience of the content professors at the tertiary level.

Table 10

Years of Teaching Experience at the Tertiary Level

Years of Experience	Full Sample (N = 50)	
	<i>n</i>	%
≤ 1	1	2
2–5	12	24
6–10	10	20
11–15	7	14
16–20	3	6
> 20	17	34

Content professors indicated a range of years of teaching experience at the tertiary level, with the least number in ≤1 year ($n = 1$, 2%) and the most in >20 years ($n = 17$, 34%). For analysis purposes, data were grouped as ≤10 years ($n = 23$) and ≥11 years ($n = 27$).

Table 11 shows the distribution of respondents according to their academic rank.

Table 11

Academic Rank of Content Professors

Academic Rank	Full Sample (N = 50)	
	<i>n</i>	%
Instructor	13	26
Lecturer	4	8
Senior Lecturer	2	4
Assistant Professor	12	24
Associate Professor	10	20
Professor	9	18

The highest number of responses was received from instructors ($n = 13$), and the lowest number from senior lecturers ($n = 2$). During analysis, academic ranks were divided into two groups, with “teaching track” Instructor, Lecturer, and Senior Lecturer responses combined into one group ($n = 19$) and the responses of the “academic track” Assistant Professor, Associate Professor, and Professor responses combined in the other ($n = 31$).

The age distribution of the participating content professors can be seen in Table 12.

Table 12

Age distribution of Content Professors

Age	Full Sample (N = 50)	
	<i>n</i>	%
≤ 25	-	-
26-35	10	20
36-45	20	40
46-55	9	18
> 55	11	22

The 36-45 age range was the most populated age group at 40% ($n = 20$). There were no respondents in the ≤ 25 age group. the data were grouped into two categories for analysis purposes, with 26–45-year-olds ($n = 30$, 60%) comprising one group and 46+ year-olds ($n = 20$, 40%) comprising the other.

The gender distribution of the participating content professors is presented in Table 13.

Table 13

Gender Distribution of Content Professors

Gender	Full Sample (N = 50)	
	<i>n</i>	%
Female	22	44

Gender	Full Sample (N = 50)	
	<i>n</i>	%
Male	28	56
Prefer not to Say	-	-

Although relatively evenly distributed, a higher proportion of males (56%) responded to the content professor questionnaire. This was in contrast to the student questionnaire, where more female students (61%) responded.

Instrumentation

The data collection tools used in this study were questionnaires for both groups of participants. Both questionnaires were comprised of two sections each.

The first section of each questionnaire is for the purpose of collecting demographic information from the participants. In the student questionnaire, demographic data were collected about students' discipline, the semester enrolled in, their attendance in the preparatory program, letter grades received for the ENG 101 and ENG 102 EGAP courses, CGPA, age, and gender. Demographic data collected from content professors included discipline, years of tertiary level teaching experience, academic rank, age, and gender.

The second part of the questionnaires examined students' CTDs as perceived by themselves or their content professors in their respective tools. This section, in the version of the questionnaire for the students and for the content professors, employs the UF/EMI (Appendix A). As presented in Chapter 2, this tool is a questionnaire developed at the University of Florida, with the purpose of measuring the CTD constructs of *Engagement*, *Cognitive Maturity* and *Innovativeness*. Following reliability testing, the scale developers reported a Cronbach's alpha coefficient of 0.94 for the UF/EMI and for the subconstructs, 0.91 for *Engagement*, 0.79 for *Cognitive Maturity*, and 0.80 for *Innovativeness* (Irani et al., 2007).

The UF/EMI has 26 statements and uses a 5-point Likert-type scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The total scores have a possible range of 26-130, with higher scores indicating a higher CTD (Lamm, 2016). The items that measure each construct are indicated in Table 14.

Table 14

The Constructs and the Items Measuring Them

Construct	Items (N = 26)
<i>Engagement</i> (n = 11)	2 I look for opportunities to solve problems. 3 I am interested in many issues. 5 I am able to relate to a wide variety of issues. 7 I enjoy finding answers to challenging questions. 8 I am a good problem solver. 9 I am confident that I can reach a reasonable conclusion. 14 I am able to apply my knowledge to a wide variety of issues. 17 I am able to explain things clearly. 18 I ask good questions when trying to clarify a solution. 19 I present issues in a clear and precise manner. 22 I keep on working on things until I get them right.
<i>Cognitive Maturity</i> (n = 8)	1 I listen carefully to the opinions of others even when they disagree with me. 11 I am likely to change my opinion when I am given new information that conflicts with my current opinion. 13 I try to consider the facts without letting my biases affect my decisions 16 I can get along with people who do not share my opinions. 20 I consider how my own biases affect my opinions. 24 I try to find multiple solutions to problems. 25 I ask many questions when making a decision. 26 I believe that most problems have more than one solution.
<i>Innovativeness</i> (n = 7)	4 I enjoy learning about many topics. 6 I ask lots of questions in a learning environment. 10 I strive to be well informed. 12 I enjoy solving problems. 15 I enjoy learning even when I am not in school. 21 I search for the truth even when it makes me uncomfortable. 23 I will go out of my way to find the right answers to a problem.

With regard to the content professor questionnaire, the UF/EMI was adapted by the researcher for use in the second section. Each statement was reworded to

measure the same constructs according to the content professors' perceptions of the CTDs of their students (Appendix B). For example, the item "I look for opportunities to solve problems" in the student questionnaire was reworded as "My students look for opportunities to solve problems".

Piloting

Piloting of the adapted content professor questionnaire was conducted for face validity purposes to ensure that questions and instructions were clear, items were unbiased, and the questionnaire was worded appropriately and unambiguously (Fraenkel & Wallen, 2009). As it was intended for the entire target population within the bounded system to be sent the questionnaire for their participation, piloting was conducted with four members of faculty at another EMI foundation university in Ankara.

Based on the feedback received, two changes were made. Firstly, the "6=I don't know" option, which had originally been added to the Likert scale, was removed entirely from the questionnaire. The reason for initially adding that option was due to the wording of some of the items, which required content professors to make conjectures about what students think/believe or do outside of lesson times (e.g., Item 26 My students believe that most problems have more than one solution). During piloting, "6 = I don't know" was never selected, and one respondent questioned how it was phrased. For this reason, it was decided that the 6th option would be removed and (unlike in the students' questionnaire, where all items are compulsory), the content professors were permitted to refrain from responding to some items if they so wished.

The second change made to the questionnaire was an addition to the instructions, in which the phrase “think about the student population as a whole” was underlined and written in bold font.

Data Collection Procedures

Once the tools had been finalised and prepared for distribution using Google Forms, approval for the study was sought and received from the Ethics Committee of Bilkent University. Upon the approval and the agreement of the upper administration of the target university, the links to the final questionnaires were then sent by email to all undergraduate students by the university authorities and to content professors teaching undergraduate courses by the researcher, with detailed information regarding the purpose of the study.

The questionnaire links included a cover page giving details about the purpose of the study and the eligibility requirements of participants. This was followed by an informed consent form, which all participants were required to agree to in order to be able to proceed to the questionnaire.

As the study specifically focuses on an EMI context, the instructions for both the student and content professor questionnaires emphasised the importance of considering the statements in the items of the questionnaire in light of English being the medium of instruction and interaction in the classroom. They were, therefore, requested in underlined and bold font to consider the instances where the medium of communication is English for communication related questions.

Data Analysis Procedures

Following data collection, all responses were analysed using IBM SPSS Statistics (Bilkent University Version 30). Firstly, tests were conducted to ensure the reliability of the two questionnaires. The reliability of an instrument refers to the

stability and consistency of the scores across the items in that instrument (Creswell, 2012). The internal consistency is of particular relevance when multiple items in an instrument are used to measure a single construct (Muijs, 2004). Cronbach's alpha is an accepted measure of internal consistency, and "has become routine practice in virtually all psychological and social science research in which multiple-item measures of a construct are used" (Schmitt, 1996, p. 350).

Consequently, Cronbach's alphas were calculated to measure the reliability of both the student and the content professor questionnaires. The two questionnaires were analysed for internal consistency of the three constructs they purport to measure: *Engagement*, *Cognitive Maturity*, and *Innovativeness*, alongside the overall UF/EMI questionnaire. The results of these analyses are shown in Table 15.

Table 15

Reliability Results for the UF/EMI Questionnaires

Questionnaire	UF/EMI and Its Constructs	<i>n</i>	Cronbach's α
Students	UF/EMI Overall	26	.89
	<i>Engagement</i>	11	.89
	<i>Cognitive Maturity</i>	8	.78
	<i>Innovativeness</i>	7	.84
Content Professors	UF/EMI Overall	26	.96
	<i>Engagement</i>	11	.92
	<i>Cognitive Maturity</i>	8	.87
	<i>Innovativeness</i>	7	.85

For an instrument to be considered internally consistent, it is desirable for the Cronbach's alpha value to be .70 and above (Muijs, 2004). The results of the analysis show that both questionnaires had high levels of internal consistency. In the student questionnaire, all values were above .80, except for *Cognitive Maturity*, which came in just below at .78. The content professors' questionnaire, in particular, showed very high internal consistency with both UF/EMI overall and *Engagement* alpha

coefficients above .90 and the remaining two constructs with alpha coefficients above .80.

Once internal reliability had been assured, in order to answer the research questions, the data that had been collected were first analysed descriptively, and the means and standard deviations of the students' and content professors' responses were calculated. This was followed by the inferential analysis of the data.

Rana et al. (2016) highlight the importance of selecting the correct statistical tests for the analysis and interpretation of the data, especially when choosing between parametric and non-parametric tests. Which of these test types is more appropriate to use for analysis relies heavily on whether or not the data is distributed normally, and Ajee et al. (2024), thus, emphasise the need to check for normality of data distribution.

The data collected for this study were checked for normal distribution using the Shapiro-Wilk test, as it is considered appropriate for smaller sample sizes (Ajee et al., 2024; Orcan, 2020). The independent samples of each variable were tested separately, as recommended by Orcan (2020). Based on the results of the tests, where normality assumptions were met, a parametric test was used, and where normality assumptions were not met, the null hypothesis was rejected and a non-parametric test was preferred (Ajee et al., 2024). As all of the variables had two groups, where a parametric test was deemed more appropriate, an independent *t*-test was employed, and for non-parametric data, a Mann-Whitney U test was used (Rana et al., 2016).

To answer the first research question, IBM SPSS (Bilkent University Version 30) was used to calculate the mean and standard deviation of the results coming from the questionnaire for the CTDs of students as perceived by themselves and then for the CTDs of students as perceived by content professors. For both of these

subsections, the mean score and standard deviation were calculated for the overall UF/EMI questionnaire, followed by each of the constructs of *Engagement*, *Cognitive Maturity*, and *Innovativeness*. Finally, the mean score and standard deviation for all of the individual items comprising the constructs were also calculated.

Next, the data were analysed inferentially to answer research question 2. To investigate whether students' perceptions of their CTDs differed according to various variables, the data collected from the students were grouped according to discipline of study, the academic semester they were enrolled in, their attendance in the pre-sessional English language preparatory program, the letter grade they received from the EGAP courses ENG 101 and ENG 102 explicitly teaching critical thinking, their CGPA, their age, and their gender. For each variable, students were divided into two groups, and the data were tested for normal distribution in order to ascertain whether a parametric or non-parametric test would be more suitable for analysis. The results of the Shapiro-Wilk test for all student variables, and the statistical test consequently used for analysis can be seen below in Table 16.

Table 16

Shapiro-Wilk Test Results for Student Data

Construct	Variables	Total Sample (N = 82)			Statistical Test Used
		<i>Shapiro-Wilk W</i>	<i>df</i>	<i>p</i>	
<i>Engagement</i>	Discipline				
	STEM	.881	42	<.001	Mann-Whitney U
	Non-STEM	.915	40	.036	
	Semester				
	1-2	.890	49	<.001	Mann-Whitney U
	3-8	.870	33	<.001	
	Preparatory Program				
	Did Not Attend	.867	53	<.001	<i>t</i> -test

Construct	Variables	Total Sample (N = 82)			Statistical Test Used
		<i>Shapiro-Wilk W</i>	<i>df</i>	<i>p</i>	
	Attended	.968	29	.518	Mann-Whitney U
	ENG 101 Grade				
	A to B+	.878	46	<.001	
	B to C	.909	29	.016	
	ENG 102 Grade				Mann-Whitney U
	NA	.900	43	.001	
	A to C	.855	39	<.001	
	CGPA				Mann-Whitney U
	3.00-4.00	.913	41	.004	
	≤2.99	.841	31	<.001	
	Age				Mann-Whitney U
	18-20	.904	56	<.001	
	21+	.843	26	.001	
	Gender				<i>t</i> -test
	Female	.886	50	<.001	
	Male	.935	31	.061	
<i>Cognitive Maturity</i>	Discipline				Mann-Whitney U
	STEM	.880	42	<.001	
	Non-STEM	.897	40	.002	
	Semester				Mann-Whitney U
	1-2	.891	49	<.001	
	3-8	.884	33	.002	
	Preparatory Program				<i>t</i> -test
	Did Not Attend	.873	53	<.001	
	Attended	.968	29	.518	
	ENG 101 Grade				Mann-Whitney U
	A-B+	.915	46	.003	
	B-C	.897	29	.009	
	ENG 102 Grade				Mann-Whitney U
	NA	.885	43	<.001	
	A-C	.895	39	.002	
	CGPA				
	3.00-4.00	.936	41	.024	

Construct	Variables	Total Sample (N = 82)			Statistical Test Used
		<i>Shapiro-Wilk W</i>	<i>df</i>	<i>p</i>	
<i>Innovativeness</i>	≤2.99	.812	31	<.001	Mann-Whitney U
	Age				
	18-20	.894	56	<.001	Mann-Whitney U
	21+	.890	26	.001	
	Gender				
	Female	.874	50	<.001	<i>t</i> -test
	Male	.961	31	.316	
	Discipline				
	STEM	.876	42	<.001	Mann-Whitney U
	Non-STEM	.940	40	.036	
	Semester				
<i>Innovativeness</i>	1-2	.938	49	.012	Mann-Whitney U
	3-8	.859	33	<.001	
	Preparatory Program				
	Attended	.917	52	.001	<i>t</i> -test
	Did not Attend	.958	29	.288	
	ENG 101 Grade				
	A to B+	.915	46	.002	Mann-Whitney U
	B to C	.917	29	.026	
	ENG 102 Grade				
	NA	.949	43	.055	<i>t</i> -test
	A to C	.863	39	<.001	
	CGPA				
	3.00-4.00	.932	41	.016	Mann-Whitney U
	≤2.99	.849	31	<.001	
	Age				
	18-20	.933	56	<.001	Mann-Whitney U
	21+	.872	26	.010	
	Gender				
	Female	.899	50	<.001	Mann-Whitney U
	Male	.928	31	.038	

As can be seen from Table 16, the results of the Shapiro-Wilk test indicated the use of the Mann-Whitney U test for all variables across all the constructs, except for a few exceptions. An independent *t*-test was employed to analyse the data for preparatory program attendance across all three constructs, for gender in terms of *Engagement* and *Cognitive Maturity*, and for ENG 102 letter grade in relation to *Innovativeness*.

The analysis of the data to answer research question 3, which examined whether there were differences in content professors' perceptions of student CTDs according to some variables, followed a similar method to the students' data analysis. The data collected from the content professors were grouped according to the variables of content professors' disciplines, years of teaching experience, academic rank, age, and gender. Once again, each variable was divided into two groups and tested for normality using the Shapiro-Wilk test, the results of which can be found below in Table 17.

Table 17

Shapiro-Wilk Test Results for Content Professor Data

Construct	Variables	Total Sample (N = 50)			Statistical Test Used
		<i>Shapiro-Wilk W</i>	<i>df</i>	<i>p</i>	
<i>Engagement</i>	Discipline				
	STEM	.972	19	.811	<i>t</i> -test
	Non-STEM	.965	31	.402	
	Experience				
	≤10 years	.978	23	.874	<i>t</i> -test
	≥11 years	.966	27	.492	
	Academic rank				
	Teaching track	.970	19	.781	
	Academic track	.972	31	.583	<i>t</i> -test

Construct	Variables	Total Sample (N = 50)			Statistical Test Used
		<i>Shapiro-Wilk W</i>	<i>df</i>	<i>p</i>	
<i>Cognitive Maturity</i>	Age				
	26-45	.966	20	.428	<i>t</i> -test
	46+	.947	30	.320	
	Gender				
	Female	.963	22	.542	<i>t</i> -test
	Male	.988	28	.978	
	Discipline				
	STEM	.967	19	.716	<i>t</i> -test
	Non-STEM	.975	31	.673	
	Experience				
	≤10 years	.961	23	.492	<i>t</i> -test
	≥11 years	.980	27	.873	
	Academic rank				
	Teaching track	.979	19	.928	<i>t</i> -test
	Academic track	.972	31	.569	
<i>Innovativeness</i>	Age				
	26-45	.963	20	.364	<i>t</i> -test
	46+	.977	30	.889	
	Gender				
	Female	.943	22	.233	<i>t</i> -test
	Male	.968	28	.421	
	Discipline				
	STEM	.944	19	.312	<i>t</i> -test
	Non-STEM	.964	31	.368	
	Experience				
	≤10 years	.971	23	.705	<i>t</i> -test
	≥11 years	.928	27	.063	
	Academic rank				
	Teaching track	.918	19	.105	<i>t</i> -test
	Academic track	.973	31	.595	
	Age				
	26-45	.977	20	.731	<i>t</i> -test

Construct	Variables	Total Sample (N = 50)			Statistical Test Used
		<i>Shapiro-Wilk W</i>	<i>df</i>	<i>p</i>	
	46+	.941	30	.251	
	Gender				
	Female	.951	22	.328	<i>t</i> -test
	Male	.961	28	.368	

The results of the Shapiro-Wilk test showed that all of the groups were normally distributed, and, as such, an independent *t*-test was used to analyse all of the content professor data for all variables with regard to the CTDs of *Engagement*, *Cognitive Maturity*, and *Innovativeness*.

Finally, research question 4 was addressed to determine whether a difference existed between students' and content professors' perceptions of student CTDs. The results of the Shapiro-Wilk test and the tests used to analyse the data are displayed below in Table 18.

Table 18

Shapiro-Wilk Test Results for the Difference between Students and Content Professors

Construct	Variables	Total Sample (N = 132)			Statistical Test Used
		<i>Shapiro-Wilk W</i>	<i>df</i>	<i>p</i>	
<i>Engagement</i>	Students	.901	82	<.001	<i>t</i> -test
	Content Professors	.984	50	.720	
<i>Cognitive Maturity</i>	Students	.893	82	<.001	<i>t</i> -test
	Content Professors	.977	50	.425	
<i>Innovativeness</i>	Students	.918	82	<.001	<i>t</i> -test
	Content Professors	.977	50	.447	

The Shapiro-Wilk test showed that a parametric test would be appropriate for all constructs, and as the comparison was between two groups, an independent *t*-test was implemented to analyse the difference in students' and content professors' perceptions in terms of *Engagement*, *Cognitive Maturity*, and *Innovativeness*.



CHAPTER 4: RESULTS

Introduction

This study aims to investigate the CT dispositions of undergraduate students studying at a tertiary-level EMI institution in Türkiye. The study uses a survey design to collect data on and examine the perceptions of student CTDs from the perspective of both the students themselves and the content professors.

First, this chapter will report the overall CTDs of students based on their own and content professors' perceptions as indicated by their responses to the UF/EMI questionnaire. This will be followed by presenting the analysis of both perceptions according to three constructs: *Engagement* (E), *Cognitive Maturity* (M), and *Innovativeness* (I).

Next, the chapter will delve into whether a difference exists in perceptions according to a number of variables pertaining to students (discipline, semester enrolled in, attendance in the English language preparatory program, letter grades received for the ENG 101 and ENG 102 EGAP courses, CGPA, age, and gender) and content professors (discipline, years of experience, academic rank, age, and gender).

Finally, the chapter will conclude by giving further results regarding the examination of whether there is a significant difference between the perceptions of students and content professors about students' CTDs.

Critical Thinking Dispositions of Students

The first research question (RQ) was about the CTDs of undergraduate students as perceived by themselves (RQ1.a) and by the content professors (RQ1.b). Below, the students' and content professors' UF/EMI questionnaire overall results are

presented, followed by a closer look at the results regarding the individual constructs within the framework.

Student Perceptions

Overall Student Critical Thinking Disposition

The mean scores and standard deviations of students' CTDs as a whole and those for each construct are shown in Table 19.

Table 19

UF/EMI Student Questionnaire: Tendency and Dispersion Across Constructs

Constructs	Number of Items	N = 82	
		M	SD
UF/EMI Overall	26	3.79	0.68
<i>Engagement</i>	11	3.80	0.73
<i>Cognitive Maturity</i>	8	3.76	0.69
<i>Innovativeness</i>	7	3.82	0.78

The average UF/EMI score of the students when asked to rate themselves was towards the higher end of the spectrum, which is supported by the average score of 3.79 ($SD = 0.68$) for the whole questionnaire.

The descriptive statistical analysis of the overall scores of the constructs of *Engagement*, *Cognitive Maturity*, and *Innovativeness* reveals a similar picture across the board with very close mean scores (ranging from 3.76 to 3.82), suggesting a general trend above average and with standard deviations indicating moderate variance in responses. Among the three constructs, students nevertheless perceived themselves strongest in *Innovativeness*, which has the highest mean with 3.82, but also the highest degree of variance ($SD = 0.78$).

Conversely, students scored themselves lowest for *Cognitive Maturity*, which had both the lowest mean and lowest variance ($M = 3.76$, $SD = 0.69$). The results for each construct are examined more closely in the following sections.

Engagement Disposition

Of the 26 items in the UF/EMI, 11 items are intended to measure *Engagement*, which is the students' "predisposition to looking for opportunities to use reasoning; anticipating situations that require reasoning; and confidence in reasoning ability" (Ricketts & Rudd, 2004, p. 24).

Table 20 shows the means and standard deviations of each individual item measuring the construct of *Engagement* in the questionnaire.

Table 20

Student Engagement Results

Item	<i>N</i> = 82	
	<i>M</i>	<i>SD</i>
2 I look for opportunities to solve problems.	4.10	1.00
3 I am interested in many issues.	3.83	1.11
5 I am able to relate to a wide variety of issues.	3.89	1.10
7 I enjoy finding answers to challenging questions.	3.85	1.15
8 I am a good problem solver.	3.80	1.07
9 I am confident that I can reach a reasonable conclusion.	4.04	0.90
14 I am able to apply my knowledge to a wide variety of issues.	3.70	1.11
17 I am able to explain things clearly.	3.52	1.10
18 I ask good questions when trying to clarify a solution.	3.55	1.14
19 I present issues in a clear and precise manner.	3.66	1.02
22 I keep on working on things until I get them right.	3.87	1.02

Students perceived themselves as being above average for the *Engagement* disposition ($M = 3.80$, $SD = 0.73$), and the scores for the individual items were relatively close. From among the 11 items in the questionnaire, students scored highest for "I look for opportunities to solve problems" (Item 2), with a mean of 4.10 ($SD = 1.00$). The item which students perceived themselves to be the weakest in was their ability to explain things clearly (Item 17), which had a mean of 3.52 ($SD = 1.10$). Overall, the narrow range of scores shows a moderately high level of agreement with the statements, indicating that students generally perceive themselves

as having a high level of *Engagement*, although the moderate level of variability in the response shows that individual experiences vary.

Cognitive Maturity Disposition

The second construct in the UF/EMI, *Cognitive Maturity*, is comprised of 8 items measuring the “predisposition to being aware of the complexity of problems; being open to other points of view; and being aware of their own and others' biases and predispositions” (Ricketts & Rudd, 2004, p. 24).

The means and standard deviations of the responses students gave to the items related to *Cognitive Maturity* were calculated and presented in Table 21.

