Robert McNamara Loomis

CRITICAL THINKING DISPOSITIONS OF FIRST-YEAR STUDENTS IN AN ENGLISH MEDIUM HIGHER EDUCATION CONTEXT

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Critical Thinking Dispositions of First-Year Students in an English Medium Higher Education Context

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Robert McNamara Loomis

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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.

Asst. Prof. Dr. Necmi Akşit (Advisor)

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 FIRST-YEAR STUDENTS IN AN ENGLISH MEDIUM HIGHER EDUCATION CONTEXT

Robert McNamara Loomis

MA in Teaching English as a Foreign Language

Advisor: Asst. Prof. Dr. Necmi Akşit

January 2024

This thesis investigates the critical thinking dispositions of undergraduate students at an English medium foundation university in Türkiye. It examines the critical thinking dispositions of students enrolled in a first year English composition course and whether their critical thinking dispositions differ according to gender, age, high school attended, attendance of an English preparatory program, and CGPA and course grade previously received in the first semester English composition course, as well as whether there is a relationship between critical thinking dispositions and CGPA. This study adopts a quantitative case research methodology, employing a combination of survey, causal-comparative and correlational design. To this end, the University of Florida/Engagement, Cognitive Maturity, Innovativeness instrument was yes to collect data. The major findings of the study include that the students report to have high moderate levels of critical thinking. They were not found to differ significantly according to the demographic factors with the exception of Cognitive Maturity, which differed significantly according to grade received in a first year English composition course. In addition, there was no significant correlation between critical thinking dispositions and CGPA.

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

ÖZET

EĞİTİM DİLİ İNGİLİZCE OLAN BİR YÜKSEKÖĞRETİM KURUMUNDAKİ BİRİNCİ SINIF ÖĞRENCİLERİNİN ELEŞTİREL DÜŞÜNME EĞİLİMLERİ

Robert McNamara Loomis

Yabancı Dil Olarak İngilizce Öğretimi Yüksek Lisans Programı

Danışman: Dr. Öğr. Üyesi Necmi Akşit

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Bu tez, Türkiye'de eğitim dili İngilizce olan bir yükseköğretim kurumunda okumakta olan lisans öğrencilerinin eleştirel düşünme eğilimleri incelenmektedir. Bu kapsamda, birinci sınıfta İngilizce kompozisyon dersi almakta olan öğrencilerin, eleştirel düşünme eğilimleri ve bu eğilimlerin cinsiyet, yaş, mezun oldukları lisenin türü, İngilizce hazırlık programlarına katılımları, genel not ortalaması ve kompozisyon dersinde almış oldukları harf notlarına göre değişim gösterip göstermediği araştırılmaktadır. Bir nicel durum çalışması olan bu tez, kesitsel anket, nedensel-karşılaştırma ve korelasyon araştırma desenlerini benimsemiştir. Bu amaçla, Florida Üniversitesi Eleştirel Düşünme Eğilimi Ölçeği kullanılarak veri toplanmıştır. Araştırmanın ana sonuçlarına göre öğrencilerin yüksek orta seviye eleştirel düşünme seviyesine sahip olduğu bulunmuştur. Bilişsel Olgunluk boyutu dışında öğrenciler arasında demografik özelliklerle bağlantılı bir farklılık saptanmamıştır. Bilişsel Olgunluk boyutu ise öğrencilerin ilk İngilizce yazım dersinde almış oldukları ders notlarına göre anlamlı olarak farklılık göstermiştir. Bunun yanında, genel not ortalaması ile eleştirel düşünme eğilimleri arasında anlamlı bir korelasyon bulunamamıştır.

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

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CHAPTER 1: INTRODUCTION

Introduction

Scholars have identified critical thinking as a key 21st century skill, needed for success in the changing social and economic environment, spurred on by technological advancement (Chu et al., 2016). These changes make an emphasis on critical thinking into higher education of paramount importance. Critical thinking in higher education began primarily in North America but today, the integration of critical thinking into higher education is becoming a matter of global interest (Davies & Barnett, 2015). In addition to this global interest in critical thinking, the requirements of international students studying in English speaking countries for education, has led to the need for a greater understanding of critical thinking in English language education. Current understandings of critical thinking vary and have evolved from varying intellectual traditions (Davies & Barnett, 2015, p. 6-8), but one commonly understood component of critical thinking is the possession of critical thinking dispositions (Davies & Barnett, 2015). A critical thinking disposition can be understood as a "'cast or habit of mind' or 'frame of mind' that is necessary for exercising critical thinking" (Davies & Barnett, 2015, p. 13). It can be understood as a pre-requisite for critical thinking. Thus, the cultivation of critical thinking dispositions is of great significance in higher education contexts.

This study aims to investigate university freshmen's perceived critical thinking dispositions at an English medium foundation university in Türkiye. This chapter will begin by providing background into critical thinking and critical thinking dispositions. It will explain the role of critical thinking and critical thinking dispositions in higher education. Then it will explain the significance of critical

thinking and critical thinking dispositions in the field of English for Academic Purposes (EAP) and the state of critical thinking in higher education in Türkiye. This chapter will subsequently define the problem, and establish the purpose and the research questions. Finally, it will explain the significance of the study and define the key terms relevant to the inquiry.

Background of the Study

Critical thinking is a core component of education systems around the world. According to Facione (1990a), widespread interest in the development of critical thinking, at least in its modern iteration, in public education has its roots in the United States. He explains that inquiry, learning and thinking came to be seen as central to education at both the K-12 and university level by the 1980s in the United States (Facione, 1990a). Today, interest in critical thinking is no longer exclusive to the United States and is gaining increasing interest internationally (Davies & Barnett, 2015), including in the Turkish education system (Kitchen et al., 2019). Yet, despite this interest, there is no common definition of critical thinking, and it has been defined and understood differently by scholars over time.

The study of critical thinking among educational theorists developed over the 20th century. Dewey (1910) described reflective thinking as "judgment suspended during further inquiry" (p. 14), and argued that this thinking needed to be taught in the education system. Glaser (1941) would later define critical thinking as consisting of three components. For him, it consists of "(1) an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences, (2) knowledge of the methods of logical inquiry and reasoning, and (3) some skill in applying those methods" (Glaser, 1941, p. 5). Bloom (1956),

created a taxonomy that could be used to classify learning aims across curricula, which included both cognitive and affective domains.

Critical thinking also has its roots in philosophical traditions, with roots in Greek philosophy, but which by the mid-twentieth century have often highlighted the role of logic and reasoning. Seminal among these is Ennis (1964) who grounded his definition in evaluation and argumentation skills. However, the concept of critical thinking continued to widen.

By the 1980's it was argued by many scholars that critical thinking also involved attitudes or the decision to exercise critical thinking skills. Siegel (1980) argues that a willingness, in addition to ability, is a core component of the critical thinker. Kitchener and King (1990) further examine the thinking process required for the use of critical thinking which they term as "Reflective Judgment". McPeck (1981), Ennis (1985), and Facione (1990a) all refer to this aspect of critical thinking as critical thinking dispositions. Facione (1990a) argues that cognitive skills are not sufficient if they are not accompanied by the disposition to use them. As Facione et al. (1996) declare, "[t]he overall disposition toward critical thinking is the consistent internal motivation to employ one's critical thinking abilities in judging what to believe or do in any situation" (p. 4).

In 1990, there was an effort by scholars from varying disciplines to come together and create a definition for critical thinking. This work resulted in the APA Delphi Report (Facione, 1990a), based on the work of this interdisciplinary panel of scholars, attempts to provide a framework for critical thinking, which is understood to consist of skills and dispositions. Their framework conceptualizes critical thinking dispositions as consisting of "approaches to life and living in general" and "approaches to specific issues/questions or problems" (Facione, 1990a,

p.25). Facione (1990a) argues that a critical thinker must possess dispositions connected to both of these approaches. Thus, critical thinking dispositions can be argued to be an indispensable component of critical thinking.

Facione, would later use the framework he puts forward to develop The California Critical Thinking Disposition Inventory (CCTDI), an instrument "designed to measure the disposition toward CT [critical thinking]" (Facione et al., 1995). This tool has subsequently been used by a number of other scholars in the pursuit of measuring critical thinking dispositions. However, in the early 2,000s scholars from the University of Florida decided to develop a new instrument and, consulting the relevant literature, developed their own framework of critical thinking dispositions (Lamm, 2016). Over time, they created their own tool, known as the University of Florida Engagement, *Cognitive Maturity* and *Innovativeness* instrument (UF/EMI), which measures the dispositions of *Engagement*, *Cognitive Maturity* and *Innovativeness*. This was published in its final form in 2007 (Lamm, 2016).

A number of studies have since investigated the critical thinking dispositions according to various demographic variables, such as gender, age or academic discipline. This has been investigated in studies using the CCTDI (Facione et al., 1995; Giancarlo & Facione, 2001) as well as the UF/EMI (Ekinci & Ekinci, 2017; Fite, 2017, Lewis, 2012; Ricketts & Rudd, 2005). According to Simsek (2011) these individual differences may "distinguish learners from each other in the teaching and learning processes". This points to the relevance of investigation into whether critical thinking disposition differs according to such factors.

However, a debate exists within the field as to whether or not it is possible to measure critical thinking using generic instruments. Some claim that critical thinking occurs within disciplinary contexts. This could then imply that critical thinking

outside of the context of subject disciplines cannot be meaningfully measured. However, many scholars believe general thinking skills may exist alongside critical thinking skills within a specific discipline (Ennis, 1989;1990; McPeck, 1990). In addition, it is possible that critical thinking dispositions, which relate to the attitude, behaviors or habits of the individual, can be meaningfully measured outside of the context of a subject domain, as they reflect a "relatively stable and enduring aspect of one's personality" (Giancarlo & Facione, 2001, p. 32).

Davies and Barnett (2015) claim that critical thinking "is arguably a central concern of higher education of our time" (p. 3). Moore (2019) explains that critical thinking is increasingly demanded through all parts of a university curriculum, and is often explicitly sought after in the hiring process of job applicants. Furthermore, Li (2019) maintains that undergraduates must learn to think critically as it is necessary for them to engage with the knowledge they gain in their academic study. This is especially significant today, due to the breadth and availability of information students have at their immediate disposal (Li, 2019). All of these factors mean that cultivating critical thinking is an essential mission of institutes of higher learning.

As a major component of critical thinking, critical thinking dispositions have great significance for students in university contexts. First, this is because while one may possess the capacity to use critical thinking skills associated with cognitive skills and reasoning, without the necessary dispositions, they may not choose to do so (Facione, 1990a). Facione (1990a) sees critical dispositions as being a prerequisite of a critical thinker. From this point of view, universities need to focus on the cultivation of critical thinking dispositions, so that students choose to engage in critical thinking (Facione et al., 1995). It is argued that without possessing critical thinking dispositions, individuals may not become critical thinkers.

Second, it could be argued that defining critical thinking, solely according to cognitive skills that are needed in argumentation, without an inclusion of critical thinking dispositions, would not represent critical thinking at all. Davies (2015) argues that hypothetically a lawyer who is skilled in argumentation but is not critically disposed towards the case, its outcomes, or their client, would not be considered a critical thinker. Merely being able to engage in logical argumentation does not fully capture what it means to think critically. This demonstrates the significance of the development of critical dispositions in a university context, as it is not adequate to merely equip students with the cognitive ability to engage in logical argument and evaluation. Rather, they must possess the dispositions to do so critically. Therefore, students in higher education contexts, including those in EAP contexts, must develop critical thinking dispositions in tandem with cognitive skills connected to logic and reasoning.

The critical thinking educational movement may have begun primarily in North America in contexts in which a majority of students are native speakers of English. However, critical thinking is today a concern of institutions of higher learning worldwide (Davies & Barnett, 2015). In international contexts especially, critical thinking is a significant component of EAP as students of differing language backgrounds need to prepare for higher education in an English medium of instruction (EMI) context (Moore, 2019). Thus, developing both students' critical thinking skills and dispositions must be a concern for EAP programs in EMI universities and university programs. Critical thinking is frequently argued to be a necessary part of academic success and thus should be considered a central part of EAP (Moore, 2019; Wilson 2016). Due to its significance, The British Association of Lecturers in English for Academic Purposes [BALEAP] even considers the

development of critical thinking in students to be a core competency required of EAP practitioners (2008), indicative of its significance in the field.

In Türkiye, there are a significant number of EMI or partially EMI universities. In a 2015 report, the British Council and *Türkiye Ekonomi Politikaları Araştırma Vakfı* [TEPAV] wrote that many of these universities are among the most prestigious in the nation (2015). Due to EMI instruction, Turkish universities commonly offer English preparatory programs, from which prospective students are required to pass in order to study in their departments. In addition, many include English courses at the undergraduate level (British Council & TEPAV, 2015). However, the British Council and TEPAV (2015) note that nationwide, the university English curriculum disproportionately focuses on English for general purposes, with too little emphasis on academic skills needed to prepare students for success in an EAP context. They believe that many of the necessary skills for academic success, including critical thinking, need greater emphasis in the English curriculum. They argue it is necessary to transition to English for general academic purposes (EGAP), with a greater emphasis on critical thinking. Similarly, it has been noted that many Turkish undergraduates have had little experience in their native language education or in their prior English language education in developing critical thinking dispositions (Yükselir, 2020).

Statement of the Problem

Critical thinking dispositions are crucial in higher education. Today, many scholars view critical thinking as extending beyond cognitive skills, and agree that critical thinking dispositions are a significant factor in a student's development as a critical thinker. Tishman et al. (1993) go as far as to say that "being a good thinker means having the right thinking dispositions" (p. 147). If this is the case, it is

essential that critical thinking dispositions be better understood in order to integrate them into the curriculum.

However, despite decades of efforts to incorporate critical thinking into the curriculum in the United States, "students are insufficiently developing their powers of critical thought" (Davies & Barnett, 2015, p.1). The trend of universities incorporating business and free market principles is believed to threaten an emphasis on critical thinking. Davies and Barnett (2015) argue that as universities embrace these principles, there is a push to teach skills that can be directly transferred to professional environments. They write that especially in the United Kingdom and in Australia "'critical thinking' has faded from the public debate about higher education as 'employability' has arisen" (p.2)

In Türkiye, although the Turkish Ministry of Education now emphasizes critical thinking as a core component of their curriculum, at the K-12 level, in practice there is not always sufficient assessment of higher ordering thinking, including critical thinking and problem solving skills (Kitchen et al., 2019). This implies that many Turkish students entering university may not have a strong foundation in critical thinking. Regarding Turkish higher education, The British council and TEPAV came to similar conclusions in a 2015 report concerning the state of English language education at Turkish universities. They report that in many English programs at Turkish universities, and university English Preparatory programs in particular, were not found to be developing critical thinking adequately (British Council & TEPAV, 2015). This illustrates that students entering Turkish EMI university contexts may not be well enough equipped in critical thinking.

This can be argued to play a role in the ability of Turkish undergraduates to adapt to academic life in EAP contexts. Altınmakas and Bayyurt (2019), in an

exploratory study, assert that faculty members at a university in Istanbul believe critical thinking plays a role in the challenges that Turkish undergraduates have in English language academic writing in their undergraduate course. Similarly, Kamaşak et al. (2021) argue that Turkish undergraduates face difficulty adjusting to university life at EMI universities in part because their high school education and English preparatory programs do not prepare them sufficient academic skills or development of cognitive abilities to adjust to the language challenges in an EMI university context. It can be claimed that Turkish students who enter EMI universities may be unprepared in terms of critical thinking to manage academic life.

One part of addressing this problem is fostering critical thinking dispositions at the undergraduate level. In EMI universities and programs in Türkiye, EAP courses play a role in equipping undergraduates with the critical thinking dispositions needed to develop into critical thinkers as students and ultimately world citizens. However, to do this, a better understanding of the critical thinking dispositions that incoming Turkish undergraduates possess is needed.

Research in relation to critical thinking dispositions has been conducted in various educational sectors from primary to higher education. Yet, at the tertiary level, a notable gap exists in studies, particularly within privately established foundation universities offering programs through English-Medium Instruction (EMI). Furthermore, very little attention has been given to investigating critical thinking in Türkiye's EMI or partially EMI leading foundation universities, especially in regards to research focusing on individual differences. In addition, there remains uncertainty as to whether critical thinking dispositions are discipline dependent. Therefore, increasing knowledge of how Turkish university first-year

perceive critical thinking dispositions could serve as a starting point in assessing how to address their needs, as well as a springing point for further research.

Purpose

This study aims to investigate student perceptions of their critical thinking dispositions at a foundation university in Türkiye. Using the UF/EMI, which was developed by scholars at the university of Florida in the 2000's, who were influenced by the APA Delphi Report (Facione, 1990a), it will examine the critical thinking dispositions of first-year students who have completed at least one semester at university and are enrolled in a compulsory first year EGAP course. It will investigate whether student perceptions of critical thinking dispositions differ according to their academic department, whether or not they have attended the English preparatory program at their university of attendance, the high school they attended, their age, and gender. In addition, it will determine whether there is a relationship between student perceptions of critical thinking dispositions and academic achievement, defined according to overall cumulative grade point average (CGPA) and according to their letter grade in a first semester EGAP course.

Give the central role of EAP programs in cultivating critical thinking, gaining further insight into the critical thinking dispositions of students in EMI contexts has significance. Having a greater understanding of student critical thinking dispositions is a relevant path of inquiry. Furthermore, given that in some cases Turkish may not be entering their studies with sufficient cultivation of critical thinking (British Council & TEPAV, 2015; Kitchen, 2019), this study may be especially valuable in a Turkish context. Since this study will be conducted in an EMI university in Türkiye which does provide EGAP courses to university first-year, gaining knowledge of how students perceive critical thinking dispositions may better equip EAP programs

with similar EGAP courses in Türkiye or abroad to develop student critical thinking. Furthermore, increasing understanding of student perceptions of critical thinking dispositions, and the relationship that these dispositions have to academic achievement, may provide insight for curriculum designers in Türkiye at the K-12 level or in English preparatory programs as they attempt to prepare students for academic study within their departments.

Research Questions

This study will attempt to answer the following questions:

1. What critical thinking dispositions do undergraduate students enrolled in a compulsory first year EGAP course at an English medium foundation University believe they possess?
2. Do their critical thinking dispositions differ according to
    i. the student's academic department?
    ii. whether the student attended the English preparatory program at their university of study?
    iii. the high school the student attended?
    iv. age?
    v. gender?
    vi. letter grade in an English for general academic purposes course?
    vii. overall cumulative grade point average [CGPA]?
3. Is there a relationship between student perceptions of critical thinking dispositions and academic achievement as measured by their overall cumulative grade point average [CGPA]?

Significance of the Study

EAP can play a role in cultivating critical thinking in students at the tertiary level (Wilson, 2016). However, as stated above, higher education systems across the globe still struggle to adequately prepare their students to become critical thinkers. A part of addressing this need is to better understand critical thinking dispositions and how students perceive them and how it connects to their academic success. By better understanding how students perceive critical thinking dispositions and what factors may influence their perceptions, EAP programs may be better equipped to understand how to address student needs.

Furthermore, compared to studies conducted in the United States and elsewhere, there are relatively few studies concerned with the critical thinking dispositions of students at top tier, foundation Turkish universities, especially in EGAP EMI contexts. Several studies have examined the critical thinking dispositions of students in specific undergraduate departments, including pre-service teachers (Çevik, 2013; Çubukçu, 2006; Gök & Erdoğan 2011; Kuvaç & Koç, 2014). There have also been studies that investigate the critical thinking dispositions of Turkish undergraduates in English for specific academic purposes (ESAP) courses (Yükselir, 2020) or Turkish undergraduates enrolled in English preparatory programs (Dayıoğlu 2003, Genç, 2017). Therefore, this study intends to add to the literature by examining the critical thinking dispositions of university first-year enrolled in EGAP courses in Turkish EMI contexts.

Furthermore, there have been few studies in Türkiye examining individual difference in similar contexts. In addition, there is limited body of research examining the relationship between critical thinking dispositions and academic achievement in similar contexts in Türkiye or outside of Türkiye in recent years.

Thus, this study will shed further light on how individual difference interacts with critical thinking in Turkish EMI contexts and may provide a valuable point of comparison for similar studies set in non-Turkish contexts or studies focusing on previous generations of students. Finally, this study hopes to add to the discussion surrounding whether critical thinking is general (Ennis, 1990; Ennis, 1996; Giancarlo & Facione, 2001) or discipline specific (Jones, 2015; McPeck, 1981; McPeck, 1990), by comparing the difference in scores by academic department.

Although there have not been many studies conducted in similar contexts, several top tier universities according to the Times Higher Education rankings (2023) in Türkiye, such as Bilkent University, Middle Eastern Technical University and Boğaziçi University, have EMI and provide EGAP courses to their first year students (British Council & TEPAV, 2015). Given that in EMI universities the English language support infrastructure plays a major role in preparing students for academic study, investigating the critical thinking dispositions of undergraduates in EGAP courses at an EMI university is highly relevant. Thus this study may also be of value to those developing the curriculum of EAP programs in Türkiye and abroad.

Definition of Key Terms

English for Academic Purposes (EAP): EAP is "defined by its focus on teaching English specifically to facilitate learners' study or research through the medium of English" (Hamp-Lyons, 2011, p. 89).

English for General Academic Purposes (EGAP): EGAP is the teaching of academic English relevant to students across academic disciplines (Flowerdew, 2016, p. 8).

English for Specific Academic Purposes (ESAP): ESAP is the teaching of EAP according to the specific needs of students in different academic disciplines (Flowerdew, 2016, p. 7).

English for General Purposes (EGP): English for general purposes "is concerned with the teaching and learning of everyday English communication skills" (Chen & Flowerdew, 2018, p. 336).

English Medium of Instruction (EMI): EMI is defined as "the use of the English language to teach academic subjects (other than English itself) in countries or jurisdictions where the first language of the majority of the population is not English" (Macaro, 2018).

Critical Thinking: Critical thinking, according to the Delphi Report is "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, 1990b, p.2).

Critical Thinking Dispositions: Critical thinking dispositions are defined in the Delphi report as the affective dispositions which are necessary to nurture critical thinking (Facione, 1990b).

The APA Delphi Report: A report written by Facione based on the work of a panel of experts who created a framework towards understanding critical thinking. The framework understands critical thinking to consist of discrete skills and dispositions (Facione, 1990a).

California Critical Thinking Dispositions Inventory (CCTDI): An inventory that "derives its conceptualization of the disposition toward CT [critical thinking] from the APA Delphi Report" (Facione et al., 1995, p. 5).

UF/EMI: This is an instrument that that was developed by researchers at the university of Florida, based on a 26 item five-point Likert-type scale. It measures "three constructs of critical thinking disposition: engagement, cognitive maturity and innovativeness" (Lamm, 2016).

Engagement: The engagement disposition measure's people's predisposition to looking for opportunities to use reasoning, anticipating situations that require reasoning, and confidence in reasoning ability (Bisdorf-Rhoades et al., 2005, p. 4).

Cognitive Maturity: 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 (Bisdorf-Rhoades et al., 2005, p. 4).

Innovativeness: The innovativeness disposition measures predisposition to be intellectually curious and desire to know the truth (Bisdorf-Rhoades et al., 2005, p. 4).

CHAPTER 2: REVIEW OF RELATED LITERATURE

Introduction

This study focuses on student perceptions of critical thinking dispositions in the context of an EMI, foundation university Türkiye. It will examine the critical thinking dispositions that undergraduates enrolled in compulsory first year EGAP believe they possess. In addition, it will investigate whether student perceptions of dispositions differ according to their academic department, their prior enrollment in the English preparatory program, the high school they attended, age, gender, and academic achievement. Finally, it will determine whether there is a relationship between student perception of critical thinking dispositions and academic achievement as measured by CGPA.

This chapter will provide a review of relevant literature, first focusing on critical thinking and critical thinking dispositions. It will then review relevant literature that has been done on critical thinking in EAP, EGAP, EAP in Türkiye, and finally on similar studies conducted in The USA, international undergraduate contexts and in Türkiye.

Critical Thinking

Since the early twentieth century, educational thinkers have theorized how to implement critical thinking in the education system. As early as 1910, Dewey, defined what he referred to as "reflective thought." He considered this to be "active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusion to which it tends" (1910, p. 6). Notably, this conception does not limit itself to the mental processes of evidence based reasoning, but implies the necessity of action and agency on the part

of the individual. In his view, the practitioner of conscious thought must make a conscious and repeated decision to engage in this behavior (Dewey, 1910). Dewey (1910) believed that reflective thought was therefore trainable. He went on to argue that it was therefore the schools that had a responsibility to train reflective thought as a part of curriculum.

A second influential educational scholar who sought to define critical thinking was Edward Glaser. He described it as:

> (1) an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experience; (2) knowledge of the methods of logical enquiry and reasoning; and (3) some skill in applying those methods. Critical thinking calls for a persistent effort to examine any belief or supposed form of knowledge in the light of the evidence that supports it and the further conclusions to which it tends. (1941, p. 5)

This definition shares certain assumptions with Dewey, highlighting the role of evidence, reason and action, though notably incorporating the idea of an "attitude" and "disposition" (1941, p. 5).

A third influence on the field of critical thinking in educational contexts is Bloom's (1956) taxonomy. Bloom (1956), created a taxonomy that could be used to categorize educational objectives. This included both a cognitive and an affective domain. In order of complexity, the cognitive domain includes "knowledge," "comprehension," "analysis," "synthesis," and "evaluation" (1956, p. 18). He (1956) considers these to represent "educational behaviors" (p. 18) that may help educators align objectives and assessment. As for the affective domain, Bloom (1956) explains that it "includes objectives which describe changes in interest, attitudes, and values,

and the development of appreciations and adequate adjustment" (p.7). He views both to be play an essential role in curriculum design.