Table 21

Student Cognitive Maturity Results

Item	N = 82	
	M	SD
1 I listen carefully to the opinions of others even when they disagree with me.	4.09	0.92
11 I am likely to change my opinion when I am given new information that conflicts with my current opinion.	3.60	1.04
13 I try to consider the facts without letting my biases affect my decisions	3.62	1.06
16 I can get along with people who do not share my opinions.	3.48	1.22
20 I consider how my own biases affect my opinions.	3.77	1.05
24 I try to find multiple solutions to problems.	3.45	1.26
25 I ask many questions when making a decision.	3.93	1.13
26 I believe that most problems have more than one solution.	4.12	1.08

Once again, students scored themselves towards the high end of the scale with moderate variance when responding to the items in the *Cognitive Maturity* construct. The statement which students responded to most positively was “I believe that most problems have more than one solution” (Item 26), with a mean of 4.12 ($SD = 1.08$). They scored themselves lowest when responding to “I try to find multiple solutions to problems” (Item 24), which had a mean of 3.45 ($SD = 1.26$).

Interestingly, this item also had the highest level of variance in the group, indicating that individual responses varied to some extent.

Innovativeness Disposition

The final disposition of the UF/EMI, *Innovativeness*, measures the “predisposition to be intellectually curious and desire to know the truth” (Ricketts & Rudd, 2004, p. 24) with 7 items.

The descriptive statistics for the 7 individual items that make up this construct are provided in Table 22.

Table 22

Student Innovativeness Results

Item	<i>N</i> = 82	
	<i>M</i>	<i>SD</i>
4 I enjoy learning about many topics.	4.07	1.02
6 I ask lots of questions in a learning environment.	3.17	1.26
10 I strive to be well informed.	4.10	0.98
12 I enjoy solving problems.	3.83	1.12
15 I enjoy learning even when I am not in school.	4.20	0.96
21 I search for the truth even when it makes me uncomfortable.	3.78	1.14
23 I will go out of my way to find the right answers to a problem.	3.59	1.15

As with the results of the preceding two constructs, students scored themselves on the higher end of the scale for the *Innovativeness* disposition. However, it is interesting to note that the items which they saw themselves as being the strongest and weakest in from the entire UF/EMI questionnaire belonged to this construct.

Specifically, they scored highest for “I enjoy learning even when I am not in school” (Item 15) with the highest mean and the lowest variance ($M = 4.20$, $SD = 0.96$) in the group. Conversely, they were in the least agreement with “I ask lots of questions in a learning environment” (Item 6), which had the lowest mean at 3.17,

but also the highest variance ($SD = 1.26$), showing that although the overall score was the lowest, the individual responses varied across the scale.

Content Professor Perceptions

Overall Perception of Student Critical Thinking Disposition

The overall mean score given by the professors when scoring students' CTDs was 3.35 ($SD = 0.65$). In terms of both the total score and the overall mean, content professors have scored their students' CTDs lower than students scored themselves.

The mean scores and standard deviations of the full questionnaire and each individual construct of *Engagement*, *Cognitive Maturity*, and *Innovativeness* are shown in Table 23.

Table 23

UF/EMI Content Professor Questionnaire: Tendency and Dispersion Across Constructs

Constructs	Number of Items	$N = 50$	
		M	SD
UF/EMI Overall	26	3.35	0.65
<i>Engagement</i>	11	3.49	0.74
<i>Cognitive Maturity</i>	8	3.25	0.73
<i>Innovativeness</i>	7	3.26	0.75

Content professors rated students' CTDs in terms of *Engagement*, *Cognitive Maturity*, and *Innovativeness* just above average, with *Cognitive Maturity* and *Innovativeness* receiving very close mean scores of 3.25 ($SD = 0.73$) and 3.26 ($SD = 0.75$), respectively. Content professors' responses indicate that they perceive students as possessing greater *Engagement* ($M = 3.49$, $SD = 0.74$), which received a higher score than the other two dispositions. The standard deviation for all three constructs was comparable and showed that individual content professors' responses were only moderately varied.

A more detailed examination of the three constructs and the individual items that comprise them is presented below.

Perception of Engagement Disposition

Content professors' responses to the items pertaining to the *Engagement* dispositions are displayed in Table 24.

Table 24

Content Professor Engagement Results

Item	N = 50		
	<i>n</i>	<i>M</i>	<i>SD</i>
2 My students look for opportunities to solve problems.	50	3.58	1.07
3 My students are interested in many issues.	50	3.56	1.22
5 My students are able to relate to a wide variety of issues.	50	3.56	1.07
7 My students enjoy finding answers to challenging questions.	49	3.55	1.04
8 My students are good problem solvers.	50	3.52	0.76
9 My students are confident that they can reach a reasonable conclusion.	50	3.56	0.88
14 My students are able to apply their knowledge to a wide variety of issues.	50	3.06	1.02
17 My students are able to explain things clearly.	50	3.46	0.95
18 My students ask good questions when trying to clarify a solution.	50	3.70	0.95
19 My students present issues in a clear and precise manner.	49	3.59	0.91
22 My students keep on working on things until they get them right.	50	3.26	1.03

Although content professors rated their students towards the higher end of the scale, their scores were noticeably lower than the scores of the students. In this construct, they scored students highest for asking good questions when trying to clarify a solution (Item 18) with a mean of 3.70 ($SD = 0.95$). Incidentally, this was also the highest-scoring item across all of the constructs. On the other hand, they scored students lowest for applying their knowledge to a wide variety of issues (Item 14), which had the lowest mean at 3.06 ($SD = 1.02$).

Perception of Cognitive Maturity Disposition

The mean and standard deviation values for the content professors' responses to the items related to the *Cognitive Maturity* construct are shown in Table 25.

Table 25

Content Professor Cognitive Maturity Results

Item	N = 50		
	<i>n</i>	<i>M</i>	<i>SD</i>
1 My students listen carefully to the opinions of others even when they disagree with them.	50	3.62	0.83
11 My students are likely to change their opinion when they are given new information that conflicts with their current opinion.	49	3.53	1.02
13 My students try to consider the facts without letting their biases affect their decisions	49	2.96	1.04
16 My students can get along with people who do not share their opinions.	49	3.37	0.91
20 My students consider how their own biases affect their opinions.	49	2.86	1.04
24 My students try to find multiple solutions to problems.	50	3.00	1.05
25 My students ask many questions when making a decision.	50	3.30	1.11
26 My students believe that most problems have more than one solution.	50	3.34	0.98

Content professors' responses regarding their students' *Cognitive Maturity* were quite wide ranging, with some of their scores dropping below the midpoint 3 score and others rising above 3.5. Overall, content professors scored students highest for listening carefully to the opinions of others even when they disagree with them (Item 1), with a mean of 3.62 ($SD = 0.83$). The variance for this item was the lowest in the group and indicated that individual scores did not vary very much. Content professors were least enthusiastic about their students' ability to consider how their own biases affect their opinions (Item 20). This also happened to be among the lowest-scoring items in the whole questionnaire and received a mean score of 2.86 ($SD = 1.04$).

Perception of Innovativeness Disposition

The content professors' responses to the items measuring *Innovativeness* were analysed descriptively, and the results can be seen in Table 26.

Table 26

Content Professor Innovativeness Results

Item	N = 50		
	<i>n</i>	<i>M</i>	<i>SD</i>
4 My students enjoy learning about many topics.	50	3.64	1.06
6 My students ask lots of questions in a learning environment.	50	3.12	1.21
10 My students strive to be well informed.	49	3.67	1.05
12 My students enjoy solving problems.	50	3.50	0.81
15 My students enjoy learning even when they are not in school.	49	3.06	0.99
21 My students search for the truth even when it makes them uncomfortable.	50	2.84	1.06
23 My students will go out of their way to find the right answers to a problem.	50	3.02	1.08

For this disposition, content professors scored students highest for striving to be well informed (Item 10) ($M = 3.67$, $SD = 1.05$). However, they felt the students were weakest in searching for the truth even when it made them uncomfortable (Item 21). Notably, this was also the lowest-scoring item in the entire questionnaire and had a mean of 2.84 ($SD = 1.06$). The standard deviation for both the highest and lowest scored items in this group was moderate, once again showing that individual responses were somehow varied.

Student Perception Differences

This section is about the results when of the inferential analysis conducted to explore whether their CTDs differed by (a) discipline of study, (b) academic semester enrolled in at the time of responding to the questionnaire, (c) attendance in the pre-sessional language preparatory program, (d) letter grade received from ENG 101 and ENG 102, (e) CGPA, (f) age, and (g) gender. The results are presented

separately for each of the three dispositions: *Engagement*, *Cognitive Maturity*, and *Innovativeness*.

Engagement Disposition

First, the *Engagement* disposition of the participating students was calculated according to their differences across multiple variables, which are presented in the subsections below.

Discipline of Study

The difference in student responses based on their disciplines (STEM vs non-STEM) as tested by the Mann-Whitney U test is displayed in Table 27.

Table 27

Mann-Whitney U Test for Engagement Average Score by Students' Discipline

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>STEM^a</i> (<i>n</i> =42)	<i>Non-STEM^b</i> (<i>n</i> =40)	<i>STEM^a</i> (<i>n</i> =42)	<i>Non-STEM^b</i> (<i>n</i> =40)			
<i>Engagement Average</i>	42.43	40.53	1782	1621	801.000	-0.362	.717

^a Architecture, Computer Engineering, Economics, Electrical and Electronics Engineering, Industrial Engineering, Information Systems and Technologies, Interior Architecture and Environmental Design, Mathematics, Mechanical Engineering, Molecular Biology and Genetics, Physics

^b American Culture and Literature, Archaeology, Basic Education, Communication and Design, English Language and Literature, International Relations, Law, Management, Political Science and Public Administration, Psychology, Translation and Interpretation

Overall, it can be seen that although students studying in STEM disciplines reported a slightly higher *Engagement* score when compared to those in non-STEM disciplines, the difference between the two groups was not statistically significant ($U = 801, z = -0.362, p = .717$).

The results regarding the differences between students studying in STEM and non-STEM disciplines by individual items measuring *Engagement* can be seen in Table 28.

Table 28*Mann-Whitney U Test for Engagement Items by Students' Discipline*

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>STEM^a</i> (<i>n</i> =42)	<i>Non-STEM^b</i> (<i>n</i> =40)	<i>STEM^a</i> (<i>n</i> =42)	<i>Non-STEM^b</i> (<i>n</i> =40)			
2 I look for opportunities to solve problems.	41.23	41.79	1731.5	1671.5	828.500	-0.117	.907
3 I am interested in many issues.	41.20	41.81	1730.5	1672.5	827.500	-0.121	.904
5 I am able to relate to a wide variety of issues.	40.14	42.93	1686	1717	783.000	-0.557	.578
7 I enjoy finding answers to challenging questions.	45.60	37.20	1915	1488	668.000	-1.668	.095
8 I am a good problem solver.	44.48	38.38	1868	1535	715.000	-1.222	.222
9 I am confident that I can reach a reasonable conclusion.	42.32	40.64	1777.5	1625.5	805.500	-0.346	.729
14 I am able to apply my knowledge to a wide variety of issues.	39.36	43.75	1653	1750	750.000	-0.876	.381
17 I am able to explain things clearly.	41.04	41.99	1723.5	1679.5	820.500	-0.190	.849
18 I ask good questions when trying to clarify a solution.	43.21	39.70	1815	1588	768.000	-0.691	.490
19 I present issues in a clear and precise manner.	43.35	39.56	1820.5	1582.5	762.500	-0.755	.450
22 I keep on working on things until I get them right.	42.45	40.50	1783	1620	800.000	-0.388	.698

^a Architecture, Computer Engineering, Economics, Electrical and Electronics Engineering, Industrial Engineering, Information Systems and Technologies, Interior Architecture and Environmental Design, Mathematics, Mechanical Engineering, Molecular Biology and Genetics, Physics

^b American Culture and Literature, Archaeology, Basic Education, Communication and Design, English Language and Literature, International Relations, Law, Management, Political Science and Public Administration, Psychology, Translation and Interpretation

The results indicate that there is no statistical difference between STEM and non-STEM students in their responses to any of the individual items measuring *Engagement*.

Academic Semester Enrolled In

Table 29 below presents the comparison of two semester-based student groups (semesters 1–2 vs. 3–8) in terms of their differences, as analysed using a Mann-Whitney U test.

Table 29

Mann-Whitney U Test for Engagement Average Score by Students' Semester

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	1-2	3-8	1-2	3-8			
	(<i>n</i> =49)	(<i>n</i> =33)	(<i>n</i> =49)	(<i>n</i> =33)			
<i>Engagement Average</i>	41.42	41.62	2029.5	1373.5	804.500	-0.038	.970

The results showed that the mean ranks of the average scores for *Engagement* according to students' semesters were very close and that any difference was not significant ($U = 804.5$, $z = -0.038$, $p = .970$).

The results of the analysis conducted according to each individual item in the questionnaire measuring the *Engagement* construct are presented in Table 30.

Table 30

Mann-Whitney U Test for Engagement Items by Students' Semester

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	1-2	3-8	1-2	3-8			
	(<i>n</i> =49)	(<i>n</i> =33)	(<i>n</i> =49)	(<i>n</i> =33)			
2 I look for opportunities to solve problems.	39.66	44.23	1943.5	1459.5	718.500	-0.930	.353
3 I am interested in many issues.	41.57	41.39	2037	1366	805.000	-0.035	.972

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>1-2</i> (<i>n</i> =49)	<i>3-8</i> (<i>n</i> =33)	<i>1-2</i> (<i>n</i> =49)	<i>3-8</i> (<i>n</i> =33)			
5 I am able to relate to a wide variety of issues.	44.93	36.41	2201.5	1201.5	640.500	-1.672	.094
7 I enjoy finding answers to challenging questions.	43.07	39.17	2110.5	1292.5	731.500	-0.761	.447
8 I am a good problem solver.	41.23	41.89	2020.5	1382.5	795.500	-0.130	.897
9 I am confident that I can reach a reasonable conclusion.	42.22	40.42	2069	1334	773.000	-0.363	.717
14 I am able to apply my knowledge to a wide variety of issues.	40.03	43.68	1961.5	1441.5	736.500	-0.714	.475
17 I am able to explain things clearly.	39.07	45.11	1914.5	1488.5	689.500	-1.183	.237
18 I ask good questions when trying to clarify a solution.	42.06	40.67	2061	1342	781.000	-0.269	.788
19 I present issues in a clear and precise manner.	40.34	43.23	1976.5	1426.5	751.500	-0.566	.571
22 I keep on working on things until I get them right.	42.40	40.17	2077.5	1325.5	764.500	-0.436	.663

As none of the items had a *p*-score above .05, it was understood that no significant difference existed between the responses of the two groups in any single item.

Attendance in the Pre-Sessional Language Preparatory Program

Table 31 below displays the results of an independent t-test comparing students who attended the pre-sessional English language preparatory program with those who did not.

Table 31

Independent t-Test for Engagement Average Score by Students' Attendance at English Language Preparatory Program

Construct	Did Not Attend (<i>n</i> = 53)		Attended (<i>n</i> = 29)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Engagement Average	3.70	0.79	3.98	0.59	80	-1.641	.105	-0.379

The average score for students' *Engagement* disposition was above average for the students who attended the preparatory program and those who did not, however, no statistically significant difference was identified between the two groups; $t(80) = -1.641$, $p = .105$, $d = -0.379$.

Table 32 presents the results of independent t-tests conducted for each individual questionnaire item measuring *Engagement*, comparing the two student groups.

Table 32

Independent t-Test for Engagement Items by Students' Attendance at English Language Preparatory Program

Item	Did Not Attend (<i>n</i> = 53)		Attended (<i>n</i> = 29)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
2 I look for opportunities to solve problems.	3.94	1.12	4.38	0.68	80	-1.916	.059	-0.442
3 I am interested in many issues.	3.81	1.19	3.86	0.95	80	-0.197	.844	-0.045
5 I am able to relate to a wide variety of issues.	3.89	1.16	3.90	1.01	80	-0.038	.970	-0.009

Item	Did Not Attend (<i>n</i> = 53)		Attended (<i>n</i> = 29)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
7 I enjoy finding answers to challenging questions.	3.66	1.26	4.21	0.82	77.40	-2.378	.020*	-0.487
8 I am a good problem solver.	3.70	1.05	4.00	1.10	80	-1.224	.224	-0.283
9 I am confident that I can reach a reasonable conclusion.	4.00	0.92	4.10	0.86	80	-0.498	.620	-0.115
14 I am able to apply my knowledge to a wide variety of issues.	3.49	1.20	4.07	0.80	76.87	-2.605	.011*	-0.536
17 I am able to explain things clearly.	3.43	1.15	3.69	1.00	80	-1.004	.318	-0.232
18 I ask good questions when trying to clarify a solution.	3.51	1.17	3.62	1.08	80	-0.422	.674	-0.098
19 I present issues in a clear and precise manner.	3.55	1.08	3.86	0.88	80	-1.342	.183	-0.310
22 I keep on working on things until I get them right.	3.75	1.07	4.07	0.88	80	-1.347	.182	-0.311

**p* < .05

It is interesting to note that students who attended the English language preparatory program scored themselves higher on average for every single item measuring *Engagement* in the UF/EMI. Notably, the results of the Welch's *t*-test showed unequal variance and the difference in scores between the two groups when responding to whether they *enjoy finding answers to difficult questions* (Item 7) was

significant, $t(77.40) = -2.378, p = .020$. Students who had attended the preparatory program ($M = 4.21, SD = 0.82$) scored significantly higher than students who had not attended the preparatory program ($M = 3.66, SD = 1.26$). The effect size, Cohen's $d = -0.487$, indicates a medium effect (Cohen, 1988).

Furthermore, when rating their *ability to apply their knowledge to a wide variety of issues* (Item 14), students who had attended the English preparatory program ($M = 4.07, SD = 0.80$) again rated themselves significantly higher than the students who had not attended ($M = 3.49, SD = 1.20$), $t(76.87) = -2.605, p = .011$.

The effect size, Cohen's $d = -0.536$, indicates a medium effect.

Letter Grade Received from EGAP Courses

A further point of comparison was for the letter grades that students received for the EGAP courses (ENG 101 and ENG 102) that students are required to take in their freshman year.

ENG 101. The first of these courses that students are enrolled in is ENG 101. Students were categorised as receiving letter grades A to B+ or B to C.

The results of the Mann-Whitney U test for the *Engagement* average are presented in Table 33.

Table 33

Mann-Whitney U Test for Engagement Average Score by Students' Letter Grade Received for ENG 101

Construct	Mean Rank		Sum of Ranks		U	z	p
	<i>A to B+</i> ($n=46$)	<i>B to C</i> ($n=29$)	<i>A to B+</i> ($n=46$)	<i>B to C</i> ($n=29$)			
<i>Engagement</i> Average	40.78	33.59	1876	974	539.000	-1.395	.163

As can be seen from the table, there was no significant difference in the *Engagement* average score between students receiving A to B+ and those receiving B to C ($U = 539, z = -1.395, p = .163$).

The results of the statistical analysis of each individual item in the *Engagement* disposition can be found in Table 34.

Table 34

Mann-Whitney U Test for Engagement Items by Students' Letter Grade Received for ENG 101

Item	Mean Rank		Sum of Ranks		U	z	p
	<i>A to B+</i> ($n=46$)	<i>B to C</i> ($n=29$)	<i>A to B+</i> ($n=46$)	<i>B to C</i> ($n=29$)			
2 I look for opportunities to solve problems.	40.59	33.90	1867	983	548.000	-1.404	.160
3 I am interested in many issues.	40.99	33.26	1885.5	964.5	529.500	-1.563	.118
5 I am able to relate to a wide variety of issues.	39.80	35.14	1831	1019	584.000	-0.951	.342
7 I enjoy finding answers to challenging questions.	40.05	34.74	1842.5	1007.5	572.500	-1.074	.283
8 I am a good problem solver.	40.28	34.38	1853	997	562.000	-1.210	.226
9 I am confident that I can reach a reasonable conclusion.	39.09	36.28	1798	1052	617.000	-0.598	.550
14 I am able to apply my knowledge to a wide variety of issues.	38.15	37.76	1755	1095	660.000	-0.080	.937
17 I am able to explain things clearly.	42.57	30.76	1958	892	457.000	-2.393	.017*

Item	Mean Rank		Sum of Ranks		U	z	p
	<i>A to B+</i> ($n=46$)	<i>B to C</i> ($n=29$)	<i>A to B+</i> ($n=46$)	<i>B to C</i> ($n=29$)			
18 I ask good questions when trying to clarify a solution.	39.24	36.03	1805	1045	610.000	-0.644	.520
19 I present issues in a clear and precise manner.	41.36	32.67	1902	947	512.500	-1.777	.076
22 I keep on working on things until I get them right.	39.26	36.00	1806	1044	609.000	-0.662	.508

* $p < .05$

Students in the group receiving letter grades A to B+ scored themselves higher on average for every item. In addition, when rating themselves for their *ability to explain things clearly* (Item 17), students in the A to B+ group ($M = 42.57$) scored themselves significantly higher than those in the B to C group ($M = 30.76$), $U = 457$, $z = -2.393$, $p = .017$. The effect size, calculated as $r = -0.264$, suggests a small effect.

ENG 102. After completing ENG 101 successfully, first-year students are enrolled in ENG 102, and the next point of analysis was between those students who had completed (and therefore received a letter grade from) ENG 102 and those who had not yet received a grade.

Table 35 presents the results of a Mann-Whitney U test comparing the average Engagement scores between student groups.

Table 35

Mann-Whitney U Test for Engagement Average Score by Students' Letter Grade Received for ENG 102

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>No Grade (n=43)</i>	<i>A to C (n=39)</i>	<i>No Grade (n=43)</i>	<i>A to C (n=39)</i>			
<i>Engagement Average</i>	38.44	44.87	1653	1750	707.000	-1.223	.221

The *Engagement* scores of students who had not yet received a grade from ENG 102 did not differ significantly from the *Engagement* scores of students with a letter grade A to C ($U = 707, z = -1.223, p = .221$).

The data was also examined to ascertain whether there was a significant difference between the two groups of students in terms of each item measuring the *Engagement* disposition. The results of the analysis are presented in Table 36.

Table 36

Mann-Whitney U Test for Engagement Items by Students' Letter Grade Received for ENG 102

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>No Grade (n=43)</i>	<i>A to C (n=39)</i>	<i>No Grade (n=43)</i>	<i>A to C (n=39)</i>			
2 I look for opportunities to solve problems.	39.50	43.71	1698.5	1704.5	752.500	-0.872	.383
3 I am interested in many issues.	39.09	44.15	1681	1722	735.000	-1.002	.316
5 I am able to relate to a wide variety of issues.	44.20	38.53	1900.5	1502.5	722.500	-1.134	.257
7 I enjoy finding answers to challenging questions.	40.29	42.83	1732.5	1670.5	786.500	-0.505	.614
8 I am a good problem solver.	40.19	42.95	1728	1675	782.000	-0.553	.580
9 I am confident that I can reach a reasonable conclusion.	40.69	42.40	1749.5	1653.5	803.500	-0.351	.726

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>No Grade (n=43)</i>	<i>A to C (n=39)</i>	<i>No Grade (n=43)</i>	<i>A to C (n=39)</i>			
14 I am able to apply my knowledge to a wide variety of issues.	36.73	46.76	1579.5	1823.5	633.500	-1.996	.046*
17 I am able to explain things clearly.	37.41	46.01	1608.5	1794.5	662.500	-1.718	.086
18 I ask good questions when trying to clarify a solution.	40.95	42.10	1761	1642	815.000	-0.226	.821
19 I present issues in a clear and precise manner.	37.97	45.40	1632.5	1770.5	686.500	-1.483	.138
22 I keep on working on things until I get them right.	41.38	41.63	1779.5	1623.5	833.500	-0.049	.961

* $p < .05$

Among the 11 items for the *Engagement* disposition, students receiving a letter grade of A to C ($M = 46.76$) scored themselves significantly higher than the students who had not yet received a grade ($M = 36.73$) for their *ability to apply their knowledge to a wide variety of issues* (Item 14), $U = 633.5$, $z = -1.996$, $p = .046$. The effect size, calculated as $r = -0.220$, suggests a small effect.

Cumulative Grade Point Average

Table 37 below presents the results of a Mann-Whitney U test comparing overall *Engagement* disposition between students with a CGPA of ≤ 2.99 and those with a CGPA of ≥ 3.00 .

Table 37*Mann-Whitney U Test for Engagement Average Score by Students' CGPA*

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	≤ 2.99 (<i>n</i> =31)	≥ 3.00 (<i>n</i> =41)	≤ 2.99 (<i>n</i> =31)	≥ 3.00 (<i>n</i> =41)			
<i>Engagement Average</i>	34.50	38.01	1069.5	1558.5	573.500	-0.706	.480

According to these results, there is no significant difference between the average *Engagement* score of students with a CGPA of ≤ 2.99 and those with a CGPA of ≥ 3.00 , $U = 573.5$, $z = -0.706$, $p = .480$.

Table 38 presents a further comparison of the two groups on each individual *Engagement* item.

Table 38*Mann-Whitney U Test for Engagement Items by Students' CGPA*

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	≤ 2.99 (<i>n</i> =31)	≥ 3.00 (<i>n</i> =41)	≤ 2.99 (<i>n</i> =31)	≥ 3.00 (<i>n</i> =41)			
2 I look for opportunities to solve problems.	36.24	36.70	1123.5	1504.5	627.500	-0.099	.921
3 I am interested in many issues.	36.02	36.87	1116.5	1511.5	620.500	-0.178	.859
5 I am able to relate to a wide variety of issues.	30.73	40.87	952.5	1675.5	456.500	-2.139	.032*
7 I enjoy finding answers to challenging questions.	35.10	37.56	1088	1540	592.000	-0.516	.606
8 I am a good problem solver.	35.61	37.17	1104	1524	608.000	-0.332	.740
9 I am confident that I can reach a reasonable conclusion.	36.90	36.20	1144	1484	623.000	-0.155	.877
14 I am able to apply my knowledge to a wide variety of issues.	32.37	39.62	1003.5	1624.5	507.500	-1.526	.127

Item	Mean Rank		Sum of Ranks		U	z	p
	≤ 2.99	≥ 3.00	≤ 2.99	≥ 3.00			
	($n=31$)	($n=41$)	($n=31$)	($n=41$)			
17 I am able to explain things clearly.	34.85	37.74	1080.5	1547.5	584.500	-0.606	.545
18 I ask good questions when trying to clarify a solution.	35.98	36.89	1115.5	1512.5	619.500	-0.189	.850
19 I present issues in a clear and precise manner.	36.06	36.83	1118	1510	622.000	-0.162	.871
22 I keep on working on things until I get them right.	30.45	41.07	944	1684	448.000	-2.243	.025*

* $p < .05$

The Mann-Whitney U test revealed that students in the ≥ 3.00 CGPA group ($M = 40.87$) rated themselves significantly higher than students within the ≤ 2.99 CGPA group ($M = 30.73$) in terms of their perceived *ability to relate to a wide range of issues* (Item 5), $U = 456.5$, $z = -2.139$, $p = .032$. The effect size, calculated as $r = 0.236$, suggests a small effect. Moreover, for their tendency to *keep working on things until they get them right* (Item 22), the difference between the ≥ 3.00 CGPA group ($M = 41.07$) and the ≤ 2.99 CGPA group ($M = 30.45$) was significant, $U = 448$, $z = -2.243$, $p = .025$. The effect size, calculated as $r = -0.248$, indicates a small effect.

Age

The results of the Mann-Whitney U test comparing the average *Engagement* disposition score of the students in the 18-20 and 21+ age groups are presented in Table 39.

Table 39*Mann-Whitney U Test for Engagement Average Score by Students' Age*

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>18-20</i> (<i>n</i> =56)	<i>21+</i> (<i>n</i> =26)	<i>18-20</i> (<i>n</i> =56)	<i>21+</i> (<i>n</i> =26)			
<i>Engagement Average</i>	38.98	46.92	2183	1220	587.000	-1.407	.159

The results indicate that the difference between the age groups 18-20 and 21+ is not statistically significant when considered in relation to students' self-reported *Engagement* score, $U = 587$, $z = -1.407$, $p = .159$.

The results of the analysis measuring the difference between the two age groups in the individual items of the *Engagement* disposition are presented in Table 40.

Table 40*Mann-Whitney U Test for Engagement Items by Students' Age*

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>18-20</i> (<i>n</i> =56)	<i>21+</i> (<i>n</i> =26)	<i>18-20</i> (<i>n</i> =56)	<i>21+</i> (<i>n</i> =26)			
2 I look for opportunities to solve problems.	38.32	48.35	2146	1257	550.000	-1.937	.053
3 I am interested in many issues.	41.34	41.85	2315	1088	719.000	-0.093	.926
5 I am able to relate to a wide variety of issues.	43.42	37.37	2431.5	971.5	620.500	-1.128	.259
7 I enjoy finding answers to challenging questions.	41.79	40.88	2340	1063	712.000	-0.167	.868
8 I am a good problem solver.	39.11	46.65	2190	1213	594.000	-1.407	.159
9 I am confident that I can reach a	40.06	44.60	2243.5	1159.5	647.500	-0.867	.386

Item	Mean Rank		Sum of Ranks		U	z	p
	18-20 ($n=56$)	21+ ($n=26$)	18-20 ($n=56$)	21+ ($n=26$)			
reasonable conclusion.							
14 I am able to apply my knowledge to a wide variety of issues.	37.97	49.10	2126.5	1276.5	530.500	-2.064	.039*
17 I am able to explain things clearly.	37.56	49.98	2103.5	1299.5	507.500	-2.310	.021*
18 I ask good questions when trying to clarify a solution.	40.12	44.48	2246.5	1156.5	650.500	-0.799	.424
19 I present issues in a clear and precise manner.	40.63	43.38	2275	1128	679.000	-0.513	.608
22 I keep on working on things until I get them right.	40.86	42.88	2288	1115	692.000	-.376	.707

* $p < .05$

The results of this analysis clearly indicate that students aged 21+ ($M = 49.10$) scored themselves significantly higher than students aged 18-21 ($M = 37.97$) in *being able to apply their knowledge to a wide variety of issues* (Item 14), $U = 530.5$, $z = -2.064$, $p = .039$. The effect size, calculated as $r = 0.228$, indicates a small effect. In addition, for *being able to explain things clearly* (Item 17), students aged 21+ ($M = 49.98$) once again scored themselves significantly higher than students aged 18-21 ($M = 37.56$), $U = 507.5$, $z = -2.310$, $p = .021$. The effect size, calculated as $r = 0.255$, suggests a small effect.

Gender

The final point of comparison was the gender of the participating students (Female and Male). The results of the independent *t*-test used for comparing the average female and male *Engagement* scores are presented in Table 41.

Table 41

Independent t-Test for Engagement Average Score by Students' Gender

Construct	Female (<i>n</i> = 50)		Male (<i>n</i> = 31)		<i>t</i> (79)	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
<i>Engagement</i> Average	3.75	0.83	3.90	0.55	-0.899	.371	-0.206

As evident in the table, there was no significant difference between females and males in their average scores for the disposition of *Engagement*, $t(79) = -0.899$, $p = .371$, $d = -0.206$.

The results of the analysis of student responses to each item in the *Engagement* construct are depicted in Table 42.

Table 42

Independent t-Test for Engagement Items by Students' Gender

Item	Female (<i>n</i> = 50)		Male (<i>n</i> = 31)		<i>t</i> (79)	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
2 I look for opportunities to solve problems.	3.96	1.09	4.32	0.83	-1.589	.116	-0.363
3 I am interested in many issues.	3.72	1.18	4.00	1.00	-1.099	.275	-0.251
5 I am able to relate to a wide variety of issues.	3.92	1.16	3.84	1.04	0.319	.750	0.073
7 I enjoy finding answers to challenging questions.	3.76	1.21	4.03	1.05	-1.038	.303	-0.237
8 I am a good problem solver.	3.80	1.05	3.84	1.13	-0.157	.876	-0.036

Item	Female (<i>n</i> = 50)		Male (<i>n</i> = 31)		<i>t</i> (79)	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
9 I am confident that I can reach a reasonable conclusion.	4.06	0.98	4.03	0.75	0.135	.893	0.031
14 I am able to apply my knowledge to a wide variety of issues.	3.58	1.16	3.87	1.02	-1.145	.256	-0.262
17 I am able to explain things clearly.	3.40	1.09	3.71	1.13	-1.226	.224	-0.280
18 I ask good questions when trying to clarify a solution.	3.54	1.16	3.61	1.09	-0.281	.779	-0.064
19 I present issues in a clear and precise manner.	3.56	1.03	3.84	1.00	-1.193	.236	-0.273
22 I keep on working on things until I get them right.	3.94	1.04	3.81	0.95	0.582	.562	0.133

The results indicate that there is no significant difference between female and male participants' responses to the items measuring the *Engagement* disposition in the UF/EMI.

Cognitive Maturity Disposition

Results regarding whether students' *Cognitive Maturity* differs according to multiple variables are presented below.

Discipline of Study

The responses received were analysed to see if the *Cognitive Maturity* disposition of students studying in STEM (*n* = 42) and non-STEM (*n* = 40) disciplines differed significantly.

Table 43 presents the results of the Mann-Whitney U Test used to analyse the average *Cognitive Maturity* scores of students studying in STEM and non-STEM disciplines.

Table 43*Mann-Whitney U Test for Cognitive Maturity Average Score by Students' Disciplines*

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>STEM</i> (<i>n</i> =42)	<i>Non-STEM</i> (<i>n</i> =40)	<i>STEM</i> (<i>n</i> =42)	<i>Non-STEM</i> (<i>n</i> =40)			
<i>Cognitive Maturity Average</i>	42.08	40.89	1767.50	1635.50	815.500	-0.228	.820

As can be seen from the results, there did not appear to be any significant difference between students studying in STEM and non-STEM disciplines in terms of their self-perceived *Cognitive Maturity*, $U = 815.5$, $z = -0.228$, $p = .820$.

The results of the analysis of the two groups for each individual item that comprises the *Cognitive Maturity* construct are presented in Table 44.

Table 44*Mann-Whitney U Test for Cognitive Maturity Items by Students' Disciplines*

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>STEM</i> (<i>n</i> =42)	<i>Non-STEM</i> (<i>n</i> =40)	<i>STEM</i> (<i>n</i> =42)	<i>Non-STEM</i> (<i>n</i> =40)			
1 I listen carefully to the opinions of others even when they disagree with me.	40.99	42.04	1721.5	1681.5	818.500	-0.220	.826
11 I am likely to change my opinion when I am given new information that conflicts with my current opinion.	45.67	37.13	1918	1485	665.000	-1.699	.089
13 I try to consider the facts without letting my biases affect my decisions	41.36	41.65	1737	1666	834.000	-0.058	.954

Item	Mean Rank		Sum of Ranks		U	z	p
	<i>STEM</i> ($n=42$)	<i>Non-STEM</i> ($n=40$)	<i>STEM</i> ($n=42$)	<i>Non-STEM</i> ($n=40$)			
16 I can get along with people who do not share my opinions.	46.32	36.44	1945.5	1457.5	637.500	-1.933	.053
20 I consider how my own biases affect my opinions.	40.43	42.63	1698	1705	795.000	-0.439	.661
24 I try to find multiple solutions to problems.	36.61	46.64	1537.5	1865.5	634.500	-1.972	.049*
25 I ask many questions when making a decision.	41.88	41.10	1759	1644	824.000	-0.158	.874
26 I believe that most problems have more than one solution.	40.79	42.25	1713	1690	810.000	-0.300	.765

* $p < .05$

When responding to these 8 items, students studying in non-STEM disciplines ($M = 46.64$) indicated that they *try to find multiple solutions to a problem* (Item 24) to a significantly higher degree than their counterparts studying in STEM disciplines ($M = 36.61$), $U = 634.5$, $z = -1.972$, $p = .049$. The effect size, calculated as $r = 0.218$, suggests a small effect.

Academic Semester Enrolled In

Students' semester of study at the time of participating in the study was the next variable by which they were compared. The results of the Mann-Whitney U test were utilised to compare students in semesters 1 and 2 with those in semesters 3 to 8 in terms of their Cognitive Maturity, as presented in Table 45 below.

Table 45*Mann-Whitney U Test for Cognitive Maturity Score by Students' Semester*

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>Semester</i>	<i>Semester</i>	<i>Semester</i>	<i>Semester</i>			
	<i>1-2</i> (<i>n</i> =49)	<i>3-8</i> (<i>n</i> =33)	<i>1-2</i> (<i>n</i> =49)	<i>3-8</i> (<i>n</i> =33)			
<i>Cognitive Maturity Average</i>	42.09	40.62	2062.5	1340.5	779.500	-0.275	.783

The results of the test show that there is no statistical difference between the two groups of students in terms of their self-perceived average *Cognitive Maturity* score, $U = 779.5$, $z = -0.275$, $p = .783$.

The analysis of students' responses to the individual items measuring *Cognitive Maturity* is presented in Table 46.

Table 46*Mann-Whitney U Test for Cognitive Maturity Items by Students' Semester*

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>1-2</i>	<i>3-8</i>	<i>1-2</i>	<i>3-8</i>			
	(<i>n</i> =49)	(<i>n</i> =33)	(<i>n</i> =49)	(<i>n</i> =33)			
1 I listen carefully to the opinions of others even when they disagree with me.	40.57	42.88	1988	1415	763.000	-0.475	.635
11 I am likely to change my opinion when I am given new information that conflicts with my current opinion.	41.92	40.88	2054	1349	788.000	-0.203	.839
13 I try to consider the facts without letting my biases affect my decisions	39.28	44.80	1924.5	1478.5	699.500	-1.075	.283

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>1-2</i> (<i>n</i> =49)	<i>3-8</i> (<i>n</i> =33)	<i>1-2</i> (<i>n</i> =49)	<i>3-8</i> (<i>n</i> =33)			
16 I can get along with people who do not share my opinions.	39.78	44.06	1949	1454	724.000	-0.822	.411
20 I consider how my own biases affect my opinions.	42.91	39.41	2102.5	1300.5	739.500	-0.686	.492
24 I try to find multiple solutions to problems.	44.94	36.39	2202	1201	640.000	-1.648	.099
25 I ask many questions when making a decision.	43.74	38.17	2143.5	1259.5	698.500	-1.107	.268
26 I believe that most problems have more than one solution.	43.27	38.88	2120	1283	722.000	-0.880	.379

Once again, the Mann-Whitney *U* test results showed that no significant difference existed between the students enrolled in their first and second semesters and those enrolled in their third through eighth semesters in their responses to the items measuring *Cognitive Maturity*.

Attendance in the Pre-Sessional Language Preparatory Program

Students were next compared in terms of whether they attended (*n* = 29) or did not attend (*n* = 53) the pre-sessional English language preparatory program prior to entering their freshman year. The findings of the independent *t*-test used to compare the *Cognitive Maturity* average scores of the students in both groups can be found in Table 47.

Table 47

Independent t-Test for Cognitive Maturity Score by Students' Attendance at English Language Preparatory Program

Construct	Did Not Attend (<i>n</i> = 53)		Attended (<i>n</i> = 29)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Cognitive Maturity Average	3.67	0.76	3.90	0.52	80	-1.463	.147	-0.338

The test results showed that the students who attended the preparatory program ($M = 3.90$; $SD = 0.52$) had only a slightly higher mean score than those who did not attend ($M = 3.67$, $SD = 0.76$), and this difference was not significant, $t(80) = -1.463$, $p = .147$, $d = -0.338$.

The results of the comparison between both groups for each item measuring *Cognitive Maturity* are presented in Table 48.

Table 48

Independent t-Test for Cognitive Maturity Items by Students' Attendance at English Language Preparatory Program

Item	Did Not Attend (<i>n</i> = 53)		Attended (<i>n</i> = 29)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
1 I listen carefully to the opinions of others even when they disagree with me.	4.00	1.02	4.24	0.69	80	-1.139	.258	-0.263
11 I am likely to change my opinion when I am given new information that conflicts with my current opinion.	3.60	1.12	3.59	0.91	80	0.073	.942	0.017

Item	Did Not Attend (<i>n</i> = 53)		Attended (<i>n</i> = 29)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
13 I try to consider the facts without letting my biases affect my decisions	3.55	1.15	3.76	0.87	80	-0.861	.392	-0.199
16 I can get along with people who do not share my opinions.	3.38	1.26	3.66	1.14	80	-0.986	.327	-0.228
20 I consider how my own biases affect my opinions.	3.77	1.14	3.76	0.87	80	0.062	.951	0.014
24 I try to find multiple solutions to problems.	3.26	1.32	3.79	1.08	80	-1.846	.069	-0.426
25 I ask many questions when making a decision.	3.81	1.18	4.14	1.03	80	-1.255	.213	-0.290
26 I believe that most problems have more than one solution.	4.02	1.22	4.31	0.76	80	-1.169	.246	-0.270

The results of the *t*-test indicated that no significant difference was present between those students who had attended the pre-sessional preparatory program and those who had not when compared according to their responses to the *Cognitive Maturity* items.

Letter Grade Received from EGAP Courses

ENG 101. The letter grades received by students in the first of two freshman-year EGAP courses, ENG 101, were also a point of comparison when analysing students' *Cognitive Maturity* disposition. In Table 49, the results of the Mann-Whitney U test employed to compare the responses of students receiving an A to B+ from ENG 101 with those of students receiving a B to C have been shared.

Table 49*Mann-Whitney U Test for Cognitive Maturity Score by Students' Letter Grade**Received for ENG 101*

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>A to B+</i> (<i>n</i> =46)	<i>B to C</i> (<i>n</i> =29)	<i>A to B+</i> (<i>n</i> =46)	<i>B to C</i> (<i>n</i> =29)			
<i>Cognitive Maturity Average</i>	39.83	35.10	1832	1018	583.000	-0.916	.359

The results indicate that there was no significant difference between students receiving higher than a B and those receiving a B or below from ENG 101 in terms of their average *Cognitive Maturity* disposition, $U = 583$, $z = -0.916$, $p = .359$.

The results of the analysis examining how the letter grade students received for ENG 101 may have differed for each item in the questionnaire measuring the *Cognitive Maturity* construct can be seen in Table 50.

Table 50*Mann-Whitney U Test for Cognitive Maturity Items by Students' Letter Grade**Received for ENG 101*

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>A to B+</i> (<i>n</i> =46)	<i>B to C</i> (<i>n</i> =29)	<i>A to B+</i> (<i>n</i> =46)	<i>B to C</i> (<i>n</i> =29)			
1 I listen carefully to the opinions of others even when they disagree with me.	37.91	38.14	1744	1106	663.000	-0.048	.962
11 I am likely to change my opinion when I am given new information that conflicts with my current opinion.	41.29	32.78	1899.5	950.5	515.500	-1.725	.085

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>A to B+</i> (<i>n</i> =46)	<i>B to C</i> (<i>n</i> =29)	<i>A to B+</i> (<i>n</i> =46)	<i>B to C</i> (<i>n</i> =29)			
13 I try to consider the facts without letting my biases affect my decisions	38.37	37.41	1765	1085	650.000	-0.192	.847
16 I can get along with people who do not share my opinions.	40.24	34.45	1851	999	564.000	-1.153	.249
20 I consider how my own biases affect my opinions.	40.88	33.43	1880.5	969.5	534.500	-1.524	.128
24 I try to find multiple solutions to problems.	37.93	38.10	1745	1105	664.000	-0.034	.973
25 I ask many questions when making a decision.	38.70	36.90	1780	1070	635.000	-0.372	.710
26 I believe that most problems have more than one solution.	38.78	36.76	1784	1066	631.000	-0.422	.673

As can be seen from the results of the Mann-Whitney U test, there was no significant difference between students when compared in terms of the letter grade they received for the ENG 101 course.

ENG 102. Students' *Cognitive Maturity* dispositions were also analysed with regard to the second EGAP course, ENG 102. The results of the Mann-Whitney U test comparing the differences between the group of students who had received a letter grade from ENG 102 with those who had not yet received a grade in terms of their average *Cognitive Maturity* scores are displayed in Table 51.

Table 51

Mann-Whitney U Test for Cognitive Maturity Average Score by Students' Letter Grade Received for ENG 102

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>No Grade (n=43)</i>	<i>A to C (n=39)</i>	<i>No Grade (n=43)</i>	<i>A to C (n=39)</i>			
<i>Cognitive Maturity Average</i>	38.43	44.88	1652.5	1750.5	706.500	-1.230	.219

Although the students who had successfully completed and received a grade from ENG 102 scored higher than the students who had yet to complete the course, this difference was not statistically significant, $U = 706.5$, $z = -1.230$, $p = .219$.

The results of the comparison between the two groups for each individual item of the *Cognitive Maturity* construct are presented in Table 52.

Table 52

Mann-Whitney U Test for Cognitive Maturity Items by Students' Letter Grade Received for ENG 102

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>No Grade (n=43)</i>	<i>A to C (n=39)</i>	<i>No Grade (n=43)</i>	<i>A to C (n=39)</i>			
1 I listen carefully to the opinions of others even when they disagree with me.	37.42	46.00	1609	1794	663.000	-1.800	.072
11 I am likely to change my opinion when I am given new information that conflicts with my current opinion.	39.05	44.21	1679	1724	733.000	-1.025	.305
13 I try to consider the facts	37.34	46.09	1605.5	1797.5	659.500	-1.733	.083

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>No Grade (n=43)</i>	<i>A to C (n=39)</i>	<i>No Grade (n=43)</i>	<i>A to C (n=39)</i>			
without letting my biases affect my decisions							
16 I can get along with people who do not share my opinions.	38.35	44.97	1649	1754	703.000	-1.295	.195
20 I consider how my own biases affect my opinions.	41.35	41.67	1778	1625	832.000	-0.063	.949
24 I try to find multiple solutions to problems.	43.12	39.72	1854	1549	769.000	-0.667	.505
25 I ask many questions when making a decision.	42.30	40.62	1819	1584	804.000	-0.341	.733
26 I believe that most problems have more than one solution.	41.24	41.78	1773	1629	827.500	-0.110	.912

The results of the Mann-Whitney U test showed that despite some differences between groups in their *Cognitive Maturity* individual item scores, these differences were not significant.

Cumulative Grade Point Average

The results of the Mann-Whitney U test used to ascertain whether there was any significant difference in the *Cognitive Maturity* disposition of students based on their CGPA are displayed in Table 53.

Table 53*Mann-Whitney U Test for Cognitive Maturity Average Score by Students' CGPA*

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	≤ 2.99	≥ 3.00	≤ 2.99	≥ 3.00			
	(<i>n</i> =31)	(<i>n</i> =41)	(<i>n</i> =31)	(<i>n</i> =41)			
<i>Cognitive Maturity Average</i>	35.79	37.04	1109.5	1518.5	613.500	-0.251	.802

The findings indicate that the difference between the scores of the students with a CGPA of ≤ 2.99 and those with a CGPA of ≥ 3.00 is not significant, $U = 613.5$, $z = -0.251$, $p = .802$.

The results of the comparison between the two groups for each of the individual items measuring the *Cognitive Maturity* disposition are shown in Table 54.

Table 54*Mann-Whitney U Test for Cognitive Maturity Items by Students' CGPA*

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	≤ 2.99	≥ 3.00	≤ 2.99	≥ 3.00			
	(<i>n</i> =31)	(<i>n</i> =41)	(<i>n</i> =31)	(<i>n</i> =41)			
1 I listen carefully to the opinions of others even when they disagree with me.	37.48	35.76	1162	1466	605.000	-0.385	.700
11 I am likely to change my opinion when I am given new information that conflicts with my current opinion.	32.32	39.66	1002	1626	506.000	-1.542	.123
13 I try to consider the facts without letting my biases affect my decisions	36.00	36.88	1116	1512	620.000	-0.184	.854

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	≤ 2.99 (<i>n</i> =31)	≥ 3.00 (<i>n</i> =41)	≤ 2.99 (<i>n</i> =31)	≥ 3.00 (<i>n</i> =41)			
16 I can get along with people who do not share my opinions.	38.27	35.16	1186.5	1441.5	580.500	-0.643	.520
20 I consider how my own biases affect my opinions.	33.40	38.84	1035.5	1592.5	539.500	-1.154	.249
24 I try to find multiple solutions to problems.	35.66	37.13	1105.5	1522.5	609.500	-0.306	.760
25 I ask many questions when making a decision.	34.24	38.21	1061.5	1566.5	565.500	-0.852	.394
26 I believe that most problems have more than one solution.	35.05	37.60	1086.5	1541.5	590.500	-0.549	.583

When comparing the scores of students having a CGPA equal to or above 3.00 with students having a CGPA below 3.00, no significant difference was found.