While conceptions of critical thinking in contemporary educational contexts may have begun in the early twentieth century, its foundations are much older. The study of formal logic and rhetoric, which have their roots in antiquity, have an influence on critical thinking as well. Socratic questioning and Socratic dialogue reflect questioning and dialogue in order to determine truth, and incorporate logical reasoning and a testing of arguments (Hanscomb, 2016). Aristotle (1984) conceptualized rhetoric and its role in persuasion as well as theorizing logic, including the development of syllogisms. These foundations continue to have a major influence on the concept of critical thinking.

In the latter half of the twentieth century, philosophical perspectives of critical thinking continue to have a major influence in the field. Many of these attempts to define critical thinking have focused on reasoning, logic and argumentation, which Davies (2015) refers to as the "skills" view. For example, although he would later refine his definition, Ennis' (1964) first definition of critical thinking described it as "correct assessing of statements" (p. 599). He identifies a list of proficiencies connected to this ability that require logical reasoning, such as "judging whether: 1. A statement follows from the premises" (p. 599). McPeck (1981) also considers logical reasoning to be significant but expands the definition. He argues that critical thinking can include, but is not limited to the assessment of statements or detection of logical error.

However, McPeck's theory extends beyond logical reasoning and evaluation of evidence and (1981) introduces the notion of "reflective skepticism" which he defines as, "the disposition and skill to do X in such a way that E (the available

evidence from a field) is suspended (or temporarily rejected) as sufficient to establish the truth or viability of P (some proposition or action within X)" (p. 13). In addition, he emphasizes the processes involved in assessing statements and argues that critical thinking occurs in subject specific genres (McPeck 1981).

Siegel (1980) also sees a definition purely set on skills or logical reasoning to be insufficient in describing critical thinking. He believes critical thinking is "the ability and willingness to be objective, impartial, and non-arbitrary, based on evidence" (p. 1). In this definition, willingness is viewed to be of equal significance to ability. He goes on to describe this as a "critical spirit" or "critical attitude" of the individual, that is needed to engage in critical thinking (p. 5). Paul (1994) has a similar conception, in which he understands critical thinking in a "weak" and "strong" sense. To Paul, critical thinking in a "weak" sense involves a mastery of discrete skills, devoid of context or ethics (1994). Critical thinking "in the strong sense…is to develop particular values and traits of mind" (p. 182). Ennis (1985) would later revise his initial (1964) definition, describing critical thinking as "reflective and reasonable thinking that is focused on deciding what to believe or do" (p. 45), similarly integrating the idea of reflectivity.

Over time, this attitude, or spirit, or willingness increasingly became known as critical thinking dispositions. Many scholars have argued that critical thinking definitions should include the notion of dispositions and have sought to define them (Davies &Barnett, 2015; Ennis, 1985; Facione, 1990a; McPeck, 1981; Perkins et al., 1993). Davies and Barnett (2015) understand them as, "a 'cast or habit of the mind' or 'frame of mind' which is necessary for exercising critical thinking. Dispositions are not arguments or judgments, but affective states. They include critical thinking attitudes and a sense of psychological readiness of the human being to be critical" (p.

55). In this view, critical thinking must reflect the underlying attitude or mental preparedness to exercise the cognitive skills of critical thinking.

Other perspectives on critical thinking have introduced definitions that are socially situated and influenced by critical pedagogy. Advancing the idea of "criticality," Barbules and Berk (1999) argue that critical thinking "begins with the premise of a social context" and is "a way of being" with an implication of "going against the grain" (p. 21). This definition understands critical thinking as existing only within a social context and requires an ability to act within it.

Similarly, critical pedagogy perspectives find skills and dispositions to be an inadequate definition of critical thinking and believe action must be extended to the institutional level (Davies and Barnett, 2015). Freire (1971) argues that a "critical consciousness" is necessary to create change in the world, and allowing students to become agents who can combat oppression (p. 73). Also from a critical pedagogy perspective, Giroux (2020) expresses his vision of how teachers need to cultivate students as "critical agents" (p. 5). He argues that

> It is crucial for educators not only to connect classroom knowledge to the experiences, histories, and resources that students bring to the classroom but also to link such knowledge to the goal of furthering their capacities to be critical agents who are responsive to moral and political problems of their time and recognize the importance of organized collective struggles. (p. 5)

In this view critical thinking cannot be separated from social contexts and necessarily requires action and engagement with institutions. Benesch (1993), a proponent of critical EAP, seconds this viewpoint, asserting that "critical thinking…is a search for the social, historical, and political roots of conventional knowledge and an orientation to transform learning and society" (p. 546). Thus,

from the critical perspective, critical thinking is oppositional and requiring of action and transformation, not only a set of cognitive skills and affective dispositions.

Critical Thinking Dispositions

Since the 1980s it has been often asserted that critical thinking requires more than a set of cognitive skills, and must incorporate critical thinking dispositions (Davies & Barnett, 2015). Various scholars have attempted to define them and create frameworks to understand them. One early example comes from Ennis (1985), who identifies 13 dispositions, though he would later refine them to 12 (Ennis, 2015). These dispositions are used to describe a theoretical ideal critical thinker who would for example "seek reasons" or "be openminded" (p. 46). For Ennis (1985), their cultivation is a prerequisite for critical thinking, which he defines as "reflective and reasonable thinking that is focused on deciding what to believe or do" (p.45). For example, to engage in such thinking as he describes, having the disposition to "seek reasons" (Ennis, 1985, p. 46) would be a requirement.

Halpern (1998) similarly sees critical thinking dispositions as a "willingness to think critically" (p. 452). Similar positions have been argued in more recent scholarship. Hamby (2015) advocates the concept of critical thinking virtues that are made up of "motivations, dispositions, goals, and other habits" (p. 79). In his understanding, technical proficiency in the skill of critical thought lacks relevance if these virtues lack, describing them as "cultivated excellences of a person's character that consistently guide her in the skillful process of critical inquiry" (p. 79). Like Ennis (1985), each believe critical thinking necessitates the possession of critical thinking dispositions. This connection has subsequently been found to exist in several studies (Colucciello, 1997; Facione & Facione 2000; Profetto-McGrath, 2003).

One commonly used framework for understanding critical thinking dispositions emerged from the APA Delphi report. In 1990, the APA Delphi Report was created by the American Philosophy Association. A group of experts from various academic disciplines met with the intention of defining critical thinking (Facione, 1990a). They argued that dispositions were an essential component of critical thinking (Facione, 1990a). Facione (1990a) declares:

> We understand critical thinking to be 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 was based. Critical thinking is essential as a tool of inquiry. Critical thinking is a pervasive and self-rectifying, human phenomenon. The ideal critical thinker is habitually inquisitive, well-informed, honest in facing personal biases, prudent in making judgments, willing to consider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in selection of criteria, focused in inquiry and persistent in seeking result which are as precise as the subject and circumstances of inquiry permit. (p. 3)

Central to this definition is the idea that a critical thinker must possess certain dispositions, habits and attitudes.

Facione (1990a) understands these critical thinking dispositions to relate to "approaches to life and living in general" and "approaches to specific issues, questions or problems" (p. 25). The former, refers to dispositions such as "inquisitiveness with regards to a wide range of issues" or "flexibility in considering alternatives and opinions," while the latter considers dispositions required for specific problems, including "orderliness in working with complexity" (p. 25).

Facione, et al. (1995) would later develop the CCTDI to measure critical thinking dispositions using the framework of the APA Delphi Report. Their instrument further refined this framework by categorizing critical thinking dispositions as connecting to one of seven sub-scales, defined as "*Inquisitiveness, Open-mindedness, Systematicity, Analyticity, Truth-seeking, Critical thinking [CT] Self-confidence,* and *Maturity"* (Facione et al., 1995, p. 5). Facione et al. (1995) conducted a study in which they used this tool to measure the critical thinking dispositions of 587 entering college freshmen in an American university. Their overarching finding was that "only 13 percent of the 587 college freshmen were positive on all seven CT dispositional scales of the CCTDI" (Facione et al., 1995, p. 12).

Several scholars from The University of Florida built a new tool, influenced by the Delphi report's framework (Lamm, 2016). This tool was first tested in piloting in 2003 and was later published by Irani et al. in 2007, when it became known as the University of Florida *Engagement, Cognitive Maturity* and *Innovativeness* tool (UF/EMI) (Retrieved from Fite, 2017).

The UF/EMI is a questionnaire which measures critical thinking dispositions, according to three dispositions: *Engagement, Cognitive Maturity* and *Innovativeness* (Bisdorf-Rhoades et al., 2005). The questionnaire consists of 26 questions, with eleven measuring *Engagement,* eight measuring *Cognitive Maturity* and seven measuring *Innovativeness* (Bell & Loon, 2015). According to Bisdorf-Rhoades et al. (2005), who conducted an early study using this tool in 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 will be used as the instrument of this study. It has been chosen due to the fact that it has been tested for reliability and validity in a variety of contexts (Bell & Loon, 2015) and has been administered in a variety of higher education contexts (Bell & Loon, 2015).

Critical Thinking in English for Academic Purposes

Critical thinking skills are viewed as essential, both for academic success, and for preparation for the workforce, thus a needed component of higher education (Li, 2019). Critical thinking skills has been a main-stream concept in higher education in the United States since the 1980s (Ennis, 2015). As early as 1980 studying critical thinking was a graduation requirement for all students in the California State University system (Ennis, 2015). Today, a similar emphasis on critical thinking can be observed globally, with universities across the world including "critical thinking prominently among the graduate attributes that they aim to engender" (Wilson, 2019, p. 3). It is argued to be essential for academic success at the university level, and therefore needed to be instructed and evaluated (Li, 2019).

However, there is still a question of whether critical thinking is being nurtured effectively in higher education. Pascarella's (1987) study revealed that American university students' critical thinking levels improved only moderately over the course of their freshman year. Giancarlo and Facione (2001), however, found in

a large scale study, conducted over four years, that critical thinking dispositions of students did increase in regards to certain dispositions.

More recently, many have argued that the quality of critical thinking instruction in higher education is as low as it has ever been. Davies and Barnett (2015) explain that in the United States, recent studies have shown that university undergraduates make very little progress in the cultivation of critical thinking skills. A study conducted with 2,322 American undergraduates between 2005 and 2009, found that "45% of students made no significant improvement in their critical thinking or reasoning skills during the first two years of college and 36% made no significant improvement after an entire four-year college degree" (Arum & Roska, 2011 as cited in Davies and Barnett, 2015, p. 4). Similarly, Arum and Roska (2011) assert that, while there is much variation according to institution, department and individual, many students demonstrate low levels of critical thinking. This illustrates that there is still a question of how critical thinking can be developed in university contexts.

One reason why institutions of higher education may struggle to engender their students with critical thinking is that it is not fully understood by academics. Atkinson (1997) argues that academics "seem almost… unwilling or unable to define critical thinking" and often "appear to take the concept on faith" (p. 73). This is seconded by Paul (2005) who believes that one aspect of this problem is that university faculty members lack a clear conception of what critical thinking is. Davies and Barnett (2015) maintain that it is necessary to work towards a model to understand critical thinking in higher education and assert that any such model must consist of both an individual dimension which includes skills and dispositions, as well as sociocultural dimensions. A key component of the individual dimension is

the cultivation of critical thinking dispositions, as skills "without the disposition to *use* them are not much use" (Davies & Barnett, 2015, pp. 8-9).

Hyland and Hamp-Lyons (2002) define EAP "as teaching English with the aim of facilitating learners' study or research in that language." (p. 2). EAP has grown over recent decades for several reasons. Hyland and Hamp-Lyons (2002) claim that English is increasingly becoming the language of academic discourse which has created the need for students around the world to become fluent in academic English discourse. They write that in response to this need, EAP has developed from the field of "Teaching English as a Second/Foreign Language in universities and other academic settings" in the latter decades of the twentieth century (p. 1). It can be understood as emerging from the field of English for Specific Purposes, alongside English for Occupational Purposes (Flowerdew & Peacock, 2001). Today EAP addresses a diverse group of students, and is practiced in a variety of settings and in a number of ways. Hyland and Hamp-Lyons (2002) state that, "[t]he modern-day field of EAP addresses the teaching of English in the academy at all age and proficiency levels, and it draws on a range of interdisciplinary influences for its research methods, theories and practices" (p. 3).

EAP currently exists in a variety of settings. Jordan (1997) explains that EAP instruction exists in the context of universities in English speaking countries, of EAP instruction in non-EMI universities in non-English speaking countries, as well as EMI universities in non-English speaking countries, and may have native or non-native instructors. Flowerdew and Peacock (2001) argue that a major contributing factor for these trends is the economic dominance of English speaking countries. They assert that not only do non-native speakers of English want to participate in the economies of English speaking countries, but "[t]hey also want to

gain access to their technology and expertise," which leads to increasing numbers of non-native speaker international students in English speaking countries and to the increasing number of English medium institutions in non-English speaking countries (p. 10).

The implementation of EAP instruction also differs in different contexts. According to Jordan (1997), EAP contexts may vary, being pre-sessional or in-sessional, and may be coordinated by language centers, English or language teaching departments, or may fall underneath other academic departments, such as English or applied linguistics. In addition, it may be intensive, or studied part time, alongside courses in other departments (Jordan, 1997). Furthermore, the approach to teaching EAP can be further divided between EAP and ESAP (Flowerdew & Peacock 2001; Jordan, 1997), also known as the common core approach and the subject specific approach (Jordan, 1997).

English for General Academic Purposes

A core component of EGAP is study skills. According to Jordan (1997), it is now generally agreed on that a central component of an EGAP course is instruction in study skills. This includes study skills used in academic contexts across disciplines such as note-taking or listening skills (Jordan, 1997). However, Jordan (1997) argues that beyond study skills, EGAP includes "*a general academic English register,* incorporating *a formal academic style,* with *a proficiency in the language use*" (p. 5). EGAP thus focuses on skills and language that are transferrable across academic contexts and disciplines.

It is often argued that EAP instruction needs to emphasize the cultivation of critical thinking skills (Li, 2019; Moore, 2019; Wilson, 2016; Wilson; 2019). Wilson (2016) claims that EAP students especially have a need for critical thinking

instruction in many cases due to their background. She asserts that, "many EAP students do not have a great deal of experience in critical reading and critical thinking-or at least of the kinds of critical thinking expected in tertiary education" (p. 257). This may be the case for various reasons, such as prior education, lack of access to books or potentially due to cultural influences (Wilson, 2016). Li (2019) explains that for many L2 students in EAP contexts it is difficult for them to assert their own voice in academic writing, or to identify the voice of the author in academic reading. She maintains that while linguistic ability certainly plays a role in this, so do criticality and critical thinking skills (Li, 2019), indicating that the nurturing of critical thinking in EAP courses plays a role acculturating students to academic life.

Approaches to teaching critical thinking in EAP courses vary, echoing the debate between common core and subject specific approaches to EAP. Moore (2019) distinguishes what he considers the teaching of critical thinking as a generic skill from teaching critical thinking as disciplinary discourse. From the generic skills perspective, critical thinking skills are seen as distinct "cognitive operations" that may be transferable across different contexts (Moore, 2019, p. 7). According to Moore (2019), this approach draws from Ennis' (1987) and Facione's (1990a) conceptions off critical thinking as comprising of skills, as well as dispositions, that are divisible and transferrable. This approach to critical thinking can be readily applied to an EGAP course, which emphasizes the transferability of academic skills and language, and includes students from differing disciplinary backgrounds (Moore, 2019).

For others, critical thinking is most efficiently taught in the confines of disciplinary discourse (Moore, 2019). McPeck (1981, 1990) has vehemently argued

that "[c]ritical thinking always manifests itself in connection with some identifiable activity or subject area and never in isolation" rather than appearing as a general skill (1981, p. 5). The study of critical thinking as a discipline specific phenomenon has been further explored by Moore (2004), who takes a measured stance, but nevertheless cautions the reader against reducing critical thinking to its general application. Jones (2015) argues that critical thinking skills differ according to academic subject and compares how various disciplines conceive of them.

However, it is also claimed that the debate concerning whether critical thinking is generalizable or domain specific is a false dichotomy. According to Davies (2006), general critical thinking skills and subject specific critical thinking skills can in fact complement one another. Even Jones (2015) who propones critical thinking's subject specificity, acknowledges that many critical thinking skills are transferrable or generalizable across academic contexts. Thus it can be argued that there is a place for both the instruction of general-critical thinking and subject-specific critical thinking in higher education. Furthermore, critical thinking dispositions can be argued to be relatively static as they reflect the attitude or spirit of the individual, so may be less tied to individual subject domains than skills (Giancarlo & Facione, 2001). Ennis (1996) also believes that unlike critical thinking skills that may be evidenced in one are but not in another, critical thinking dispositions of an individual likely do not manifest differently in different subject domains. This suggests that they may be meaningfully measured using tools such as the UF/EMI that are not domain specific.

EAP in Türkiye

Among nations with emerging economies, Türkiye has several high performing universities, according to the *Times Higher Education Supplement* global

university rankings (British Council & TEPAV, 2015). In 2022, there were a total of 207 institutions of higher learning in Türkiye (Council of Higher Education, 2022). 129 of these institutions were state universities, 74 were foundation universities and 4 were foundation vocational institutions (Council of Higher Education, 2022), 11 of which were ranked in the top 1,000 universities globally according to the Time Higher Education Rankings in 2022 (Times Higher Education, 2022). Of these universities, some are conducted in a Turkish medium of instruction, some are EMI, and others offer a mixed medium of instruction (British Council & TEPAV, 2015). In 2015, the British Council & TEPAV (2015), claimed that while it is not possible to give a precise number, there are more private universities using EMI instruction.

English instruction in EMI or partial EMI universities in Türkiye often takes place in English preparatory programs (British Council & TEPAV, 2015). According to the British Council & TEPAV (2015), since 1996, EMI universities have been required to provide English preparatory programs, theoretically offering an EAP curriculum, which students attend prior to beginning their departmental study unless they are able to pass an English proficiency exam. The British Council & TEPAV (2015) report that there are five kinds of English curriculums that they encountered at Turkish universities, English for General Purposes (EGP), EGAP, mixed EGP-EGAP, ESAP, and English for Occupational Purposes. They argue that one issue in many contexts is that most universities, whether EMI or not follow an EGP curriculum and at the undergraduate level are mostly EGAP with little emphasis on needs analysis in terms of discipline specific needs (British Council & TEPAV, 2015). They also recommend that more EGAP and ESAP instruction be instituted beyond the preparatory level and freshman

year. They argue that this shift to better align the English curricula with student needs would improve student motivation, linguistic level and critical thinking (British Council & TEPAV 2015).

Findings in University Contexts within The United States

Since the 1990s, there have been many studies that attempt to measure critical thinking dispositions in North American university contexts. The earliest studies made use of the CCTDI tool. Several investigated the critical thinking dispositions of university undergraduates at American Universities, the first of which was Facione et al. (1995) who examined the critical thinking dispositions of incoming university freshmen at a university in The United States. Since that initial study, others have focused on similar populations of university undergraduates from a variety of disciplines (Bers et al., 1996; Dennet, 2014; Dusenbury, 2016; Giancarlo & Facione, 2001; Lampert, 2005; Ruff, 2005; Walsh, 1996).

Other studies have focused on more specific contexts in tertiary education, including community college students (Albano, 2017; Reed, 1998) and Masters students (Murray, 2003). Furthermore, many studies using the CCTDI examining the critical thinking dispositions of nursing (Bower, 1995; Brendan, 1998; Chaisuwan, 2020; Heath, 2000; Profetto-McGrath, 1999; Raymond & Profetto-McGrath, 2005).

The UF/EMI has been used in the study of critical thinking dispositions in American university contexts since the early 2000s. Ricketts' (2003) dissertation on students in secondary schools was among the earliest studies to use the UF/EMI. Although, the target population was below the tertiary level, a notable finding was that "there was a low positive relationship between total EMI and critical thinking skills" (p. 98).

The UF/EMI has been utilized in many higher education contexts. Rudd and Baker (2000) found that an undergraduate population of agricultural students had moderate levels of critical thinking overall. Similarly, Bisdorf-Rhoades et al. (2005) administered the UF/EMI to agricultural communications students attending 12 different universities. The study revealed that agricultural students tend to have a moderate disposition towards critical thinking overall, but scored most highly in the *Innovativeness* construct and least highly in terms of cognitive maturity.

In similar contexts, Burbach et al. (2012) examined the critical thinking dispositions of undergraduate agricultural students. They found the participants to possess low levels of critical thinking dispositions and notably found no difference according to gender or age, but that there was a relationship according to CGPA (Burbach et al. 2012). Fite (2017) examined the critical thinking dispositions of undergraduate agricultural majors and their relationship to other factors such as "student achievement, agricultural education experiences and demographic data" (p. vi). Fite (2017) found no major differences in critical thinking dispositions according to these variables, and through regression analysis developed a model towards predicting critical thinking dispositions.

In other studies, using the UF/EMI, Stedman and Andenoro (2007) found critical thinking dispositions to have a significant relationship with emotional intelligence, among undergraduate agricultural leadership students. Furthermore, Stedman et al. (2009) investigated the critical thinking dispositions of undergraduates at 4 universities in Eastern parts of the united states. They found a weak relationship between CGPA and critical thinking dispositions and no difference according to gender or age (2009).

In another study, Towns (2012) examined the critical thinking dispositions of undergraduate students at Tennessee State University. He found the participants to have high moderate critical thinking dispositions overall, with the *Engagement* as the highest, and *Innovativeness* the weakest. Towns (2012) found no difference in disposition regarding demographic features. Finally, in a study focused on the critical thinking dispositions of seminary students studying at a number of different American universities, Sneed (2017), similarly found the students to possess higher moderate critical thinking dispositions and found no difference according to demographic features, but a minor correlation between *Innovativeness* and CGPA. The students were most disposed to *Engagement* and least to *Cognitive Maturity.*

Findings in International Undergraduate Contexts

Critical thinking dispositions of undergraduate students have also been studied in international university contexts. A number of these studies have also used the CCTDI. In China, Zhang (2009), Zheng (2021) Liu and Jin (2021) all conducted studies focusing on Chinese undergraduates who were studying English language at differing levels. Similarly, Djamaa (2016) examined the critical thinking dispositions of Algerian students in an EFL. Gyenes (2021) used qualitative methods to examine the critical thinking skills and dispositions of undergraduate students at a Japanese EMI university.

The UF/EMI has also been used in a few international university contexts. Bell & Loon (2015) used the UF/EMI to investigate the relationship between the critical thinking dispositions of students in a British undergraduate context and their learning in a business simulation. The researchers found a positive correlation between learning and critical thinking dispositions, with *Engagement* being most predictive.

Duncan et al. (2016), conducted a comparative study of undergraduate and graduate students in agricultural and scientific fields coming from the United States, Austria and Italy, who were enrolled in a global seminar course. The study found that the students exhibited weak critical thinking dispositions overall, with American students scoring the highest.

Finally, in a large scale study conducted in India with Bengali students, Sahonowas and Santoshi (2020) found Bengali students at an Indian university to have relatively low levels of critical thinking dispositions, using a version of the UF/EMI that had been translated into Bengali. However, notably, this study found that critical thinking dispositions correlated with resilience.

Findings in Turkish Educational Contexts

Much research has been done in Turkish educational contexts in regards to Critical Thinking Dispositions. A variety of studies have attempted to measure the critical thinking dispositions, using Turkish Translations of the CCTDI (Kökdemir, 2003) and the UF/EMI (Kılıç & Şen, 2014), as well as other instruments.

There have been no studies in Türkiye focusing on undergraduate students enrolled in EAP courses at top tier EMI universities, however there have been a number of studies examining critical thinking dispositions of Turkish students in various English language contexts. Within Turkish higher education, most studies have found that undergraduate students do not report high critical thinking dispositions.

The CCTDI has been used in English preparatory contexts (Dayıoğlu, 2003; Genç, 2017) and in an ESAP business English course (Yükselir, 2020). Using the UF/EMI, Kök (2020) investigated English preparatory students' critical thinking dispositions who were studying at a Turkish state university and found students to

possess moderate critical thinking dispositions. In addition, critical thinking dispositions were not found to have any relationship with English language competence or with perceived English language competence.

The UF/EMI has also been used in other Turkish higher education contexts. Coskun and Altinkurt (2016) used the UF/EMI to study the critical thinking dispositions of pre-service teachers, studying at Muğla Sıtkı Koçman University in Western Türkiye. The study found that the participants possessed moderate to high levels of critical thinking dispositions, with relatively little variation between them. In addition, it found they did not differ according to gender.

Komsu (2021) used the UF/EMI to examine the critical thinking dispositions of graduate students at a Turkish university. They exampned the relationship between critical thinking dispositions and self-efficacy and academic creativity. They found the students believed themselves to have high critical thinking dispositions.

A number of previous studies have been conducted to investigate the critical thinking dispositions of Turkish students in non-English language contexts, using the CCTDI. Studies have focused on mixed populations of undergraduates (Tümkaya et al. 2009), science majors (Tümkaya, 2011), engineering students (Özyürt and Özyürt, 2015) and distance education students (Yüksel & Türkses, 2015).

There have also been a number of studies in Türkiye that focus on undergraduates in specific academic contexts using the CCTDI. As in The United States, there have been a few studies investigating the critical thinking dispositions of nursing candidates (Arli et al., 2017; Dur & Erkin, 2023; Ozturk et al., 2008; Yurdanur, 2016). However, many more have focused on Turkish university students who are pre-service teachers, (Akdere, 2010; Akgül & Şahin İzmirli, 2021; Bakır,

2015; Beşoluk & Önder, 2009; Çevik, 2013; Çubukçu, 2006; Ekici, 2017; Gök & Erdoğan 2011; Gürsan 2021; İncikabı et al., 2013; Kalelioglu & Gulbahar, 2014; Kuvaç & Koç, 2014; Sağlam & Büyükuysal, 2013; Sendag et al., 2015; Serin et al. 2018).

The CCTDI has also been used to investigate the critical thinking dispositions among K-12 students (Işık, 2010; Korkmaz & Karakuş, 2009). Furthermore, the critical thinking dispositions of primary school aged students have been studied using the Critical Thinking Disposition Scale for Primary students (Aslan, 2022; Karahan, 2023).