Age

Student age was also examined to ascertain whether there was any significant difference between the *Cognitive Maturity* dispositions of students of different ages. Table 55 displays the results of the Mann-Whitney U test, which was used to compare the average *Cognitive Maturity* score of the students in the two age ranges.

Table 55

Mann-Whitney U Test for Cognitive Maturity Average Score by Students' Age

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	18-20 (<i>n</i> =56)	21+ (<i>n</i> =26)	18-20 (<i>n</i> =56)	21+ (<i>n</i> =26)			
<i>Cognitive Maturity Average</i>	42.48	39.38	2379	1024	673.000	-0.550	.582

The results indicate that there was no significant difference between the students in the 18-20 and 21+ age groups in terms of their self-perceived *Cognitive Maturity* score, $U = 673$, $z = -0.550$, $p = .582$.

The analysis was also conducted for the 8 individual items measuring *Cognitive Maturity*, the results of which are given in Table 56 below.

Table 56

Mann-Whitney U Test for Cognitive Maturity Items by Students' Age

Item	Mean Rank		Sum of Ranks		U	z	p
	18-20 ($n=56$)	21+ ($n=26$)	18-20 ($n=56$)	21+ ($n=26$)			
1 I listen carefully to the opinions of others even when they disagree with me.	42.07	40.27	2356	1047	696.000	-0.352	.725
11 I am likely to change my opinion when I am given new information that conflicts with my current opinion.	42.13	40.15	2359	1044	693.000	-0.365	.715
13 I try to consider the facts without letting my biases affect my decisions	40.48	43.69	2267	1136	671.000	-0.592	.554
16 I can get along with people who do not share my opinions.	42.04	40.35	2354	1049	698.000	-0.308	.758
20 I consider how my own biases affect my opinions.	43.93	36.27	2460	943	592.000	-1.426	.154
24 I try to find multiple solutions to problems.	42.96	38.37	2405.5	997.5	646.500	-0.840	.401
25 I ask many questions when making a decision.	41.43	41.65	2320	1083	724.000	-0.042	.966

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	18-20 (<i>n</i> =56)	21+ (<i>n</i> =26)	18-20 (<i>n</i> =56)	21+ (<i>n</i> =26)			
26 I believe that most problems have more than one solution.	42.59	39.15	2385	1018	667.000	-0.654	.513

The Mann-Whitney U test results do not indicate any significant difference between the scores of the students aged 18-20 and those aged 21+.

Gender

The last point of comparison among students was the gender of the participating students. In Table 57 below, the results of the independent *t*-test conducted to examine whether a significant difference existed between the female and male students in terms of their *Cognitive Maturity* average scores are given.

Table 57

Independent t-Test for Cognitive Maturity Average Score by Students' Gender

Construct	Female (<i>n</i> = 50)		Male (<i>n</i> = 31)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
<i>Cognitive Maturity</i> Average	3.71	0.79	3.83	0.50	79	-0.720	.474	-0.165

The mean score of both groups was above average, with females having a slightly lower mean than the males ($M = 3.71$, $SD = 0.79$ and $M = 3.83$, $SD = 0.50$, respectively). However, the difference was not significant, $t(79) = -0.720$, $p = .474$, $d = -0.165$.

The same analysis was then conducted for each individual item under *Cognitive Maturity* to examine whether females and males scored themselves

significantly differently for any of them. The results of the independent *t*-test are given in Table 58.

Table 58

Independent t-Test for Cognitive Maturity Items by Students' Gender

Item	Female (<i>n</i> = 50)		Male (<i>n</i> = 31)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
1 I listen carefully to the opinions of others even when they disagree with me.	3.98	0.98	4.23	0.81	79	-1.173	.244	-0.268
11 I am likely to change my opinion when I am given new information that conflicts with my current opinion.	3.56	1.05	3.68	1.05	79	-0.489	.626	-0.112
13 I try to consider the facts without letting my biases affect my decisions	3.62	1.18	3.61	0.88	79	0.029	.977	0.007
16 I can get along with people who do not share my opinions.	3.16	1.24	3.94	1.03	79	-2.920	.005*	-0.668
20 I consider how my own biases affect my opinions.	3.76	1.10	3.81	0.98	79	-0.193	.848	-0.044
24 I try to find multiple solutions to problems.	3.62	1.26	3.16	1.24	79	1.602	.113	0.366
25 I ask many questions when making a decision.	3.96	1.14	3.90	1.14	79	0.218	.828	0.050
26 I believe that most problems have more than one solution.	4.04	1.16	4.29	0.94	79	-1.013	.314	-0.232

**p* < .01

From among the eight items, only when responding to the statement *I can get along with people who do not share my opinion* (Item 16) was there a significant difference, $t(79) = -2.920, p = .005$, with male students ($M = 3.94, SD = 1.03$) scoring significantly higher than the female students ($M = 3.16, SD = 1.24$). The effect size, Cohen's $d = -0.668$, suggests a moderate effect.

Innovativeness Disposition

Once again, the data collected from students was analysed to explore whether their *Innovativeness* dispositions as perceived by themselves differed by (a) discipline of study, (b) academic semester enrolled in, (c) attendance in the pre-sessional language preparatory program, (d) letter grade received from ENG 101 and ENG 102, (e) CGPA, (f) age, and (g) gender.

Discipline of Study

The responses to the seven statements in the *Innovativeness* construct of students studying in STEM disciplines were compared with responses from students in non-STEM disciplines to ascertain whether there were any significant differences between the groups. The results of the Mann-Whitney U test used to analyse the data to compare the two groups in terms of the students' average *Innovativeness* score are shown in Table 59.

Table 59

Mann-Whitney U Test for Innovativeness Average Score by Students' Discipline

Construct	Mean Rank		Sum of Ranks		U	z	p
	<i>STEM</i> ($n=42$)	<i>Non-STEM</i> ($n=40$)	<i>STEM</i> ($n=42$)	<i>Non-STEM</i> ($n=40$)			
<i>Innovativeness</i> Average	44.37	38.49	1863.5	1539.5	719.500	-1.121	.262

Although STEM students scored themselves higher on average for *Innovativeness*, the difference between the two groups was not significant ($U = 719.5$, $z = -1.121$, $p = .262$). The results of the comparison of the two groups for each of the 7 statements measuring *Innovativeness* are presented in Table 60.

Table 60

Mann-Whitney U Test for Innovativeness Items by Students' Discipline

Item	Mean Rank		Sum of Ranks		U	z	p
	<i>STEM</i> ($n=42$)	<i>Non-STEM</i> ($n=40$)	<i>STEM</i> ($n=42$)	<i>Non-STEM</i> ($n=40$)			
4 I enjoy learning about many topics.	43.96	38.91	1846.5	1556.5	736.500	-1.025	.305
6 I ask lots of questions in a learning environment.	41.26	41.75	1733	1670	830.000	-0.095	.924
10 I strive to be well informed.	44.40	38.45	1865	1538	718.000	-1.207	.228
12 I enjoy solving problems.	45.02	37.80	1891	1512	692.000	-1.435	.151
15 I enjoy learning even when I am not in school.	42.71	40.23	1794	1609	789.000	-0.512	.609
21 I search for the truth even when it makes me uncomfortable.	45.64	37.15	1917	1486	666.000	-1.680	.093
23 I will go out of my way to find the right answers to a problem.	41.69	41.30	1751	1652	832.000	-0.077	.939

STEM students ranked higher for all items, except when responding to the statement about *asking lots of questions in a learning environment* (Item 6); however, none of the differences were statistically significant.

Academic Semester Enrolled In

Students' *Innovativeness* scores were examined next for any differences that may be seen between students enrolled in semesters 1 and 2 or semesters 3 through 8. The results of the Mann-Whitney U test which was employed to compare the average *Innovativeness* score of students between groups have been displayed in Table 61.

Table 61

Mann-Whitney U Test for Innovativeness Score by Students' Semester

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>Semester 1-2</i> (<i>n</i> =49)	<i>Semester 3-8</i> (<i>n</i> =33)	<i>Semester 1-2</i> (<i>n</i> =49)	<i>Semester 3-8</i> (<i>n</i> =33)			
<i>Innovativeness</i> Average	40.93	42.35	2005.5	1397.5	780.500	-0.265	.791

When comparing students in different semesters for *Innovativeness*, it was noted that there was no significant difference between groups, $U = 780.5$, $z = -0.265$, $p = .791$.

The results of the analysis for each of the 7 items in the *Innovativeness* construct can be found in Table 62.

Table 62

Mann-Whitney U Test for Innovativeness Items by Students' Semester

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>1-2</i> (<i>n</i> =49)	<i>3-8</i> (<i>n</i> =33)	<i>1-2</i> (<i>n</i> =49)	<i>3-8</i> (<i>n</i> =33)			
4 I enjoy learning about many topics.	42.15	40.53	2065.5	1337.5	776.500	-0.323	.747
6 I ask lots of questions in a	41.77	41.11	2046.5	1356.5	795.500	-0.126	.900

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>1-2</i> (<i>n</i> =49)	<i>3-8</i> (<i>n</i> =33)	<i>1-2</i> (<i>n</i> =49)	<i>3-8</i> (<i>n</i> =33)			
learning environment.							
10 I strive to be well informed.	41.17	41.98	2017.5	1385.5	792.500	-0.161	.872
12 I enjoy solving problems.	40.59	42.85	1989	1414	764.000	-0.440	.660
15 I enjoy learning even when I am not in school.	42.31	40.30	2073	1330	769.000	-0.404	.686
21 I search for the truth even when it makes me uncomfortable.	39.62	44.29	1941.5	1461.5	716.500	-0.906	.365
23 I will go out of my way to find the right answers to a problem.	40.94	42.33	2006	1397	781.000	-0.270	.787

Once again, the Mann-Whitney U test revealed that there was no significant difference between students when grouped according to their semester.

Attendance in the Pre-Sessional Language Preparatory Program

A further point of comparison was whether or not students had attended the pre-sessional English language preparatory program prior to entering their disciplines. The results of the independent *t*-test used to examine and compare the *Innovativeness* disposition of students who had or had not attended the preparatory school are presented below in Table 63.

Table 63*Independent t-Test for Innovativeness Score by Students' Attendance at English**Language Preparatory Program*

Construct	Did Not Attend (<i>n</i> = 53)		Attended (<i>n</i> = 29)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
<i>Innovativeness Average</i>	3.68	0.86	4.06	0.53	80	-2.164	.033*	-0.500

**p* < .05

Students who had attended the preparatory program had a higher mean score and lower variance ($M = 4.06$, $SD = 0.53$) than students who had not ($M = 3.68$, $SD = 0.86$), and this difference was statistically significant, $t(80) = -2.164$, $p = .033$. The effect size, Cohen's $d = -0.500$, suggests a moderate effect.

A second analysis examined whether any significant difference existed between the student groups in any of the individual items measuring *Innovativeness*.

The results of this test are presented in Table 64.

Table 64*Independent t-Test for Innovativeness Items by Students' Attendance at English**Language Preparatory Program*

Item	Did Not Attend (<i>n</i> = 53)		Attended (<i>n</i> = 29)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
4 I enjoy learning about many topics.	4.02	1.10	4.17	0.85	80	-0.652	.516	-0.151
6 I ask lots of questions in a learning environment.	2.96	1.33	3.55	1.02	80	-2.074	.041*	-0.479

Item	Did Not Attend (<i>n</i> = 53)		Attended (<i>n</i> = 29)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
10 I strive to be well informed.	4.06	1.06	4.17	0.81	71.79	-0.554	.581	-0.118
12 I enjoy solving problems.	3.60	1.21	4.24	0.79	77.60	-2.876	.005**	-0.588
15 I enjoy learning even when I am not in school.	4.15	1.01	4.28	0.88	80	-0.560	.577	-0.129
21 I search for the truth even when it makes me uncomfortable.	3.66	1.26	4.00	0.89	74.71	-1.425	.158	-0.298
23 I will go out of my way to find the right answers to a problem.	3.34	1.24	4.03	0.82	76.87	-3.037	.003**	-0.625

**p* < .05

***p* < .01

For all items, students who had attended the preparatory program scored themselves higher (in most cases, above a 4 out of the possible 5 on the Likert scale) than the students who had not attended the preparatory program. Moreover, from among 7 items in total, significant differences were revealed in 3 items following an independent-samples *t*-test. For Item 6: *I ask lots of questions in a learning environment*, there was a significant difference between groups, $t(80) = -2.074$, $p = .041$, with the students who had attended the preparatory program ($M = 3.55$, $SD = 1.02$) scoring themselves higher than the students who had not attended the preparatory program ($M = 2.96$, $SD = 1.33$). The effect size, Cohen's $d = -0.479$, indicates a moderate effect.

Furthermore, the results of the Welch's unequal variance *t*-test showed a significant difference between the two groups for two other items. For Item 12: *I*

enjoy solving problems, there was a significant difference, $t(77.6) = -2.876, p = .005$, between students who had attended the preparatory program ($M = 4.24, SD = 0.79$) and those who had not ($M = 3.60, SD = 1.21$), with the effect size, Cohen's $d = -0.588$, indicating a moderate effect. For Item 23: *I will go out of my way to find the right answers to a problem*, there was again a significant difference, $t(76.87) = -3.037, p = .003$, between students who had attended the preparatory program ($M = 4.03, SD = 0.82$) and those who had not ($M = 3.34, SD = 1.24$), with the effect size, Cohen's $d = -0.625$, indicating a moderate effect.

Letter Grade Received from the EGAP Courses

ENG 101. The letter grade that participating students received for ENG 101 (A to B+ vs B to C), the first of the two freshman-year EGAP courses, was considered when examining students' responses to the *Innovativeness* statements in the questionnaire.

The findings of the Mann-Whitney U test used to first check for significant differences between the two groups in terms of their average *Innovativeness* score are displayed in Table 65.

Table 65

Mann-Whitney U Test for Innovativeness Score by Students' Letter Grade Received for ENG 101

Construct	Mean Rank		Sum of Ranks		U	z	p
	<i>A to B+</i> ($n=46$)	<i>B to C</i> ($n=29$)	<i>A to B+</i> ($n=46$)	<i>B to C</i> ($n=29$)			
<i>Innovativeness</i> Average	38.68	36.91	1779.5	1070.5	635.500	-0.344	.731

The statistical analysis did not indicate any difference in average scores between students based on the letter grade they received for ENG 101, $U = 635.5$, $z = -0.344$, $p = .731$. The results of the analysis for each individual item under the *Innovativeness* disposition are presented in Table 66.

Table 66

Mann-Whitney U Test for Innovativeness Items by Students' Letter Grade Received for ENG 101

Item	Mean Rank		Sum of Ranks		U	z	p
	<i>A to B+</i> ($n=46$)	<i>B to C</i> ($n=29$)	<i>A to B+</i> ($n=46$)	<i>B to C</i> ($n=29$)			
4 I enjoy learning about many topics.	38.64	36.98	1777.5	1072.5	637.500	-0.343	.732
6 I ask lots of questions in a learning environment.	37.91	38.14	1744	1106	663.000	-0.045	.964
10 I strive to be well informed.	40.64	33.81	1869.5	980.5	545.500	-1.413	.158
12 I enjoy solving problems.	38.02	37.97	1749	1101	666.000	-0.011	.991
15 I enjoy learning even when I am not in school.	38.73	36.84	1781.5	1068.5	633.500	-0.393	.694
21 I search for the truth even when it makes me uncomfortable.	38.40	37.36	1766.5	1083.5	648.500	-0.210	.834
23 I will go out of my way to find the right answers to a problem.	38.84	36.67	1786.5	1063.5	628.500	-0.436	.663

Once again, there were no significant differences between the two student groups when comparing their responses to the 7 items comprising *Innovativeness*.

ENG 102. Students were also grouped according to whether they had completed ENG 102 or were yet to receive a letter grade, and their responses were analysed to see if there was any difference between their average scores for *Innovativeness* as a whole, followed by their scores for each individual item.

Table 67 shows the results of the independent *t*-test used to analyse student responses according to their groups.

Table 67

Independent t-Test for Innovativeness Average Score by Students' Letter Grade Received for ENG 102

Construct	No Grade (<i>n</i> = 43)		A to C (<i>n</i> = 39)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
<i>Innovativeness</i> Average	3.69	0.82	3.96	0.71	80	-1.538	.128	-.340

The mean score of students who received a grade for ENG 102 was higher than that of the students who were yet to complete the course and receive a grade ($M = 3.96$, $SD = 0.71$; $M = 3.69$, $SD = 0.82$, respectively), but this difference was not significant.

The results of the *Innovativeness* individual item analysis for both groups are displayed in Table 68.

Table 68

Independent t-Test for Innovativeness Items by Students' Letter Grade Received for ENG 102

Item	No Grade (<i>n</i> = 43)		A to C (<i>n</i> = 39)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
4 I enjoy learning about many topics.	4.02	1.10	4.13	0.92	80	-0.465	.643	-0.103
6 I ask lots of questions in a learning environment.	3.02	1.26	3.33	1.24	80	-1.119	.267	-0.247
10 I strive to be well informed.	3.98	1.08	4.23	0.84	80	-1.179	.242	-0.261
12 I enjoy solving problems.	3.63	1.16	4.05	1.05	80	-1.730	.087	-0.383
15 I enjoy learning even when I am not in school.	4.19	0.93	4.21	1.01	80	-0.089	.929	-0.020
21 I search for the truth even when it makes me uncomfortable.	3.60	1.24	3.97	1.01	80	-1.472	.145	-0.325
23 I will go out of my way to find the right answers to a problem.	3.42	1.31	3.77	0.93	75.73	-1.404	.164	-0.305

As with the average score for the construct, the mean score of every individual item was higher for students who had received a grade from ENG 102, with the average scores of 4 out of 7 items in this group going above 4 on the Likert scale (Items 4, 10, 12, 15), compared to only 2 items (Items 4 and 15) in the group that had not received a grade. However, no significant difference between the groups was revealed.

Cumulative Grade Point Average

Students were also grouped according to their CGPA, with students receiving ≤ 2.99 in one group and those receiving ≥ 3.00 in the other, when examining their disposition to *Innovativeness*.

The results obtained from the Mann-Whitney U test implemented to compare the average *Innovativeness* scores of both groups of students are displayed in Table 69.

Table 69

Mann-Whitney U Test for Innovativeness Average Score by Students' CGPA

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	≤ 2.99 (<i>n</i> =31)	≥ 3.00 (<i>n</i> =41)	≤ 2.99 (<i>n</i> =31)	≥ 3.00 (<i>n</i> =41)			
<i>Innovativeness</i> Average	36.15	36.77	1120.5	1507.5	624.500	-0.125	.900

The Mann-Whitney U test did not reveal any differences of significance between students with a CGPA of 3.00 and above or 2.99 and below, $U = 624.5$, $z = -0.125$, $p = .900$.

The two groups were further analysed to look at differences in responses to each individual item for *Innovativeness* in the UF/EMI, and the results of the test are shown in Table 70.

Table 70

Mann-Whitney U Test for Innovativeness Items by Students' CGPA

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	≤ 2.99 (<i>n</i> =31)	≥ 3.00 (<i>n</i> =41)	≤ 2.99 (<i>n</i> =31)	≥ 3.00 (<i>n</i> =41)			
4 I enjoy learning about many topics.	38.15	35.26	1182.5	1445.5	584.500	-0.619	.536
6 I ask lots of questions in a	37.87	35.46	1174	1454	593.000	-0.495	.620

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	≤ 2.99 (<i>n</i> =31)	≥ 3.00 (<i>n</i> =41)	≤ 2.99 (<i>n</i> =31)	≥ 3.00 (<i>n</i> =41)			
learning environment.							
10 I strive to be well informed.	32.50	39.52	1007.5	1620.5	511.500	-1.503	.133
12 I enjoy solving problems.	35.39	37.34	1097	1531	601.000	-0.408	.683
15 I enjoy learning even when I am not in school.	37.61	35.66	1166	1462	601.000	-0.422	.673
21 I search for the truth even when it makes me uncomfortable.	35.47	37.28	1099.5	1528.5	603.500	-0.380	.704
23 I will go out of my way to find the right answers to a problem.	34.84	37.76	1080	1548	584.000	-0.609	.542

As with the average score, there was no significant difference in students' responses for any of the items under *Innovativeness*.

Age

The disposition of students to *Innovativeness* according to their age was also studied. Two groups were formed with students aged 18-20 (*n* = 56) in one group and those aged 21 and over (*n* = 26) in the second group. The results following the Mann-Whitney U test which was implemented to compare the average *Innovativeness* scores of both groups are displayed in Table 71.

Table 71*Mann-Whitney U Test for Innovativeness Average Score by Students' Age*

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>18-20</i> (<i>n</i> =56)	<i>21+</i> (<i>n</i> =26)	<i>18-20</i> (<i>n</i> =56)	<i>21+</i> (<i>n</i> =26)			
<i>Innovativeness</i> Average	39.31	46.21	2201.5	1201.5	605.500	-1.224	.221

The results indicate that although students aged 21 and over scored higher for *Innovativeness*, the difference is not statistically significant, $U = 605.5$, $z = -1.224$, $p = .221$.

Table 72 shows the results of the analysis for each individual item under *Innovativeness*.

Table 72*Mann-Whitney U Test for Innovativeness Items by Students' Age*

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>18-20</i> (<i>n</i> =56)	<i>21+</i> (<i>n</i> =26)	<i>18-20</i> (<i>n</i> =56)	<i>21+</i> (<i>n</i> =26)			
4 I enjoy learning about many topics.	41.89	40.65	2346	1057	706.000	-0.234	.815
6 I ask lots of questions in a learning environment.	38.75	47.42	2170	1233	574.000	-1.575	.115
10 I strive to be well informed.	41.40	41.71	2318.5	1084.5	722.500	-0.058	.953
12 I enjoy solving problems.	40.88	42.83	2289.5	1113.5	693.500	-0.359	.719
15 I enjoy learning even when I am not in school.	42.07	40.27	2356	1047	696.000	-0.345	.730
21 I search for the truth even when it makes me uncomfortable.	39.63	45.52	2219.5	1183.5	623.500	-1.084	.278

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>18-20</i> (<i>n=56</i>)	<i>21+</i> (<i>n=26</i>)	<i>18-20</i> (<i>n=56</i>)	<i>21+</i> (<i>n=26</i>)			
23 I will go out of my way to find the right answers to a problem.	38.94	47.02	2180.5	1222.5	584.500	-1.486	.137

As with the average score, there was no significant difference in any of the individual statements when student age groups were compared.

Gender

Finally, whether or not students' innovativeness disposition differed according to gender was investigated. After the exclusion of one student who preferred not to answer, 81 students were grouped as either Female (*n* = 50) or Male (*n* = 31). The results of the Mann-Whitney *U* test used to compare the two groups for *Innovativeness* can be found in Table 73.

Table 73

Mann-Whitney U Test for Innovativeness Average Score by Students' Gender

Construct	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>Female</i> (<i>n=50</i>)	<i>Male</i> (<i>n=31</i>)	<i>Female</i> (<i>n=50</i>)	<i>Male</i> (<i>n=31</i>)			
<i>Innovativeness</i> Average	41.61	40.02	2080.5	1240.5	744.500	-0.297	.766

When student responses were compared according to gender, students' disposition to innovativeness showed no significant difference between groups, *U* = 744.5, *z* = -0.297, *p* = .766.

The results of the Mann-Whitney *U* test for each individual statement for *Innovativeness* are in Table 74 below.

Table 74*Mann-Whitney U Test for Innovativeness Items by Students' Gender*

Item	Mean Rank		Sum of Ranks		<i>U</i>	<i>z</i>	<i>p</i>
	<i>Female</i> (<i>n</i> =50)	<i>Male</i> (<i>n</i> =31)	<i>Female</i> (<i>n</i> =50)	<i>Male</i> (<i>n</i> =31)			
4 I enjoy learning about many topics.	40.89	41.18	2044.5	1276.5	769.500	-0.057	.955
6 I ask lots of questions in a learning environment.	42.52	38.55	2126	1195	699.000	-0.758	.449
10 I strive to be well informed.	40.87	41.21	2043.5	1277.5	768.500	-0.067	.946
12 I enjoy solving problems.	40.25	42.21	2012.5	1308.5	737.500	-0.381	.703
15 I enjoy learning even when I am not in school.	39.44	43.52	1972	1349	697.000	-0.818	.413
21 I search for the truth even when it makes me uncomfortable.	40.52	41.77	2026	1295	751.000	-0.243	.808
23 I will go out of my way to find the right answers to a problem.	41.97	39.44	2098.5	1222.5	726.500	-0.490	.624

It can be seen from the results of the statistical analysis that the disposition of female students for Innovativeness did not differ significantly from that of male students.

Content Professor Perception Differences

The data collected from the content professors was also analysed to examine whether their perceptions of students' CTDs differed by the content professors' (a) discipline, (b) years of teaching experience, (c) academic rank, (d) age, and (e)

gender. The results have been presented separately for the *Engagement*, *Cognitive Maturity*, and *Innovativeness* dispositions, below.

Engagement Disposition of Students

Differences between participating content professors' responses across multiple variables were first examined in terms of their perceptions of students' *Engagement* disposition.

Discipline

The first point of comparison was between content professors in STEM disciplines and those in non-STEM disciplines. The results of the independent *t*-test used to compare content professors' perceptions of students' disposition to *Engagement* based on their disciplines are presented in Table 75.

Table 75

Independent t-Test for Engagement Average Score by Content Professors' Discipline

Construct	STEM ^a (<i>n</i> = 19)		Non-STEM ^b (<i>n</i> = 31)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
<i>Engagement Average</i>	3.44	0.74	3.53	0.75	48	-0.406	.687	-0.118

^a Architecture, Chemistry, Computer Engineering, Electrical and Electronics Engineering, Information Systems and Technologies, Interior Architecture and Environmental Design, Mathematics, Mechanical Engineering, Molecular Biology and Genetics, Physics, Urban Design and Landscape Architecture

^b American Culture and Literature, Archaeology, Communication and Design, English Language and Literature, Fine Arts, Graphic Design, International Relations, Management, Music, Performing Arts, Political Science and Public Administration, Psychology, Tourism and Hotel Management, Translation and Interpretation

There was only a small difference in the mean scores between content professors in STEM disciplines (*M* = 3.44, *SD* = 0.74) and non-STEM disciplines (*M* = 3.53, *SD* = 0.75), with the latter group being only slightly higher, a difference which was not significant, $t(48) = -0.406$, $p = .687$, $d = -0.118$.

The same comparison was also made for each individual statement within the *Engagement* construct, and the results are shown in Table 76.

Table 76

Independent t-Test for Engagement Items by Content Professors' Discipline

Item	STEM ^a (<i>n</i> = 19)		Non-STEM ^b (<i>n</i> = 31)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
2 My students look for opportunities to solve problems.	3.58	1.07	3.58	1.09	48	-0.005	.996	-0.002
3 My students are interested in many issues.	3.53	1.12	3.58	1.29	48	-0.152	.880	-0.044
5 My students are able to relate to a wide variety of issues.	3.53	0.96	3.58	1.15	48	-0.172	.864	-0.50
7 My students enjoy finding answers to challenging questions.	3.56	1.10	3.55	1.03	47	0.023	.982	0.007
8 My students are good problem solvers.	3.58	0.84	3.48	0.72	48	0.424	.673	0.124
9 My students are confident that they can reach a reasonable conclusion.	3.37	0.76	3.68	0.95	48	-1.205	.234	-0.351
14 My students are able to apply their knowledge to a wide variety of issues.	2.95	1.13	3.13	0.96	48	-0.608	.546	-0.177
17 My students are able to explain things clearly.	3.42	0.90	3.48	1.00	48	-0.224	.824	-0.065
18 My students ask good questions when trying to clarify a solution.	3.58	0.90	3.77	0.99	48	-0.700	.488	-0.204

Item	STEM ^a (<i>n</i> = 19)		Non-STEM ^b (<i>n</i> = 31)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
19 My students present issues in a clear and precise manner.	3.47	0.84	3.67	0.96	47	-0.719	.476	-0.211
22 My students keep on working on things until they get them right.	3.21	1.13	3.29	0.97	48	-0.264	.793	-0.077

Content professors in both groups had comparable perceptions of their students' *Engagement* disposition, with mean scores generally around the 3.5 mark. Interestingly, both STEM ($M = 2.95$, $SD = 1.13$) and non-STEM ($M = 3.13$, $SD = 0.96$) content professors scored their students lowest for their *ability to apply their knowledge to a variety of issues* (Item 14).

The independent *t*-test results in Table 76 indicate that there was no significant difference between the perceptions of content professors from STEM disciplines and those from non-STEM disciplines regarding student *Engagement* in any individual statement.

Years of Teaching Experience

Content professors were also grouped according to their years of experience at the tertiary level, with those having worked 1-10 years ($n = 23$) comprising one group and those having worked 11+ years ($n = 27$) comprising the other.

The result of the independent *t*-test used to compare how content professors perceived their students' *Engagement* levels based on their levels of experience is shared in Table 77.

Table 77

Independent t-Test for Engagement Average Score by Content Professors' Years of Teaching Experience

Construct	1-10 years (<i>n</i> = 23)		11+ years (<i>n</i> = 27)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Engagement Average	3.36	0.79	3.61	0.68	48	-1.206	.234	-0.342

Content professors with 11+ years of experience scored students only slightly higher than content professors with 1-10 years of experience ($M = 3.61$, $SD = 0.68$ and $M = 3.36$, $SD = 0.79$, respectively), but this difference was not a significant one.

Content professors' responses were then compared for every item measuring *Engagement*, and the results of the comparison according to their teaching experience are displayed in Table 78.

Table 78

Independent t-Test for Engagement Items by Content Professors' Years of Teaching Experience

Item	1-10 years (<i>n</i> = 23)		11+ years (<i>n</i> = 27)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
2 My students look for opportunities to solve problems.	3.39	1.033	3.74	1.095	48	-1.154	.254	-0.327
3 My students are interested in many issues.	3.39	1.270	3.70	1.171	48	-0.905	.370	-0.257
5 My students are able to relate to a wide variety of issues.	3.39	1.12	3.70	1.03	48	-1.028	.309	-0.292
7 My students enjoy finding answers to	3.22	1.04	3.85	0.97	47	-2.190	.034*	-0.627

Item	1-10 years (<i>n</i> = 23)		11+ years (<i>n</i> = 27)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
challenging questions.								
8 My students are good problem solvers.	3.39	0.78	3.63	0.74	48	-1.104	.275	-0.313
9 My students are confident that they can reach a reasonable conclusion.	3.48	0.95	3.63	0.84	48	-0.599	.552	-0.170
14 My students are able to apply their knowledge to a wide variety of issues.	2.78	1.13	3.30	0.87	48	-1.819	.075	-0.516
17 My students are able to explain things clearly.	3.43	1.08	3.48	0.85	48	-0.171	.865	-0.049
18 My students ask good questions when trying to clarify a solution.	3.61	1.08	3.78	0.85	48	-0.621	.537	-0.176
19 My students present issues in a clear and precise manner.	3.73	1.03	3.48	0.80	47	0.938	.353	0.269
22 My students keep on working on things until they get them right.	3.13	1.10	3.37	0.97	48	-0.821	.416	-0.233

**p* < .05

The results show that both groups had a moderate view of their students' *Engagement* disposition. Out of 11 total items, content professors with 11+ years rated their students higher for 10 items, the only exception being Item 19, where content professors with 1-10 years' experience had a higher opinion of their students' ability to *present issues in a clear and precise manner* (Item 19) than the content professors with 11+ years' experience ($M = 3.73$, $SD = 1.03$ and $M = 3.48$, $SD =$

0.80, respectively). Furthermore, both the 1-10 years group ($M = 2.78$, $SD = 1.13$) and the 11+ years group ($M = 3.30$, $SD = 0.87$) awarded the lowest scores to their students' *ability to apply their knowledge to a wide variety of issues* (Item 14).

Of note, the content professors with 11+ years' experience gave the highest score when rating their students' *enjoyment of finding answers to challenging questions* (Item 7) ($M = 3.85$, $SD = 0.97$), and when compared to content professors with 1-10 years of experience ($M = 3.22$, $SD = 1.04$) the difference was significant, $t(47) = -2.190$, $p = .034$. The effect size, Cohen's $d = -0.627$, indicates a medium effect.

Academic Rank

Content professors were also grouped according to their academic rank. The division was made according to whether they were on the academic track (Assistant Professor, Associate Professor, or Professor) or teaching track (Instructor, Lecturer, or Senior Lecturer).

The results of the independent t -test comparing content professors' perceptions of student *Engagement* according to their academic rank are presented in Table 79.

Table 79

Independent t-Test for Engagement Average Score by Content Professors' Academic Rank

Construct	Teaching Track ^a ($n = 19$)		Academic Track ^b ($n = 31$)		df	t	p	Cohen's d
	M	SD	M	SD				
<i>Engagement Average</i>	3.45	0.56	3.52	0.84	48	-0.295	.769	-0.086

^a Instructor, Lecturer, Senior Lecturer

^b Assistant Professor, Associate Professor, Professor

Content professors on the academic track ($M = 3.52$, $SD = 0.84$) perceived their students' *Engagement* as slightly higher than their teaching track colleagues ($M = 3.45$, $SD = 0.56$). However, the difference was not significant, $t(48) = -0.295$, $p = .769$, $d = -0.086$. The results of the analysis comparing the groups for each item under *Engagement* are presented in Table 80.

Table 80

Independent t-Test for Engagement Items by Content Professors' Academic Rank

Item	Teaching Track ^a ($n = 19$)		Academic Track ^b ($n = 31$)		df	t	p	Cohen's d
	M	SD	M	SD				
2 My students look for opportunities to solve problems.	3.37	1.0	3.71	1.10	48	-1.096	.279	-0.319
3 My students are interested in many issues.	3.37	1.17	3.68	1.25	48	-0.871	.388	-0.254
5 My students are able to relate to a wide variety of issues.	3.63	0.96	3.52	1.15	48	0.366	.716	0.107
7 My students enjoy finding answers to challenging questions.	3.28	1.02	3.71	1.04	47	-1.413	.164	-.419
8 My students are good problem solvers.	3.53	0.77	3.52	0.77	48	0.045	.964	0.013
9 My students are confident that they can reach a reasonable conclusion.	3.47	0.77	3.61	0.96	48	-0.536	.594	-0.156
14 My students are able to apply their knowledge to a wide variety of issues.	2.95	0.71	3.13	1.18	48	-0.683	.498	-0.177

Item	Teaching Track ^a (<i>n</i> = 19)		Academic Track ^b (<i>n</i> = 31)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
17 My students are able to explain things clearly.	3.53	0.91	3.42	0.99	48	0.382	.704	0.111
18 My students ask good questions when trying to clarify a solution.	3.74	0.87	3.68	1.01	48	0.212	.833	0.062
19 My students present issues in a clear and precise manner.	3.78	0.73	3.48	1.00	47	1.091	.281	0.323
22 My students keep on working on things until they get them right.	3.32	1.00	3.23	1.06	48	0.298	.767	0.087

^a Instructor, Lecturer, Senior Lecturer

^b Assistant Professor, Associate Professor, Professor

Interestingly, once again the lowest score given by both groups was for students' *ability to apply their knowledge to a wide variety of issues* (Item 14), with teaching track content professors giving a mean of 2.9 (*SD* = 0.71) and academic track content professors giving a mean of 3.13 (*SD* = 1.18), which are, respectively, just below and just above the mid-point of the 5-point Likert scale used.

Overall, the content professors' responses to the individual items did not reveal any significant differences between those who were on the academic track and those who were not.

Age

Age was another factor by which the content professors' responses were compared. They were divided into two groups, with 26–45-year-olds in one group (*n* = 30) and 46+ year-olds (*n* = 20) in the other group.

In Table 81 below, the results of the independent *t*-test used to compare how the two groups perceive their students' *Engagement* disposition are displayed.

Table 81

Independent t-Test for Engagement Average Score by Content Professors' Age

Construct	26-45 Years (<i>n</i> = 30)		46+ Years (<i>n</i> = 20)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
<i>Engagement Average</i>	3.40	0.73	3.60	0.75	48	-1.025	.310	-0.296

The mean scores were above average for both groups, and there was no significant difference between them; $t(48) = -1.025$, $p = .310$, $d = -0.296$.

The content professors' responses to each item within the *Engagement* disposition were also analysed by age, and the results are presented in Table 82.

Table 82

Independent t-Test for Engagement Items by Content Professors' Age

Item	26-45 Years (<i>n</i> = 30)		46+ Years (<i>n</i> = 20)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
2 My students look for opportunities to solve problems.	3.63	0.89	3.50	1.32	31	0.396	.695	0.123
3 My students are interested in many issues.	3.47	1.25	3.70	1.17	48	-0.661	.511	-0.191
5 My students are able to relate to a wide variety of issues.	3.47	1.11	3.70	1.03	48	-0.751	.457	-0.217
7 My students enjoy finding answers to challenging questions.	3.34	1.01	3.85	1.04	47	-1.700	.096	-0.494

Item	26-45 Years (<i>n</i> = 30)		46+ Years (<i>n</i> = 20)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
8 My students are good problem solvers.	3.40	0.68	3.70	0.87	48	-1.375	.175	-0.397
9 My students are confident that they can reach a reasonable conclusion.	3.43	0.90	3.75	0.85	48	-1.247	.218	-0.360
14 My students are able to apply their knowledge to a wide variety of issues.	2.83	1.05	3.40	0.88	48	-1.984	.053	-0.573
17 My students are able to explain things clearly.	3.40	1.04	3.55	0.83	48	-0.542	.590	-0.156
18 My students ask good questions when trying to clarify a solution.	3.67	1.03	3.75	0.85	47	-0.300	.765	-0.087
19 My students present issues in a clear and precise manner.	3.59	0.98	3.60	0.82	48	-0.052	.959	-0.015
22 My students keep on working on things until they get them right.	3.20	1.03	3.35	1.04	48	-0.502	.618	-0.145

Content professors' perceptions of students' *ability to apply their knowledge to a wide variety of issues* (Item 14) had the lowest mean at 2.83 (*SD* = 1.05) in the 26–45-year-olds group, whereas the lowest mean in the 46+ year-olds group was 3.35 (*SD* = 1.04) for content professors' perceptions of their students *keeping on working on things until they get them right* (Item 22). On the other hand, the items that received the highest scores were *My students look for opportunities to solve*

problems (Item 2) for the younger age group ($M = 3.63$, $SD = 0.89$) and *My students enjoy finding answers to challenging questions* (Item 7) for the older age group ($M = 3.85$, $SD = 1.04$). Nevertheless, no significant differences were detected for any item when compared by the content professors' age groups.

Gender

The responses received from the content professors were finally analysed in terms of their gender. All participants responded as female ($n = 22$) or male ($n = 28$), with none opting for the “prefer not to say” option. An independent t -test was run, and the results for the *Engagement* construct were calculated and are presented in Table 83.

Table 83

Independent t-Test for Engagement Average Score by Content Professors' Gender

Construct	Female ($n = 22$)		Male ($n = 28$)		df	t	p	Cohen's d
	M	SD	M	SD				
Engagement Average	3.50	0.79	3.48	0.71	48	0.069	.945	0.020

Both female and male content professors reported an above-average score for student *Engagement* ($M = 3.50$, $SD = 0.79$ and $M = 3.48$, $SD = 0.71$, respectively). The mean scores were relatively close, and the t -test did not reveal any significant difference between female content professors, $t(48) = 0.069$, $p = .945$, $d = 0.020$.

The results of the independent-samples t -test for possible differences between female and male respondents in relation to the items in the *Engagement* construct are shown in Table 84.

Table 84*Independent t-Test for Engagement Items by Content Professors' Gender*

Item	Female (<i>n</i> = 22)		Male (<i>n</i> = 28)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
2 My students look for opportunities to solve problems.	3.64	1.14	3.54	1.04	48	0.327	.745	0.093
3 My students are interested in many issues.	3.50	1.30	3.61	1.17	48	0.307	.760	-0.087
5 My students are able to relate to a wide variety of issues.	3.50	1.23	3.61	0.96	48	0.348	.730	-0.099
7 My students enjoy finding answers to challenging questions.	3.68	0.89	3.44	1.16	47	0.790	.433	0.227
8 My students are good problem solvers.	3.55	0.60	3.50	0.88	48	0.207	.837	0.059
9 My students are confident that they can reach a reasonable conclusion.	3.68	0.89	3.46	0.88	48	0.861	.393	0.245
14 My students are able to apply their knowledge to a wide variety of issues.	3.09	1.11	3.04	0.96	48	0.188	.851	0.054
17 My students are able to explain things clearly.	3.41	0.96	3.50	0.96	48	0.332	.741	-0.095
18 My students ask good questions when trying to clarify a solution.	3.77	0.97	3.64	0.95	48	0.475	.637	0.135

Item	Female (<i>n</i> = 22)		Male (<i>n</i> = 28)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
19 My students present issues in a clear and precise manner.	3.55	1.01	3.63	0.84	47	0.319	.751	-0.092
22 My students keep on working on things until they get them right.	3.14	0.99	3.36	1.06	48	0.752	.456	-0.214

As can be seen from the table, there was no statistical difference between the female and male content professors in their perceptions of students' *Engagement* disposition as a whole and in individual items (all $p > .05$), suggesting that gender did not play a significant role in professor responses.

Cognitive Maturity Disposition of Students

The responses of content professors were also examined according to how their perceptions of students' *Cognitive Maturity* disposition differed according to their (a) discipline, (b) years of teaching experience, (c) academic rank, (d) age, and (e) gender.

Discipline

Content professors' responses regarding their perceptions of students' *Cognitive Maturity* disposition were analysed according to their disciplines, which were grouped as either STEM or non-STEM. The results of the independent *t*-test implemented to compare the *Cognitive Maturity* average scores given by the two groups are shown in Table 85 below.

Table 85*Independent t-Test for Cognitive Maturity Average Score by Content Professors'**Discipline*

Construct	STEM ^a (<i>n</i> = 19)		Non- STEM ^b (<i>n</i> = 31)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
<i>Cognitive Maturity</i> Average	3.07	0.83	3.36	0.65	48	-1.382	.173	-0.403

In the average scores, non-STEM content professors ($M = 3.36$, $SD = 0.65$) perceived their students as having slightly higher *Cognitive Maturity* than did their STEM colleagues ($M = 3.07$, $SD = 0.83$), but this difference was not significant, $t(48) = -1.382$, $p = .173$, $d = -0.403$.

The content professors' responses were then analysed for each item under *Cognitive Maturity*, and the results are presented in Table 86.

Table 86*Independent t-Test for Cognitive Maturity Items by Content Professors' Discipline*

Item	STEM ^a (<i>n</i> = 19)		Non- STEM ^b (<i>n</i> = 31)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
1 My students listen carefully to the opinions of others even when they disagree with them.	3.37	0.83	3.77	0.81	48	-1.710	.094	-0.498
11 My students are likely to change their opinion when they are given new information that conflicts with their current opinion.	3.22	1.00	3.71	1.01	47	-1.636	.108	-0.485
13 My students try to consider the facts without letting their	2.78	1.11	3.06	1.00	47	-.929	.358	-0.275

Item	STEM ^a (<i>n</i> = 19)		Non- STEM ^b (<i>n</i> = 31)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
biases affect their decisions								
16 My students can get along with people who do not share their opinions.	3.11	1.08	3.52	0.77	47	-1.530	.133	-0.453
20 My students consider how their own biases affect their opinions.	2.61	1.20	3.00	0.93	47	-1.269	.211	-0.376
24 My students try to find multiple solutions to problems.	2.84	1.17	3.10	0.98	48	-.830	.411	-0.242
25 My students ask many questions when making a decision.	3.11	1.24	3.42	1.03	48	-.970	.337	-0.282
26 My students believe that most problems have more than one solution.	3.37	1.17	3.32	0.87	48	.159	.875	0.046

Overall, content professors from the STEM disciplines generally perceived their students' *Cognitive Maturity* lower than their colleagues from the non-STEM disciplines did. In fact, on three items (Items 13, 20, and 24) their mean scores fell to 2.78 (*SD* = 1.11), 2.61 (*SD* = 1.20), and 2.84 (*SD* = 1.17), respectively, whereas non-STEM content professors scored their students higher than 3 for the same items. Nevertheless, the difference between the two groups was not significant.

Experience at the Tertiary Level

The results of the independent *t*-test comparing content professors' perceptions of students' *Cognitive Maturity* disposition based on whether they had 1-10 years or 11+ years of experience at the tertiary level can be found in Table 87.

Table 87

Independent t-Test for Cognitive Maturity Average Score by Content Professors' Years of Teaching Experience

Construct	1-10 years (<i>n</i> = 23)		11+ years (<i>n</i> = 27)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Cognitive Maturity Average	3.15	0.80	3.34	0.67	48	-0.947	.348	-0.269

Looking at the results of the *t*-test, it can be ascertained that the mean scores of both groups were just above average, and there was no significant difference between them, $t(48) = -0.947$, $p = .348$, $d = -0.269$.

The data from the two groups were further compared for each item measuring *Cognitive Maturity*, the results of which have been presented in Table 88.

Table 88

Independent t-Test for Cognitive Maturity Items by Content Professors' Years of Teaching Experience

Item	1-10 years (<i>n</i> = 23)		11+ years (<i>n</i> = 27)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
1 My students listen carefully to the opinions of others even when they disagree with them.	3.52	0.85	3.70	0.82	48	-0.769	.446	-0.218
11 My students are likely to change their opinion when they are given new information that conflicts with their current opinion.	3.43	1.20	3.62	0.85	47	-0.600	.552	-0.175
13 My students try to consider the facts	2.65	1.19	3.23	0.82	47	-2.004	.051	-0.574

Item	1-10 years (<i>n</i> = 23)		11+ years (<i>n</i> = 27)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
without letting their biases affect their decisions								
16 My students can get along with people who do not share their opinions.	3.39	0.99	3.35	0.85	47	0.172	.864	0.049
20 My students consider how their own biases affect their opinions.	2.70	1.06	3.00	1.02	47	-1.022	.312	-0.293
24 My students try to find multiple solutions to problems.	2.87	1.14	3.11	0.97	48	-0.808	.423	-0.229
25 My students ask many questions when making a decision.	3.22	1.24	3.37	1.01	48	-0.481	.632	-0.137
26 My students believe that most problems have more than one solution.	3.39	1.08	3.30	0.91	48	0.338	.737	0.096

Fluctuations existed in the scores, with neither of the groups consistently scoring their students higher or lower than the other group across all of the items measuring *Cognitive Maturity*. Nevertheless, both the content professors with 1-10 years' experience, and content professors with 11+ years' experience scored their students highest for their tendency to *listen carefully to the opinions of others even when they disagreed with them* (Item 1). Of note, while the content professors with 11+ years of experience never fell below the 3.00 mark for any of the items, the content professors with 1-10 years' experience scored their students below a 3.00 for *My students try to consider the facts without letting their biases affect their decisions* (Item 13; $M = 2.65$, $SD = 1.19$), *My students consider how their own biases affect*

their opinions (Item 20; $M = 2.70$, $SD = 1.06$), and *My students try to find multiple solutions to problems* (Item 24; $M = 2.87$, $SD = 1.14$). However, the differences between the two groups were not significant.

Academic Rank

Content professors were also compared in terms of their academic rank as academic track or teaching track members of faculty when examining their perceptions of students' *Cognitive Maturity*. The results of the independent t -test for the average scores are below in Table 89.

Table 89

Independent t-Test for Cognitive Maturity Average Score by Content Professors' Academic Rank

Construct	Teaching Track ^a ($n = 19$)		Academic Track ^b ($n = 31$)		df	t	p	Cohen's d
	M	SD	M	SD				
<i>Cognitive Maturity Average</i>	3.33	0.61	3.21	0.80	48	0.577	.567	0.168

^a Instructor, Lecturer, Senior Lecturer

^b Assistant Professor, Associate Professor, Professor

The mean scores of the teaching track and academic track content professors were both just above average at 3.33 ($SD = 0.61$) and 3.21 ($SD = 0.80$), respectively, and the difference was not significant, $t(48) = 0.577$, $p = .577$, $d = 0.168$.