In addition, a number of studies have used the UF/EMI to investigate the critical thinking dispositions of students in K-12 contexts. Tabak and Yilmaz-Özcan (2019) claim that 4th grade students who received instruction in argumentation showed high levels of critical thinking dispositions according to the UF/EMI. Hebebci and Usta (2022) found STEM education to positively affect critical thinking skills among Middle school students.

In terms of high school contexts, a high school context, Orhan and Ay (2023) found critical thinking instruction conducted in a variety of approaches led to higher critical thinking dispositions in high school students. In another study, Orhan (2022) measured the critical thinking dispositions of high school students with the UF/EMI. Notably he found that critical thinking dispositions did not differ according to gender, but there was a positive relationship between the three dispositions and perceived problem solving skills

CHAPTER 3: METHODS

Introduction

This study aims to investigate the perceptions of undergraduate students studying at an EMI university in Türkiye, concerning critical thinking dispositions. It examines their critical thinking dispositions and whether these dispositions differ according to their academic discipline, prior enrollment in an English preparatory school, high school education, age and gender. In addition, it determines whether there is a relationship between their critical thinking dispositions and their academic achievement, measured by cumulative grade point average and by letter grade received in their first semester EGAP course.

This chapter will first explain the research designs that will be employed in the study. Then, it will describe the setting and participants of the study. This will be followed by a description of the methods of data collection and data analysis.

Research Design

This study is a case study that examines a specific population of students enrolled in EGAP courses at an EMI, foundation university in Türkiye. This design was chosen, as it allows for an in-depth investigation into a given context and its complexities. According to Hamilton & Corbett-Whittier (2013), case studies "can begin to capture the complexity of learning and teaching and the contexts and communities surrounding them" (p. 2). According to Mills et al. (2012), "the ideal is to realize not statistical generalization but *analytical generalization*, to be able to generalize the results to a broader theory" (p. 3). It is argued that the specific characteristics of the case chosen provides a meaningful contribution to the study of critical thinking dispositions in Turkish higher education contexts.

Case studies may be either qualitative or quantitative in nature, or employ a mixed methodology, depending on a variety of factors, such as the research questions and the phenomena being studied (Mills et al., 2012). This case study employs multiple quantitative methods, using both descriptive and inferential statistics, to examine the critical thinking dispositions of EGAP students in a unique context.

First, this case study uses survey design in regards to the first research question. An instrument that intends to gain insight into student critical thinking dispositions was administered to undergraduate students enrolled in compulsory EGAP courses at an EMI university in Türkiye. This design was chosen because as Fraenkel and Wallen (2009) explain, a survey design can be used "to describe the characteristics of a population" or to "find out how the members of a population distribute themselves on one or more variable" (p. 390).

The study also uses causal comparative design to answer the second research question. It examines if the students' critical thinking dispositions differ by the grouping variables of their academic department, whether or not they have attended the English preparatory program at their university, and if so for how long, according to the high school they attended, their age, and their gender. In addition, it is used to compare whether their academic success differed significantly according to letter grade in an EGAP course and CGPA. According to Gay et al. (2011), causal-comparative design can be used to attempt to find the reason behind a difference between pre-existing populations. Causal comparative design can thus be used to investigate whether critical thinking dispositions differ according to the given grouping variables.

Finally, explanatory correlational design is used to answer the third research question. This design is used to investigate "the extent to which two variables (or

more) co-vary" (Creswell, 2008, p. 340). Correlational design is utilized to determine whether there is a relationship between critical thinking dispositions and academic achievement, as determined by students' cumulative grade point average and the letter grade which they received in their first semester EGAP course.

Setting and Participants

This study was conducted at an EMI foundation university in Türkiye. The university includes ten faculties which consist of 33 departments offering undergraduate courses. This university is a top tier EMI foundation university, ranked as top 5 foundation university in 2023 and 2024 by Times Higher Education, with all departments providing education in English language. The law faculty teaches courses related to Turkish law in Turkish language; however, their courses which do not specifically focus on the Turkish legal system, as well as non-departmental courses that their undergraduate students take, are taught in English as well. Therefore, undergraduate students from all academic disciplines have a need for a high level of academic English and enroll in EGAP courses during their first year of study.

Prior to enrolling in their departmental courses, all students are required to pass an English proficiency exam that is linked to the B2 level of the Common European Framework (CEFR) or alternatively to submit a TOEFL IBT score of 87 or an IELTS score of 6.5. After passing the English proficiency exam and enrolling in their departmental courses, all students are required to take two EGAP courses, English and Composition I and English and Composition II, in their first year.

The link to the questionnaire was sent to all students currently enrolled the second semester EGAP course, and 89 students voluntarily participated in the study. All previously had completed at least one semester at university and had passed a

first semester EGAP course. There may have been a minority of participants who had failed to pass ENG 102 in the previous semester and were repeating the course. In addition, all the participants had passed the in-house English proficiency exam, or submitted the requisite TOELF IBT score or IELTS score of 87 or 6.5 respectively, prior to entering their faculties. The participants were studying in different academic departments in different academic faculties. In addition, the students differed in their prior educational experiences, age and gender.

For the survey and correlational design, the researcher sent the link to the whole population in the target group twice in order to increase the return rate and, following the guidelines of the Ethics Board, those who volunteered participated in the study. As for the causal-comparative design, those who participated were grouped according to predetermined grouping variables among the existing population. The grouping variables were based on the academic department of the student, on whether or not the students had attended the English preparatory program of the university, the high school they had attended, their age, their gender, and academic performance as measured by letter grade in a second semester EGAP course and by overall CGPA. These demographic variables can be viewed in the tables below.

Table 1 shows a breakdown of the number of students in each academic department.

Table 1

Academic Departments of the Participants

Academic Department	Full Sample (*n*=89)	
	n	*%*
Total	89	100

Academic Department	Full Sample (*n*=89)	
	n	%
Architecture	8	9
Graphic Design	1	1.1
Interior Architecture and Environmental Design	5	5.6
Management	5	5.6
Economics	4	4.5
International Relations	7	7.9
Political Science and Public Administration	7	7.9
Computer Engineering	3	3.4
Electrical and Electronics Engineering	8	9
Industrial Engineering	3	3.4
Mechanical Engineering	3	3.4
Archaeology	1	1.1
English Language and Literature	5	5.6
Philosophy	1	1.1
Translation and Interpretation	4	4.5
Law	3	3.4
Chemistry	1	1.1
Molecular Biology and Genetics	8	9
Physics	4	4.5

The number of students who attended the English preparatory program are shown below in Table 2.

Table 2

Attendance in the English Preparatory School

English Preparatory School Attendance	Full Sample (*n*=89)	
	n	*%*
Total	89	100
Attended	22	24.7
Did not Attend	67	75.3

The number of students who attended public and private high schools is displayed in Table 3.

Table 3

Type of High School attended by the Participants

High School	Full Sample (*n*=89)	
	n	*%*
Total	89	100
Public	32	35.9
Private	57	64

In Table 4, the age breakdown of the participants can be seen.

Table 4

Age Breakdown of the Participants

Age	Full Sample (*n*=89)	
	n	*%*
Total	89	100
18-19	60	67.4

Age	Full Sample (*n*=89)	
	n	*%*
20-21	29	32.6

Table 5 displays the number of female students compared to male students or those who declined to answer.

Table 5

Gender Breakdown of the Participants

Gender	Full Sample (*n*=89)	
	n	*%*
Total	89	100
Male or Preferred not to Answer	31	65.2
Female	58	31.5

In terms of academic performance, this study investigated their performance in their first semester EGAP course in terms of their letter grade. The number of students who passed with an A or A-, as well as those who passed with a C through B+ are shown below. Because passing this course was a prerequisite for students in the target population, all students had received a C or higher.

Table 6

Letter Grades Received in a First Semester EGAP Course

Letter Grades	Full Sample (*n*=89)	
	n	*%*
Total	89	100
A or A-	30	33.7

Letter Grades	Full Sample (*n*=89)	
	n	*%*
C through B+	59	66.3

Finally, the table below shows the number of participants whose CGPA was below 2.7, 2.7-3.3 and above 3.3. One respondent declined to put their numerical CGPA.

Table 7

Overall CGPA of the Participants

Overall CGPA	Full Sample (*n*=88)	
	n	*%*
Total	88*	100
Above 3.3	30	38.6
2.7-3.3	28	31.8
Below 2.7	30	38.6

*One respondent declined to answer the exact CGPA so has been left out.

It can be seen that the participants of the study have differing prior educational experiences at the tertiary level as well as their prior educational background at the high school level. In terms of the students who reported that they attended a public or private high school following an international curriculum, it is unknown in two cases which curriculum they followed. One wrote "Diploma program" and the other declined to answer.

Instrumentation

This study uses a two-part questionnaire that was administered online, using Google Forms. This method was chosen because according to Fraenkel and Wallen (2009), written questionnaires are one of the most common methods of conducting

survey research. The first part is a demographics questionnaire, which asked questions students questions concerning their academic department, prior attendance in their university's English preparatory program, high school education, age, gender, and academic achievement (Appendix A).

The second part of the questionnaire was adapted from the UF/EMI (Appendix B). The UF/EMI is an instrument that was created by researchers at the university of Florida (Fite, 2017) to examine critical thinking dispositions, beginning in 2000 (Lamm, 2016). It emerged following Rudd, Moore and Penfield's factor analysis which determination that the CCTDI (Facione et al., 1995) did not produce the desired constructs that it intended to represent (Lamm, 2016). Over the coming years, researchers from the university of Florida developed the UF/EMI which measures the constructs of *Engagement, Cognitive Maturity* and *Innovativeness* (Lamm, 2016).

The UF/EMI uses a five point Likert scale which "is a method of attitude, opinion, or perception assessment of a unidimensional variable or a construct made up of multidimensions or subscales" (Salkind, 2010, p. 2). It consists of 26 discrete statements, intended to investigate critical thinking dispositions, which are sortable into the three constructs *of Engagement, Cognitive Maturity* and *Innovativeness* (Lamm, 2016, p. 1). This instrument has previously been administered and tested for reliability in various university contexts (Duncan et al., 2016; Stedman & Andenoro, 2007). There is a possible range of 26 to 130. Within this range, a reported score below 85.8 indicates a low score. A moderate score falls in the range of 85.9 to 106.6, and scores greater than 106.7 represent a high score (Lewis, 2012).

Methods of Data Collection

For this study the UF/EMI has been adapted as an online version, using Google Forms. Through conversation with experts in the field of EAP in Turkish contexts who were familiar with the population, it was decided to add a glossary to define the word "Strive" (Appendix B). The questionnaire was completed by 89 students.

Care was taken to ensure that the study was conducted ethically. Prior to administering the survey, approval was sought from the relevant institutional ethics board. After approval was granted, the department which offers EGAP courses from the foundation university was contacted and it was requested that the survey be distributed via email to the target population. Subsequently, the department distributed the survey via email to students within the program. Additionally, since the researcher was an instructor at this institution at the time of the study, the survey was not distributed to students currently taking EGAP courses from the researcher not to violate the university's ethics policy.

Furthermore, the students were informed of the purpose of the study and provided their informed consent. According to Tuckman and Harper (2012), in educational research involving human subjects, it is essential that participants provide their informed consent. The students who wished to participate filled out an informed consent form before they completed the study. The participants were informed of the purpose of the study, that they could decide not to participate and have their responses removed from the study at any time, that their answers would be anonymous, and that any data that emerged from their responses would be used for research purposes only (Appendix C). Participants completed the online adaptation of the survey and their answers were saved.

Methods of Data Analysis

After completing the data collection, measures were taken to ensure the reliability and validity of the instrument. Creswell (2012) explains, "**Reliability** means that the scores from an instrument are stable and consistent…**Validity** is the development of sound evidence to demonstrate that the test interpretation of scores…matches its proposed use" (p. 159). Cronbach's alpha was calculated to test the reliability. According to Gaur and Gaur (2009), "The Cronbach alpha coefficient is an indicator of internal consistency of the scale" (p. 3). It can determine whether varying scale questions on a given instrument "measure the same underlying construct" (Gaur & Gaur, 2009, p. 3). The researcher conducted this analysis for each of the constructs on the UF/EMI, *Engagement, Cognitive Maturity* and *Innovativeness* to ensure reliability within the constructs. The results can be seen in Table 8.

Table 8

Cronbach's Alpha Coefficients of the UF/EMI

Construct	Number of Items	Cronbach's Alpha
Engagement	11	.919
Cognitive Maturity	8	.853
Innovativeness	7	.840
Total	26	.951

In each case the Cronbach's alpha coefficient was above .8 which represents a good level of internal reliability as "A value of Cronbach alpha above .70 can be used as a reasonable test of scale reliability" (Gaur & Gaur, 2009, p. 3). Cronbach's alpha indicates the reliability of the instrument in this context. These scores corroborate those of the original developers of the scale who reported a Cronbach's alpha coefficient of .94 for the instrument (Irani et al., 2007, as cited in Lamm et al.,

2011). In terms of each construct, the developers reported a Cronbach's alpha of .91 for *Engagement*, .80 for *Innovativeness* and .79 for *Cognitive Maturity* (Irani et al., 2007, as cited in Lamm et al., 2011). This researcher's findings corroborate the reliability of the instrument in this context.

In regards to validity, the tool used in this study is informed by the theoretical frameworks as outlined in the review of literature. Researchers from the University of Florida developed the UF/EMI after consulting the literature on critical thinking dispositions and endeavoring to make an instrument that they felt could accurately measure critical thinking dispositions (Lamm, 2016). This tool has since been utilized to study critical thinking dispositions in many higher education settings, including Turkish contexts, as outlined in the literature review.

To control internal validity, the researcher provided clear instructions to the participants, and anonymous responses were collected to minimize the possibility of altering responses to conform any norms. The participants joined the study voluntarily, and were free to leave at any time or decide to withdraw their responses from the study. These steps ensure that the participants were comfortable and felt no duress while giving their responses.

Other measures were taken to measure the internal validity of the instrument. Creswell (2012) writes that measuring internal validity is based on using certain statistical measures. Such measures can "see if scores to items are related in a way that is expected" or "test a theory and see if the scores, as expected, support the theory" (pp. 163-164). Several tests were undertaken in regards to factor analysis.

First, factor loadings were conducted to determine whether items within a construct correlated with one another, or as Yang (2010) writes, they are "correlation coefficients between observable variables and latent common factors" (p. 2). In

addition, the Kaiser-Meyer-Olkin test of sampling adequacy and Bartlett's test of Sphericity were conducted. The former "indicates the proportion of variance in your variables that might be caused by underlying factors", while the latter "tests the hypothesis that your correlation matrix is an identity matrix, which would indicate that your variables are unrelated" (IBM, 2022b). Finally, factor analysis was used to determine communalities, which "is the proportion of each variable's variance that can be explained by the factors" (UCLA Statistical Consulting Group, n.d.), showing whether items within a given construct share a degree of variance (Appendix E). In any case, the researcher would like to note that the adequacy of factor analysis results depends on sample size.

In addition, measures were taken to determine the normality of the sample. The Shapiro-Wilk test was conducted using SPSS, which is a common way to measure the normality of a given sample (Mishra et al., 2019). However, the results showed evidence against the null hypothesis of normality in regard to each statement and in terms of the UF/EMI total score. In each case, *p* was found to be lower than .05 (Appendix D). This indicates that it cannot be assumed that the data may not have been "drawn from a normally distributed population" (Hinton et al., 2014, p. 100). Hence, non-parametric measures were taken.

The data collected from the instrument was analyzed using descriptive and inferential statistical analysis with the help of SPSS. The student answers were sorted according to the five-point Likert scale and recorded anonymously. The data was then transferred from the Google questionnaire to SPSS.

To answer the first research question, the researcher used SPSS to calculate the mean score and standardization for the overall score on the UF/EMI. In addition, the mean score and standardization was calculated for *Engagement*, *Cognitive*

Maturity and *Innovativeness*. Finally, the mean scores and standard deviations were calculated for each statement falling within the three constructs of *Engagement, Cognitive Maturity* and *Innovativeness.*

To answer the second research question, inferential statistics were employed, using SPSS. First, the groups were determined in regards to the pre-determined grouping variables of department, attendance of English language preparatory program, the high school which the student attended, their age, their gender, their letter grade in a first semester EAP course, and their overall CGPA. In terms of academic department, students were sorted into two groups: those in the faculty of science and the faculty of education, and those studying in the Faculty of Art, Design, and Architecture, the Faculty of Business Administration, the Faculty of Economics, Administrative, and Social Sciences, the Faculty of Humanities, and the Faculty of Law. They were sorted according to those who had attended the English preparatory program and those who had not. In terms of high school, they were grouped by those who attended a private high school and those who had attended public high schools. For age, two groups were created based on those who were 18 or 19 and those where 20 or 21. In terms of gender one group was created for students who identified as female, and another was created for those who identified as male or who preferred to not answer. Regarding academic success, one group was formed for those who received an A or A- in their EAP course, and a second group for those who received between a C to B+. As all of the students in this study had passed this pre-requisite course, none had received below a C. Finally, in terms of overall CGPA, three groups were formed based on the grading system of the university concerned. First were students whose CGPA was 3.3-4. Second, were students with a CGPA of 2.7-3.29. Third, were students with a CGPA below 2.7.

The researcher then used SPSS to analyze whether these groups differed significantly from one another. Commonly, parametric tests, such as the independent t-test and one-way ANOVA are used to compare groups (Hinton et al., 2014). independent t-tests are "used to determine whether the scores of two groups are significantly different from one another" (Gay et al. 2011, p. 234), while one-way ANOVA can determine the differences between more than two groups (IBM 2022a). However, the null hypothesis was disproved in the Shapiro Wilks test (Appendix D), which called into question the normality of the data.

According to Sijtsma and Emons (2010), it is necessary to use nonparametric tests "in situations in which it is unreasonable to assume that the sample was drawn from a population distribution with a particular parametric shape, such as the normal distribution" (p. 347). In addition, non-parametric tests "are suitable for categorical data" (Sijtsma & Emons, 2010, p. 347). Thus, the researcher chose to use non-parametric tests in lieu of the independent t-test and one-way ANOVA.

The Mann-Whitney U test, a non-parametric test (Sijtsma & Emons 2010), can be used to compare the differences between two groups and is often used in place of a t-test (Hinton et al., 2014, p. 235). It was used to investigate whether the perceptions of critical thinking dispositions differed significantly between students according to academic department, attendance of the English language preparatory program, the high school they attended, their age, their gender, and their course grade in a first semester EAP course.

To determine whether students differed in their critical thinking dispositions according to CGPA, the researcher chose the Kruskal-Wallis test, using SPSS. The Kruskal-Wallis test is "the non-parametric analogue of one-way ANOVA, which does not make assumptions about normality" (Van Hecke, 2012, p. 242). Thus, the

researcher used this test to compare the critical thinking dispositions among the three predetermined groups.

Correlational analysis was used to answer the third research question. According to Hinton et al. (2014), "A correlation is performed to test the degree to which the variation in the scores on the two variables co-relate – that is, the extent to which the variation in the scores on one variable result in corresponding variation in the scores on the second variable" (p. 297). The researcher used linear correlational analysis on SPSS to see if there is a relationship between the critical thinking dispositions and the overall cumulative grade point average of the student, as well as between critical thinking dispositions and the letter grade received in the students' first semester EGAP course. This analysis was conducted in terms of their overall dispositions to *Engagement*, *Cognitive Maturity* and *Innovativeness* as well as for each statement on the UF/EMI.

The researcher used SPSS to find the Pearson correlation coefficient (*r),* which indicates "how much the scores of the two variables vary together (their 'product') and then contrasts this with how much they vary on their own" (Hinton et al., 2014, p. 298). An *r* value that approaches 1 or -1 respectively represents a positive or negative correlation between the two variables, whereas an *r* value of 0 shows no correlation (Hinton et al., 2014)

CHAPTER 4: RESULTS

Introduction

This study aimed to gain insight into the critical thinking dispositions of undergraduate students at an EMI university in Türkiye. Using survey design, it examined the critical thinking dispositions that students who are enrolled in a second semester EGAP course in their freshman year at university possess.

This chapter will first examine the overall critical thinking dispositions of the participants, as measured by their scores on the UF/EMI. In addition, it will examine the critical thinking dispositions of students according to the UF/EMI's three constructs of *Engagement*, *Cognitive Maturity* and *Innovativeness* respectively (Fite, 2017). According Ricketts and Rudd (2005), two of the developers of the UF/EMI:

> The engagement disposition measured students' dispositions to use reasoning; anticipating situations that require reasons; and confidence in reasoning ability. The Innovativeness disposition measures students' predisposition to be intellectually curious and wanting to know the truth. The Cognitive Maturity (Maturity) disposition measured students' awareness of the complexity of real problems; being open to other points of view; and being aware of their own and others' biases and predispositions. (p. 33)

After reporting the findings in terms of the participants' total scores, it will report the participants' critical thinking dispositions in references to these three constructs. It will subsequently report the differences found in each of the three constructs according to the students' departments, attendance of English preparatory program, age, gender, type of high school, CGPA, and letter grade in their first semester EGAP course. Finally, it will explore the relationships between the

disposition and their academic achievement as defined by CGPA and letter grades.

Overall Critical Thinking Dispositions

First, this study investigated the perceived overall critical thinking dispositions of the participants. The participants (n=89) who completed the UF-EMI, had a total score of 101.30, with a standard deviation of 18.88 out of a possible total score of 130. This translated to a mean score of 3.90 on a five-point Likert scale, with a standard deviation of 0.73. The participants provided responses slightly on the positive side of the scale with little variability, implying a high degree of agreement among the participants. However, although there was relatively low variance between respondents in terms of the overall score, there was variation in regards to individual statements. These differences will be indicated in the following sections construct by construct.

In addition, their results were calculated in terms of the three constructs of *Engagement*, *Cognitive Maturity* and *Innovativeness*. The mean and standard deviation were calculated separately for these three dispositions in terms of average score. The results can be seen below in Table 9.

Table 9

Central Tendency & Dispersion: Engagement, Cognitive Maturity and Innovativeness

Construct	Number of Items	*n*	*M*	*SD*
Engagement	11	89	3.884	0.797
Cognitive Maturity	8	89	3.965	0.733
Innovativeness	7	89	3.838	0.782

It can be seen that the participants had similar mean scores and standard deviations on each of the three dispositions in terms of average score. The average scores suggest that respondents have a relatively high level of *Engagement*,

Cognitive Maturity, and *Innovativeness.* However, there is a slight increase in variability in the *Engagement* scores (*SD*=0.797).

Further findings connected to each disposition will be shared in the coming sections.

Engagement

The first of the three dispositions that this chapter will explore is *Engagement*. According to 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" (p. 4). The factor analysis indicated a suitably high level of construct validity within the construct (Appendix F), though the researcher notes that a smaller sample size may reduce the significance of these results.

Engagement: Dispositions Possessed as Perceived by the Students

First, in order to further understand the participants (*n*=89) score for the disposition to *Engagement*, the eleven statements within the *Engagement* construct were considered individually. The mean and standard deviation were calculated in for each item. These can be viewed in Table 10.

Table 10

UF/EMI Engagement Scores of the Participants

Item	*n*	*M*	*SD*
2. I look for opportunities to solve problems	89	4.15	0.97
3. I am interested in many issues	89	4.07	1.11
5. I am able to relate to a wide variety of issues	89	3.94	1.08
7. I enjoy finding answers to challenging questions	89	3.93	1.17
8. I am a good problem solver	89	3.79	1.08
9. I am confident that I can reach a reasonable conclusion	89	3.84	1.12
14. I am able to apply my knowledge to a wide variety of issues	89	4.12	0.89

Item	*n*	*M*	*SD*
17. I am able to explain things clearly	89	3.64	1.10
18. I ask good questions when trying to clarify a solution	89	3.84	1.02
19. I present issues in a clear and concise manner	89	3.67	1.06
22. I keep on working on things until I get them right	89	3.72	1.13

It can be observed that in terms of the *Engagement* disposition, participants most agreed with the statements "I look for opportunities to solve problems" (*M*=4.15; *SD*=0.97) and "I am able to apply my knowledge to a wide variety of issues" (*M*=4.12; *SD*=0.89). These statements were also those of which had the least degree of variance between participant responses. On the other hand, the items with which the participants least agreed with were "I am able to explain things clearly" (*M*=3.64; *SD*=1.10) and "I present issues in a clear and concise manner" (*M*=3.67; *SD*=1.06). The statement that had the most variance in responses was "I enjoy finding answers to challenging questions" (*SD*=1.17), closely followed by "I keep on working on things until I get them right" (*SD*=1.13.), "I am confident that I can reach a reasonable conclusion" (*SD*=1.12) and "I am interested in many issues" (*SD*=1.11).

Difference in Dispositions

Inferential analysis was conducted to determine whether or not the disposition towards *Engagement* differs according to department, attendance of an English preparatory program, age, gender, letter grade, and CGPA. These results are shown in the following sub-sections.

Department. The participants were first compared in regards to their academic department of study. The results in terms of mean and standardization were calculated for their overall average score. In addition, these results were calculated for each statement within the *Engagement* construct, for students who studying in the Faculty of Engineering and the Faculty of Science and for those who were in the

Faculty of Art, Design, and Architecture, the Faculty of Business Administration, The Faculty of Economics, Administrative, and Social Sciences, the Faculty of Humanities and Letters, and the Faculty of Law. The results in terms of average scores can been in Table 11.

Table 11

UF/EMI Engagement Average score of the Participants by Academic Department

Construct	Faculty of Engineering + Faculty of Science (*n*=30)		Other Faculties* (*n*=59)	
	M	*SD*	*M*	*SD*
Engagement Average Score	3.797	0.896	3.928	0.754

* (Faculty of Art, Design, and Architecture; Business Administration; Economics, Administrative, and Social Sciences; Humanities and Letters; Law)

Both groups reported a high mean *Engagement* score. It can be seen that overall the students who studied in faculties other than the Faculty of Engineering and the Faculty of Science scored lower than those who studied in other faculties.