The findings of the independent t -test used to analyse each of the items for *Cognitive Maturity* according to the content professors' academic rank can be seen in Table 90.

Table 90

Independent t-Test for Cognitive Maturity Items by Content Professors' Academic Rank

Item	Teaching Track ^a (<i>n</i> = 19)		Academic Track ^b (<i>n</i> = 31)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
1 My students listen carefully to the opinions of others even when they disagree with them.	3.53	0.84	3.68	0.83	48	-0.621	.538	-0.181
11 My students are likely to change their opinion when they are given new information that conflicts with their current opinion.	3.61	1.04	3.48	1.03	47	0.416	.679	0.123
13 My students try to consider the facts without letting their biases affect their decisions	3.06	1.00	2.90	1.08	47	0.490	.626	0.145
16 My students can get along with people who do not share their opinions.	3.28	0.75	3.42	0.99	47	-0.523	.603	-0.155
20 My students consider how their own biases affect their opinions.	2.94	1.06	2.81	1.05	47	0.444	.659	0.131
24 My students try to find multiple solutions to problems.	3.16	0.90	2.90	1.14	48	0.830	.411	0.242

Item	Teaching Track ^a		Academic Track ^b		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	(n = 19)		(n = 31)					
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
25 My students ask many questions when making a decision.	3.32	1.11	3.29	1.13	48	0.078	.938	0.023
26 My students believe that most problems have more than one solution.	3.63	0.68	3.16	1.10	48	1.866	.068	0.488

^a Instructor, Lecturer, Senior Lecturer

^b Assistant Professor, Associate Professor, Professor

Content professors' perceptions of their students' *Cognitive Maturity*

disposition remained around the 3.00 mark, with neither group showing a tendency to grade much higher or lower than the other group. It is worth noting, however, that both of them gave their lowest scores to their students' tendency to *consider how their own biases affect their opinions* (Item 20), with teaching track and academic track content professors giving mean scores of 2.94 (*SD* = 1.06) and 2.81 (*SD* = 1.05), respectively. Furthermore, the independent *t*-test did not reveal any significant differences between the two groups' perceptions.

Age

Age was the next factor investigated when analysing content professors' perceptions of student *Cognitive Maturity* levels. Participants were grouped as 26-45 years and 46+ years, and the results of the independent *t*-test which was run to compare the responses of the two groups are depicted in Table 91 below.

Table 91*Independent t-Test for Cognitive Maturity Average Score by Content Professors' Age*

Construct	26-45 Years (<i>n</i> = 30)		46+ Years (<i>n</i> = 20)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
<i>Cognitive Maturity Average</i>	3.10	0.72	3.41	0.73	48	-1.225	.226	-0.354

Both groups scored their students above average for their overall *Cognitive Maturity* disposition. The difference between the two groups was not significant, with 26–45-year-olds giving a mean of 3.10 (*SD* = 0.72), and 46+ year-olds giving a mean of 3.41 (*SD* = 0.73), $t(48) = -1.225$, $p = .226$, $d = -0.354$.

The independent *t*-test results for the comparison of the groups on an item-by-item basis are presented in Table 92.

Table 92*Independent t-Test for Cognitive Maturity Items by Content Professors' Age*

Item	26-45 Years (<i>n</i> = 30)		46+ Years (<i>n</i> = 20)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
1 My students listen carefully to the opinions of others even when they disagree with them.	3.60	0.72	3.65	0.99	48	-0.207	.837	-0.060
11 My students are likely to change their opinion when they are given new information that conflicts with their current opinion.	3.38	1.08	3.75	0.91	47	-1.254	.216	-0.365
13 My students try to consider the facts without letting their	2.79	1.11	3.20	0.89	47	-1.358	.181	-0.395

Item	26-45 Years (<i>n</i> = 30)		46+ Years (<i>n</i> = 20)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
biases affect their decisions								
16 My students can get along with people who do not share their opinions.	3.24	0.91	3.55	0.89	47	-1.177	.245	-0.342
20 My students consider how their own biases affect their opinions.	2.72	1.00	3.05	1.10	47	-1.079	.286	-0.314
24 My students try to find multiple solutions to problems.	2.80	1.03	3.30	1.03	48	-1.680	.099	-0.485
25 My students ask many questions when making a decision.	3.23	1.14	3.40	1.10	48	-0.516	.608	-0.149
26 My students believe that most problems have more than one solution.	3.33	1.03	3.35	0.93	48	-0.058	.954	-0.017

When the results are looked at as a whole, in keeping with their overall score, it can be seen that the older age group also scored their students higher than their younger colleagues for every single item. However, they perceived their students' strengths differently, with the 26–45-year-olds giving them the highest score for *listening carefully to the opinions of others even when they disagreed with them* (Item 1; $M = 3.60$, $SD = 0.72$), while the 46+ year-olds gave their students a moderately high score for being *likely to change their opinions when given new and conflicting information* (Item 11; $M = 3.75$, $SD = 0.91$).

Of note, both groups had the lowest perceptions of their students' ability to *consider how their biases affect their opinions* (Item 20), with the younger content professors scoring them with a mean of 2.72 ($SD = 1.00$) and the older content professors giving them a mean score just above the midpoint at 3.05 ($SD = 3.05$). The differences between the groups, however, were not statistically significant, indicating that age was not a determining factor in content professors' perception of their students' *Cognitive Maturity* disposition.

Gender

Gender was the final difference for which content professors' responses were compared. The results of the independent *t*-test employed to analyse the data for any significance between female and male content professors' perception of students' *Cognitive Maturity* disposition are depicted in Table 93.

Table 93

Independent t-Test for Cognitive Maturity Average Score by Content Professors' Gender

Construct	Female ($n = 22$)		Male ($n = 28$)		df	t	p	Cohen's d
	M	SD	M	SD				
<i>Cognitive Maturity Average</i>	3.27	0.75	3.24	0.73	48	0.172	.864	0.049

Female and male content professors had very close average mean scores, at 3.27 ($SD = 0.75$) and 3.24 ($SD = 0.73$), respectively, and the difference was not significant, $t(48) = 0.172$, $p = .864$, $d = 0.049$. The results of the subsequent analysis of the differences between the groups for each item of *Cognitive Maturity* are shown in Table 94.

Table 94*Independent t-Test for Cognitive Maturity Items by Content Professors' Gender*

Item	Female (<i>n</i> = 22)		Male (<i>n</i> = 28)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
1 My students listen carefully to the opinions of others even when they disagree with them.	3.64	0.85	3.61	0.83	48	0.122	.903	0.035
11 My students are likely to change their opinion when they are given new information that conflicts with their current opinion.	3.43	1.08	3.61	0.99	47	-0.601	.551	-0.173
13 My students try to consider the facts without letting their biases affect their decisions	3.14	0.91	2.82	1.12	47	1.072	.289	0.310
16 My students can get along with people who do not share their opinions.	3.38	0.80	3.36	0.99	47	0.090	.929	0.026
20 My students consider how their own biases affect their opinions.	2.95	1.02	2.79	1.07	47	0.551	.584	0.159
24 My students try to find multiple solutions to problems.	2.95	0.90	3.04	1.17	48	-0.269	.789	-0.077
25 My students ask many questions when making a decision.	3.32	1.04	3.29	1.18	48	0.102	.920	0.029
26 My students believe that most problems have more than one solution.	3.27	1.08	3.39	0.92	48	-0.426	.672	-0.121

The results in Table 94 show that, once again, scores were generally quite close to one another. The two groups' lowest scores were for the same statement referring to whether their students *consider how their biases affect their opinions* (Item 20), with both female and male professors' mean scores lying below the midway 3.00 mark ($M = 2.95$, $SD = 1.02$ and $M = 2.79$, $SD = 1.07$, respectively). The independent t -test suggests that female and male content professors did not differ significantly in how they perceived their students' *Cognitive Maturity* by item.

Innovativeness Disposition of Students

Content professors' responses to the UF/EMI questionnaire were finally examined for differences in their responses to the *Innovativeness* disposition.

Discipline

Content professors' affiliation with a STEM or non-STEM discipline was the first point of comparison, and the results of the independent t -test used to compare the two groups are provided in Table 95.

Table 95

Independent t-Test for Innovativeness Average Score by Content Professors'

Discipline

Construct	STEM ^a ($n = 19$)		Non-STEM ^b ($n = 31$)		df	t	p	Cohen's d
	M	SD	M	SD				
<i>Innovativeness Average</i>	3.23	0.77	3.29	0.75	48	-0.280	.780	-0.082

STEM and non-STEM content professors' perceptions of their students' *Innovativeness* disposition were similar, with mean scores just above average, and no significant difference between them, $t(48) = -0.280$, $p = .780$, $d = 0.082$.

A comparison between the two groups was also made for each of the 7 items measuring *Innovativeness*, for which results are provided in Table 96.

Table 96

Independent t-Test for Innovativeness Items by Content Professors' Discipline

Item	STEM ^a (<i>n</i> = 19)		Non-STEM ^b (<i>n</i> = 31)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
4 My students enjoy learning about many topics.	3.63	1.17	3.65	1.02	48	-0.043	.966	-0.013
6 My students ask lots of questions in a learning environment.	2.79	1.23	3.32	1.17	48	-1.538	.131	-0.448
10 My students strive to be well informed.	3.68	1.16	3.67	0.99	47	0.056	.955	0.017
12 My students enjoy solving problems.	3.63	0.83	3.42	0.81	48	0.893	.377	0.260
15 My students enjoy learning even when they are not in school.	3.06	1.06	3.06	0.96	47	-0.030	.976	-0.009
21 My students search for the truth even when it makes them uncomfortable.	2.79	1.08	2.87	1.06	48	-0.262	.794	-0.076
23 My students will go out of their way to find the right answers to a problem.	3.00	1.16	3.03	1.05	48	-0.102	.919	-0.030

The overall scores of content professor perceptions of students' *Innovativeness* according to their disciplines are around the midpoint of the 5-point Likert scale. Moreover, the highest and lowest scored items are the same for both STEM and non-STEM professors, with the highest scores given to students for

striving to be well informed (Item 10; $M = 3.68$, $SD = 1.16$ and $M = 3.67$, $SD = 0.99$, respectively; $t(47) = 0.056$, $p = .955$, $d = 0.017$), and the lowest scores for their efforts to *search for the truth even when it makes them uncomfortable* (Item 21; $M = 2.79$, $SD = 1.08$ and $M = 2.87$, $SD = 1.06$, respectively; $t(48) = -0.262$, $p = .794$, $d = -0.076$). No significant differences could be found for any of the individual items when comparing content professors by their disciplines.

Years of Teaching Experience

The content professors' experience teaching at the tertiary level was the basis for the next comparison, with those having taught 1-10 years in one group and 11+ years in the second group.

The results of the independent t -test selected to compare the perceptions of content professors with 1-10 years and 11+ years of teaching experience regarding overall student *Innovativeness* can be seen in Table 97.

Table 97

Independent t-Test for Innovativeness Average Score by Content Professors' Years of Teaching Experience

Construct	1-10 years ($n = 23$)		11+ years ($n = 27$)		df	t	p	Cohen's d
	M	SD	M	SD				
<i>Innovativeness</i> Average	3.08	0.78	3.42	0.70	48	-1.605	.115	-0.455

Although content professors with more years of experience had a higher mean score than the content professors with fewer years of experience, the difference was not significant, $t(48) = -1.605$, $p = .115$, $d = -0.455$. The results of the comparison between the two groups for each item in the *Innovativeness* construct are shared in Table 98.

Table 98

Independent t-Test for Innovativeness Items by Content Professors' Years of Teaching Experience

Item	1-10 years (<i>n</i> = 23)		11+ years (<i>n</i> = 27)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
4 My students enjoy learning about many topics.	3.57	1.16	3.70	0.99	48	-0.455	.651	-0.129
6 My students ask lots of questions in a learning environment.	2.83	1.19	3.37	1.18	48	-1.616	.113	-0.459
10 My students strive to be well informed.	3.50	1.26	3.81	0.83	47	-1.004	.322	-0.301
12 My students enjoy solving problems.	3.39	0.72	3.59	0.89	48	-0.869	.389	-0.247
15 My students enjoy learning even when they are not in school.	2.70	1.02	3.38	0.85	47	-2.576	.013*	-0.737
21 My students search for the truth even when it makes them uncomfortable.	2.70	1.06	2.96	1.06	48	-0.890	.378	-0.252
23 My students will go out of their way to find the right answers to a problem.	2.91	1.16	3.11	1.01	48	-0.643	.523	-0.183

**p* < .05

A look at the mean scores shows that for every single item, content professors with 11+ years of experience perceived their students as having greater *Innovativeness* disposition than did their colleagues with 1-10 years of experience.

The mean scores for both groups were also quite wide-ranging (2.70-3.50 in the 1-10

years group and 2.96-3.81 in the 11+ years group). Especially when asked if their students *enjoy learning even when not in school* (Item 15), the independent *t*-test revealed a significant difference, $t(47) = -2.576, p = .013$. Content professors with 11+ years of experience ($M = 3.38, SD = 0.85$) responded significantly more positively than their colleagues with 1-10 years of experience ($M = 2.70, SD = 1.02$). The effect size, Cohen's $d = -0.737$, indicates a moderate effect.

Academic Rank

The content professors' perception of students' *Innovativeness* disposition was explored next in relation to their academic rank as either academic track or teaching track. The results of the independent *t*-test utilised to compare the responses of the two groups are presented in Table 99.

Table 99

Independent t-Test for Innovativeness Average Score by Content Professors'

Academic Rank

Construct	Teaching Track ^a ($n = 19$)		Academic Track ^b ($n = 31$)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
<i>Innovativeness Average</i>	3.24	0.53	3.28	0.86	48	-0.190	.850	-0.050

^a Instructor, Lecturer, Senior Lecturer

^b Assistant Professor, Associate Professor, Professor

The mean scores for the *Innovativeness* average were quite close for the two groups, with no significant difference, $t(48) = -0.190, p = .850, d = -0.050$. The independent *t*-test was again used to compare the groups across the 7 individual items measuring *Innovativeness*, and the results of the test are shared in Table 100.

Table 100*Independent t-Test for Innovativeness Items by Content Professors' Academic Rank*

Item	Teaching Track ^a (<i>n</i> = 19)		Academic Track ^b (<i>n</i> = 31)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
4 My students enjoy learning about many topics.	3.58	1.02	3.68	1.11	48	-0.315	.754	-0.092
6 My students ask lots of questions in a learning environment.	2.79	1.13	3.32	1.22	48	-1.538	.131	-0.448
10 My students strive to be well informed.	3.74	0.93	3.63	1.13	47	0.334	.740	0.098
12 My students enjoy solving problems.	3.53	0.61	3.48	0.93	48	0.195	.846	0.052
15 My students enjoy learning even when they are not in school.	3.00	0.77	3.10	1.11	47	-0.328	.745	-0.097
21 My students search for the truth even when it makes them uncomfortable.	2.74	1.10	2.90	1.04	48	-0.536	.594	-0.156
23 My students will go out of their way to find the right answers to a problem.	3.32	0.95	2.84	1.13	48	1.540	.130	0.449

^a Instructor, Lecturer, Senior Lecturer^b Assistant Professor, Associate Professor, Professor

Both academic track and teaching track content professors scored the students' *Innovativeness* items as average, though there was some fluctuation with individual items receiving a moderately high score or, in some cases, below the mid-score of 3.00. Interestingly, the highest and lowest scoring items were not the same

for the groups, with teaching track content professors perceiving students as being strongest in *striving to be well-informed* (Item 10) ($M = 3.74$, $SD = 0.93$) and weakest in *searching for the truth even when it makes them uncomfortable* (Item 21) ($M = 2.74$, $SD = 1.10$), while content professors on the academic track rated their students strongest with regards to *enjoying learning about many topics* (Item 4) ($M = 3.68$, $SD = 1.11$), and weakest in *going out of their way to find the right answers to a problem* (Item 23) ($M = 2.84$, $SD = 1.13$). Despite these relative differences, there was no significant difference between the two groups on any of the items.

Age

The content professors' responses regarding the *Innovativeness* of their students were also compared in terms of their ages, with participants being placed in either the 26-45 years old group or the 46+ years old group. The independent *t*-test results for the *Innovativeness* average score can be seen in Table 101 below.

Table 101

Independent t-Test for Innovativeness Average Score by Content Professors' Age

Construct	26-45 Years ($n = 30$)		46+ Years ($n = 20$)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
<i>Innovativeness</i> Average	3.12	0.71	3.48	0.76	48	-1.689	.098	-0.488

The *Innovativeness* score of students as perceived by their content professors in the 46+ age group was slightly higher than their content professors in the 26-45 age group ($M = 3.48$, $SD = 0.76$ and $M = 3.12$, $SD = 0.71$, respectively). However, this difference was not significant, $t(48) = -1.689$, $p = .098$, $d = -0.488$. The same analysis was then conducted for each item within the *Innovativeness* construct, and the results are presented in Table 102.

Table 102*Independent t-Test for Innovativeness Items by Content Professors' Age*

Item	26-45 Years (<i>n</i> = 30)		46+ Years (<i>n</i> = 20)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
4 My students enjoy learning about many topics.	3.57	1.14	3.75	0.97	48	-0.593	.556	-0.171
6 My students ask lots of questions in a learning environment.	2.97	1.25	3.35	1.14	48	-1.103	.275	-0.319
10 My students strive to be well informed.	3.45	1.12	4.00	0.86	47	-1.856	.070	-0.539
12 My students enjoy solving problems.	3.33	0.71	3.75	0.91	48	-1.813	.076	-0.523
15 My students enjoy learning even when they are not in school.	2.93	1.03	3.25	0.91	47	-1.114	.271	-0.324
21 My students search for the truth even when it makes them uncomfortable.	2.67	0.99	3.10	1.12	48	-1.436	.158	-0.414
23 My students will go out of their way to find the right answers to a problem.	2.93	1.05	3.15	1.14	48	-0.692	.492	-0.200

The scores given by content professors for their students' *Innovativeness* disposition were quite wide-ranging, although the 46+ years age group consistently scored their students higher than the 26-45 years age group for every single item. The two groups' highest scores were for different items, yet both the younger and older

content professors perceived their students as being weakest in *searching for the truth even when it makes them uncomfortable* (Item 21) ($M = 2.67$, $SD = 0.99$ and $M = 3.10$, $SD = 1.12$, respectively). Despite the wide range of scores, the difference between the groups was not significant for any of the individual items, $t = -1.436$, $p = .158$.

Gender

The final comparison was made between the female and male content professors with regard to their perception of student *Innovativeness* disposition. The results of the independent t -test comparing the average *Innovativeness* scores of female and male content professors have been shared in Table 103.

Table 103

Independent t-Test for Innovativeness Average Score by Content Professors' Gender

Construct	Female ($n = 22$)		Male ($n = 28$)		df	t	p	Cohen's d
	M	SD	M	SD				
<i>Innovativeness</i> Average	3.29	0.76	3.24	0.75	48	0.254	.801	0.072

The mean scores that female and male content professors gave to their students for *Innovativeness* were above average ($M = 3.29$, $SD = 0.76$ and $M = 3.24$, $SD = 0.75$, respectively), and were not significantly different, $t(48) = 0.254$, $p = .801$, $d = 0.072$.

The independent t -test results for the analysis of the content professors' responses to the individual items measuring *Innovativeness* by gender are presented in Table 104.

Table 104*Independent t-Test for Innovativeness Items by Content Professors' Gender*

Item	Female (<i>n</i> = 22)		Male (<i>n</i> = 28)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
4 My students enjoy learning about many topics.	3.68	1.09	3.61	1.07	48	0.244	.808	0.069
6 My students ask lots of questions in a learning environment.	3.41	1.18	2.89	1.20	48	1.522	.134	0.434
10 My students strive to be well informed.	3.71	1.06	3.64	1.06	47	0.234	.816	0.067
12 My students enjoy solving problems.	3.50	0.80	3.50	0.84	48	0.000	1.000	0.000
15 My students enjoy learning even when they are not in school.	3.14	1.01	3.00	0.98	47	0.497	.621	0.144
21 My students search for the truth even when it makes them uncomfortable.	2.86	0.99	2.82	1.12	48	0.139	.890	0.040
23 My students will go out of their way to find the right answers to a problem.	2.77	0.92	3.21	1.17	48	-1.453	.153	-0.414

Content professor perceptions of student *Innovativeness* across individual items varied from below to above the midpoint 3.00 score. The highest scoring item was common to both groups, with female and male content professors perceiving students as being strongest in *striving to be well informed* (Item 10), with means of

3.71 ($SD = 1.06$) and 3.64 ($SD = 1.06$), respectively. The groups awarded the lowest scores to different items, with females giving their students a mean score of 2.77 ($SD = 0.92$) for *going out of their way to find the right answers to a problem* (Item 23), and males giving a mean score of 2.82 ($SD = 1.12$) for *searching for the truth even when it makes them uncomfortable*. Despite the fluctuations in the responses, the differences between the two groups were not significant.

Differences Between Student and Content Professor Perceptions

The final area of investigation was the difference in student perceptions of their own CTDs and content professors' perceptions of student CTDs (Overall, *Engagement*, *Cognitive Maturity*, and *Innovativeness*).

Overall Critical Thinking Disposition of Students

First, the UF/EMI scores of the students and content professors were compared to see if there were any significant differences between their perceptions of students' overall CTDs. The results of the independent t -test which was used for the analysis are shown in Table 105.

Table 105

Independent t-Test for Average Scores by Participant Groups

Construct	Students ($n = 82$)		Content Professors ($n = 50$)		$t(130)$	p	Cohen's d
	M	SD	M	SD			
UF/EMI Average	3.79	0.68	3.35	0.69	3.547	<.001*	0.636

* $p < .01$

The results of the analysis show that students' perceptions of their own CTDs ($M = 3.79$, $SD = 0.68$) are higher on average than the content professors' perceptions of the CTDs of their students ($M = 3.35$, $SD = 0.69$), but with comparable variance.

Furthermore, this difference was found to be highly statistically significant, $t(48) = 3.547$, $p < .001$, and the effect size, Cohen's $d = 0.636$, indicates a moderate effect.

Engagement Disposition of Students

The responses from students and content professors were then examined for differences in their perceptions of students' *Engagement* disposition. The results of the independent t -test used to analyse the data are presented in Table 106.

Table 106

Independent t-Test for Engagement Average Score by Participant Groups

Construct	Students ($n = 82$)		Content Professors ($n = 50$)		df	t	p	Cohen's d
	M	SD	M	SD				
<i>Engagement Average</i>	3.80	0.73	3.49	0.74	130	2.342	.021*	0.420

* $p < .05$

As can be seen from the results, students' perceptions ($M = 3.80$, $SD = 0.73$) of their own *Engagement* are higher than the content professors' perceptions ($M = 3.49$, $SD = 0.74$), to a significant degree, $t(130) = 2.342$, $p = .021$, The effect size, Cohen's $d = 0.420$, indicates a medium effect.

The results of the independent t -test for participant responses to individual items under *Engagement* can be seen in Table 107.

Table 107

Independent t-Test for Engagement Items by Participant Groups

Item	Students			Content Professors			df	t	p	Cohen's d
	n	M	SD	n	M	SD				
2 Look for opportunities	82	4.10	1.00	50	3.58	1.07	130	2.806	.006*	0.503

Item	Students			Content Professors			<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>				
to solve problems.										
3 Interested in many issues.	82	3.83	1.11	50	3.56	1.22	130	1.305	.194	0.234
5 Able to relate to a wide variety of issues.	82	3.89	1.10	50	3.56	1.07	130	1.689	.094	0.303
7 Enjoy finding answers to challenging questions.	82	3.85	1.15	49	3.55	1.04	129	1.513	.133	0.273
8 Good problem solver.	82	3.80	1.07	50	3.52	0.76	130	1.643	.103	0.295
9 Confident about reaching a reasonable conclusion.	82	4.04	0.90	50	3.56	0.88	130	2.981	.003*	0.535
14 Able to apply knowledge to a wide variety of issues.	82	3.70	1.11	50	3.06	1.02	130	3.293	.001*	0.591
17 Able to explain things clearly.	82	3.52	1.10	50	3.46	0.95	130	0.342	.733	0.061
18 Ask good questions when trying to clarify a solution.	82	3.55	1.14	50	3.70	0.95	130	-0.788	.432	-0.141
19 Present issues in a clear and precise manner.	82	3.66	1.02	49	3.59	0.91	129	0.376	.707	0.068
22 Keep on working on things until	82	3.87	1.02	50	3.26	1.03	130	3.312	.001*	0.594

Item	Students			Content Professors			<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>				

they get them right.