To compare both groups, the researcher checked if the normality assumption was met according to the Shapiro-Wilk Test. Based on the results, he opted to conduct a non-parametric test, namely the Mann-Whitney U which may be used in place of an independent-samples T test (Hinton et al., 2014). The Mann-Whitney U results are displayed in Table 12.

Table 12

The Mann-Whitney U Test for UF/EMI Engagement Average Score of the Participants by Academic Department

Construct	Mean Rank		*U*	*z*	*p*
	Faculty of Engineering + Faculty of Science (n=30)	Other Faculties* (n=59)			
Engagement Average Score	42.95	46.04	823.500	-0.535	.592

* (Faculty of Art, Design, and Architecture; Business Administration; Economics, Administrative, and Social Sciences; Humanities and Letters; Law)

It can be seen that the two groups did not differ significantly, in terms of their disposition to *Engagement* according to the results of the Mann-Whitney U test, as the *p* value was greater than .05, indicating that any difference between the two groups may be explained by random chance.

In addition, the mean and standard deviations for each item within the *Engagement* construct were calculated for both groups (Table 13).

Table 13

UF/EMI Engagement Scores of the Participants by Department

Item	Faculty of Engineering + Faculty of Science (*n*=30)		Other Faculties* (*n*=59)	
	M	*SD*	*M*	*SD*
2. I look for opportunities to solve problems	4.200	0.996	4.119	0.966
3. I am interested in many issues	4.100	1.155	4.050	1.090
5. I am able to relate to a wide variety of issues	3.900	1.242	3.966	0.999
7. I enjoy finding answers to challenging questions	3.867	1.306	3.966	1.098
8. I am a good problem solver	3.733	1.143	3.814	1.058
9. I am confident that I can reach a reasonable conclusion	3.833	1.206	3.848	1.080
14. I am able to apply my knowledge to a wide variety of issues	4.067	0.944	4.153	0.867
17. I am able to explain things clearly	3.433	1.165	3.746	1.060
18. I ask good questions when trying to clarify a solution	3.633	1.245	3.949	0.879

Item	Faculty of Engineering + Faculty of Science (*n*=30)		Other Faculties* (*n*=59)	
	M	*SD*	*M*	*SD*
19. I present issues in a clear and concise manner	3.500	1.137	3.763	1.023
22. I keep on working on things until I get them right	3.500	1.225	3.831	1.069

* (Faculty of Art, Design, and Architecture; Business Administration; Economics, Administrative, and Social Sciences; Humanities and Letters; Law)

Both groups reported high average scores for each statement. Each statement had a mean score falling in the range of 3.5 to 4.2 on a five-point Likert scale. With the exceptions of statements 2 and 3, students in the Faculty of Engineering and the Faculty of Science reported to have lower critical thinking dispositions than other students, with the largest disparity in statement 22.

The results of a normality test prompted the researcher to choose a non-parametric test to compare the groups. Thus, the Mann-Whitney U test was conducted to determine whether the differences between these two groups were significant in terms *Engagement* and for each item within the *Engagement* construct. The former is shown in Table 14

Table 14

The Mann-Whitney U Test for UF/EMI Engagement Scores of the Participants by Academic Department

Item	Mean Rank		*U*	*z*	*p*
	Faculty of Engineering + Faculty of Science (*n*=30)	Other Faculties* (*n*=59)			
2. I look for opportunities to solve problems	47.47	43.75	811.000	-0.710	.478
3. I am interested in many issues	46.52	44.23	839.500	-0.433	.665
5. I am able to relate to a wide variety of issues	45.90	44.54	858.000	-0.266	.790
7. I enjoy finding answers to challenging questions	45.15	44.92	880.500	-0.042	.966
8. I am a good problem solver	44.05	45.48	856.500	-0.295	.768

Item	Mean Rank		*U*	*z*	*p*
	Faculty of Engineering + Faculty of Science (*n*=30)	Other Faculties* (*n*=59)			
9. I am confident that I can reach a reasonable conclusion	45.53	44.73	869.000	-0.157	.875
14. I am able to apply my knowledge to a wide variety of issues	43.60	45.71	843.000	-0.436	.663
17. I am able to explain things clearly	40.63	47.22	754	-1.319	.187
18. I ask good questions when trying to clarify a solution	41.98	46.53	794.500	-0.921	.357
19. I present issues in a clear and concise manner	41.35	46.86	775.500	-1.133	.257
22. I keep on working on things until I get them right	40.42	47.33	747.500	-1.344	.179

* (Faculty of Art, Design, and Architecture; Business Administration; Economics, Administrative, and Social Sciences; Humanities and Letters; Law)

The results indicate there is no significant difference between the groups in regards to any of the statements falling under the *Engagement*. In each case, the *p* value was greater than .05, which means that any variation may be explained by various chance. Thus, the participants did not demonstrate significant differences in terms of their *Engagement.*

English Preparatory Program Experience. The next area that was investigated was experience in an English preparatory program. The students were grouped according to those who had, and those who had not. To determine whether the critical thinking disposition of *Engagement* differed according to attendance of an English preparatory program, the mean and standard deviation was calculated for the average *Engagement* score, as well as for each statement within the *Engagement* construct of the UF/EMI for both groups. Table 15 depicts the mean and the standard deviation of the two groups in terms of average scores.

Table 15

UF/EMI Engagement Average Score of the Participants by Attendance of English Preparatory Program

Construct	Attended the English Preparatory Program (*n*=22)		Did not attend the English Preparatory Program (*n*=67)	
	M	*SD*	*M*	*SD*
Engagement Average Score	3.959	0.606	3.859	0.852

Both groups reported high mean scores on a five-point Likert scale. The results show that those who attended the English preparatory program prior to beginning their departmental classes had a higher mean score than the others.

A normality test showed that the normality assumption was not met, so a non-parametric test was used, the Mann-Whitney U test, to determine whether the two groups differed significantly. These results are shown below.

Table 16

The Mann-Whitney U Test for UF/EMI Engagement Average Score of the Participants by Attendance of the English Preparatory Program

Construct	Mean Rank		*U*	*z*	*p*
	Attended the English Preparatory Program (*n*=22)	Did not attend the English Preparatory Program (*n*=67)			
Engagement Average Score	45.20	44.93	732.500	-0.043	.966

It can be seen that the two groups did not significantly differ as the *p* value was above .05, indicating that any difference may be the result of chance. These results show that the participants do not appear to differ significantly in *Engagement* on the basis of their attendance of the English Preparatory program. To determine

whether the groups differed in regards to the responses of any individual statement, first the researcher calculated the mean and standard deviation for each response.

Table 17

UF/EMI Engagement Scores of the Participants by Attendance of English Preparatory Program

Item	Attended the English Preparatory Program (*n*=22)		Did not attend the English Preparatory Program (*n*=67)	
	M	*SD*	*M*	*SD*
2. I look for opportunities to solve problems	4.182	0.853	4.134	1.013
3. I am interested in many issues	4.046	1.090	4.075	1.119
5. I am able to relate to a wide variety of issues	4.000	0.926	3.925	1.132
7. I enjoy finding answers to challenging questions	3.954	0.899	3.925	1.247
8. I am a good problem solver	4.046	0.575	3.702	1.194
9. I am confident that I can reach a reasonable conclusion	3.864	0.990	3.836	1.163
14. I am able to apply my knowledge to a wide variety of issues	4.136	0.834	4.119	0.913
17. I am able to explain things clearly	3.636	1.217	3.642	1.069
18. I ask good questions when trying to clarify a solution	3.818	1.097	3.851	1.004
19. I present issues in a clear and concise manner	3.909	0.868	3.597	1.115
22. I keep on working on things until I get them right	3.955	0.899	3.642	1.190

Both groups reported high mean scores for each statement with the lowest score for either group being a mean of 3.597 of 5. The greatest differences in mean between the two groups occurred in regards to statements 8, 19 and 22. Furthermore, in all instances other than numbers 3, 17 and 18, students who had attended the English preparatory program reported higher critical thinking dispositions than those who had not. Having calculated these scores, the researcher investigated the significance of these differences, using a non-parametric test as the assumption of normality could not be assumed. The Mann-Whitney U test was used to gauge whether or not these differences were significant for each statement (Table 18).

Table 18

The Mann-Whitney U Test for UF/EMI Engagement Scores of the Participants by Attendance of English Preparatory Program

Item	Mean Rank		*U*	*z*	*p*
	Attended the English Preparatory Program (*n*=22)	Did not attend the English Preparatory Program (*n*=67)			
2. I look for opportunities to solve problems	43.66	45.44	707.500	-0.310	.756
3. I am interested in many issues	43.89	45.37	712.500	-0.255	.799
5. I am able to relate to a wide variety of issues	44.34	45.22	722.500	-0.156	.876
7. I enjoy finding answers to challenging questions	42.07	45.96	672.500	-0.662	.508
8. I am a good problem solver	47.61	44.14	679.500	-0.653	.514
9. I am confident that I can reach a reasonable conclusion	43.73	45.42	709.000	-0.301	.764
14. I am able to apply my knowledge to a wide variety of issues	44.52	45.16	726.500	-0.120	.905
17. I am able to explain things clearly	45.80	44.74	719.500	-0.193	.847
18. I ask good questions when trying to clarify a solution	44.61	45.13	728.500	-.095	.924
19. I present issues in a clear and concise manner	49.16	43.63	645.500	-1.038	.299
22. I keep on working on things until I get them right	48.43	43.87	661.500	-0.809	.419

In no case did the *p* value disprove the null hypothesis, which indicates that there is no significant difference in the *Engagement* construct between the two groups in regard to any statement. Overall, there is no indication that the participants differed in their *Engagement* according to whether they had attended an English preparatory program.

Age Age was also a demographic factor that was compared in terms of *Engagement.* First, the researcher examined the mean *Engagement* score for those students aged 18-19 (*n*=60) and those aged 20-21 (*n*=29). The results of the average score and standard deviation are seen in Table 19.

Table 19

UF/EMI Engagement Average Score of the Participants by Age

Construct	18-19 (*n*=60)		20-21 (*n*=29)	
	M	*SD*	*M*	*SD*
Engagement Average Score	3.900	0.795	3.850	0.813
Engagement Sum Total Score	42.900	8.742	42.345	8.945

Overall both groups displayed high levels of *Engagement* but those aged 18-19, had a slightly higher mean score than those aged 20 or 21. Before comparing the significance of these results, the researcher first used a normality test to determine whether there could be an assumption of normality. Based on the results, he used the Mann-Whitney U test, a non-parametric test (Table 20).

Table 20

The Mann-Whitney U Test for UF/EMI Engagement Average Score of the Participants by Age

Construct	Mean Rank		*U*	*z*	*p*
	18-19 (*n*=60)	20-21 (*n*=29)			
Engagement Average Score	46.25	42.41	795.000	-0.658	.510

The *p* value of .510 indicates that it cannot be assumed the difference is not due to chance. Therefore, the difference between groups do not differ significantly in overall *Engagement.*

The researcher then investigated the scores of the two groups for each statement. The mean and standard deviation are shown below.

Table 21

UF/EMI Engagement Scores of the Participants by Age

Item	18-19 (*n*=60)		20-21 (*n*=29)	
	M	*SD*	*M*	*SD*
2. I look for opportunities to solve problems	4.200	1.038	4.035	0.823
3. I am interested in many issues	4.133	1.112	3.931	1.100
5. I am able to relate to a wide variety of issues	4.000	1.150	3.828	0.928
7. I enjoy finding answers to challenging questions	3.867	1.214	4.069	1.067
8. I am a good problem solver	3.817	1.097	3.724	1.066
9. I am confident that I can reach a reasonable conclusion	3.900	1.100	3.724	1.162
14. I am able to apply my knowledge to a wide variety of issues	4.200	0.879	3.966	0.906
17. I am able to explain things clearly	3.633	1.057	3.655	1.203
18. I ask good questions when trying to clarify a solution	3.917	0.962	3.690	1.137
19. I present issues in a clear and concise manner	3.617	1.091	3.793	1.013
22. I keep on working on things until I get them right	3.617	1.136	3.931	1.100

Both groups reported high mean scores for each statement. In terms of age, students who were 18 or 19, reported higher scores on seven of the 11 statements. To determine whether or not the difference in mean scores were significant, a Mann-Whitney U test was conducted (Table 22), as a normality test indicated that the assumption of normality was not met.

Table 22

The Mann-Whitney U Test for UF/EMI Engagement Scores of the Participants by Age

Item	Mean Rank		*U*	*z*	*p*
	18-19 (*n*=60)	20-21 (*n*=29)			
2. I look for opportunities to solve problems	48.04	38.71	687.500	-1.767	.077
3. I am interested in many issues	47.26	40.33	734.500	-1.299	.194
5. I am able to relate to a wide variety of issues	47.87	39.07	698.000	-1.707	.088
7. I enjoy finding answers to challenging questions	43.93	47.21	806.000	-0.604	.546

Item	Mean Rank		*U*	*z*	*p*
	18-19 (*n*=60)	20-21 (*n*=29)			
8. I am a good problem solver	45.97	43.00	812.000	-0.606	.545
9. I am confident that I can reach a reasonable conclusion	46.29	42.33	792.500	-0.766	.444
14. I am able to apply my knowledge to a wide variety of issues	47.63	39.57	712.500	-1.650	.099
17. I am able to explain things clearly	44.48	46.07	839.000	-0.315	.753
18. I ask good questions when trying to clarify a solution	46.43	42.05	784.500	-0.877	.380
19. I present issues in a clear and concise manner	43.88	47.31	803.000	-0.700	.484
22. I keep on working on things until I get them right	42.61	49.95	726.500	-1.415	.157

In no case did the *p* value fall below 0.05 and disprove the null hypothesis. This suggests there is no indication that the two groups differed significantly in regards to any of the statements. Therefore, it cannot be assumed that the differences in *Engagement* between students who were 18-9 (*n*=60) and those who were 20-21 (*n*=29) are significant.

Gender. In terms of gender, the students were grouped into those who were male or preferred not to answer (*n*=31) and those who were female (*n*=58). The mean score and the standard deviation of the two groups were calculated in terms of *Engagement*. These results are shown in Table 23.

Table 23

UF/EMI Engagement Average and Sum Total Score of the Participants by Gender

Construct	Male + Prefer not to Answer (*n*=31)		Female (*n*=58)	
	M	*SD*	*M*	*SD*
Engagement Average Score	3.786	0.860	3.936	0.763

Both groups reported a high mean score. However, it can be seen that the students who identified themselves as female reported a higher mean score with lower variance than those who identified as male or who preferred not to answer.

The researcher then determined whether this difference was significant. A normality test showed that the assumption of normality could not be assured so the Mann-Whitney U test, a non-parametric test, was used (Table 24).

Table 24

The Mann-Whitney U Test for UF/EMI Engagement Average Score of the Participants by Gender

Construct	Mean Rank		*U*	*z*	*p*
	Male + Prefer not to Answer (*n*=31)	Female (*n*=58)			
Engagement Average Score	40.81	47.24	769.000	-1.123	.262

The *p* value of .262, indicates that the groups did not differ significantly in overall *Engagement*.

The researcher subsequently examined the two groups' answers for each statement indicating *Engagement.* The mean and standard deviation are shown below.

Table 25

UF/EMI Engagement Scores of the Participants by Gender

Item	Male + Prefer not to Answer (*n*=31)		Female (*n*=58)	
	M	*SD*	*M*	*SD*
2. I look for opportunities to solve problems	4.000	1.000	4.224	0.956
3. I am interested in many issues	3.871	1.284	4.172	0.994
5. I am able to relate to a wide variety of issues	3.903	1.136	3.966	1.059
7. I enjoy finding answers to challenging questions	4.000	1.342	3.897	1.071
8. I am a good problem solver	3.548	1.234	3.914	0.978
9. I am confident that I can reach a reasonable conclusion	3.677	1.166	3.931	1.090
14. I am able to apply my knowledge to a wide variety of issues	4.129	0.957	4.121	0.860
17. I am able to explain things clearly	3.645	1.050	3.638	1.135

Item	Male + Prefer not to Answer (*n*=31)		Female (*n*=58)	
	M	*SD*	*M*	*SD*
18. I ask good questions when trying to clarify a solution	3.613	1.116	3.966	0.955
19. I present issues in a clear and concise manner	3.677	1.077	3.672	1.066
22. I keep on working on things until I get them right	3.581	1.177	3.793	1.104

Overall, both groups reported positively to each of the statements. Female students scored higher on seven of the 11 statements, with the greatest disparity relating to item 8.

The research used a test to determine whether or not normality could be assumed. Given the results, the Mann-Whitney U test was used to determine whether or not the differences between the two groups were significant. Table 26 displays the results of the Mann-Whitney U test for each of the 11 statements.

Table 26

The Mann-Whitney U Test for UF/EMI Engagement Scores of the Participants by Gender

Item	Mean Rank		*U*	*z*	*p*
	Male + Prefer not to Answer (*n*=31)	Female (*n*=58)			
2. I look for opportunities to solve problems	40.45	47.43	758.000	-1.343	.179
3. I am interested in many issues	41.84	46.69	801.000	-0.924	.355
5. I am able to relate to a wide variety of issues	44.11	45.47	871.500	-0.269	.788
7. I enjoy finding answers to challenging questions	48.97	42.88	776.000	-1.142	.253
8. I am a good problem solver	40.48	47.41	759.000	-1.439	.150
9. I am confident that I can reach a reasonable conclusion	40.84	47.22	770.000	-1.254	.210
14. I am able to apply my knowledge to a wide variety of issues	46.02	44.46	867.500	-0.325	.745
17. I am able to explain things clearly	44.32	45.36	878.000	-0.210	.834
18. I ask good questions when trying to clarify a solution	39.82	47.77	738.500	-1.620	.105
19. I present issues in a clear and concise manner	45.03	44.98	898.000	-0.010	.992

Item	Mean Rank		*U*	*z*	*p*
	Male + Prefer not to Answer (*n*=31)	Female (*n*=58)			
22. I keep on working on things until I get them right	42.02	46.59	806.500	-0.897	.370

In each case, the *p* value failed to disprove the null hypothesis set at 0.05, meaning any difference in mean may be explained by chance. Thus, there is no evidence that the participants differed from one another significantly in regards to any indicator of *Engagement* according to their gender.

Type of High School. The researcher examined whether participants who attended public school (*n*=32) differed from those who had attended private school (*n*=57) in the mean scores for their responses to the *Engagement* construct. First, the results were calculated to see the mean and standard deviations for the two groups in terms of their *Engagement* average score. The results are shown in Table 27.

Table 27

UF/EMI Engagement Average score of the Participants by High School

Construct	Public High School (*n*=32)		Private High School (*n*=57)	
	M	*SD*	*M*	*SD*
Engagement Average Score	3.886	0.763	3.882	0.821

Both groups reported a high overall level of *Engagement.* Those who attended public high schools reported a slightly higher mean score than those who went to private high schools. The researcher then sought to compare the significance of the mean score between the two groups. A test indicated that normality could not be assumed, so the Mann-Whitney U test was used (Table 28).

Table 28

The Mann-Whitney U Test for UF/EMI Engagement Average Score of the Participants by High School

Construct	Mean Rank		*U*	*z*	*p*
	Public High School (*n*=32)	Private High School (*n*=57)			
Engagement Average Score	44.30	45.39	889.500	-0.193	.847

The *p* score indicates that the two groups did not differ significantly. Therefore, the participants showed no significant difference *Engagement* according to the high school they attended.

The researcher then investigated whether the participants differed by high school attended in terms of the eleven statements that indicate *Engagement.* The mean scores and standard deviations are shown in table 29.

Table 29

UF/EMI Engagement Scores of the Participants by High School

Item	Public High School (*n*=32)		Private High School (*n*=57)	
	M	*SD*	*M*	*SD*
2. I look for opportunities to solve problems	4.219	0.870	4.105	1.030
3. I am interested in many issues	4.188	0.965	4.000	1.180
5. I am able to relate to a wide variety of issues	4.031	0.897	3.895	1.175
7. I enjoy finding answers to challenging questions	4.125	0.942	3.825	1.269
8. I am a good problem solver	3.688	1.061	3.842	1.099
9. I am confident that I can reach a reasonable conclusion	3.719	1.170	3.912	1.090
14. I am able to apply my knowledge to a wide variety of issues	4.031	0.897	4.175	0.889
17. I am able to explain things clearly	3.469	1.047	3.737	1.126
18. I ask good questions when trying to clarify a solution	3.781	1.039	3.877	1.019
19. I present issues in a clear and concise manner	3.719	0.991	3.649	1.110
22. I keep on working on things until I get them right	3.781	0.832	3.684	1.270

Overall, both groups reported high mean scores for each statement. On a five-point Likert scale, the lowest score reported by either group was 3.469 in response to statement 17. In regards to difference, the largest discrepancies appeared for statements 7 and 17.

A test of normality again indicated that a non-parametric test be used. Therefore, the Mann-Whitney U test was chosen to determine whether the differences between groups were significant on any of the eleven statements (Table 30).

Table 30

The Mann-Whitney U Test for UF/EMI Engagement Scores of the Participants by High School

Item	Mean Rank		*U*	*z*	*p*
	Public High School (*n*=32)	Private High School (*n*=57)			
2. I look for opportunities to solve problems	45.53	44.70	895.000	-0.161	.872
3. I am interested in many issues	46.66	44.07	859.000	-0.496	.620
5. I am able to relate to a wide variety of issues	44.73	45.15	903.500	-0.082	.934
7. I enjoy finding answers to challenging questions	47.13	43.81	844.000	-0.627	.531
8. I am a good problem solver	42.06	46.65	818.000	-0.959	.337
9. I am confident that I can reach a reasonable conclusion	42.45	46.43	830.500	-0.787	.431
14. I am able to apply my knowledge to a wide variety of issues	41.72	46.84	807.000	-1.074	.283
17. I am able to explain things clearly	40.36	47.61	763.500	-1.473	.141
18. I ask good questions when trying to clarify a solution	43.19	46.02	854.000	-0.581	.561
19. I present issues in a clear and concise manner	45.14	44.92	907.500	-0.046	.963
22. I keep on working on things until I get them right	43.63	45.77	868.000	-0.424	.672

The *p* values did not fall below an alpha of .05. Thus, there were no differences according to high school attended that could not be attributed to chance. This indicates that the differences in mean between the two groups were not significant in regard to any of the statements in terms of *Engagement* so the

participants do not appear to differ in the disposition towards *Engagement* according to high school attended.

Letter Grade. In addition, this study investigated whether the participants' disposition towards *Engagement* differed by letter grade received in their first semester EGAP course. One group was formed, consisting of the students who had received an A- or A (*n*=30), while the other group included the students receiving grades between C and B+ (*n*=59). The means and standard deviations of both groups were calculated for their overall *Engagement*. The average and sum total scores can be seen in Table 31.

Table 31

UF/EMI Engagement Average Score of the Participants by Letter Grade

Construct	A- and A (*n*=30)		C through B+ (*n*=59)	
	M	*SD*	*M*	*SD*
Engagement Average Score	4.112	0.483	3.767	0.897

The mean scores of both groups was high, yet the students who received an A or A- in the first semester EGAP course reported higher levels of *Engagement* with less variance in their responses. The researcher then investigated whether this difference was significant. A normality test resulted in a non-parametric test being used, so the Mann-Whitney U test was chosen.

Table 32

The Mann-Whitney U Test for UF/EMI Engagement Average Score of the Participants by Letter Grade

Construct	Mean Rank		*U*	*z*	*p*
	A- and A (*n*=30)	C through B+ (*n*=59)			
Engagement Average Score	49.28	42.82	756.500	-1.119	.263

The *p* score showed that the difference in mean between the groups was not significant, indicating that the students' *Engagement* did not differ according to letter grade.

The researcher investigated this difference further by examining their responses to each of the eleven statement that indicate *Engagement*. Table 33 shows the mean scores and standard deviations of each group for each statement.

Table 33

UF/EMI Engagement Scores of the Participants by Letter Grade

Item	A- and A (*n*=30)		C through B+ (*n*=59)	
	M	*SD*	*M*	*SD*
2. I look for opportunities to solve problems	4.333	0.661	3.929	1.215
3. I am interested in many issues	4.333	0.661	3.929	1.303
5. I am able to relate to a wide variety of issues	4.133	0.730	3.750	1.295
7. I enjoy finding answers to challenging questions	4.267	0.785	3.79	1.134
8. I am a good problem solver	3.867	1.042	3.786	1.031
9. I am confident that I can reach a reasonable conclusion	4.067	0.944	3.643	1.224
14. I am able to apply my knowledge to a wide variety of issues	4.267	0.450	3.714	1.182
17. I am able to explain things clearly	3.767	0.971	3.429	1.317
18. I ask good questions when trying to clarify a solution	4.167	0.747	3.464	1.170
19. I present issues in a clear and concise manner	3.833	0.913	3.571	1.260
22. I keep on working on things until I get them right	3.967	0.999	3.786	1.134

Each group reported relatively high levels of disposition, with the lowest response being a mean score of 3.571 to statement 19. The two groups differed most greatly in response to statements 2 and 3.

To determine the significance of the differences, a Mann-Whitney U test was used to compare the responses between those students who received an A or A- (*n*=30) with those who received a B+ or lower (*n*=59). The researcher used the

Mann-Whitney U Test as the results of a test of normality indicated that a non-parametric test be used. The results are shown in Table 34.