* $p < .01$

For every single item, students respond more positively than content professors. Students scored themselves highest for their tendency to *look for opportunities to solve problems* (Item 2) ($M = 4.10$, $SD = 1.00$), while professors gave students the highest score for their ability to *present issues in a clear and precise manner* (Item 19) ($M = 3.59$, $SD = 0.91$).

Students and content professors had significantly different perceptions in 4 of the 11 areas covered under the *Engagement* construct. Specifically, students' mean scores were significantly higher than content professors' for students' tendency to *look for opportunities to solve problems* (Item 2) ($M = 4.10$, $SD = 1.00$ vs $M = 3.58$, $SD = 1.07$), $t(130) = 2.806$, $p = .006$, the effect size, Cohen's $d = 0.503$, indicating a medium effect; for their *confidence in their ability to reach a reasonable conclusion* (Item 9) ($M = 4.04$, $SD = 0.90$ vs $M = 3.56$, $SD = 0.88$), $t(130) = 2.981$, $p = .003$, the effect size, Cohen's $d = 0.535$, indicating a medium effect; for their *ability to apply their knowledge to a wide variety of issues* (Item 14), ($M = 3.70$, $SD = 1.11$ vs $M = 3.06$, $SD = 1.02$), $t(130) = 3.293$, $p = .001$, the effect size, Cohen's $d = 0.591$, indicating a medium effect; and for their tendency to *keep working on problems until they get them right* (Item 22), ($M = 3.87$, $SD = 1.02$ vs $M = 3.26$, $SD = 1.03$), $t(130) = 3.312$, $p = .001$, the effect size, Cohen's $d = 0.594$, indicating a medium effect.

It can thus be presumed that students perceive their *Engagement* disposition significantly more positively than how content professors perceive student *Engagement*.

Cognitive Maturity Disposition of Students

Next, student and content professor perceptions of students' *Cognitive Maturity* disposition were investigated. Table 108 shows the results of the independent *t*-test for the average *Cognitive Maturity* scores.

Table 108

Independent t-Test for Cognitive Maturity Score by Participant Groups

Construct	Students (<i>n</i> = 82)		Content Professors (<i>n</i> = 50)		<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
<i>Cognitive Maturity</i> Average	3.76	0.69	3.25	0.73	130	3.993	<.001*	0.716

**p* < .01

The results indicate that students' overall perception of their own *Cognitive Maturity* (*M* = 3.76, *SD* = 0.69) is significantly higher than how the content professors perceive students' *Cognitive Maturity* (*M* = 3.25, *SD* = 0.73), *t*(130) = 3.993, *p* = <.001. The effect size, Cohen's *d* = 0.716, indicates a moderate effect.

The participants' responses to each of the items comprising the *Cognitive Maturity* construct were also compared, and the results of the independent *t*-test are depicted in Table 109.

Table 109

Independent t-Test for Cognitive Maturity Items by Participant Groups

Item	Students			Content Professors			<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>				
1 Listen carefully to the opinions of others even when	82	4.09	0.92	50	3.62	0.83	130	2.925	.004**	0.525

Item	Students			Content Professors			<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>				
they disagree with them.										
11 Likely to change their opinion when given new information that conflicts with their current opinion.	82	3.60	1.04	49	3.53	1.02	129	0.359	.720	0.065
13 Try to consider the facts without letting their biases affect their decisions	82	3.62	1.06	49	2.96	1.04	129	3.484	<.001**	0.629
16 Can get along with people who do not share their opinions.	82	3.48	1.22	49	3.37	0.91	122.9	0.539	.563	0.097
20 Consider how their own biases affect their opinions.	82	3.77	1.05	49	2.86	1.04	129	4.834	<.001**	0.873
24 Try to find multiple solutions to problems.	82	3.45	1.26	50	3.00	1.05	130	2.124	.036*	0.381
25 Ask many questions when making a decision.	82	3.93	1.13	50	3.30	1.11	130	3.110	.002**	0.558
26 Believe that most	82	4.12	1.08	50	3.34	0.98	130	4.170	<.001**	0.748

Item	Students			Content Professors			<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>				
problems have more than one solution.										
* <i>p</i> < .05										
** <i>p</i> < .01										

Students' mean scores for all of the items under the *Cognitive Maturity* construct were higher than the content professors' mean scores. Moreover, students and content professors had significantly different perceptions in 6 of the 8 items. Students ($M = 3.45$, $SD = 1.36$) perceived themselves as *trying to find multiple solutions to a problem* (Item 24) with a higher mean than did content professors ($M = 3.00$, $SD = 1.05$). The difference was significant, $t(130) = 2.124$, $p = .036$, and the effect size, Cohen's $d = 0.381$, indicates a small effect. In addition, there was high statistical significance in the differences between students' and content professors' responses regarding students' tendencies to *listen carefully to the opinions of others even when they disagree with them* (Item 1) ($M = 4.09$, $SD = 0.92$ vs $M = 3.62$, $SD = 0.83$), $t(130) = 2.925$, $p = .004$, with the effect size, Cohen's $d = 0.525$, indicating a medium effect; students' efforts to *consider the facts without letting their biases affect their decisions* (Item 13) ($M = 3.62$, $SD = 1.06$ vs $M = 2.96$, $SD = 1.04$), $t(129) = 3.484$, $p = <.001$, with the effect size, Cohen's $d = 0.629$, indicating a medium effect; students' *considerations of how their own biases affect their opinions* (Item 20) ($M = 3.77$, $SD = 1.05$ vs. $M = 2.86$, $SD = 1.04$), $t(129) = 4.834$, $p = <.001$, the effect size, Cohen's $d = 0.873$, indicating a medium effect; students' efforts to *ask many questions when making a decision* (Item 25) ($M = 3.45$, $SD = 1.36$ vs. $M = 3.00$, $SD = 1.05$), $t(130) = 3.110$, $p = .002$, the effect size, Cohen's $d = 0.558$,

indicating a medium effect; and students' *beliefs that most problems have more than one solution* (Item 26) ($M = 3.45$, $SD = 1.36$ vs. $M = 3.00$, $SD = 1.05$), $t(130) = 4.170$, $p = <.001$, the effect size, Cohen's $d = 0.748$, indicating a medium effect.

. These results indicate that there are noteworthy significant differences between students' perceptions and content professors' perceptions of the *Cognitive Maturity* levels of students.

Innovativeness Disposition of Students

Finally, students' and content professors' responses were compared with regard to their average *Innovativeness* score. The results of the independent t -test used to analyse the scores for this disposition can be seen below, in Table 110.

Table 110

Independent t-Test for Innovativeness Score by Participant Groups

Construct	Students ($n = 82$)		Content Professors ($n = 50$)		df	t	p	Cohen's d
	M	SD	M	SD				
<i>Innovativeness</i> Average	3.82	0.78	3.26	0.75	130	4.041	<.001*	0.725

* $p < .01$

Students had a moderately high perception of their own *Innovativeness* level ($M = 3.82$, $SD = 0.78$), while content professors' perception of student *Innovativeness* was just above average ($M = 3.26$, $SD = 0.75$), and this difference was highly statistically significant, $t(130) = 4.041$, $p = <.001$. The effect size, Cohen's $d = 0.725$, indicates a moderate effect.

The students' and content professors' responses were further examined in terms of the scores they gave for the 7 items that the *Innovativeness* construct

consisted of, and the findings of the independent *t*-test used for the analysis have been provided in Table 111.

Table 111

Independent t-Test for Innovativeness Items by Participant Groups

Item	Students			Content Professors			<i>df</i>	<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>				
4 Enjoy learning about many topics.	82	4.07	1.02	50	3.64	1.06	130	2.334	.021*	0.419
6 Ask lots of questions in a learning environment.	82	3.17	1.26	50	3.12	1.21	130	0.229	.820	0.041
10 Strive to be well informed.	82	4.10	0.98	49	3.67	1.05	129	2.340	.021*	0.422
12 Enjoy solving problems.	82	3.83	1.12	50	3.50	0.81	130	1.807	.073	0.324
15 Enjoy learning even when not in school.	82	4.20	0.96	49	3.06	0.99	129	6.466	<.001**	1.167
21 Search for the truth even when it makes them uncomfortable.	82	3.78	1.14	50	2.84	1.06	130	4.713	<.001**	0.846
23 Will go out of their way to find the right answers to a problem.	82	3.59	1.15	50	3.02	1.08	130	2.798	.006**	0.502

**p* < .05

** *p* < .01

Once again, students scored themselves higher than the content professors for every item in the *Innovativeness* scale. In fact, this was the disposition for which students perceived themselves as being strongest, and gave themselves the highest

scores in this construct for *enjoying learning about many topics* (Item 4) with $M = 4.07$ ($SD = 1.02$) compared to content professors' $M = 3.64$ ($SD = 1.06$), which was significant, $t(130) = 2.334$, $p = .021$, and the effect size, Cohen's $d = 0.419$, suggests a medium effect. In addition, there was a significant difference for the item *striving to be well informed* (Item 10), $t(129) = 2.340$, $p = .021$, with students ($M = 4.10$, $SD = 0.98$) scoring themselves higher than their content professors' ($M = 3.67$, $SD = 1.07$), which was incidentally content professors' highest score in this construct. The effect size, Cohen's $d = 0.422$, indicates a medium effect. Finally, there was a highly significant difference for *enjoying learning even when not in school* (Item 15), $t(129) = 6.466$, $p = <.001$, with students ($M = 4.20$, $SD = 0.96$) rating themselves higher than the content professors ($M = 3.06$, $SD = 0.99$). The effect size, Cohen's $d = 1.167$, indicates a strong effect.

Furthermore, the statement regarding students' tendency to *search for the truth even when it makes them uncomfortable* (Item 21) was perceived much more positively by the students ($M = 3.78$, $SD = 1.4$) than the content professors ($M = 2.84$, $SD = 1.06$), who gave it their lowest score, and the difference was highly statistically significant, $t(130) = 4.713$, $p = <.001$. The effect size, Cohen's $d = 0.846$, indicates a strong effect.

Likewise, students' inclination to *go out of their way to find the right answer to a problem* (Item 23) was perceived much more positively by the students ($M = 3.59$, $SD = 1.15$) than the content professors ($M = 3.02$, $SD = 1.08$) and the difference was once again highly statistically significant, $t(130) = 2.798$, $p = .006$, with the effect size, Cohen's $d = 0.502$, suggesting a medium effect. Consequently, the results suggest that students perceive their *Innovativeness* disposition as significantly higher than how content professors perceive it.

CHAPTER 5: DISCUSSION

Introduction

This study examines the CTDs of undergraduate students as perceived by themselves and the content professors at a foundation EMI university in Türkiye. Data collected from 82 students and 50 content professors were compared according to various variables, and then examined to see if there was a significant difference between the perceptions of the two groups.

This chapter will give a brief overview of the study, followed by a discussion of the major findings from the study and the conclusions that may be drawn from the results and in relation to the relevant literature. Next, the chapter will discuss the implications of the findings in terms of practice and further research. Finally, the chapter will conclude by addressing the limitations of the study.

Overview of the Study

The current study investigates the CTDs of students enrolled at an EMI foundation university in Türkiye. The study employs the UF/EMI inventory to first explore undergraduate students' CTDs as perceived by both the students and content professors. The means and standard deviations of students' and content professors' responses are calculated and then examined with regard to the subconstructs of *Engagement*, *Cognitive Maturity*, and *Innovativeness*.

The study also seeks to determine whether students' self-perceived dispositions of *Engagement*, *Cognitive Maturity*, and *Innovativeness* vary based on the demographic variables of academic discipline, semester, participation in a pre-

sessional language preparatory program, grades in ENG 101 and ENG 102, CGPA, age, and gender. In addition, the study examines differences in content professors' perceptions of student CTDs according to their discipline, teaching experience, academic rank, age, and gender.

Finally, this study investigates the difference between students' CTDs as perceived by themselves and by the content professors in terms of the subconstructs *Engagement*, *Cognitive Maturity*, and *Innovativeness*.

Overall, students perceive themselves as having moderate CTD across all of the constructs. Some significant differences exist in the self-perceptions of students for individual items in the questionnaire based on their demographic differences. Content professors, on the other hand, rate students a little lower at just above the midpoint for all constructs, with different emphases placed on each one. Also, the content professors' years of experience is found to be a factor that has a significant effect on some of their responses. Notably, the difference between the students' and content professors' perceptions is significant for all constructs.

Discussion of Major Findings

This section will discuss the major findings of the study under the subheadings of overall perceptions of student CTDs, differences in perceptions according to demographic variables of both students and professors, and differences in perceptions between students and content professors.

Overall Perceptions of Student Critical Thinking Dispositions

Overall, students and content professors hold moderately positive views about students' CTDs. While there is general agreement on areas of relative strength and weakness, some differences emerge in the way students and professors assess these dispositions. Notably, students tend to rate themselves more positively than

their professors do. These findings suggest a partial alignment in perceptions, with noteworthy discrepancies that may point to differing expectations or interpretations of CT among the two groups.

Of note, the results of this study mirror those reported by Bisdorf-Rhoades et al. (2005) in their examination of the CTDs of agricultural communication students, with students in both studies scoring themselves as having moderate CTDs, with *Innovativeness* the highest-scoring and *Cognitive Maturity* the lowest-scoring dispositions. Interestingly, Ricketts and Rudd (2004) discovered a positive relationship between agricultural youth leaders' CT skills and their *Engagement* and *Innovativeness* dispositions, but a negative relationship with *Cognitive Maturity*.

Moderate to high levels of CTDs have been reported in other studies using the UF/EMI from higher education contexts in Türkiye. High moderate scores were reported by Loomis (2024) for the CTD of first-year students in an EGAP course, and by Karakoç (2021) in her study of undergraduate music students from two different universities.

Varying findings have also been reported from other educational contexts. In his investigation of the relationship between the CTDs and problem-solving skills of high school students, Orhan (2022) found students had a moderate disposition to critical thinking, whereas high mean scores for CTD were reported by Meral and Taş (2017) in their research on the relationship between self-efficacy and CTDs among middle schoolers, and by Demir (2022) in a study examining high school students' CTDs and analytical thinking skills.

Other studies from Türkiye have used the CCTDI, which is based on the same theoretical framework as the UF/EMI, to measure the self-reported CTDs of students. Among these, studies of pre-service teachers in graduate school (Çevik,

2013) and pre-service EFL teachers (Coşkun & Karahan, 2023) found moderate CT skills among participants, and Kök (2020) observed that pre-sessional preparatory program students had moderate to high CTDs. However, low CTD was reported among EFL students from different faculties by Genç (2017) and among pre-service art teachers by Taşkesen (2019).

Studies from varying contexts outside of Türkiye have also researched the CTDs of students in higher education with differing results. Nursing students in Ghana demonstrated positive dispositions to CT in a study by Boso et al. (2021). These results were supported by Wangenstein et al. (2010), who also reported high CTD among newly graduated nurses in Norway. However, some other studies reported weak CTDs among undergraduate students, as in Zheng's (2021) study on students majoring in foreign languages in a Chinese university, and Broadbear et al.'s (2005) examination of the CTDs of health education students at a university in the US. The differences encountered in the results obtained from these studies could be explained by the differences in geographical or educational contexts, the backgrounds of these students, or the demographic variables unique to the participant groups.

Student Differences in Their Perceived Critical Thinking Dispositions

Analysis of the student responses according to their demographic variables (discipline of study, academic semester enrolled in, attendance in the pre-sessional language preparatory program, letter grade received from the EGAP courses ENG 101 and ENG 102, CGPA, age, and gender) showed a significant difference in the *Innovativeness* disposition of students with regard to attendance in the preparatory program. Although the dispositions as a whole showed no other significant relationship, individual items within each construct showed significance for all the

variables except for the semester in which the students were enrolled at the time of answering the questionnaire.

Discipline of Study

The descriptive analysis of students' discipline of study reveals some interesting tendencies. The responses of STEM and non-STEM students suggest that they perceive their strengths and weaknesses in different areas, with STEM students indicating flexibility in applying knowledge and taking heed of new information, which is less apparent in non-STEM students' responses. However, STEM students' self-perceived weaknesses appear to be non-STEM students' strengths, especially in *enjoying finding answers to challenging questions* (Item 7), and *trying to find multiple solutions to problems* (Item 24), the latter to which non-STEM students are significantly more disposed.

These results could be due to the somewhat more binary nature of STEM disciplines, in which frequently a single correct answer may be more probable and/or desirable, thereby making it easier to reformulate opinions based on new and, presumably, verifiable information. This is often in contrast to non-STEM subjects, where multiple possible scenarios and solutions may be viable. These findings could also be an indication of the differences in approaches and expectations across disciplines with regard to the construct of CT (Tang, 2024), which may result in different emphases being placed on different features.

That non-STEM students are significantly more positively disposed to an item reflects in part the findings of Tümkaya et al. (2009), whose study revealed that social science students had significantly higher CTDs than science students.

However, it may be necessary to err on the side of caution as no other significant differences were found between students in STEM and non-STEM

disciplines in this study, and, overall and for all three subconstructs, STEM students had higher mean scores than non-STEM students. In a similar setting and using the same tool, Loomis (2024) also found no significant difference between the CTDs of first-year students in the Faculty of Engineering and the Faculty of Science when compared to the other faculties. The high proportion of first-year students participating in this study may also have been a factor in the findings, as students may not yet have been fully socialised into their respective disciplines and their preferred modes of inquiry, which may favour some dispositions over others.

Attendance at the Pre-Sessional Language Preparatory Program

Analysis of the data pertaining to attendance at the English language preparatory program also gave rise to some noteworthy conclusions. In student responses overall, most items related to verbal communication, specifically related to explaining and presenting things clearly and asking questions, received the lowest mean scores. However, despite the general negative tendency in responses to communication-related items, an important finding is that students who attended the pre-sessional English language preparatory program are more positively disposed to all of these communicative interactions when giving and requesting information, and are significantly more positively disposed to asking questions in a learning environment than students who did not attend the preparatory program.

Firstly, the importance of perceived competence in language skills should not be underestimated. In Lao (2020), perceived competence was found to be a significant predictor of willingness to communicate in adult ESL learners. Furthermore, perceived competence in language production is considered to predict performance and positively reinforce students' strategic use of language (Gutiérrez-Fernández et al., 2025). Higher perceived competence has also been associated with

students exhibiting greater confidence when asking questions and expressing opinions (Kök, 2020).

Furthermore, students who attended the English language preparatory program have also been found to be significantly more disposed to *Innovativeness* as a whole and to individual items related to problem-solving, enjoying challenging questions, and applying their knowledge in other areas.

Some studies have shown that dedicated CT instruction in English language preparatory program classes has resulted in significant improvements in the overall CTDs of students (Çam, 2023) and in the CCTDI subscale of inquisitiveness (Gündüz, 2017). These results are corroborated by Manalo and Sheppard (2016), who show that language proficiency alone may not be sufficient to develop critical evaluation skills in students, and that instruction in specific skills was found to be necessary. In the context of this study, students are required to prove their English proficiency at the CEFR B2 level with any one of several validated proficiency exams, but no data exists about their exact levels, which may be higher for some. However, the findings suggest that attendance at the pre-sessional language preparatory program and receiving a high grade level from an initial first-year EGAP course with a focus on critical thinking may have been advantageous in terms of enhancing students' competencies in language as well as CT.

Letter Grades Received from EGAP Courses

Some parallels can also be drawn with grades received from the EGAP courses. Though not significant, students who received a grade between A and B+ in the ENG 101 course were more positively disposed to each of the three subconstructs, and their self-reported ability to explain things clearly was significantly higher than the students with letter grades B to C. With regard to the

second EGAP course required of all freshman-year students, ENG 102, students who had completed the course were once again more positively disposed to all subconstructs, and were also significantly more confident about applying their knowledge in different contexts than students who had either not yet enrolled in or completed the course.

Loomis (2024) also reported significant differences among students in an EGAP freshman year composition course, whereby those who received either an A or A- letter grade rated themselves significantly higher for *Cognitive Maturity* than students who received letter grades B+ to C.

These findings support the argument that the EAP instruction in the preparatory program and in the EGAP courses, which are explicitly critically oriented in their goals and are designed to develop students' CT (Aksit & Aksit, 2021), are beneficial in terms of supporting the CTDs of students both through language and CT instruction.

The results are further indicative of the connection between language and CT and, in particular, the positive effect of EAP on the CTDs of students. The purpose of EAP is to prepare students to engage actively and effectively in education in English by equipping them with the skills they will need to meet the demands of academic life (Hyland & Hamp-Lyons, 2002). The increased emphasis placed on EAP classes in EMI contexts, in particular, has been shown to be a major predictor of academic success due to their integration of language and academic skills (Galloway & Rose, 2021). Among these skills is critical thinking, which has cemented its place in many EAP curricula and is considered by instructors to be an essential component of language teaching (Toshpulatova & Kinjemuratova, 2020).

CGPA

When the CGPA of students was considered, it was not found to be a significant factor in students' overall CTDs. However, when examined in terms of their *Engagement*, students were significantly more tenacious and more able to relate to different issues. Loomis (2024) found similar results whereby students with high CGPAs differed significantly from those with lower CGPAs for individual items within *Engagement* and *Innovativeness*. It can be concluded that academic success is not a very strong indicator of CTD, which is also supported by Coskun (2022) and Çevik (2013), who found no correlation, and Bakır (2015), who found a weak but positive correlation between CTD and academic achievement.

Age

When student responses were analysed by age, neither of the age groups analysed showed a more positive tendency to overall CTD than the other, which is supported by other studies from Türkiye that also found no significant difference between age groups among graduating students (Karahan & İskifoğlu, 2020) and pre-service teachers (Çevik, 2013). However, in a study of students in a university leadership course, Stedman (2009) reported that older age correlated with increased *Cognitive Maturity*, with an increased awareness of biases and subjectivities.

It is also worth noting that a significant difference was found for students aged 21 and over, who responded more positively to the statements under the *Engagement* construct on their abilities to apply their knowledge and explain things clearly, both of which were also significantly higher for students who received A to B+ in ENG 101, and students who completed ENG 102 and attended the preparatory program, respectively. These findings may suggest that the development of these

dispositions, which are significantly higher in older students, could be enhanced earlier through critical engagement in EAP programs.

Gender

Finally, the conclusions drawn from the study revealed no significant difference between males and females in their disposition to critical thinking, except for males being significantly more able to get along with people with differing viewpoints. These findings were largely supported by other studies from Türkiye, which reported that no significant difference existed between genders for CTD among secondary school students (Demir, 2022; Orhan, 2022), EFL pre-service teachers (Coşkun & Karahan, 2023), and prospective teachers (Coskun & Altinkurt, 2016; Taşkesen, 2019). Studies from international contexts also had similar results, with no significant difference found among undergraduate students in the USA (Stedman, 2008), Thailand (Boonsathirakul & Kerdsomboon, 2021), and China (Zheng, 2021).

However, some studies found that gender was a differentiating factor, such as in Aybek (2018), where male prospective teachers from different subject areas had significantly higher CTD overall than their female counterparts, and Karakoç (2021), where again male music students reported a significantly higher *Engagement* disposition than the female students. This was in contrast to Laird (2005), who found that female undergraduate students were significantly more disposed to CT overall than males in a study from the United States. The lack of significant difference in a large number of studies, as well as the varying results from different contexts, may be a result of changes in academic, social, and cultural settings that are increasingly permitting equal participation. The comparable experiences of males and females

could have resulted in the eroding of any differences that may have existed in their CTDs in the past.