Table 34

The Mann-Whitney U Test for UF/EMI Engagement Scores of the Participants by Letter Grade

Item	Mean Rank		*U*	*z*	*p*
	A- and A (*n*=30)	C through B+ (*n*=59)			
2. I look for opportunities to solve problems	53.57	40.64	628.000	-2.467	.014
3. I am interested in many issues	51.47	41.71	691.000	-1.844	.065
5. I am able to relate to a wide variety of issues	48.43	43.25	782.000	-1.014	.311
7. I enjoy finding answers to challenging questions	50.17	42.37	730.000	-1.451	.147
8. I am a good problem solver	49.07	42.93	763.000	-1.264	.206
9. I am confident that I can reach a reasonable conclusion	50.78	42.06	711.500	-1.700	.089
14. I am able to apply my knowledge to a wide variety of issues	45.70	44.64	864.000	-0.218	.827
17. I am able to explain things clearly	48.30	43.32	786.000	-0.997	.319
18. I ask good questions when trying to clarify a solution	48.40	43.27	783.000	-1.038	.299
19. I present issues in a clear and concise manner	46.70	44.14	834.000	-0.528	.598
22. I keep on working on things until I get them right	49.02	42.96	764.500	-1.178	.239

It can be seen that students who received an A or A- in their first semester EGAP course, scored significantly higher on statement 2 (p = .014) as the p value was below an alpha set at .05. This indicates it is highly likely that this difference was not due to random chance and the students differed significantly in their response to the statement “I look for opportunities to solve problems.

CGPA. Finally, this study investigated whether *Engagement* differed significantly according to CGPA. The students were grouped by those who had a CGPA above 3.3 (*n*=30), 2.7 through 3.29 (*n*=28), and below 2.7 (*n*=30). The mean level of *Engagement* and standard deviation are reported in Table 35.

Table 35

UF/EMI Engagement Average and Sum Total Scores of the Participants by CGPA

Construct	3.3-4.0 (*n*=30)		2.7-3.29 (*n*=28)		0-2.69 (*n*=30)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Engagement Average	4.091	0.539	3.708	0.984	3.842	0.811

Overall each group believed they had a high level of the disposition to *Engagement*, yet it can be seen that the students who's CGPA was 3.3 and above reported a higher mean score the two groups below. The research investigated whether this difference was significant. The results of a normality test led the research to use a non-parametric test, so the Kruskal-Wallis Rank Score Test was chosen as non-parametric test that can be used in place of "one factor independent ANOVA" (Hinton et al., 2014, p. 257) (Table 36).

Table 36

Kruskal-Wallis Rank Score Test for UF/EMI Engagement Average Score of the Participants by CGPA

Construct	Mean Rank			χ^2	*df*	*p*
	3.3-4.0 (*n*=30)	2.7-3.29 (*n*=28)	0-2.69 (*n*=30)			
Engagement Average Score	48.92	40.54	43.78	1.604	2	.448

The results indicated that the groups did not differ significantly according to their CGPA. The *p* value of .448 showed that the difference may be due to chance and thus *Engagement* cannot be understood to differ according to CGPA. The study then examined the differences between the responses of the three groups for each of the eleven statements that may indicate *Engagement.* Table 37 shows these results.

Table 37

UF/EMI Engagement Scores of the Participants by CGPA

Item	3.3-4.0 (*n*=30)		2.7-3.29 (*n*=28)		0-2.69 (n=30)	
	M	*SD*	*M*	*SD*	*M*	*SD*
2. I look for opportunities to solve problems	4.333	0.661	3.929	1.215	4.167	0.986
3. I am interested in many issues	4.333	0.661	3.929	1.303	3.933	1.258
5. I am able to relate to a wide variety of issues	4.133	0.730	3.750	1.295	3.922	1.172
7. I enjoy finding answers to challenging questions	4.267	0.785	3.79	1.134	3.733	1.461
8. I am a good problem solver	3.867	1.042	3.786	1.031	3.767	1.165
9. I am confident that I can reach a reasonable conclusion	4.067	0.944	3.643	1.224	3.800	1.186
14. I am able to apply my knowledge to a wide variety of issues	4.267	0.450	3.714	1.182	4.367	0.809
17. I am able to explain things clearly	3.767	0.971	3.429	1.317	3.700	1.002
18. I ask good questions when trying to clarify a solution	4.167	0.747	3.464	1.170	3.867	1.042
19. I present issues in a clear and concise manner	3.833	0.913	3.571	1.260	3.600	1.037
22. I keep on working on things until I get them right	3.967	0.999	3.786	1.134	3.400	1.221

Overall, the three groups responded positively to each statement, but those students with a CGPA between 2.7 and 3.29 reported mean scores of 3.429 to 3.929 on a five-point Likert scale, lower than those of the other groups. Again, due to a lack of assumption of normality, the Kruskal-Wallis Rank Score Test was utilized to determine whether these differences in mean were significant. These results can be seen in Table 38.

Table 38

Kruskal-Wallis Rank Score Test for UF/EMI Engagement Scores of the Participants by CGPA

Item	Mean Rank			χ^2	*df*	*p*
	3.3-4.0 (*n*=30)	2.7-3.29 (*n*=28)	0-2.69 (*n*=30)			
2. I look for opportunities to solve problems	46.75	41.02	45.50	.974	2	.614
3. I am interested in many issues	47.40	43.00	43.00	.702	2	.704
5. I am able to relate to a wide variety of issues	46.23	41.55	45.52	.714	2	.700
7. I enjoy finding answers to challenging questions	49.47	40.00	43.73	2.335	2	.308
8. I am a good problem solver	46.12	42.84	44.43	.345	2	.842
9. I am confident that I can reach a reasonable conclusion	49.17	39.79	44.23	2.483	2	.289
14. I am able to apply my knowledge to a wide variety of issues	45.07	35.50	52.33	8.984	2	.011
17. I am able to explain things clearly	46.67	41.43	45.20	.860	2	..650
18. I ask good questions when trying to clarify a solution	51.40	36.14	45.40	7.131	2	.028
19. I present issues in a clear and concise manner	47.42	43.61	42.42	.883	2	.643
22. I keep on working on things until I get them right	49.93	45.91	37.75	4.462	2	.107

There were significant differences in regards to two statements. The null hypothesis was disproven in regards to statements 14 (p=.011) and 18 (p=.028), indicating that the groups differed significantly from one another. Curiously, the students with a CGPA below 2.7 had a significantly higher mean score than those with a CGPA between 2.7 and 3.3 in response to statement 14. Students with a CGPA of 3.3 or higher had a significantly higher response to statement 18 than those with a CGPA between 2.7 and 3.3. These suggest that those with higher academic performance tend to exhibit better *Engagement* skills in specific aspects of *Engagement* related to asking good questions to find solutions. Although surprisingly, those with lower academic performance perceive themselves to apply knowledge more effectively than those with an average CGPA.

Cognitive Maturity

The second disposition that this chapter will examine is *Cognitive Maturity*. This refers to 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 dispositions" (Bisdorf-Rhoades et al., 2005, p. 4). The construct included 8 items (α= .862). Although the sample size may affect the significance of the results, factor analysis indicated satisfactory construct validity (Appendix F).

Cognitive Maturity: Dispositions Possessed as Perceived by Students

First, descriptive analysis was conducted. The mean and standard deviation were calculated for each statement. The 89 participants' results in relation to these items can be seen below in Table 39.

Table 39

UF/EMI Cognitive Maturity Scores of the Participants

Item	*n*	*M*	*SD*
1. I listen carefully to the opinions of others even when they disagree with me	89	4.18	0.91
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	89	3.94	0.95
13. I try to consider the facts without letting my biases affect my decisions	89	4.01	1.02
16. I can get along with people who do not share my opinions	89	3.73	1.19
20. I consider how my own biases affect my opinions	89	4.03	1.103
24. I try to find multiple solutions to problems	89	3.72	0.93
25. I ask many questions when making a decision	89	3.97	1.06
26. I believe that most problems have more than one solution	89	4.13	1.10

The students most strongly agreed with the statement "I listen carefully to the opinions of others even when they disagree with me" *(M*=4.18; *SD*=0.91), followed by "I believe that most problems have more than one solution" (*M*=4.13;

SD=1.10). On the other hand, they most disagreed with the statements "I try to find multiple solutions to problems" (*M*=3.72; *SD*=0.93) and "I can get along with people who do not share my opinions" (*M*=3.73; *SD*=1.19). There was not a large degree of variance between respondents in most cases, however the greatest difference occurred in response to the statements "I can get along with people who do not share my opinions" (*SD*=1.19) and "I believe that most problems have more than one solution" (*SD*=1.10).

Difference in Dispositions

After the mean and standard deviations for the *Cognitive Maturity* Disposition were calculated, a number of comparisons were made. The mean scores were compared according to department, English preparatory program experience, age, gender, type of high school, letter grade, and CGPA.

Department The participants studying in the Faculty of Engineering and in the Faculty of Science (*n*=30) were also compared against participants studying in other departments (*n*=59) in terms of their scores on the *Cognitive Maturity* construct which consisted of eight statements. The mean scores and standard deviations were calculated for *Cognitive Maturity*, as well as for each statement individually. The average *Cognitive Maturity* for each group can be seen below in Table 40

Table 40

UF/EMI Cognitive Maturity Average Score of the Participants by Academic Department

Construct	Faculty of Engineering + Faculty of Science (*n*=30)		Other Faculties* (*n*=59)	
	M	*SD*	*M*	*SD*
Cognitive Maturity Average Score	3.900	0.799	3.998	0.702

* (Faculty of Art, Design, and Architecture; Business Administration; Economics, Administrative, and Social Sciences; Humanities and Letters; Law)

Both groups perceived themselves to have high *Cognitive Maturity*. The students who studied in faculties other than the Faculty of Engineering and the Faculty of Science are seen to have slightly higher mean scores.

Based on the results of a normality tests, a non-parametric test was chosen to compare the significance of these results. The Mann-Whitney U test is shown below.

Table 41

The Mann-Whitney U Test for UF/EMI Cognitive Maturity Average Score of the Participants by Academic Department

Construct	Mean Rank		*U*	*z*	*p*
	Faculty of Engineering + Faculty of Science (*n*=30)	Other Faculties* (*n*=59)			
Cognitive Maturity Average Score	43.87	45.58	851.000	-0.297	.767

* (Faculty of Art, Design, and Architecture; Business Administration; Economics, Administrative, and Social Sciences; Humanities and Letters; Law)

The *p* value (.767) indicates that any difference in *Cognitive Maturity* between the two groups may be the result of random chance. Therefore, there is no evidence that the two groups differed significantly in terms of *Cognitive Maturity*.

The researcher also investigated the mean scores of the two groups for each statement within the *Cognitive Maturity* construct (Table 42).

Table 42

UF/EMI Cognitive Maturity Scores of the Participants by Department

Item	Faculty of Engineering + Faculty of Science (*n*=30)		Other Faculties* (*n*=59)	
	M	*SD*	*M*	*SD*
1. I listen carefully to the opinions of others even when they disagree with me	4.233	1.006	4.153	0.867
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	3.867	0.937	3.983	0.956
13. I try to consider the facts without letting my biases affect my decisions	4.167	0.874	3.932	1.081

Item	Faculty of Engineering + Faculty of Science (*n*=30)		Other Faculties* (*n*=59)	
	M	*SD*	*M*	*SD*
16. I can get along with people who do not share my opinions	3.533	1.252	3.831	1.162
20. I consider how my own biases affect my opinions	3.867	1.137	4.119	0.966
24. I try to find multiple solutions to problems	3.533	1.167	3.814	0.776
25. I ask many questions when making a decision	3.900	1.155	4.000	1.017
26. I believe that most problems have more than one solution	4.100	1.242	4.153	1.031

* (Faculty of Art, Design, and Architecture; Business Administration; Economics, Administrative, and Social Sciences; Humanities and Letters; Law)

Both groups responded relatively positively to each statement, with the lowest average score for either group being 3.533 on a five-point Likert scale. The largest disparity in mean score between the two groups appeared in statement 16. In order to determine whether the differences in responses among the two groups was statistically significant a Mann-Whitney U test was conducted (Table 43).

Table 43

The Mann-Whitney U Test for UF/EMI Cognitive Maturity Scores of the Participants by Academic Department

Item	Mean Rank		*U*	*z*	*p*
	Faculty of Engineering + Faculty of Science (*n*=30)	Other Faculties* (*n*=59)			
1. I listen carefully to the opinions of others even when they disagree with me	48.02	43.47	794.500	-0.898	.369
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	42.80	46.12	819.000	-0.679	.497
13. I try to consider the facts without letting my biases affect my decisions	48.07	43.44	793.000	-0.914	.361
16. I can get along with people who do not share my opinions	41.35	46.86	775.500	-1.064	.288
20. I consider how my own biases affect my opinions	41.92	46.57	792.500	-0.899	.369
24. I try to find multiple solutions to problems	42.52	46.26	810.500	-0.799	.424
25. I ask many questions when making a decision	44.28	45.36	863.500	-0.204	.838

Item	Mean Rank		*U*	*z*	*p*
	Faculty of Engineering + Faculty of Science (*n*=30)	Other Faculties* (*n*=59)			
26. I believe that most problems have more than one solution	46.38	44.30	843.500	-0.395	.693

* (Faculty of Art, Design, and Architecture; Business Administration; Economics, Administrative, and Social Sciences; Humanities and Letters; Law)

It can be observed that despite the fact that the two groups differed in regards to the mean scores, this cannot be considered statistically significant as the null hypothesis was not disproved in any case. Therefore, there is no indication that the participants' *Cognitive Maturity* differed according to Academic Department.

English Preparatory Program Experience This study also investigated whether or not *Cognitive Maturity* differed according to attendance of the English preparatory program. The mean and standard deviation were calculated for their *Cognitive Maturity* and for each statement within this construct. The average *Cognitive Maturity* score is shown below.

Table 44

UF/EMI Cognitive Maturity Average Score of the Participants by Attendance of English Preparatory Program

Construct	Attended the English Preparatory Program (*n*=22)		Did not attend the English Preparatory Program (*n*=67)	
	M	*SD*	*M*	*SD*
Cognitive Maturity Average Score	3.938	0.642	3.974	0.765

Both groups perceived themselves to have high *Cognitive* Maturity, indicated by mean scores that approached 4 on five-point Likert scale. It can be seen that those who had not attended the English Preparatory Program reported a higher mean score. A normality test indicated that non-parametric tests should be used to compare the

two groups as the assumption of normality was not met. Thus, the researcher utilized the Mann-Whitney U test to compare the two groups (Table 45).

Table 45

The Mann-Whitney U Test for UF/EMI Cognitive Maturity Average Score of the Participants by Attendance of the English Preparatory Program

Construct	Mean Rank		*U*	*z*	*p*
	Attended the English Preparatory Program (*n*=22)	Did not attend the English Preparatory Program (*n*=67)			
Cognitive Maturity Average Score	40.48	46.49	637.500	-0.952	.341

As the *p* value did not exceed .05, any difference in mean may be the result of random chance which indicates the groups *Cognitive Maturity* did not differ according to attendance of the English preparatory program.

The two groups also differed in their responses to the eight statements within the *Cognitive Maturity* construct. Their mean scores and standard deviations are illustrated in Table 46.

Table 46

UF/EMI Cognitive Maturity Scores of the Participants by Attendance of English Preparatory Program

Item	Attended the English Preparatory Program (*n*=22)		Did not attend the English Preparatory Program (*n*=67)	
	M	*SD*	*M*	*SD*
1. I listen carefully to the opinions of others even when they disagree with me	4.227	0.869	4.164	0.931
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	3.864	0.834	3.970	0.984
13. I try to consider the facts without letting my biases affect my decisions	4.046	0.950	4.000	1.044

Item	Attended the English Preparatory Program (*n*=22)		Did not attend the English Preparatory Program (*n*=67)	
	M	*SD*	*M*	*SD*
16. I can get along with people who do not share my opinions	3.818	0.958	3.702	1.267
20. I consider how my own biases affect my opinions	4.091	0.971	4.015	1.052
24. I try to find multiple solutions to problems	3.682	0.839	3.731	0.963
25. I ask many questions when making a decision	3.682	1.129	4.060	1.028
26. I believe that most problems have more than one solution	4.091	0.811	4.149	1.184

Both groups responded positively to each statement, with all responses falling in a range of 3.62 to 4.227 on a five-point Likert scale. The Mann-Whitney U test was used to find whether the two groups differed significantly (Table 47).

Table 47

The Mann-Whitney U Test for UF/EMI Cognitive Maturity Scores of the Participants by Attendance of English Preparatory Program

Item	Mean Rank		*U*	*z*	*p*
	Attended the English Preparatory Program (*n*=22)	Did not attend the English Preparatory Program (*n*=67)			
1. I listen carefully to the opinions of others even when they disagree with me	45.75	44.75	720.500	-0.179	.858
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	40.80	46.38	644.500	-1.043	.297
13. I try to consider the facts without letting my biases affect my decisions	44.91	45.03	735.000	-0.022	.983
16. I can get along with people who do not share my opinions	44.27	45.24	721.000	-0.170	.865
20. I consider how my own biases affect my opinions	45.61	44.80	723.500	-0.144	.886
24. I try to find multiple solutions to problems	42.80	45.72	688.500	-0.570	.569
25. I ask many questions when making a decision	38.50	47.13	594.000	-1.490	.569
26. I believe that most problems have more than one solution	39.59	46.78	618.000	-1.241	.214

There was no significant difference between these two groups as in every case, the *p* value was above an alpha set at .05. This indicates that any difference in mean may be the result of chance. The Mann-Whitney U tests suggest that the participants' *Cognitive Maturity* did not differ according to attendance of English preparatory program.

Age It was also investigated as to whether the disposition towards *Cognitive Maturity* differed according to age. The students were sorted into those who were 18 or 19 (*n*=60) and those who were 20-21 (*n*=29). Descriptive statistics were calculated for each statement to observe whether these two groups differed. The mean and standard deviations for the average score was calculated. The results for the average and sum total scores are seen below.

Table 48

UF/EMI Cognitive Maturity Average Score of the Participants by Age

Construct	18-19 (*n*=60)		20-21 (*n*=29)	
	M	*SD*	*M*	*SD*
Cognitive Maturity Average Score	3.967	0.726	3.961	0.760

Both age groups perceived themselves to have high *Cognitive Maturity*, with mean scores of 3.967 and 3.961 on a five-point Likert scale. There was very little difference between the means of the two groups, but those aged 18 to 19 years had a higher mean score than those aged 10 or 21. Mann-Whitney U, a non-parametric test was chosen to compare the significance of these findings given the results of a normality test. This is shown in Table 49.

Table 49

The Mann-Whitney U Test for UF/EMI Cognitive Maturity Average Score of the Participants by Age

Construct	Mean Rank		*U*	*z*	*p*
	18-19 (*n*=60)	20-21 (*n*=29)			
Cognitive Maturity Average Score	45.02	44.97	869.000	-0.009	.993

The *p* value (*p*=.993) indicates that any difference in *Cognitive Maturity* may likely have been the result of random chance. In terms of their differences in response to each of the eight statements, the results are displayed below.

Table 50

UF/EMI Cognitive Maturity Scores of the Participants by Age

Item	18-19 (*n*=60)		20-21 (*n*=29)	
	M	*SD*	*M*	*SD*
1. I listen carefully to the opinions of others even when they disagree with me	4.217	0.885	4.103	0.976
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	3.817	1.000	4.207	0.774
13. I try to consider the facts without letting my biases affect my decisions	4.033	0.974	3.966	1.117
16. I can get along with people who do not share my opinions	3.700	1.239	3.793	1.114
20. I consider how my own biases affect my opinions	4.050	1.032	4.000	1.035
24. I try to find multiple solutions to problems	3.683	1.000	3.793	0.774
25. I ask many questions when making a decision	4.067	0.989	3.759	1.185
26. I believe that most problems have more than one solution	4.167	1.076	4.069	1.163

Both groups agreed with the statements as more than half of all responses were above 4 on a five-point Likert scale and the lowest response for either group was 3.683. The two groups differed most concerning statement 11. After the mean and standard deviations were calculated Mann-Whitney U tests were conducted to

analyze the significance of these differences. The results in terms of average score are seen in Table 51.

Table 51

The Mann-Whitney U Test for UF/EMI Cognitive Maturity Scores of the Participants by Age

Item	Mean Rank		*U*	*z*	*p*
	18-19 (*n*=60)	20-21 (*n*=29)			
1. I listen carefully to the opinions of others even when they disagree with me	46.04	42.84	807.500	-0.625	.532
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	41.97	51.28	688.000	-1.889	.059
13. I try to consider the facts without letting my biases affect my decisions	45.04	44.91	867.500	-0.025	.980
16. I can get along with people who do not share my opinions	45.01	44.98	869.500	-0.005	.996
20. I consider how my own biases affect my opinions	45.73	43.48	826.000	-0.431	.666
24. I try to find multiple solutions to problems	44.71	45.60	852.500	-0.189	.850
25. I ask many questions when making a decision	46.96	40.95	752.500	-1.127	.260
26. I believe that most problems have more than one solution	45.65	43.66	831.000	-0.374	.708

In most cases the *p* value was above .500, which indicates a likelihood that the results in random chance. The *p* value for statement 11 of .059 still fell above an alpha set at .05, which means that the groups cannot be assumed to differ meaningfully. The results of the Mann-Whitney U test indicate that *Cognitive Maturity* did not differ according to age.

Gender In addition, this study investigated whether the disposition towards *Cognitive Maturity* differed according to gender. Two groups were formed, those who identified as male or who preferred not to answer (*n*=31) and those who were female (*n*=58). First, it calculated the mean and standard deviation for each group's

responses in terms of *Cognitive Maturity* average. The mean and standard deviation of the average score are seen in Table 52.

Table 52

UF/EMI Cognitive Maturity Average Score of the Participants by Gender

Construct	Male + Prefer not to Answer (*n*=31)		Female (*n*=58)	
	M	*SD*	*M*	*SD*
Cognitive Maturity Average Score	3.944	0.780	3.976	0.713

Both groups responded positively as the average score in both cases was near 4 on a five-point Likert scale. The female students reported to have a slightly higher overall *Cognitive Maturity* disposition compared to male students and students who preferred to not answer. The results of a normality test led the researcher to use a non-parametric test in order to determine the significance of these responses so the Mann-Whitney U test was selected (Table 53).

Table 53

The Mann-Whitney U Test for UF/EMI Cognitive Maturity Average Score of the Participants by Gender

Construct	Mean Rank		*U*	*z*	*p*
	Male + Prefer not to Answer (*n*=31)	Female (*n*=58)			
Cognitive Maturity Average Score	44.34	45.35	878.500	-0.178	.859

As the *p* value was above .05, any difference in mean cannot be assumed to be significant. Thus, overall *Cognitive Maturity* was not shown to differ according to gender.

The study also investigated the responses of the two groups in regards to each statement indicating *Cognitive Maturity*. Their mean responses and standard deviations can be seen in Table 54.

Table 54

UF/EMI Cognitive Maturity Scores of the Participants by Gender

Item	Male + Prefer not to Answer (*n*=31)		Female (*n*=58)	
	M	*SD*	*M*	*SD*
1. I listen carefully to the opinions of others even when they disagree with me	4.323	.909	4.103	.912
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	4.032	.912	3.897	.968
13. I try to consider the facts without letting my biases affect my decisions	3.936	1.237	4.052	.887
16. I can get along with people who do not share my opinions	3.581	1.336	3.810	1.115
20. I consider how my own biases affect my opinions	3.968	1.169	4.069	.953
24. I try to find multiple solutions to problems	3.613	1.022	3.776	.879
25. I ask many questions when making a decision	4.161	1.068	3.862	1.050
26. I believe that most problems have more than one solution	3.936	1.237	4.241	1.014

The mean responses were relatively high for each statement, with the lowest response being 3.581 on a five-point Likert scale. The two groups showed the greatest disparity in mean score of their responses to statement 25 and 26. The Mann-Whitney U test was used to determine whether or not these differences between the two groups were significant (Table 55).

Table 55

The Mann-Whitney U Test for UF/EMI Cognitive Maturity Scores of the Participants by Gender

Item	Mean Rank		*U*	*z*	*p*
	Male + Prefer not to Answer (*n*=31)	Female (*n*=58)			
1. I listen carefully to the opinions of others even when they disagree with me	50.27	42.18	735.500	-1.609	.108
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	47.19	43.83	831.000	-0.694	.487
13. I try to consider the facts without letting my biases affect my decisions	46.35	44.28	857.000	-0.414	.679
16. I can get along with people who do not share my opinions	42.98	46.08	836.500	-0.602	.547
20. I consider how my own biases affect my opinions	44.97	45.02	898.000	-0.010	.992
24. I try to find multiple solutions to problems	42.90	46.12	834.000	-0.692	.489
25. I ask many questions when making a decision	50.23	42.21	737.000	-1.528	.126
26. I believe that most problems have more than one solution	40.68	47.31	765.000	-1.266	.206

In no cases was the null hypothesis disproved as the *p* value exceeded .05 for each statement. This indicates there is a greater than 5% likelihood that the results are due to random chance for each statement. Thus, the Mann-Whitney U test suggests that *Cognitive Maturity* did not differ according to gender.

Type of High School It was also investigated as to whether students in EGAP courses differed in the disposition towards *Cognitive Maturity* according to the high school they attended. First, the researcher calculated the average *Cognitive Maturity* mean scores and standard deviations for students who attended public school (*n*=32) and private school (*n*=57). These results are displayed in Table 56.

Table 56

UF/EMI Cognitive Maturity Average Score of the Participants by High School

Construct	Public High School (*n*=32)		Private High School (*n*=57)	
	M	*SD*	*M*	*SD*
Cognitive Maturity Average Score	4.051	0.741	3.917	0.730

Both groups considered themselves to have high *Cognitive Maturity.* However, the students who had attended public schools reported higher levels of overall *Cognitive Maturity*, with a mean score above 4 on a five-point Likert scale. A normality test resulted in the researcher using a non-parametric test to compare the significance of these results. The Mann-Whitney U test was chosen (Table 57).