Academic Semester

Finally, there was no statistically significant difference between students based on the academic semester in which they are enrolled. Other studies have also reported no change in the CTDs of students in different years of higher education (Bakır, 2015; Coskun & Altinkurt, 2016; Coşkun & Karahan, 2023; Taşkesen, 2019), or have reported an increase in students in the later stages of their education that was not significant (Boonsathirakul & Kerdsonboon, 2021; Zheng, 2021). In contrast to these findings, Giancarlo and Facione (2001) reported, in a longitudinal study of undergraduate students, that their CTDs were generally either maintained or increased, with a significant difference found in their overall disposition. Similarly, a significant increase in CTDs of undergraduate students in different years was reported by Tümkaya et al. (2009). Some reasons for the difference in these findings may be related to the uneven distribution of students across semesters. In this study, first and second-semester students made up a large proportion of the participants which did not permit a more widespread picture of students at different stages of their education. Another possible cause could be related to the specific experiences that students are exposed to both in and out of their educational contexts.

Nevertheless, the large number of findings indicating little or no change are supported by Davies and Barnett's (2015) observation that with the increasing marketisation of higher education institutions, the focus has shifted away from the cultivation of student criticality and its associated skills, dispositions and actions. It has also been argued that EMI contexts face unique dilemmas related to instruction in what is often an additional language for both students and content professors

(Kırkgöz, 2009). For this reason, it has been suggested that more focus needs to be placed on pedagogy in EMI contexts to address these perceived difficulties and deficiencies (Richards & Pun, 2022).

Content Professor Differences in Their Perceptions of Student Critical Thinking Dispositions

Content professor perceptions of students' CTDs were at low moderate levels overall and for the three constructs of *Engagement*, *Cognitive Maturity*, and *Innovativeness*.

None of the demographic features of content professors that were examined showed a significant difference in their perceptions overall or in the subconstructs. However, content professors with 11+ years of experience working in the tertiary level were significantly more positive in their perceptions of the enjoyment students felt at addressing challenging questions and learning outside of school compared to the content professors with 1-10 years of experience.

These differences in perceptions could be a result of differences in the content professors' expectations, or it could be due to differences in their instructional approaches resulting from their comparative levels of experience.

No other studies have been found that examine the demographic variables that may be factors in content professors' perceptions of student CTDs. However, studies from other contexts examining teacher perceptions have provided varying results. In a study at a university in Vietnam, Lu and Nguyen (2022) found that students were perceived by their content professors as having high CT skills. The opposite was indicated by Dwee et al. (2016), who reported that ESP instructors at a university in Malaysia perceived their students as lacking CT skills and observed them to be passive learners, citing the exam-oriented school system as a possible

cause. A similar claim can be made for Türkiye, where students are not given sufficient opportunity to develop their CT abilities due to the limited emphasis placed on such complex thinking skills by the national exams (Kök, 2020; Gündüz, 2017) and the resulting approach to teaching at the secondary level (Kitchen et al., 2019).

Though not significant, a general trend may warrant mentioning. In the *Engagement* disposition, content professors perceived their students as being weakest in their *ability to apply their knowledge to a wide variety of issues*. This item received the lowest rating from all of the content professor groups across all of the variables (except for age, where it received the second lowest score given by the 46+ age group).

This is a concern that also highlights the ongoing debate about whether CT is universally applicable across different contexts, with some scholars contending that CT is subject-specific (McPeck, 1981), others arguing that CT is both specific and generally applicable, as thought and knowledge are equally necessary for its effective implementation (Butler & Halpern, 2020), and still others maintaining that dispositions (as opposed to skills) reflect tendencies of our characters that make them more universally applicable (Ennis, 1996; Giancarlo & Facione, 2001). However, it is worth noting that STEM content professors generally tended to perceive students' CTDs less positively than non-STEM content professors, which could also be a result of the differences in how CT is conceived of and approached in different disciplines (Tang, 2024).

No other significant differences were revealed in terms of the discipline, academic rank, age or gender of the content professors.

Difference in Student and Content Professor Perceptions

The study came to a conclusion that students' perceptions of their own CTDs are higher for every disposition and every item comprising the scale than content professors' perceptions of the CTDs of their students, and the difference between the two groups for the overall CTDs of students is highly statistically significant ($p < .01$). In comparing the responses to each subconstruct, it can be seen that *Cognitive Maturity* receives the lowest mean score from both groups; however, while students rate themselves highest for *Innovativeness*, content professors perceive their students as being stronger in *Engagement*.

When examining the differences between student and content professor perceptions, it can be seen that the difference in the perceptions of the two groups is significant for *Engagement*, *Cognitive Maturity* and *Innovativeness*.

This difference between what students perceive and how others view the CT levels of students has been previously documented and discussed (Tsui, 2002). In the *Cognitive Maturity* construct, students scored themselves highest regarding their *belief that most problems have more than one solution* (while scoring themselves lowest *for trying to find multiple solutions to a problem*). This apparent contradiction, coupled with the fact that in both cases, content professors' mean scores were significantly lower, may be an indication that the students in the current study have the CTDs necessary for *recognising* a problem, but not for *tackling* the problem effectively.

Problem solving and CT are closely associated, and previous studies have discovered a positive correlation between CTDs and problem-solving skills among nursing students (Beşer & Kıssal, 2009), computer engineering students (Özyurt, 2015), pre-service teachers (Kutluca, 2018), and high school students (Orhan, 2022).

In the case of the student participants of this study, it could be an indication that their cognitive maturity disposition (anticipating, recognising, and feeling confident in solving problems) or the associated problem solving skills are not sufficiently developed.

Additionally, students' responses to the items in the *Innovativeness* scale generally indicate a positive approach to learning. Related items consistently received high mean scores and were among the highest-scoring items in the questionnaire overall. There was consensus with content professors in this regard, as they too perceived their students positively for the items. This could indicate a high motivation for learning, which has long been associated with CTDs under the premise that having the *disposition* to think critically will be the motivating factor to attain and employ the necessary *skills* to think critically (Facione et al., 1995). Hamby (2015) further emphasises the integral role of internal motivation in critical thinking, arguing that without it, we could not develop the necessary "habit of skillful thinking" (p. 86). The high level of motivation observed from the results can also be considered in terms of the educational context supported by the findings of Aksit & Kahvecioglu (2022), who reported that students studying in EMI contexts reported higher motivation to learn.

In their perceptions of students' disposition to *Cognitive Maturity*, the significant difference between content professors' and students' responses for various items may also need to be considered. Although content professors recognised that students listen to differing opinions, they were less positive about students' consideration of their own and others' biases. Thus, students are perceived by content professors as being relatively interested in others' opinions, but unlikely to question the source of their own, which implies that they may be inflexible when it

comes to reforming any existing viewpoints. This is further compounded by content professors' low estimation of students' tendency to *search for the truth even when it makes them uncomfortable*, thus underscoring students' hesitancy to question their own biases and the basis of their own opinions.

These results are in line with those reported by Facione et al. (1995), who found that, in their study of the CTDs of college freshmen, responses varied in terms of *Cognitive Maturity*, and students were disinclined to search for knowledge that did not support their preconceptions.

These findings may indicate that while students may be able to engage in some level of critical thinking, they do so with limited regard to others' opinions and their own potential biases. If a major goal of CT is indeed the effective engagement of individuals in civic society (Butler & Halpern, 2020; Davies & Barnett, 2015; Duhan-Kaplan, 1991; Kincheloe, 2000), then this disunity warrants attention. In a diverse society, it is essential that we engage in self-reflection, acknowledge our biases, and become open to new and sometimes contradictory views. Any rigidity in that regard would limit dialogue and commitment to the principles of equality. Studies have shown positive correlations between CTDs and social justice attitudes (Gültekin, 2024) and democratic values (Uluçınar & Aypay, 2018), and that the teaching of and exposure to democratic values at all levels of education encourage critical thinking, discussion, and community participation (Smith, 2009). Students may benefit from such efforts, as they may contribute to the development of the critical being whose critical skills and dispositions extend into critical action.

This distinction that students appear to have made between recognising the existence of a multiplicity of solutions and actively attempting to find multiple solutions could also be an indication of not just a lack of CT skills or dispositions,

but the absence of a propensity to take necessary action. This points to the missing dimension of “critical participation” in the criticality axis proposed by Davies and Barnett (2015) and may need to be addressed accordingly in the educational setting. Lea and Street’s (2006) academic literacies model can be a useful framework for this purpose, in its attention to the simultaneous development of students’ study skills, academic socialisation, and critical engagement with their environment.

Implications for Practice

It is clear that, in the context of this study, there is a significant disparity between how students and content professors perceive students’ CTDs. Based on these results and in light of some significant differences in demographic variables that have been identified, several implications for practice can be identified.

Firstly, the evident gap between how students and content professors perceive students’ CTDs needs to be addressed. This misalignment could be an indication that the standards to be met and expectations from students have not been clearly communicated to students. How information is imparted and the pedagogical methods used in the classroom are considered influencing factors in encouraging CT in students (Burbach et al., 2012; Choy & Cheah, 2009).

However, it is not a simple matter of recommending that content professors incorporate more CT into their course content, as the specific context must also be taken into account. The unique challenges posed by EMI implementation have led to recommendations for a more student-centred EMI pedagogy characterised by increased student-teacher and student-student interaction (Ismailov, 2021). By engaging with students in this manner, more opportunities would be created for asking higher-order questions, which have been shown to encourage higher-order answers (Sahan, 2021).

Furthermore, it is crucial that content professors are made more knowledgeable about critical thinking and its associated dispositions through some institutional professional development and teaching excellence endeavours since the effective cultivation of CT is only possible if content professors know what it is they are expected to be teaching (Dwyer et al., 2014) and students know what they are expected to be learning (Abrami et al., 2008). Thus, explicit dialogue between students and content professors around expectations and understandings of criticality could also contribute to narrowing this perception gap.

Another interesting finding in this study was the significant difference between the perceptions of the students who had and those who had not attended the pre-sessional English language preparatory program. More than any other variable, attendance at the preparatory program was indicative of significantly higher *Innovativeness* as a whole, as well as multiple items related to problem-solving. Moreover, attendance at the English Preparatory program, receiving a letter grade A to B+ in ENG 101, and successful completion of ENG 102 were all indicative (even if not always significantly) of a higher disposition to items related to communication. Although language proficiency has been shown to account to some degree for the demonstration of CT by students (Liyanage, 2021; Manalo & Sheppard, 2016; Xu et al., 2023). In this context, all students are required to document their English language proficiency at least at B2 CEFR level prior to entering their departments, and some students may even be at C1 or C2 CEFR level. It is hard to link any statistical results to language proficiency level, but the specific experience of these students in the EAP courses may have played a role in shaping students' CTDs.

Various studies have already documented the positive impact that EAP instruction can have on CTDs (Çam, 2023; Gündüz, 2017). As such, the curricula of

both in-sessional and pre-sessional EAP courses should maintain the combined objectives of improving students' language proficiency and their academic skills, with special emphasis on developing students' higher order thinking skills. This can be achieved through the critical evaluation of texts and encouraging students to engage in verbal and written argumentation after providing the appropriate instruction (Aksit & Aksit, 2021; Lu & Nguyen, 2022).

Some further action that could be taken to ensure the critical engagement of students beyond their pre-sessional and freshman year EGAP courses into their disciplines could be through cooperative action between EAP instructors and content professors. This could be achieved through discipline-specific ESAP courses or through an "adjunct model" where students are simultaneously enrolled in a language and a content course, which coordinate content and assignments to complement each other (Evers, 2007). Collaborations of this nature could also provide a more cohesive learning experience for students.

Another avenue worth exploring would be the incorporation of a CT course into the curriculum. Such courses should have the dual objective of fostering the dispositions as well as the skills required for CT to take place (Hitchcock, 2017). The effectiveness of such approaches has been documented in studies reporting improved CTDs following the completion of a CT course (Alpat, 2019; Güncü, 2018).

A widely voiced concern with CT education is that, based on the argument that CT is subject-specific (McPeck, 1981), transfer across subjects may be limited. However, dispositions may not be as constrained by context and are more widely applicable (Giancarlo & Facione, 2001). For this reason, transdisciplinary or interdisciplinary activities, projects, or courses designed with a critical purpose could be made available. By exposing students to diverse perspectives and approaches to

CT and problem solving, this approach could “promote the learning of transcontextual thinking skills and the awareness of and ability to direct one's own thinking and learning” (Halpern, 1998, p. 451)

Finally, the need for continuous professional development for both EMI content professors and EAP instructors should be considered. By providing them with the appropriate support, they will have the practical tools to incorporate materials and activities that promote CT and its associated dispositions and skills in students to help them engage with disciplinary content in a more critical manner.

Implications for Further Research

This study examines the CTDs of students as perceived by themselves and by the content professors at a foundation EMI university in Türkiye, and uncovers some differentiating variables, as well as important disparities between students' and content professors' perceptions. The results of this study, nevertheless, highlight some areas that would benefit from further exploration.

Firstly, this study is solely quantitative in nature, and the integration of qualitative data would be a beneficial addition. Qualitative data in the form of individual or focus group interviews, participant reflections, or classroom observations would both support the quantitative findings and enhance the depth of the research and the conclusions drawn.

In addition, as this is a case study focusing on a single institution, it would be recommended to conduct a similar study in other contexts as well. By comparing results from other higher education institutions that have the same or different characteristics, the effect of such contextual factors as being EMI/non-EMI or state/foundation (among other features) could be examined as possible factors in the CTDs of the students and of how these are perceived by the content professors.

Further research in other contexts would also be beneficial in more closely examining results pertaining to language use. Students' responses to communication-related items within each construct generally received the lowest mean scores. In fact, the Item that received the lowest mean score from students overall was *I ask lots of questions in a learning environment*. Examining student perceptions from other contexts where the L1 is the medium of instruction would provide valuable sources of comparison, and adding a qualitative component to the study by conducting interviews with students may shed further light on these findings.

Considering that attendance at the pre-session English preparatory program appeared to be a differentiating factor, particularly for the disposition to *Innovativeness*, a more detailed examination of how CTDs can be developed via the teaching of English could be explored, which would be beneficial for informing instructional methods in other contexts. Such data may also be of value when considering appropriate pedagogies for EMI contexts where language, content, and CT instruction may intersect. Some studies have examined collaborations between EAP instructors and content professors (see Macaro et al., 2016), and further research into collaborative ESAP courses with the inclusion of critical thinking elements could also provide additional valuable insights.

In addition, an examination of the CTDs of undergraduate students in EMI contexts in relation to other variables, especially pertaining to human and cultural capital, would also be beneficial. For example, these could include their cultural and linguistic backgrounds as well as an examination of their own and their parents' educational background, as well as their reading habits outside of education. Considering the increasing number of international students coming to study in Türkiye, studies could also explore these students' dispositions in comparison to

Turkish students', as other studies have found differences in the CTDs of students from different countries taking the same course (Duncan et al., 2016).

The most noteworthy findings of the study were the highly significant disparities between the students' perceptions and the content professors' perceptions of the CTDs of students, and these results would benefit from further exploration. In particular, a closer examination of content professor expectations may be a valuable reference point, making it possible to see the difference, if any, between what is expected from students and what is observed. Finally, measuring students' CT levels via reliable and valid methodologies would also provide an additional perspective, permitting further investigation into any differences that may exist between students' perceptions and their behaviour.

Limitations

Firstly, the modest number of participants limits the generalisability of the results. The student questionnaire was sent to the entire undergraduate student population, and the content professor questionnaire was sent to all who taught undergraduate classes. The return rate of the student questionnaire, in particular, was low, and out of the message recipients, only 82 students and 50 content professors volunteered to participate in the study. Moreover, a larger number of respondents may have increased the statistical power of the results.

In research with survey designs, it can also be expected that only those participants who already have an interest in the topic may choose to respond to the questionnaire. This may also have an effect on the findings of the study, as those who do not respond would likely have responded differently to at least some of the questionnaire items (Fraenkel & Wallen, 2009).

Finally, a delimitation was that in order for inferential statistics to be conducted, due to the small number of respondents, groups within variables were collapsed to ensure that each group had a sufficient number of participants. As such, every variable was divided into 2 groups (such as the division of disciplines into STEM vs non-STEM) for analysis purposes, making it infeasible to make more detailed comparisons for each subgroup as intended. This may have yielded other noteworthy results.



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Appendix A

Student Questionnaire

This questionnaire aims to explore your perceptions of your critical thinking dispositions. Please read and follow the instructions carefully and answer based on your thoughts (there are no right or wrong answers). The questionnaire takes approximately 15 minutes to complete.

SECTION 1

Please respond to the questions 1-10 by entering the answer most applicable to you.

1. Gender: ☐ Male ☐ Female ☐ Prefer not to say
2. Age: ☐ 18-20 ☐ 21-23 ☐ >23
3. Did you study in the English language preparatory program? ☐ Yes ☐ No
4. Your department:
 - ☐ American Culture and Literature
 - ☐ Archaeology
 - ☐ Architecture
 - ☐ Basic Education (Classroom Teaching)
 - ☐ Chemistry
 - ☐ Communication and Design
 - ☐ Computer Engineering
 - ☐ Economics
 - ☐ Electrical and Electronics Engineering
 - ☐ English Language and Literature
 - ☐ Fine Arts
 - ☐ Graphic Design
 - ☐ History
 - ☐ Industrial Engineering
 - ☐ Information Systems and Technologies
 - ☐ Interior Architecture and Environmental Design
 - ☐ International Relations
 - ☐ Law
 - ☐ Management
 - ☐ Mathematics
 - ☐ Mechanical Engineering
 - ☐ Molecular Biology and Genetics
 - ☐ Music
 - ☐ Performing Arts
 - ☐ Physics
 - ☐ Political Science and Public Administration
 - ☐ Psychology
 - ☐ Tourism and Hotel Management
 - ☐ Translation and Interpretation
 - ☐ Urban Design and Landscape Architecture
5. Academic semester currently in: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8
6. Letter grade received from ENG 101 to pass: ☐ A ☐ A- ☐ B+ ☐ B ☐ B- ☐ C+ ☐ C ☐ Not Applicable (Currently enrolled to ENG 101)
7. Letter grade received from ENG 102 to pass: ☐ A ☐ A- ☐ B+ ☐ B ☐ B- ☐ C+ ☐ C ☐ C- ☐ D+ ☐ D ☐ Not Applicable (Currently enrolled to ENG 102)

8. How many times did you take ENG 101? ☐ 1 ☐ 2 ☐ 3 or more
 9. How many times did you take ENG 102? ☐ 1 ☐ 2 ☐ 3 or more
 10. Your current CGPA: ____ ☐ Not Applicable (This is my first academic semester)

SECTION 2

UF/EMI Critical Thinking Disposition Assessment *.

Please read and consider the following statements carefully and indicate how much you agree or disagree with each statement by selecting the appropriate number. **For communication-related questions please consider the instances where the language of communication is English.** (i.e. I am able to explain things clearly).

1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree

* Irani, T., Rudd, R., Gallo, M., Ricke s, J., Friedel, C., & Rhoades, E. (2007). *Critical thinking instrumentation manual*. Retrieved October 25, 2024 from <https://www.tntech.edu/citl/pdf/critical-thinking/UF-EMI.pdf>

No	Statement	1	2	3	4	5
1	I listen carefully to the opinions of others even when they disagree with me.					
2	I look for opportunities to solve problems.					
3	I am interested in many issues.					
4	I enjoy learning about many topics.					
5	I am able to relate to a wide variety of issues.					
6	I ask lots of questions in a learning environment.					
7	I enjoy finding answers to challenging questions.					
8	I am a good problem solver.					
9	I am confident that I can reach a reasonable conclusion.					
10	I strive to be well informed.					
11	I am likely to change my opinion when I am given new information that conflicts with my current opinion.					
12	I enjoy solving problems.					
13	I try to consider the facts without letting my biases affect my decisions					
14	I am able to apply my knowledge to a wide variety of issues.					
15	I enjoy learning even when I am not in school.					

16	I can get along with people who do not share my opinions.					
17	I am able to explain things clearly.					
18	I ask good questions when trying to clarify a solution.					
19	I present issues in a clear and precise manner.					
20	I consider how my own biases affect my opinions.					
21	I search for the truth even when it makes me uncomfortable.					
22	I keep on working on things until I get them right.					
23	I will go out of my way to find the right answers to a problem.					
24	I try to find multiple solutions to problems.					
25	I ask many questions when making a decision.					
26	I believe that most problems have more than one solution.					

Appendix B

Content Professor Questionnaire

Content Professors' Perceptions of Student Critical Thinking Dispositions

This questionnaire aims to explore your perceptions about the critical thinking dispositions of your undergraduate students. Please read and follow the instructions carefully and answer based on your perceptions (there are no right or wrong answers). The questionnaire takes approximately 15 minutes to complete.

SECTION 1

Please respond to the questions 1-5 by selecting the answer most applicable to you.

1. Gender: ☐ Male ☐ Female ☐ Prefer not to say
2. Age: ☐ ≤25 ☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ >55
3. Years of teaching at the tertiary level: ☐ ≤1 ☐ 2-5 ☐ 5-10 ☐ 11-15
☐ 16-20 ☐ >20
4. Department:
 - ☐ American Culture and Literature
 - ☐ Archaeology
 - ☐ Architecture
 - ☐ Basic Education (Classroom Teaching)
 - ☐ Chemistry
 - ☐ Communication and Design
 - ☐ Computer Engineering
 - ☐ Economics
 - ☐ Electrical and Electronics Engineering
 - ☐ English Language and Literature
 - ☐ Fine Arts
 - ☐ Graphic Design
 - ☐ History
 - ☐ Industrial Engineering
 - ☐ Information Systems and Technologies
 - ☐ Interior Architecture and Environmental Design
 - ☐ International Relations
 - ☐ Law
 - ☐ Management
 - ☐ Mathematics
 - ☐ Mechanical Engineering
 - ☐ Molecular Biology and Genetics
 - ☐ Music
 - ☐ Performing Arts
 - ☐ Physics
 - ☐ Political Science and Public Administration
 - ☐ Psychology
 - ☐ Tourism and Hotel Management
 - ☐ Translation and Interpretation
 - ☐ Urban Design and Landscape Architecture
5. Academic rank: ☐ Instructor ☐ Lecturer ☐ Senior lecturer ☐ Assistant Professor ☐ Associate Professor ☐ Professor

SECTION 2

Adaptation of UF/EMI Critical Thinking Disposition Assessment (Irani et al., 2007).

Please read and consider the following statements carefully and indicate how much you agree or disagree with each statement by selecting the appropriate number. There are no right or wrong answers.

While answering the questions, please think about the students who are currently studying in the department that you are attached to and, rather than thinking about individual students, **please think about the student population as a whole**. Also, **for communication-related questions please consider the instances where the medium of communication is English**. (i.e. My students are able to explain things clearly).

1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree

* Irani, T., Rudd, R., Gallo, M., Rickes, J., Friedel, C., & Rhoades, E. (2007). *Critical thinking instrumentation manual*. Retrieved October 25, 2024 from <https://www.tntech.edu/citl/pdf/critical-thinking/UF-EMI.pdf>

No	Statement	1	2	3	4	5
1	My students listen carefully to the opinions of others even when they disagree with them.					
2	My students look for opportunities to solve problems.					
3	My students are interested in many issues.					
4	My students enjoy learning about many topics.					
5	My students are able to relate to a wide variety of issues.					
6	My students ask lots of questions in a learning environment.					
7	My students enjoy finding answers to challenging questions.					
8	My students are good problem solvers.					
9	My students are confident that they can reach a reasonable conclusion.					
10	My students strive to be well informed.					
11	My students are likely to change their opinions when they are given new information that conflicts with their current opinion.					
12	My students enjoy solving problems.					
13	My students try to consider the facts without letting their biases affect their decisions					

14	My students are able to apply their knowledge to a wide variety of issues.					
15	My students enjoy learning even when they are not in school.					
16	My students can get along with people who do not share their opinions.					
17	My students are able to explain things clearly.					
18	My students ask good questions when trying to clarify a solution.					
19	My students present issues in a clear and precise manner.					
20	My students consider how their own biases affect their opinions.					
21	My students search for the truth even when it makes them uncomfortable.					
22	My students keep on working on things until they get them right.					
23	My students will go out of their way to find the right answers to a problem.					
24	My students try to find multiple solutions to problems.					
25	My students ask many questions when making a decision.					
26	My students believe that most problems have more than one solution.					