Table 57

The Mann-Whitney U Test for UF/EMI Cognitive Maturity Average Score of the Participants by High School

Construct	Mean Rank		*U*	*z*	*p*
	Public High School (*n*=32)	Private High School (*n*=57)			
Cognitive Maturity Average Score	48.88	42.82	788.000	-1.066	.286

The *p* value of .286 exceeded an alpha set at .05, suggesting any difference between the two groups may be the result of random chance. Thus, it cannot be concluded that *Cognitive Maturity* differed according to high school attended. In terms of the two groups responses to the statements that indicate *Cognitive Maturity*, the results are shown in Table 58.

Table 58

UF/EMI Cognitive Maturity Scores of the Participants by High School

Item	Public High School (*n*=32)		Private High School (*n*=57)	
	M	*SD*	*M*	*SD*
1. I listen carefully to the opinions of others even when they disagree with me	4.219	0.870	4.158	0.941
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	4.031	0.782	3.895	1.030
13. I try to consider the facts without letting my biases affect my decisions	4.250	0.880	3.877	1.070
16. I can get along with people who do not share my opinions	3.875	1.100	3.649	1.246
20. I consider how my own biases affect my opinions	4.188	0.859	3.947	1.109
24. I try to find multiple solutions to problems	3.812	0.965	3.667	0.913
25. I ask many questions when making a decision	3.781	1.211	4.070	0.961
26. I believe that most problems have more than one solution	4.250	1.078	4.070	1.116

The mean scores indicate that both groups responded positively to each statement, with half exceeding 4 on a five-point Likert scale, and the lowest mean response for either group being 3.649. Yet, differences in mean between the groups can be observed, as participants that had attended public schools self-reported higher critical thinking dispositions on seven of the eight statements within the *Cognitive Maturity* construct. To determine whether the differences in mean were statistically significant, the Mann-Whitney U test was conducted. The results for the average score can be seen below.

Table 59

The Mann-Whitney U Test for UF/EMI Cognitive Maturity Scores of the Participants by High School

Item	Mean Rank		*U*	*z*	*p*
	Public High School (*n*=32)	Private High School (*n*=57)			
1. I listen carefully to the opinions of others even when they disagree with me	45.81	44.54	868.000	-0.254	.799
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	45.58	44.68	893.500	-0.188	.851
13. I try to consider the facts without letting my biases affect my decisions	51.08	41.59	717.500	-1.903	.057
16. I can get along with people who do not share my opinions	47.98	43.32	816.500	-0.914	.361
20. I consider how my own biases affect my opinions	47.48	43.61	832.500	-0.761	.447
24. I try to find multiple solutions to problems	47.77	43.45	823.500	-0.935	.350
25. I ask many questions when making a decision	42.08	46.64	818.500	-0.876	.381
26. I believe that most problems have more than one solution	48.05	43.29	814.500	-0.914	.361

In each case, the *p* value was greater than .05 and failed to disprove the null hypothesis. Thus, any difference between the two groups may be explained by chance. Therefore, there is no evidence that the participants differ in disposition towards *Cognitive Maturity* according to the high school they attended.

Letter Grade This study further examined whether the *Cognitive Maturity* construct differed according to letter grade received in the participants' EGAP course. The mean and standard deviations were calculated for students who received an A- or A (*n*=30) and for those who received a C through B+ (*n*=59). The results for the mean and standard deviations of the construct average scores are shown in Table 60.

Table 60

UF/EMI Cognitive Maturity Average Scores of the Participants by Letter Grade

Construct	A- and A (*n*=30)		C through B+ (*n*=59)	
	M	*SD*	*M*	*SD*
Cognitive Maturity Average Score	4.300	0.351	3.795	0.816

Although both groups reported relatively high *Cognitive Maturity*, the students who had received As or A-s in their first semester EGAP course had higher mean scores as well as a much lower standard deviation than those who received lower grades. Based on the results of a normality test, the researcher chose to use the Mann-Whitney U test, a non-parametric test, to compare the significance of these results. This is shown in Table 61.

Table 61

The Mann-Whitney U Test for UF/EMI Cognitive Maturity Average and Score of the Participants by Letter Grade

Construct	Mean Rank		*U*	*z*	*p*
	A- and A (*n*=30)	C through B+ (*n*=59)			
Cognitive Maturity Average Score	57.65	38.57	505.500	-3.312	.001

The *p* value of .001 indicates a significant difference between the two groups in terms of *Cognitive Maturity*, as it is extremely unlikely to result due to chance. This shows that the participants' *Cognitive Maturity* differs according to the letter grade they received in an EGAP course and that those who received an A or A- reported a significantly higher level of *Cognitive Maturity*.

The study also examined the responses of these two groups to each of the eight statements indicating *Cognitive Maturity*. Table 62 shows their mean scores and standard deviations.

Table 62

UF/EMI Cognitive Maturity Scores of the Participants by Letter Grade

Item	A- and A (*n*=30)		C through B+ (*n*=59)	
	M	*SD*	*M*	*SD*
1. I listen carefully to the opinions of others even when they disagree with me	4.433	0.504	4.051	1.041
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	4.233	0.774	3.797	0.996
13. I try to consider the facts without letting my biases affect my decisions	4.367	0.490	3.831	1.162
16. I can get along with people who do not share my opinions	4.133	0.860	3.525	1.291
20. I consider how my own biases affect my opinions	4.500	0.509	3.797	1.141
24. I try to find multiple solutions to problems	4.033	0.669	3.559	1.005
25. I ask many questions when making a decision	4.167	0.874	3.864	1.137
26. I believe that most problems have more than one solution	4.533	0.819	3.932	1.172

The students who had received an A or an A- had a higher mean score in their responses to each question than those who had not, in each case exceeding 4.0 on a five-point Likert scale. It was also notable that the standard deviation was less in each case among students who had received an A or A-, indicating that there was relatively little variation in their responses to these statements. A Mann-Whitney U test was subsequently conducted to interpret these results.

Table 63

The Mann-Whitney U Test for UF/EMI Cognitive Maturity Scores of the Participants by Letter Grade

Item	Mean Rank		*U*	*z*	*p*
	A- and A (*n*=30)	C through B+ (*n*=59)			
1. I listen carefully to the opinions of others even when they disagree with me	49.98	42.47	735.500	-1.483	.138

Item	Mean Rank		*U*	*z*	*p*
	A- and A (*n*=30)	C through B+ (*n*=59)			
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	52.60	41.14	657.000	-2.346	.019
13. I try to consider the facts without letting my biases affect my decisions	51.48	41.70	690.500	-1.932	.053
16. I can get along with people who do not share my opinions	52.32	41.28	665.500	-2.132	.033
20. I consider how my own biases affect my opinions	55.50	39.66	570.000	-3.060	.002
24. I try to find multiple solutions to problems	51.90	41.49	678.000	-2.220	.026
25. I ask many questions when making a decision	48.67	43.14	775.000	-1.046	.296
26. I believe that most problems have more than one solution	54.77	40.03	592.000	-2.789	.005

In five of the eight statements within the construct, the Mann-Whitney U test revealed a significance between the two groups. Significant difference was found for statements 11, 16, 20, 24, and 26. In each case, the group of students who received an A or A- (*n*=30) reported significantly higher scores than those who received a B+ or lower (*n*=59). In this case, the Mann-Whitney U test revealed that the participants' *Cognitive Maturity* differed according to letter grade in an EGAP course, both in terms of measuring their overall perceived disposition and in terms of a majority of the indicators.

CGPA This study also investigated whether students differed in their disposition to *Cognitive Maturity* according to their CGPA. The mean and standard deviations were calculated for students who had a CGPA of 3.3 and above (*n*=30), 2.7 through 3.29 (*n*=28), and for those with a CGPA below 2.7 (*n*=30). First, the mean and standard deviation were calculated for *Cognitive Maturity*, which can be seen in Table 64.

Table 64

UF/EMI Cognitive Maturity Average Scores of the Participants by CGPA

Construct	3.3-4.0 (*n*=30)		2.7-3.29 (*n*=28)		0-2.69 (*n*=30)	
	M	SD	M	SD	M	SD
Cognitive Maturity Average	4.200	0.447	3.813	0.988	3.867	0.656

It can be seen that all three groups responded relatively positively, each averaging an overall *Cognitive Maturity* score of at least 3.813 on a five-point Likert scale. However, those who had a CGPA above 3.3 had a notably higher mean score than the other two groups. Due to the results of a normality test, the non-parametric Kruskal-Wallis Rank Score Test was used to compare these three groups.

Table 65

Kruskal-Wallis Rank Score Test for UF/EMI Cognitive Maturity Average Score of the Participants by CGPA

Construct	Mean Rank			χ^2	*df*	*p*
	3.3-4.0 (*n*=30)	2.7-3.29 (*n*=28)	0-2.69 (*n*=30)			
Cognitive Maturity Average Score	51.80	44.09	37.58	4.708	2	.095

The *p* value of .095 exceeded an alpha set at .05, meaning that the differences between the three groups cannot be assumed to be significant. In addition, the researcher examined the average scores of each group in response to each of the statements within the *Cognitive Maturity* Construct, which can be seen in Table 66.

Table 66

UF/EMI Cognitive Maturity Scores of the Participants by CGPA

Item	3.3-4.0 (*n*=30)		2.7-3.29 (*n*=28)		0-2.69 (*n*=30)	
	M	*SD*	*M*	*SD*	*M*	*SD*
1. I listen carefully to the opinions of others even when they disagree with me	4.400	0.498	3.964	1.232	4.167	0.874
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	4.233	0.774	3.714	1.182	3.867	0.819
13. I try to consider the facts without letting my biases affect my decisions	4.000	0.910	4.000	1.155	4.033	1.033
16. I can get along with people who do not share my opinions	3.933	1.081	3.536	1.319	3.700	1.208
20. I consider how my own biases affect my opinions	4.333	0.661	3.857	1.268	3.900	1.062
24. I try to find multiple solutions to problems	4.033	0.669	3.536	1.138	3.567	0.898
25. I ask many questions when making a decision	4.267	0.907	3.929	1.016	3.700	1.208
26. I believe that most problems have more than one solution	4.400	0.932	3.964	1.232	4.000	1.114

Overall the responses of all groups were relatively high, with the lowest response by any group to any statement being 3.536 on a five-point Likert scale to statements 16 and 24 by those who had a CGPA of 2.7 to 3.29. It can also be observed that the students with a CGPA of 3.3 or greater had higher average scores than the other groups in each case, with the exception of statement 13. To determine whether these differences were significant, a Kruskal-Wallis Rank Score Test was used (Table 67).

Table 67

Kruskal-Wallis Rank Score Test for UF/EMI Cognitive Maturity Scores of the Participants by CGPA

Item	Mean Rank			χ^2	*df*	*p*
	3.3-4.0 (*n*=30)	2.7-3.29 (*n*=28)	0-2.69 (*n*=30)			
1. I listen carefully to the opinions of others even when they disagree with me	47.90	42.11	43.33	1.095	2	.579

Item	Mean Rank			χ^2	*df*	*p*
	3.3-4.0 (*n*=30)	2.7-3.29 (*n*=28)	0-2.69 (*n*=30)			
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	51.95	40.48	40.80	5.411	2	.067
13. I try to consider the facts without letting my biases affect my decisions	43.10	45.45	45.02	.183	2	.912
16. I can get along with people who do not share my opinions	48.70	40.96	43.60	1.725	2	.422
20. I consider how my own biases affect my opinions	49.98	42.38	41.00	2.669	2	.263
24. I try to find multiple solutions to problems	51.35	41.77	40.20	5.044	2	.080
25. I ask many questions when making a decision	51.68	42.29	39.38	4.528	2	.104
26. I believe that most problems have more than one solution	51.13	40.95	41.18	3.690	2	.158

The *p* value exceeded .05 in each case, indicating that the differences may be explained by random chance. This indicates that it cannot be assumed that the participants differed in *Cognitive Maturity* according to their overall CGPA.

Innovativeness

The final disposition that this chapter examined was *Innovativeness*, which that measures "the predisposition to be intellectually curious and desire to know the truth" (Bisdorf-Rhoades et al., 2005, p. 4). A number of steps were taken to ensure the validity and reliability of the tool in measuring items within this construct. The construct consisted of seven items (α= .848) and factor analysis suggested adequate construct validity (Appendix F). Only item 6 had a low value, indicating only a very weak communality with the other variables (Appendix F) (Child, 1975).

Innovativeness: Dispositions Possessed as Perceived by Students

This study first examined the students' answers to the statements within the *Innovativeness* construct. The UF/EMI measures the disposition to *Innovativeness* through seven items. The mean and standard deviation of the participants' responses to each statement can be seen below in Table 68.

Table 68

UF/EMI Innovativeness Scores of the Participants

Item	*n*	*M*	*SD*
4. I enjoy learning about many topics	89	4.09	1.11
6. I ask lots of questions in a learning environment	89	3.06	1.27
10. I strive to be well informed	89	4.03	1.03
12. I enjoy solving problems	89	3.76	1.10
15. I enjoy learning even when I am not in school	89	4.22	0.85
21. I search for the truth even when it makes me uncomfortable	89	3.98	1.12
23. I will go out of my way to find the right answers to a problem	89	3.72	1.03

In regards to the *Innovativeness* construct, responses to one question were significantly lower than the others. Concerning the statement, "I ask lots of questions in a learning environment" (*M* 3.06; *SD* 1.27) the mean response was greater than one standard deviation (.73) lower than the total mean score (3.90). However, this item also reflected greater variance among respondents in terms of statements connected to not only *Innovativeness* but also in comparison to all statements on the UF/EMI. This is evidenced by the fact that although the mean response rate (3.06) was lower than all others in regards to the *Innovativeness* construct and to the UF/EMI overall, the mean response also has the greatest standard deviation (1.27).

The two responses within the *Innovativeness* construct that the participants most agreed with were "I enjoy learning even when I am not in school" (*M*=4.22; *SD*=.85) and "I enjoy learning about many topics" (*M*=4.09; *SD*=1.11).

Difference in Dispositions

In addition to investigating the participant's answers to the statements connecting to *Innovativeness*, this study also compared the participants' responses according to their department, English preparatory program experience, age, gender,

type of high school, letter grade and CGPA. These findings are shown in the following sub-sections.

Department It was investigated as to whether students studying in the Faculty of Engineering and the Faculty of Science (*n*=30) differed from those were not (*n*=59) in their responses to the seven statements that fall under the *Innovativeness* construct. First, the average *Innovativeness* scores were calculated for each group. These results are shown in Table 69.

Table 69

UF/EMI Innovativeness Average Score of the Participants by Academic Department

Construct	Faculty of Engineering + Faculty of Science (*n*=30)		Other Faculties* (*n*=59)	
	M	*SD*	*M*	*SD*
Innovativeness Average Score	3.833	0.826	3.840	0.766

* (Faculty of Art, Design, and Architecture; Business Administration; Economics, Administrative, and Social Sciences; Humanities and Letters; Law)

The two groups both perceive themselves to have relatively high *Innovativeness.* The difference in mean score between the two groups was relatively small, but it can be seen that in both cases students who were studying in departments other than the Faculty of Engineering and the Faculty of Science had a higher mean score. Based on the results of a normality test, the researcher used a non-parametric test to compare the significance of this finding. The Mann-Whitney U test results are seen in Table 70.

Table 70

The Mann-Whitney U Test for UF/EMI Innovativeness Average Score of the Participants by Academic Department

Construct	Mean Rank		*U*	*z*	*p*
	Faculty of Engineering + Faculty of Science (*n*=30)	Other Faculties* (*n*=59)			
Innovativeness Average Score	45.52	44.74	869.500	-0.135	.892

* (Faculty of Art, Design, and Architecture; Business Administration; Economics, Administrative, and Social Sciences; Humanities and Letters; Law)

The *p* value of .892 indicates that there is a high chance any difference in mean occurred to random chance. Thus *Innovativeness* cannot be observed to differ according to academic department.

The study also investigated whether the two groups differed in terms of their response to each of the seven statements that indicate *Innovativeness*. The mean and standard deviations can be seen below.

Table 71

UF/EMI Innovativeness Scores of the Participants by Academic Department

Item	Faculty of Engineering + Faculty of Science (*n*=30)		Other Faculties* (*n*=59)	
	M	*SD*	*M*	*SD*
4. I enjoy learning about many topics	4.033	1.217	4.119	1.068
6. I ask lots of questions in a learning environment	3.000	1.438	3.085	1.193
10. I strive to be well informed	3.967	0.999	4.068	1.048
12. I enjoy solving problems	3.633	1.326	3.830	0.968
15. I enjoy learning even when I am not in school	4.367	0.809	4.153	0.867
21. I search for the truth even when it makes me uncomfortable	3.867	1.137	4.034	1.129
23. I will go out of my way to find the right answers to a problem	3.967	0.765	3.593	1.131

* (Faculty of Art, Design, and Architecture; Business Administration; Economics, Administrative, and Social Sciences; Humanities and Letters; Law)

Both groups responded relatively positively on a five-point Likert scale, with the exception of statement 3, in which the two groups averaged 3.00 and 3.085 respectively. In five of seven statements, those students studying in faculties other than science and engineering had higher mean scores. The Mann-Whitney U test was used to find whether or these two groups differed significantly in regards to *Innovativeness*. Table 72 shows their mean scores and standard deviations in regards to each statement.

Table 72

The Mann-Whitney U Test for UF/EMI Innovativeness Scores of the Participants by Academic Department

Item	Mean Rank		*U*	*z*	*p*
	Faculty of Engineering + Faculty of Science (*n*=30)	Other Faculties* (*n*=59)			
4. I enjoy learning about many topics	44.87	45.07	881.000	-0.038	.970
6. I ask lots of questions in a learning environment	43.97	45.53	854.000	-0.289	.773
10. I strive to be well informed	42.48	46.28	809.500	-0.734	.463
12. I enjoy solving problems	44.45	45.28	868.500	-0.164	.870
15. I enjoy learning even when I am not in school	49.38	42.77	753.500	-1.294	.195
21. I search for the truth even when it makes me uncomfortable	41.78	46.64	788.500	-0.923	.356
23. I will go out of my way to find the right answers to a problem	49.32	42.81	755.500	-1.317	.188

* (Faculty of Art, Design, and Architecture; Business Administration; Economics, Administrative, and Social Sciences; Humanities and Letters; Law)

Although the two groups exhibited differences in mean scores to many of the statements, it can be seen that in no case is there a significant difference as the *p* score never fell below the alpha score of .05, indicating that the null hypothesis was not disproved. Therefore, any difference that exists may be explained by chance. Thus, according to the findings, there was no significant difference between students

enrolled in the Faculty of Engineering and the Faculty of Science and those who were not in regards to any of the statements that indicate *Innovativeness*.

English Preparatory Program Experience This study also investigated whether or not the participants' *Innovativeness* differed by attendance of an English preparatory program. First the mean and standard deviation was calculated for the average and sum total scores of those students who had attended the English preparatory program (*n*=22) and for those who had not (*n*=67). The results of the average scores can be seen in Table 73.

Table 73

UF/EMI Innovativeness Average Score of the Participants by Attendance of English Preparatory Program

Construct	Attended the English Preparatory Program (*n*=22)		Did not attend the English Preparatory Program (*n*=67)	
	M	*SD*	*M*	*SD*
Innovativeness Average Score	3.941	0.736	3.804	0.799

Both groups reported relatively high levels of *Innovativeness* with relatively little difference between them, yet it can be seen that the group that had attended the English Preparatory Program had a higher mean score than those who had not. Due to the results of a normality test, the researcher chose to use the non-parametric test, the Mann-Whitney U test, to compare the significance of this result. This can be seen in Table 74.

Table 74

The Mann-Whitney U Test for UF/EMI Innovativeness Average Score of the Participants by Attendance of the English Preparatory Program

Construct	Mean Rank		*U*	*z*	*p*
	Attended the English Preparatory Program (*n*=22)	Did not attend the English Preparatory Program (*n*=67)			
Innovativeness Average Score	48.77	43.76	654.000	-0.793	.428

A *p* value of .428 indicates that any difference in mean between the two groups may be caused by random chance. Thus, it cannot be asserted that the participants' *Innovativeness* differed according to attendance of the English Preparatory Program.

The study also examined whether the participants differed in terms of their responses to the seven statements within the *Innovativeness* construct according to their attendance of the English Preparatory program. Table 75 shows their mean responses and standard deviations.

Table 75

UF/EMI Innovativeness Scores of the Participants by Attendance of English Preparatory Program

Item	Attended the English Preparatory Program (*n*=22)		Did not attend the English Preparatory Program (*n*=67)	
	M	*SD*	*M*	*SD*
4. I enjoy learning about many topics	4.046	1.090	4.105	1.130
6. I ask lots of questions in a learning environment	3.318	1.041	2.970	1.337
10. I strive to be well informed	4.227	0.869	3.970	1.073
12. I enjoy solving problems	3.955	0.899	3.702	1.155
15. I enjoy learning even when I am not in school	4.136	0.990	4.254	0.804
21. I search for the truth even when it makes me uncomfortable	4.136	1.125	3.925	1.132

Item	Attended the English Preparatory Program (*n*=22)		Did not attend the English Preparatory Program (*n*=67)	
	M	*SD*	*M*	*SD*
23. I will go out of my way to find the right answers to a problem	3.773	1.193	3.702	0.985

Both groups responded positively to a majority of the statements with an exception of statement 6, to which the students who did not attend the English Preparatory program had a mean score below 3 on a five-point Likert scale. In terms of how the groups compared to one another, these results show that students who had attended the English Preparatory Program perceived themselves to have higher mean scores on statements 6, 10, 12, 21, and 23. The greatest difference between groups was in regard to statement 6. A Mann-Whitney U test was used to determine whether or not these differences were significant (Table 76).

Table 76

The Mann-Whitney U Test for UF/EMI Innovativeness Scores of the Participants by Attendance of English Preparatory Program

Item	Mean Rank		*U*	*z*	*p*
	Attended the English Preparatory Program (*n*=22)	Did not attend the English Preparatory Program (*n*=67)			
4. I enjoy learning about many topics	43.02	45.65	693.500	-0.452	.651
6. I ask lots of questions in a learning environment	49.59	43.49	636.000	-1.032	.302
10. I strive to be well informed	48.66	43.80	656.500	-0.857	.525
12. I enjoy solving problems	47.66	44.13	678.500	-0.636	.525
15. I enjoy learning even when I am not in school	44.36	45.21	723.000	-0.151	.880
21. I search for the truth even when it makes me uncomfortable	49.05	43.67	648.000	-0.933	.351
23. I will go out of my way to find the right answers to a problem	47.70	44.11	677.500	-0.663	.507

In each case the *p* value exceeded an alpha of .05, suggesting that the differences between groups may be caused by random chance, and thus cannot be assumed to be significant.

Age In addition, this study investigated whether or not the participants' disposition towards *Innovativeness* differed according to age. A mean score and standard deviation were calculated for the group of students aged 18-29 (*n*=60) and those who were between the ages of 20 and 21 (*n*=29) for the average *Innovativeness* scores as well as for the seven statements. Table 77 show the mean and standard deviation for the average scores.

Table 77

UF/EMI Innovativeness Average Scores of the Participants by Age

Construct	18-19 (*n*=60)		20-21 (*n*=29)	
	M	*SD*	*M*	*SD*
Innovativeness Average Score	3.857	0.768	3.798	0.823

Both groups reported relatively high *Innovativeness*, with only a small difference between them. To compare the groups, the researcher used the Mann-Whitney U test, as the results of a normality test indicated that a non-parametric test should be used. Table 78 shows the results.

Table 78

The Mann-Whitney U Test for UF/EMI Innovativeness Average Score of the Participants by Age

Construct	Mean Rank		*U*	*z*	*p*
	18-19 (*n*=60)	20-21 (*n*=29)			
Innovativeness Average Score	45.58	43.81	835.500	-0.303	.762

The two groups did not differ significantly as the *p* value was above .05. A .762 *p* value suggests it is likely that the difference in mean was caused by random chance. Thus *Innovativeness* was not observed to differ according to age.

The researcher also compared the responses to each of the seven indicators of *Innovativeness* between the two groups. Their mean and standard deviation for each of the seven statements within the *Innovativeness* construct are shown below.

Table 79

UF/EMI Innovativeness Scores of the Participants by Age

Item	18-19 (*n*=60)		20-21 (*n*=29)	
	M	*SD*	*M*	*SD*
4. I enjoy learning about many topics	4.117	1.151	4.035	1.052
6. I ask lots of questions in a learning environment	3.117	1.329	2.931	1.163
10. I strive to be well informed	4.017	1.066	4.069	0.961
12. I enjoy solving problems	3.767	1.110	3.759	1.091
15. I enjoy learning even when I am not in school	4.350	0.732	3.966	1.017
21. I search for the truth even when it makes me uncomfortable	3.933	1.163	4.069	1.067
23. I will go out of my way to find the right answers to a problem	3.700	1.013	3.759	1.091

Both groups generally responded positively to each statement, with an exception of statement 6. Those aged 18 or 19 had a mean score of 3.117, while those aged 20 or 21, averaged 2.931 on a five-point Likert scale. In regards to difference, there were not large differences in mean between the two groups, with the exception of statement 15. Still, there were some difference in mean between participants aged 18 to 19, and those aged 20 to 21. A Mann-Whitney U test was used to determine the significance of the differences between them. The results in regards to average and scores are seen in Table 80.

Table 80

The Mann-Whitney U Test for UF/EMI Innovativeness Scores of the Participants by Age

Item	Mean Rank		*U*	*z*	*p*
	18-19 (*n*=60)	20-21 (*n*=29)			
4. I enjoy learning about many topics	46.64	41.60	771.500	-0.943	.346
6. I ask lots of questions in a learning environment	46.28	42.34	793.000	-0.724	.469
10. I strive to be well informed	45.27	44.45	854.00	-0.157	.875
12. I enjoy solving problems	45.28	44.43	853.500	-0.165	.869
15. I enjoy learning even when I am not in school	48.05	38.69	687.000	-1.817	.069
21. I search for the truth even when it makes me uncomfortable	44.32	46.41	829.000	-0.396	.692
23. I will go out of my way to find the right answers to a problem	44.23	46.59	824.000	-0.472	.637

The *p* score was lowest for statement 15, but in no case did the *p* value fall below .05. This demonstrates that differences of mean may be explained by random chance. Thus, *Innovativeness* does not appear to differ according to age.

Gender This study also examined whether or not the disposition towards *Innovativeness* differed according to gender. First, the mean and standard deviation were calculated for the overall *Innovativeness* of the participants who were male or who preferred to not answer (*n*=31), and for those who were female (*n*=58). These results are shown in Table 81.

Table 81

UF/EMI Innovativeness Average Score of the Participants by Gender

Construct	Male + Prefer not to Answer (*n*=31)		Female (*n*=58)	
	M	*SD*	*M*	*SD*
Innovativeness Average Score	3.899	0.916	3.805	0.707

Both groups reported high *Innovativeness* with scores of 3.899 and 3.805 on a five-point Likert scale. Students who identified as male or who preferred not to answer had higher mean scores in overall *Innovativeness.* Based on the results of a normality test, the researcher chose to use the Mann-Whitney U test, a non-parametric test, to determine the significance of this difference (Table 82).

Table 82

The Mann-Whitney U Test for UF/EMI Innovativeness Average Score of the Participants by Gender

Construct	Mean Rank		*U*	*z*	*p*
	Male + Prefer not to Answer (*n*=31)	Female (*n*=58)			
Innovativeness Average Score	49.66	42.51	754.500	-1.250	.211

The results do not indicate that *Innovativeness* differs according to gender, as the *p* value of the Mann-Whitney U test was above .05. In addition, the mean score and standardization were calculated for each statement indicating *Innovativeness*.

Table 83

UF/EMI Innovativeness Scores of the Participants by Gender

Item	Male + Prefer not to Answer (*n*=31)		Female (*n*=58)	
	M	*SD*	*M*	*SD*
4. I enjoy learning about many topics	3.968	1.251	4.155	1.040
6. I ask lots of questions in a learning environment	3.194	1.376	2.983	1.221
10. I strive to be well informed	4.161	0.969	3.966	1.059
12. I enjoy solving problems	3.677	1.249	3.810	1.017
15. I enjoy learning even when I am not in school	4.323	1.013	4.172	0.752
21. I search for the truth even when it makes me uncomfortable	4.129	1.147	3.897	1.119
23. I will go out of my way to find the right answers to a problem	3.839	1.098	3.655	1.001

With an exception of statement 6, in which students aged 18 and 19 averaged a response of 3.194, and those aged 20 or 21 averaged a 2.983 on a five-point Likert scale, both groups responded positively to the statements indicating *Innovativeness.* The mean value for the two groups responses differed most in regards to question 21. After calculating the mean and standard deviation, a Mann-Whitney U test was utilized to determine whether these differences were significant (Table 84).

Table 84

The Mann-Whitney U Test for UF/EMI Innovativeness Scores of the Participants by Gender

Item	Mean Rank		*U*	*z*	*p*
	Male + Prefer not to Answer (*n*=31)	Female (*n*=58)			
4. I enjoy learning about many topics	43.03	46.05	838.000	-0.574	.566
6. I ask lots of questions in a learning environment	47.55	43.64	820.000	-0.731	.465
10. I strive to be well informed	47.68	43.57	816.000	-0.800	.424
12. I enjoy solving problems	44.35	45.34	879.000	-0.197	.844
15. I enjoy learning even when I am not in school	50.52	42.05	728.000	-1.670	.095
21. I search for the truth even when it makes me uncomfortable	49.82	42.42	749.500	-1.419	.156
23. I will go out of my way to find the right answers to a problem	48.90	42.91	778.000	-1.221	.222

The *p* values exceeded an alpha of .05 in each case, indicating that difference in mean may be explained by chance. The Mann-Whitney U results therefore suggest that the two groups did not significantly differ in regard to *Innovativeness.*

Type of High School In addition, it was investigated as to whether students differed in their results on the UF/EMI *Innovativeness* construct according to the school they attended. The mean and standardization for the *Innovativeness* average scores can be seen for students who attended public (*n*=32) and private (*n*=57) high schools in the table below.

Table 85

UF/EMI Innovativeness Average Score of the Participants by High School

Construct	Public High School (*n*=32)		Private High School (*n*=57)	
	M	*SD*	*M*	*SD*
Innovativeness Average Score	3.996	0.749	3.749	0.792

Both groups reported high *Innovativeness,* but those who had attended public high schools, reported a higher mean score overall. The results of a normality test prompted the researcher to use the non-parametric Mann-Whitney U test to determine the significance of this difference (Table 86).

Table 86

The Mann-Whitney U Test for UF/EMI Innovativeness Average Score of the Participants by High School

Construct	Mean Rank		*U*	*z*	*p*
	Public High School (*n*=32)	Private High School (*n*=57)			
Innovativeness Average Score	51.41	41.40	707.000	-1.761	.078

The *p* value exceeded an alpha set at .05, meaning there is a possibility that chance can explain the difference in mean between the two groups. Thus, the difference cannot be assumed to be significant. However, the researcher also investigated the two groups responses to each of the seven indicators of *Innovativeness.* The results are reported below.

Table 87

UF/EMI Innovativeness Scores of the Participants by High School

Item	Public High School (*n*=32)		Private High School (*n*=57)	
	M	*SD*	*M*	*SD*
4. I enjoy learning about many topics	4.250	1.078	4.000	1.134

Item	Public High School (*n*=32)		Private High School (*n*=57)	
	M	*SD*	*M*	*SD*
6. I ask lots of questions in a learning environment	3.406	1.160	2.860	1.302
10. I strive to be well informed	4.219	0.975	3.930	1.050
12. I enjoy solving problems	3.844	1.081	3.719	1.114
15. I enjoy learning even when I am not in school	4.313	0.780	4.175	0.889
21. I search for the truth even when it makes me uncomfortable	4.156	1.051	3.877	1.166
23. I will go out of my way to find the right answers to a problem	3.781	1.039	3.684	1.038

It can be seen that both groups responded to a majority of statements positively with an exception to number 6. Those students who had attended private schools scored only a 2.860 on a five-point Likert scale. It is seen that students who had attended public schools reported a higher mean score in response to each statement, with the largest disparity found for item 6. To determine whether the differences in mean were significant, a *p* score was calculated using a Mann-Whitney U test. The results can be seen below in Table 88.

Table 88

The Mann-Whitney U Test for UF/EMI Innovativeness Scores of the Participants by High School

Item	Mean Rank		*U*	*z*	*p*
	Public High School (*n*=32)	Private High School (*n*=57)			
4. I enjoy learning about many topics	49.83	42.29	757.500	-1.444	.149
6. I ask lots of questions in a learning environment	51.63	41.28	700.000	-1.947	.052
10. I strive to be well informed	50.27	42.04	743.500	-1.613	.107
12. I enjoy solving problems	46.69	44.05	858.000	-0.528	.598
15. I enjoy learning even when I am not in school	46.94	43.91	850.000	-0.601	.548
21. I search for the truth even when it makes me uncomfortable	49.05	42.73	782.500	-1.221	.222
23. I will go out of my way to find the right answers to a problem	46.63	44.09	860.000	-0.521	.602

The lowest *p* value of .052 still exceeded .05, thus failing to disprove the null hypothesis. This indicates that it cannot be assumed that chance does not explain the differences in mean between the two groups. Therefore, the Mann-Whitney U test does not suggest that *Innovativeness* differs according to high school attended.

Letter Grade The study also examined whether the disposition to *Innovativeness* differed according to letter grade. The mean and standard deviation in regards to the participants' *Innovativeness* overall scores was calculated for students who received an A- or A (*n*=30) and for those who received a C through B+ (*n*=59) in their first semester EGAP course. The mean and standardization for the average scores are shown below.

Table 89

UF/EMI Innovativeness Average Score of the Participants by Letter Grade

Construct	A- and A (*n*=30)		C through B+ (*n*=59)	
	M	*SD*	*M*	*SD*
Innovativeness Average Score	4.019	0.522	3.746	0.875

On a five-point Likert scale, both groups perceived themselves to have relatively high levels of *Innovativeness.* However, those who had received an A or an A- in their first semester EGAP course reported higher mean disposition to *Innovativeness* than those who received lower grades. After determining that normality of the two groups could not be assumed, the researcher chose to make use of the non-parametric Mann-Whitney U test to gauge the significance of this difference in mean (Table 90).

Table 90

The Mann-Whitney U Test for UF/EMI Innovativeness Average and Score of the Participants by Letter Grade

Construct	Mean Rank		*U*	*z*	*p*
	A- and A (*n*=30)	C through B+ (*n*=59)			
Innovativeness Average Score	48.43	43.25	782.000	-0.898	.369

In terms of the average and sum total scores, the two groups did not differ significantly. A *p* value of .369 shows the difference may be the result of random chance. However, the researcher also compared the responses of the two groups' responses to each of the seven statements. The mean and standard deviations for each statement within the construct are shown in Table 91.

Table 91

UF/EMI Innovativeness Scores of the Participants by Letter Grade

Item	A- and A (*n*=30)		C through B+ (*n*=59)	
	M	*SD*	*M*	*SD*
4. I enjoy learning about many topics	4.467	.681	3.898	1.241
6. I ask lots of questions in a learning environment	3.133	1.358	3.017	1.239
10. I strive to be well informed	4.167	.874	3.966	1.098
12. I enjoy solving problems	4.033	.809	3.627	1.202
15. I enjoy learning even when I am not in school	4.367	.490	4.153	.979
21. I search for the truth even when it makes me uncomfortable	4.267	.785	3.831	1.248
23. I will go out of my way to find the right answers to a problem	3.700	.915	3.729	1.096

Both groups responded positively to most questions with an exception to number 6. Students who had received an A or A- in their first semester EGAP course had an average mean score of 3.133, while those receiving lower grades averaged 3.017 on a five-point Likert scale. It can be observed that students who received an

A- or A, reported higher critical thinking dispositions for each item, other than number 23, with the greatest disparity between groups occurring in number 4. A Mann-Whitney U test was also used to investigate the significance of these differences. First, Table 92 shows the significance of these differences for the average scores.

Table 92

The Mann-Whitney U Test for UF/EMI Innovativeness Scores of the Participants by Letter Grade

Item	Mean Rank		*U*	*z*	*p*
	A- and A (*n*=30)	C through B+ (*n*=59)			
4. I enjoy learning about many topics	52.25	41.31	667.500	-2.064	.039
6. I ask lots of questions in a learning environment	46.65	44.16	835.500	-0.461	.644
10. I strive to be well informed	47.50	43.73	810.000	-0.729	.466
12. I enjoy solving problems	49.60	42.66	747.000	-1.369	.171
15. I enjoy learning even when I am not in school	46.22	44.38	848.500	-.359	.719
21. I search for the truth even when it makes me uncomfortable	49.93	42.49	737.000	-1.416	.157
23. I will go out of my way to find the right answers to a problem	43.35	45.84	835.500	-.503	.615

It can be seen that there are relatively fewer significant differences according to Letter grade within *Innovativeness* compared to *Engagement* or *Cognitive Maturity*. However, there was a significant difference in how the two groups responded to "I enjoy learning about many topics" as the *p* value fell below .05, thus disproving the null hypothesis. The students who received an A or A- (*n*=30) reported a significantly higher mean score than those who did not (*n*=59).

CGPA Finally, this study investigated whether or not the participants differed in their responses to the *Innovativeness* construct in regard to their CGPA. The researcher calculated the mean and standard deviation for the average and sum

total *Innovativeness* scores, as well as for each statement within the construct, according to students whose CGPA was above 3.3 (*n*=30), between 2.7 and 3.29 (*n*=28), and below 3.0 (*n*=28). The results in terms of average score are shown below.

Table 93

UF/EMI Innovativeness Average Scores of the Participants by CGPA

Construct	3.3-4.0 (*n*=30)		2.7-3.29 (*n*=28)		0-2.69 (*n*=30)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Innovativeness Average	4.024	0.524	3.730	0.974	3.757	0.802

All three groups reported relatively high *Innovativeness.* It can be seen that students with the highest CGPAs reported the highest mean and scores, followed by those with the lowest. The researcher investigated whether these differences were significant by using a non-parametric Kruskal-Wallis Rank Score Test, given the results of a normality test. The results are shown in table 94.

Table 94

Kruskal-Wallis Rank Score Test for UF/EMI Innovativeness Average Score of the Participants by CGPA

Construct	Mean Rank			χ^2	*df*	*p*
	3.3-4.0 (*n*=30)	2.7-3.29 (*n*=28)	0-2.69 (*n*=30)			
Innovativeness Average Score	47.53	44.34	41.62	.813	2	.666

The *p* value of .666 suggests that the differences between the groups cannot be assumed to be significant. But there were significant differences observed between the groups for one of the statements within the construct. First, the responses of the three groups were compared for each of the seven indicators of *Innovativeness* in terms of mean and standard deviation (Table 95).

Table 95

UF/EMI Innovativeness Scores of the Participants by CGPA

Item	3.3-4.0 (*n*=30)		2.7-3.29 (*n*=28)		0-2.69 (*n*=30)	
	M	*SD*	*M*	*SD*	*M*	*SD*
4. I enjoy learning about many topics	4.500	0.509	3.786	1.315	3.933	1.258
6. I ask lots of questions in a learning environment	2.933	1.285	3.393	1.100	2.900	1.398
10. I strive to be well informed	4.367	0.809	3.714	1.182	3.967	0.999
12. I enjoy solving problems	4.067	0.828	3.500	1.202	3.767	1.165
15. I enjoy learning even when I am not in school	4.333	0.479	4.071	0.858	4.267	1.112
21. I search for the truth even when it makes me uncomfortable	4.233	0.774	4.000	1.333	3.700	1.208
23. I will go out of my way to find the right answers to a problem	3.733	0.944	3.643	1.223	3.767	0.971

The three groups responded positively to a majority of the statements. However, it is seen that those who received the highest and the lowest grades both had mean scores below 3 on a five-point Likert scale in response to statement 6. In addition, it can be seen that students with a CGPA of 3.3 to 4.0 responded very positively to statement 4 and in five of seven statements had higher mean scores than either of the other groups. After calculating the means and standard deviation for the three groups, a Kruskal-Wallis rank score test was used to determine whether these differences were significant. The results for the average and scores are shown in Table 96.

Table 96

Kruskal-Wallis Rank Score Test for UF/EMI Innovativeness Scores of the Participants by CGPA

Item	Mean Rank			χ^2	*df*	*p*
	3.3-4.0 (*n*=30)	2.7-3.29 (*n*=28)	0-2.69 (*n*=30)			
4. I enjoy learning about many topics	51.50	39.04	42.60	4.419	2	.110

Item	Mean Rank			χ^2	*df*	*p*
	3.3-4.0 (*n*=30)	2.7-3.29 (*n*=28)	0-2.69 (*n*=30)			
6. I ask lots of questions in a learning environment	42.13	50.36	41.40	2.499	2	.287
10. I strive to be well informed	53.38	37.29	42.35	7.642	2	.022
12. I enjoy solving problems	49.85	38.38	44.87	3.865	2	.145
15. I enjoy learning even when I am not in school	44.17	38.79	50.17	3.695	2	.158
21. I search for the truth even when it makes me uncomfortable	48.02	47.43	38.25	3.308	2	.191
23. I will go out of my way to find the right answers to a problem	44.07	44.48	44.95	0.024	2	.988

The test showed that there were significant differences in regards to how the three groups responded to statement 10 (p = .022). This indicates it is highly likely that the students with a CGPA greater than 3.3 scored significantly higher than those with a CGPA between 2.7 and 3.3.

Relationship Between CGPA and Critical Thinking Dispositions

In addition to investigating whether the critical thinking dispositions of the students differed according to their academic department, whether the students attended the English preparatory program, their high school, their age, their gender, and their academic success according to letter grade in their first semester EGAP course and by CGPA, the researcher also investigated whether there was a relationship between CGPA and *Engagement*, *Cognitive Maturity* and *Innovativeness*. The results of the correlational analysis are shown below in Table 97.

Table 97

Means, Standard Deviations and Correlations between Engagement? and CGPA

Variable	*n*	*M*	*SD*	1	2	3	4
1. CGPA	88	2.94	.61	-			
2. Engagement Mean	89	3.88	.80	.06	-		
3. Cognitive Maturity Mean	89	3.96	.73	.14	82**	-	
4. Innovativeness Mean	89	3.84	.78	.11	86**	.75**	-

Variable	*n*	*M*	*SD*	1	2	3	4

**p < .05*
*** p < .01*

The overall CGPA yielded a Pearson correlation of .06 in regards to *Engagement*, .14 with *Cognitive Maturity*, and .11 with *Innovativeness.* Although a positive correlation was found in each case, a Pearson's *r* below .19 can be considered negligible (Chao, 2017). Thus, the study did not find any significant correlation between CGPA and critical thinking dispositions.

CHAPTER 5: DISCUSSION

Introduction

This study has examined the critical thinking dispositions of undergraduate students, enrolled in EGAP courses at an EMI foundation university in Türkiye. It has investigated their critical thinking dispositions, using the UF/EMI and compared their responses according to their academic department, high school, attendance of an English preparatory program, age, gender, and letter grade received in an EGAP course and CGPA. Finally, it has explored the relationship between academic achievement, measured by CGPA, and critical thinking dispositions.

This chapter will begin with a brief overview of the study that was conducted. Then, it will discuss the major findings, in reference to the literature. Finally, it will discuss the implications of the findings, both in terms of practice and in terms of areas for future research, before addressing its limitations.

Overview of the Study

This study has investigated the critical thinking dispositions of undergraduate students enrolled in a freshman EGAP course at an EMI university in Türkiye. The main aims of the study were to determine their level of critical thinking dispositions according to the UF/EMI, and to compare their critical thinking dispositions according to the demographic factors of academic department, high school, attendance of English preparatory program, age, and gender. Finally, it investigated the relationship between critical thinking dispositions academic success amongst the participants Overall, it was found that the participants possess a moderate to high level of critical thinking dispositions. In addition, the participants overall scores in regard to the three constructs of *Engagement*, *Cognitive Maturity* and *Innovativeness*

did not differ significantly. The statement to which the participants responded most positively was: "I enjoy learning even when I am not in school" (*M*=2.23; *SD*=0.85). On the other hand, the question to which they responded most negatively was: "I ask lots of questions in a learning environment" (*M*=3.06; *SD*=1.27).

There were no significant differences found between *Engagement*, *Cognitive Maturity* and *Innovativeness*, and a majority of the predetermined grouping variables. However, significant differences were found in relation to academic achievement. Most notably, was the finding that students differed significantly in regards to letter grade received in EGAP courses and the disposition towards *Cognitive Maturity*. Correlational analysis, revealed only very weak positive correlations between academic achievement and critical thinking dispositions.

Discussion of Major Findings

Overall Critical Thinking Dispositions

The findings indicate that mean scores of the three constructs reflect moderately positive dispositions among participants. The overall score of 101.3 represents a moderate level according to Lewis (2012). There was not major variation between the three dispositions. In each case, the students possessed moderate to high dispositions for *Engagement*, *Cognitive Maturity* and *Innovativeness.* *Cognitive Maturity* had the highest mean score (*M*=3.965) and *Innovativeness* had the lowest (*M*=3.838). However, there is variability in individual responses, especially in the domain of *Engagement.*

The overall finding that the participants possess moderate to high levels of critical thinking dispositions is consistent with much of the research done on critical thinking dispositions of students at the tertiary level that have used the UF/EMI. In Turkish university contexts, Kök (2012) used the UF/EMI to measure the

dispositions of English preparatory students. Like this study, he found them to have higher moderate critical thinking dispositions. Coskun and Altinkurt (2016) also reported pre-service teachers at Mugla Sıtkı University to have moderate to high overall dispositions to critical thinking (*M*=3.83).

This also mirrors the findings in two other Turkish studies in different educational contexts. Orhan (2022) similarly reports moderate to high critical thinking dispositions (*M*=3.85) among Turkish high school students. Komşu (2021) reports that the critical thinking dispositions of graduate students at a Turkish university to be higher than those in this study (*M*=4.13). Though this could be explained as a graduate student body population may differ significantly from that of a first year undergraduate population.

Other studies in Türkiye that examine critical thinking dispositions of students in English language contexts at the tertiary level have used the CCTDI (Dayıoğlu, 2003; Genç 2017; Yükselir, 2020) which has a different underlying framework.

Outside of Türkiye, most studies also find a result of moderate overall critical thinking dispositions. Stedman et al.'s (2009) study of undergraduates enrolled in courses offering leadership training at four universities in The United States also reports moderate levels of critical thinking disposition (*M*=100.19). In reference to populations of undergraduate students in agricultural departments in American universities, this was found in several studies (Bisdorf-Rhoades et al, 2005; Fite, 2017 Towns, 2012). Similarly, Sneed (2017) found a large population of seminary students at a number of American institutions to have moderate critical thinking dispositions.

However, there are a few exceptions. Baker and Rudd (2000) found that undergraduate agricultural students possessed low levels of critical thinking dispositions. Burbach et al. (2012) also reported undergraduate agricultural students at an American university to possess low levels of critical thinking dispositions. Duncan et al. (2016) came to similar conclusions in a study comparing the critical thinking dispositions of university students from the United States, Austria and Italy. Outside of the United States, Sahonawas and Santoshi (2020) found Bengali students at a university in India to have lower moderate critical thinking dispositions.

Thus in reference to the overall critical thinking dispositions, the findings of this study report similar or slightly higher critical thinking dispositions than much of the literature. Most notably, this study found higher levels of critical thinking than several other studies that have focused on English language, Turkish higher education contexts.

One possible reason for this could be that the participants in this study had all completed and were currently enrolled in EGAP courses, rather than English for general purposes courses in a preparatory school context or English for specific purposes courses. Moore (2019) has argued that many EGAP courses incorporate the teaching of general critical thinking skills into their curriculum and instruction. Wilson (2016) has similarly outlined how critical reading skills may be taught in EAP contexts. Therefore, there is a possibility that training in critical thinking had raised the level of critical thinking dispositions of these students relative to those in preparatory or Business English settings.

Another possible explanation was the context in which the target population came from. The students in this context were studying at a private university that in 2024 is ranked as among the best universities in Türkiye, according Times Higher

Education (2023). It may be the case that the population overall possesses higher critical thinking dispositions than the students at many other Turkish universities.

In addition to the finding that the students possessed moderate to high critical thinking dispositions, another major finding of the study was that the one statement to which the students responded to least positively overall was "I ask lots of questions in learning environment," (*M*=3.06) within the Innovativeness construct. This finding has not been reported in other studies that study undergraduate populations using the UF/EMI.

One reason for this is potentially cultural, stemming from previous educational experiences. Girgin and Stevens (2005) argue that a majority of Turkish university students do not experience student-centered classrooms in their prior education. Altınyelken (2011) writes that since then educational reforms have placed greater emphasis on student centered pedagogy. However, its implementation and acceptance have faced certain obstacles from teachers, students and parents. It could be the case that differences in educational experiences affect how students perceive the asking of questions.

Bali (2015), in reference to the teaching of critical thinking in an Egyptian university context, argues that "pedagogy is not necessarily culturally neutral" (p. 323) and a combination of factors such as the educational or cultural background, the political context, or the linguistic abilities of university students in an EMI context could all play a role in their behaviors. Thus there is potential that the prior educational or cultural background of the students who participated in this survey may influence their self-reported reticence to ask questions. If students have come from a home or educational environment in which they do not feel empowered to interrupt or challenge, this could impact their willingness to ask questions.

In addition to potential explanations that focus on the educational culture and history of the students, there may be alternative reasons why the participants were most negative in regards to asking questions in learning environments that relate to the EMI context. Skyrme (2010) identifies several reasons why undergraduate students in EAP contexts may be hesitant to ask instructors questions in a one on one medium. He writes that students may fear revealing a lack of confidence in the discourse to the instructor, hesitancy to ask questions in public settings, such as after class, as well as the reaction of the teachers. Although this study specifically deals with students' hesitancy to ask questions in office hours, it may still shed light on the finding in this study.

It is also worth noting that the finding that the students responded most positively to the statement, "I enjoy learning even when I am not in school" (*M*=4.22). This finding has also not been reported in other studies.

Differences in Disposition

This study also examined the difference in dispositions by academic department, attendance of English preparatory program, age, gender, type of high school, letter grade in an EGAP course, and CGPA.

Academic Department

In terms of academic department, the results of hypothesis testing suggest that gender does not appear to be a statistically significant factor influencing participants' critical thinking dispositions within the scope of the study. This implies that based on the sample data, there is no strong evidence to support the hypothesis that female and male participants exhibit different levels of critical dispositions, and any observable variations are not significant.

This has not been investigated in other studies of undergraduate students in Türkiye, using the UF/EMI. One reason that may explain why this study may not have found differences in disposition between departments is that the students were enrolled in a first year course, and therefore may not have had significant time to acculturate into their academic disciplines. Facione et al. (1995) argue that critical thinking dispositions are actively cultivated in higher education contexts, and it is indeed the duty of the individual departments to determine which dispositions must be nursed and how to do so. The notion that critical thinking is subject specific, is a matter of debate among scholars, yet many maintain that critical thinking occurs within given contexts and knowledge domains, rather than as a general skill (McPeck, 1981). Davies (2006) believes that critical thinking manifests in both subject specific and general contexts. Similarly, Jones (2015) argues that how critical thinking is expressed varies in different faculties, such as physics and history. If this is the case, it may be that first year students who participated in this study have had less time to develop critical thinking dispositions within the context of their discipline.

This finding also further supports Ennis (1996), and Giancarlo and Facione's (2001) assertion that critical thinking dispositions are relatively stable and do not only exist within a subject-specific domain. A lack of a meaningful difference provides some indication that the academic departments are not nurturing subject specific critical thinking dispositions. However, it should be noted that a majority of these students were in the second semester of their first at university, and were not yet primarily enrolled in courses within their subject specific disciplines.

Attendance of English Preparatory Program

The results of the inferential research of this study suggest that critical thinking dispositions, in terms of the three constructs, may not differ according to attendance of an English preparatory program. It seems that any variation between the two groups is not significant. One possible reason for this may have been the fact that a majority of the participants in the study had not attended the English preparatory program, with only 22 having attended. It is possible that a larger sample may have yielded different results. This question has not been examined in other studies; however, Kök (2012) has examined critical thinking dispositions within Turkish English preparatory program contexts, using the UF/EMI.

Age

This study also investigated whether critical thinking dispositions differ according to age. The results coming from the hypothesis testing indicate that students aged 18 or 19 and those aged 20 to 21 may not differ in their critical thinking dispositions of *Engagement*, *Cognitive Maturity* or *Innovativeness*, with any difference observed not being significant.

In non-Turkish tertiary education contexts, similar results were reported in several studies (Burbach et al., 2012; Sneed, 2017; Stedman et al., 2009; Towns, 2012). Age has not been investigated in Turkish undergraduate contexts using the same instrument.

One reason why this study may have found no difference unlike those studying older student populations may be that the educational experiences of a majority of students aged 18 or 19 likely did not differ greatly from those aged 20 or 21. Students in Türkiye typically enter university at 18 but in this EMI context, they must first pass an English proficiency exam and if they are unable to, they must

attend the English preparatory program. It is likely the case that a majority of the students who were 20 or 21 had not initially passed the English proficiency exam. This means that although they were older, they likely do not have experiences beyond an early undergraduate context that could impact their critical thinking dispositions more so than those aged 18 or 19 relatively to populations with more diverse age groups.

Gender

The hypothesis testing indicates that the participants' *Engagement*, *Cognitive Maturity* and *Innovativeness* seem to not differ according to gender. This mirrors the findings of Coskun and Altinkurt (2016) in their study of pre-service teachers. In addition, a study concerning Turkish high school students, aged 13 to 16, reports the same findings (Orhan, 2022). However, these conclusions are at odds with some other studies that examine undergraduate populations outside of Türkiye.

Rudd and Baker (2000) also find that female students are significantly more disposed to critical thinking than male students; whereas Fite (2017) found the opposite result among undergraduate agricultural students. On the other hand, like this study, Bisdorf-Rhoades et al. (2005), Stedman (2009) and Towns (2012) recorded no difference in disposition according to gender in American undergraduate contexts, and Sneed (2017) found gender to have an influence on critical thinking dispositions among seminary students.

High School Attended

This study also investigated whether critical thinking dispositions differed according to high school attended. It appears, based on the results of hypothesis testing, that critical thinking dispositions do not differ among the participants, in terms of *Engagement*, *Cognitive Maturity* or *Innovativeness.*

In terms of studies in Turkish higher education contexts, there have not been similar studies conducted regarding a general undergraduate population in Turkish universities that investigate the high school attended, using the UF/EMI.

Letter Grade

This study also investigated whether *Engagement*, *Cognitive Maturity* and *Innovativeness* differed according to Letter Grade received in an EGAP course. Significantly, this study found *Cognitive Maturity to differ according to letter grade.* No significant difference in *Engagement* or *Innovativeness* was observed. However, hypothesis testing suggests that *Cognitive Maturity* may differ significantly according to letter grade, with those who had received an A or A- reporting higher levels of the disposition. In addition, higher achieving students responded significantly higher in regards to the statement "I look for opportunities to solve problems" and "I enjoy learning about many topics," within *Engagement* and *Innovativeness* respectively. These findings are unique in the literature as critical thinking dispositions have not been previously investigated in Turkish EMI EGAP contexts. These findings suggest there is a possibility that critical thinking dispositions, especially *Cognitive Maturity*, may play a role in success in EGAP contexts.

One reason why critical thinking dispositions, in particular *Cognitive Maturity*, may have an effect on success in EGAP courses is the nature of the course. In the context of this study, the EGAP course was content based and had a strong emphasis on written argumentation, as well as spoken argumentation to a lesser extent. It may be the case that students with higher critical thinking dispositions, especially in regards to *Cognitive Maturity*, were better able to engage in argumentative read to write tasks, as they would have been more equipped to engage

with, reflect on and formulate ideas, as well as being less likely to become frustrated when confronting a lack of clarity or when confronted with beliefs they disagree with.

According to Sato (2022), "in argumentative essay writing tasks…students must not only present their ideas but also assess their own reasoning" (p. 3). This inclination to "assess their own reasoning" (Sato, 2022, p. 3) may be facilitated by *Cognitive Maturity.* Similarly, Andrews (2015) claims that in the "development of argumentation skills in higher education" one element that is required is a critical disposition on the part of students. He underscores that it is needed for students "to question received assumptions; [and] to hold a skeptical attitude towards 'facts' and assumptions" (p. 58). Both of these statements seem to fall under the scope of *Cognitive Maturity* within the framework of this study. Given the extent to which the EGAP context of this study emphasizes argumentation, both written and oral, it is possible that *Cognitive Maturity* is a differentiating factor between students who receive an A or A- and those who do not.

Although *Engagement* and *Innovativeness* were not found to differ significantly in students according to grade received in an EGAP course, in each case responses to one statement differed meaningfully. Students who had received an A or A- agreed significantly more strongly with the statement "I look for opportunities to solve problems," from the *Engagement* construct and "I enjoy learning about many topics" from *Innovativeness.*

It may be the case that students who exhibit the *Engagement* characteristic of habitually looking to solve problems find it easier to adapt to a first year university course that requires a higher degree of student autonomy. As Hamby (2015) remarks, "a willingness to inquire" is a prerequisite to critical thinking. Furthermore,

enjoying learning about many topics may find success based on motivation. Wilson (2018) urges EAP teachers to choose academic content authentic and meaningful to the students, when possible allowing students to choose thematic content for themselves. In this context of a theme-based CBI EGAP course, those students with many interests may have been more intrinsically motivated to engage with the content presented by the instructor.

CGPA

This study also investigated whether or not critical thinking dispositions differed according to CGPA. Interestingly the findings suggest that students did not differ significantly in regards to *Cognitive Maturity* or in terms of any indicator. However, within *Engagement* the students appeared to differ in regards to the statements "I am able to apply my knowledge to a wide variety of issues" and "I ask good questions when trying to clarify a solution." As to the *Innovativeness* construct, participants differed significantly in regards to the statement, "I strive to be well informed."

Unexpectedly, the significant differences appeared to occur between students with the highest CGPA range and the mid CGPA range, with the exception of the statement "I am able to apply my knowledge to a wide variety of issues" in which low performing students answered most positively.

In no cases in which a statistically significant difference was found, did the students with the lowest CGPA respond most negatively. It could be the case that students with mid-level CGPAs have a greater self-awareness than those with low CGPA. This could also explain why students with the lowest CGPA gave the highest scores in regard to applying their knowledge to a wide variety of issues.

Other studies have not investigated this relationship in Turkish higher education contexts using the UF/EMI.

Relationship to Academic Success

This study did not find any significant correlation between CGPA and critical thinking dispositions. This differs from the findings of other studies, using the UF/EMI. While in Turkish higher education contexts, this has not been studied using the UF/EMI, outside of Türkiye, Burbach et al. (2012) found *Engagement* to have a significant relationship with CGPA. Sneed (2017), found a weak positive relationship between *Innovativeness* and CGPA.

It seems that further investigation may be needed into the relationship between academic success and critical thinking dispositions in Turkish higher education contexts.

Implications for Practice

In terms of the implications for practice, there are several recommendations that can be made. The overall finding of this study was that students report to have critical thinking dispositions that are on the high end of moderate. Given that critical thinking dispositions play a key role in success in higher education (Davies & Barnett, 2015), it is vital that teachers and curriculum designers at both the secondary and tertiary level in Turkish contexts put more attention towards their development to further increase the critical thinking dispositions of students in the Turkish higher education system. This also suggests that EAP teachers in Turkish EMI contexts need to incorporate the nurturing of critical thinking dispositions into their curriculum and practice.

A major implication for EGAP instructors is that this study showed that in regards to each disposition, but especially *Cognitive Maturity*, there were significant

differences between students who received a letter grade of A or A- and those below. This is likely the case due to the fact that in order to engage in written or oral assignments at the university level, there is a need for students to possess a level of *Cognitive Maturity* as they encounter ideas and assert their own voice through written or spoken production. This suggests that EAP instructors as well as educators in secondary education contexts should emphasize the development of this disposition, encouraging students to become comfortable encountering ideas or even individuals they may disagree with and reflecting upon their own biases.

Wilson (2018) argues that unlike discreet critical thinking skills that can be taught, "dispositions need to be modelled and nurtured" (p. 6). This particular disposition may be cultivated by the EAP practitioner using a variety of methods. One possibility is through incorporation of tasks such as debate. According to Llano (2015), debate, in addition to teaching discrete critical thinking skills connected to the evaluation of argument, also serves to create what he describes as a culture of critical thinking. Debate tasks, if administered carefully in an EGAP or other educational contexts, can serve to expose students to different ways of thinking in the process of preparation, argumentation and even as audience members who can reflect on their own beliefs in light of the debate they are observing (Llano, 2015). Such practices can theoretically build *Cognitive Maturity* by practicing the experience of being exposed to multiple ways to approach an issue as well as being confronted by beliefs that challenge one's own bias.

An alternative suggestion is made by Bailin and Battersby (2015) who promote an inquiry based pedagogy to develop critical thinking, which may help to nurture *Engagement*, *Cognitive Maturity* and *Innovativeness.* They recommend an approach to teaching in which students determine their own questions, and focus on

understanding the context of this question, understanding the various claims and arguments made in relation to it, before evaluating them or putting forward an argument of their own. An inquiry based approach such as this would be applicable to an EGAP course and if modeled carefully by the instructor, could nurture *Cognitive Maturity* since it builds the habit of regarding issues as having multiple solutions and reflecting on one's own bias, in addition to focusing on *Engagement* and *Innovation.*

Although the participants' critical thinking dispositions differed less significantly in their overall CGPA, there were statements with which students who reported a CGPA in a B range reported significantly lower critical thinking dispositions than those who received an A or A-. One indicator of *Engagement* that differentiated the students was the statement "I ask good questions when trying to clarify a solution." This finding may have implications for practice.

The response to the statement "I ask good questions when trying to clarify a solution" may again point to the relevancy of Bailin and Battersby's (2015) inquiry centered instruction. By building pedagogy around inquiry and training students to contextualize, understand and approach problems, students may become trained in learning to ask relevant and useful questions. Thus, EAP instructors as well as teachers in other contexts can put emphasis on teaching students how to question in the pursuit of problem solving.

Another finding of this study was that students in this context answered most negatively in regards to the statement "I ask lots of questions in a learning environment." Much research done in education contexts which suggest that asking questions is an important part of learning for the student and necessary for students to take charge of their own inquiry (Bowker, 2010; Almeida 2012; Vale, 2013).

However, Skyrme (2010) has argued that students in EAP contexts may have additional difficulty, or hesitancy, in asking questions to their instructors. Bali (2015) as well argues that students in EMI contexts outside of the West may have different backgrounds in terms of education, cultural norms and linguistic confidence, all of which may affect their participation in Western models of university education. Therefore, in EMI, EAP contexts, it is especially important that instructors foster an environment and perhaps explicitly provide input into how to ask questions in academic contexts. EGAP instructors in particular, who play a role in cultivating academic skills in university students can take care to put greater emphasis on this development, both from the point of view of instilling the necessary linguistic skills and in terms of academic acculturation.

Overall, the findings of this study indicate that overall EAP practitioners in particular, as well as practitioners in pre-university education, should focus on modeling and building instruction that habituates critical thinking dispositions. EAP instructors should pursue a pedagogy that provides students the autonomy to pursue authentic interest and to inquire, to confront ideas that may be challenging them, and to be exposed to the complexities of academic lines of inquiry.

Beyond EAP, curriculum designers in both K-12 and tertiary contexts have a role in integrating critical thinking dispositions into the curriculum. It has been argued that critical thinking dispositions are "a sense of psychological readiness of the human being to be critical" (Davies & Barnett, 2015, p. 55). This understanding implies that critical thinking dispositions are then a pre-requisite to critical thinking and at the very least, must be nurtured in tandem. Thus, curriculum designers as well as educators at all levels, should take care to allow for the habituation of these dispositions. Through instilling inquiry, questioning, discussion, debate, and at times

discomfort into the education curriculum, it is hoped that these affective dispositions may be nurtured.

Implications for Further Research

There are several opportunities for future research which result from the study. First of all, there is much more that could be explored via the use of qualitative methods. Qualitative methods could be used to further explore the participants answers to the survey in greater depth. As this was a purely quantitative study designed using a cross-sectional survey, qualitative methods could be used to create "a detailed understanding of a central phenomenon" (Creswell, 2012, p. 16). Additional studies using qualitative or mixed methods could paint a richer picture as to how or why the participants answered as they did, and to explore the value they put in their responses. This may be especially of significance as this framework and instrument were developed in North American educational contexts.

For example, a major finding of the survey was that the participants reported the lowest mean score to the statement "I ask lots of questions in a learning environment". Further research could be conducted into why this is the case, employing qualitative methods to reach a richer understanding, as well as investigating whether a similar finding is found in other Turkish undergraduate samplings.

From an academic literacies perspective, it can be argued that issues connected to power and identity play a role in academic contexts (Lea & Street, 2006). It may be the case that the positioning of EAP students in an EMI university differentiates their experience and willingness to ask one on one questions, or public questions, to the instructor from those who are studying in tertiary education contexts

that use their native language. Future research could be conducted to explore this question.

Other opportunities for research connect to the scope of this study, which focused on the dispositions of students taking a second semester EGAP course, studying at an EMI university. Further research could be conducted as to how the critical thinking dispositions of students in EMI, EAP, Turkish contexts change over time, as there is relatively little research done in such contexts. For example, it could be examined as to how critical thinking dispositions evolve in such university contexts beyond the first year of study. As this study was cross-sectional, there would be further value in a longitudinal approach to both have more confidence in the perceptions of the students and to potentially witness changing trends over time.

This line of inquiry may be particularly relevant for the finding that critical thinking dispositions did not differ by academic department, further supporting the notion that critical thinking dispositions are less connected to domain knowledge and context than critical thinking skills (Giancarlo & Facione, 2001). This could be studied further with larger samples and at different institutions. In addition, future research could investigate whether this is the case among third and fourth year students who have had more time to acclimate into their academic disciplines.

In addition, there are relatively few recent studies (Dayıoğlu, 2003; Genç, 2017; Kök, 2020) that study the critical thinking dispositions within preparatory schools. The findings of this study suggest there was no significant difference in disposition between those who attended and those who did not attend. Thus further research could shed light on this phenomenon.

Further research could also be done into the subject-specificity of critical thinking dispositions. A number of scholars have asserted that critical thinking skills

differ according to different academic disciplines. However, the findings of this study support the assertions of other scholars (Ennis, 1996; Giancarlo & Facione, 2001) that critical thinking dispositions seem to not change according to the discipline of study. However, further research could be done, using qualitative or mixed methods to examine how critical thinking dispositions manifest in different subject areas and whether they differ.

Finally, there is room to further research the connection between university EGAP contexts and critical thinking dispositions. One of the findings of this study, was that *Cognitive Maturity* as well as responses to two statements indicating *Engagement* and *Innovativeness* differed significantly according to their letter grade in their first semester EAP course. This implies that critical thinking dispositions may play an important role in the mastery of general academic purposes. Since EGAP courses take the role of equipping transferrable academic skills, language and thinking to university students, further research could be conducted into how EGAP courses in EMI contexts can best develop critical thinking dispositions in their students. In addition, research can be conducted into what critical thinking dispositions students most lack as they enter EGAP courses.

Limitations

There were several limitations of the study. First of all, the methods used were entirely quantitative. Greater insight may have been yielded through the use of mixed methods, or via additional studies using qualitative methods. Creswell (2012) explains that quantitative methods may be used when "trends are explored or explanations need to be made" whereas qualitative research is appropriate when a "deep understanding" is desired (p. 19). Thus, while this study made effective use of

quantitative methods to identify trends, incorporating qualitative methods, may have allowed for a more in-depth exploration of the trends identified in the research.

Second, was the sampling method. While this study targeted an entire population of students enrolled in second semester EGAP courses, only a small percentage responded. The head of the relevant department contacted students enrolled in ENG 102 via email with a link to complete the survey. This method was chosen due to ethical and institutional considerations; however, a potential concern may be that the students who responded to the survey were not representative of the total population. Thus the results must be evaluated with a certain degree of skepticism.

A major limitation was the sample size. There were 89 participants, representing a population of university freshmen taking a second semester EAP course. Creswell (2012) writes that 30 participants are needed in a study that "relates variables" such as a correlational study, yet recommends approximately "350 individuals for a survey study" (p. 146) The number of participants in this survey are below 350, yet he allows many factors affect these numbers, and this number is just a recommendation (Creswell, 2012). In regards to most of the inferential sub-questions his recommendation of 30 participants was met, however, the relatively small total number of participants (n=89) affected choices made in terms of the second research question that examined how the students differed in their critical thinking dispositions according to various factors. It had been initially hoped that there would be enough participants to compare individual faculties against one another, rather than grouping all faculties together, other than the Faculty of Science and the Faculty of Engineering.

The relatively low number of participants also limited the extent to which the study could examine how critical thinking dispositions differed according to attendance of the English preparatory program. There were not enough participants to examine whether or not the time spent at the English preparatory program may have had an effect on critical thinking dispositions.

Given the relatively low numbers in this study, academic departments were grouped together. Future research with larger samples of students could focus on examining the dispositions between different disciplines. Further research could be done into the ways of thinking between the disciplines.

Finally, it should be noted that sample size has an effect in factor analysis. Although, the instrumentation in this study has been found to be reliable in different contexts, and the statistical measures taken to ensure internal validity in regards to the tool did not flag any major concerns (Appendix F), the results would be more convincing given a larger sample size.

An additional limitation related to the scope of the study. This study examined only students taking one second semester EGAP course. Had the study incorporated data from participants taking the first semester EGAP course, or post-first year courses, additional analysis could have been made, in terms of how critical thinking dispositions differ over time. Furthermore, a longitudinal approach may have strengthened the findings by following the population overtime, more confidently indicating how they perceive their dispositions.

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Appendix A

Questionnaire: Part 1

DEMOGRAPHIC QUESTIONS

Please provide the following information:

1. What is your department? _____

2. How would you describe your gender?
   - ☐ Male
   - ☐ Female
   - ☐ Prefer not to answer

3. What is your age?
   - ☐ 18-19
   - ☐ 20-21
   - ☐ 22-24
   - ☐ 25+

4. What type of high school did you attend?
   - ☐ Public
   - ☐ Public (following an international curriculum)
   - ☐ Private
   - ☐ Private (following an international curriculum)

If you have selected Public (following an international curriculum), or Private (following an international curriculum), please specify the program (e.g. IB Diploma Program, Advanced Placement, A-Level) _____

5. Did you attend the English Language Preparatory Program at Bilkent University?
   - ☐ Yes
   - ☐ No

If **Yes**, for how many semesters did you study at the English Language Preparatory Program?

_____

6. What is your current Cumulative Grade Point Average (CGPA)?

   _____

7. What letter grade did you get to pass ENG 101?

   _____

Appendix B

UF/EMI Questionnaire: Part 2

CRITICAL THINKING DISPOSITIONS QUESTIONNAIRE: UF/EMI

Directions: Please tick the box next to each statement below to indicate how much you agree or disagree with it.

		Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
		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.					

GLOSSARY
STRIVE: To make an effort, To try, To attempt

Appendix C

Disclaimer to Students

Dear Students,
You are invited to participate in a study about critical thinking dispositions … Please read the following information, and the criteria to meet, before you agree to participate in this study.

Purpose: The study intends to use the UF/EMI* (Irani et al., 2007; Fite, 2017) with the purpose of examining the critical dispositions used by undergraduate students, any difference in their use on the basis of educational background, high school type, gender, age, and department, and the relationship between the dispositions used and academic achievement.

Voluntary participation: Participation in this study is voluntary, and you have the right to withdraw from the study at any time for any reason. Your participation will be valuable to increase understanding of critical thinking in Turkish university contexts.

Confidentiality: If you choose to participate, your answers will be anonymous and your responses, or any other identifying information, including your university, will not be shared. Only the researchers in this study will have access to the information you share, and any data will be kept on a password protected laptop. Your responses will only be used for conducting and disseminating research.

Duration: It should take about 10 minutes to complete the questionnaire.

Criteria: Check if you meet all of the following criteria, and then read the statement that follows before you decide to put a tick next to the agreement:

1. I am at least 18 years of age.
2. I have completed at least 1 semester of study in my department courses.
3. I am currently enrolled in ENG 102.
4. I am not taking a course from Robert McNamara Loomis this semester
5. I give my informed consent to participate in this study.

Thank you very much for your time and participation
Name: Robert McNamara Loomis
Program: MA in TEFL program, Bilkent University

Thesis Advisor: Asst. Prof. Dr. Necmi Akşit

Appendix D

Shapiro Wilk Test Results

Table 97

Shapiro Wilk Test

Item	N	W	DF	Sig
UF/EMI Total	89	.767	89	.000
Engagement	89	.808	89	.000
Cognitive Maturity	89	.762	89	.000
Innovativeness	89	.868	89	.000
1. I listen carefully to the opinions of others even when they disagree with me	89	.649	89	.000
2. I look for opportunities to solve problems	89	.721	89	.000
3. I am interested in many issues	89	.718	89	.000
4. I enjoy learning about many topics	89	.715	89	.000
5. I am able to relate to a wide variety of issues	89	.704	89	.000
6. I ask lots of questions in a learning environment	89	.818	89	.000
7. I enjoy finding answers to challenging questions	89	.764	89	.000
8. I am a good problem solver	89	.685	89	.000
9. I am confident that I can reach a reasonable solution	89	.731	89	.000
10. I strive to be well informed	89	.715	89	.000
11. I am likely to change my opinion when I am given new information that conflicts with my current opinion	89	.694	89	.000
12. I enjoy solving problems	89	.741	89	.000
13. I try to consider the facts without letting my biases affect my decisions	89	.688	89	.000
14. I am able to apply my knowledge to a wide variety of issues	89	.597	89	.000
15. I enjoy learning even when I am not in school	89	.680	89	.000
16. I can get along with people who do not share my opinions	89	.746	89	.000
17.I am able to explain things clearly	89	.741	89	.000
18. I ask good questions when trying to clarity a solution	89	.714	89	.000
19. I present issues in a clear and precise manner	89	.714	89	.000
20. I consider how my own biases affect my opinions	89	.715	89	.000
21. I search for the truth even when it makes me uncomfortable	89	.723	89	.000
22. I keep on working on things until I get them right	89	.759	89	.000
23. I will go out of my way to find the right answers to a problem	89	.733	89	.000
24. I try to find multiple solutions to problems	89	.687	89	.000
25. I ask many questions when making a decision	89	.758	89	.000
26. I believe that most problems have more than one solution	89	.702	89	.000

Appendix E

Factor Analysis Results

The *Engagement* construct consisted of 11 items (**α**= .920), and when the factorability of the items was examined, it was observed that all items correlated significantly with each other. Next, the Kaiser-Meyer-Olkin measure of sampling adequacy was found to be .894, which is above the commonly recommended value of .6 (IBM, 2022b) and the Bartlett's test of sphericity was found to be significant (**χ**2(55) = 603.998, p < .001). It was also found that the communalities were all above 3.0, ranging from .39 to .739 (Table 2).

Table 98

Engagement: Communalities

Item	Extraction
2. I look for opportunities to solve problems	.688
3. I am interested in many issues	.574
5. I am able to relate to a wide variety of issues	.664
7. I enjoy finding answers to challenging questions	.393
8. I am a good problem solver	.586
9. I am confident that I can reach a reasonable conclusion	.739
14. I am able to apply my knowledge to a wide variety of issues	.650
17. I am able to explain things clearly	.485
18. I ask good questions when trying to clarify a solution	.482
19. I present issues in a clear and concise manner	.518
22. I keep on working on things until I get them right	.446

To examine the reliability, several steps were taken. All terms were seen to correlate significantly with each other when factor analysis was conducted. The Kaiser-Meyer-Olkin measure of sampling adequacy of .833 was above the minimum recommended value of .6. Furthermore, the Bartlett's test of sphericity was

significant (χ2(55) = 279.235, p < .001) and all communalities were above .3, showing that each item shared a degree of common variance with other items.

Table 99

Cognitive Maturity: Communalities

Item	Extraction
1. I listen carefully to the opinions of others even when they disagree with me	.612
11. I am likely to change my opinions when I am given new information that conflicts with my current opinion	.528
13. I try to consider the facts without letting my biases affect my decisions	.507
16. I can get along with people who do not share my opinions	.508
20. I consider how my own biases affect my opinions	.647
24. I try to find multiple solutions to problems	.442
25. I ask many questions when making a decision	.315
26. I believe that most problems have more than one solution	.584

In addition, factor analysis found each item to correlate statistically with one another. Furthermore, the Kaiser-Meyer-Olkin measure of sampling adequacy of .880, above the recommended .6 and the Bartlett's test of sphericity was significant (χ2(55) = 264.217, p < .001). In addition, the communalities ranged from .226-.761. Item 6 had a low value, indicating only a very weak communality with the other variables (Child, 1975).

Table 100

Innovativeness: Communalities

Item	Extraction
4. I enjoy learning about many topics	.761
6. I ask lots of questions in a learning environment	.226
10. I strive to be well informed	.713
12. I enjoy solving problems	.721
15. I enjoy learning even when I am not in school	.516
21. I search for the truth even when it makes me uncomfortable	.540
23. I will go out of my way to find the right answers to a problem	.361

With the exception of statement 6, all extraction values exceeded a minimum of 0.25. Therefore, significance in relation to statement 6 must be treated with caution.