Tanju DEVECİ, Yrd. Doç. Dr., The Petroleum Institute The College of Arts and Sciences, tdeveci@pi.ac.ae
Nader AYISH, Yrd. Doç. Dr., The Petroleum Institute The College of Arts and Sciences, nayish@pi.ac.ae

Correlation between Critical Thinking and Lifelong Learning Skills of Freshman Students

Abstract: University freshman students' critical thinking (CT) and lifelong learning (LLL) skills are often taken for granted. This can lead to tertiary education that is built on a weak foundation. In this paper, results of a small-scale study conducted to identify freshman students' CT and LLL readiness levels and the correlation between them are explored. Participants included 87 freshman students with a mean age of 19 studying at a university in Abu Dhabi. Data were collected using two instruments developed by other researchers. Results indicate that students' overall CT score are at the lower end, while their LLL score are slightly above the average. Female students' CT and LLL scores are higher than male students' score with differences at statistically significant levels. Also, there is a weak positive correlation between students' overall CT and LLL scores. However, there is a moderate positive correlation between female students' scores for CT and LLL. Recommendations are made in order to enhance students' CT and LLL skills and strengthen the relationship between them.

Key Words: critical thinking, lifelong learning, readiness, freshman, correlation

Birinci Sınıf Üniversite Öğrencilerinin Eleştirel Düşünme ve Yaşam Boyu Öğrenme Becerileri Arasındaki İlişki

Öz: Üniversiteye henüz başlamış öğrencilerinin eleştirel düşünme (ED) ve yaşam boyu öğrenmeye (YBÖ) ilişkin becerilerinin yeterli düzeyde olduğunu varsaymak, bu öğrencilerin üniversite eğitimini zayıf temeller üzerine inşa etmelerine neden olabilir. Bu durumdan hareketle, bu araştırma birinci sınıf üniversite öğrencilerinin ED ve YBÖ'e yönelik hazır bulunuşluk düzeylerini belirlemek üzere yürütülmüştür ve bu iki beceri arasındaki ilişkiyi tartışmaktadır. Araştırmaya, Abu Dhabi şehrindeki bir üniversiteden 19 yaş ortalamasıyla 87 öğrenci katılmıştır. Veriler daha önce diğer araştırmacılar tarafından geliştirilmiş olan iki farklı veri toplama aracı kullanılarak toplanmıştır. Sonuçlar, öğrencilerin ED puanlarının düşük, YBÖ puanlarının ise ortalamanın biraz üzerinde olduğunu göstermiştir. Kız öğrencilerin ED ve YBÖ puanlarının erkek öğrencilerinkine kıyasla daha yüksek olduğu belirlenmiştir. Ayrıca genel olarak ED ve YBÖ arasında zayıf pozitif yönde bir ilişki olduğu belirlenmiştir. Ancak kız öğrencilerin puanları arasındaki ilişki orta derecede pozitif yönde olmuştur. Sonuçlar tartışılmakta, öğrencilerin ED ve YBÖ puanları arasındaki ilişkiyi güçlendirici önerilerde bulunulmaktadır.

Anahtar Kelimeler: eleştirel düşünme, yaşam boyu öğrenme, hazır bulunuşluk, birinci sınıf, ilişki

1. INTRODUCTION

The development of critical thinking (CT) and lifelong learning (LLL) skills have been cited as essential for learners of all ages (Alcantud-Diaz, 2013; Shuman, Besterfield-Sacre & McGourty, 2005). Young children, for example, benefit from learning how to think critically by internalizing the importance of learning. This is also true for those entering university. Indeed, inherent in university studies is the necessity for self-directed learning, which is directly connected to CT and LLL. If universities want students to be reflective, independent, self-regulated learners that can interpret, analyze, evaluate, infer, and explain, developing CT and LLL skills is necessary (Larmar & Lodge, 2014; Clore & Palmer, 2009).

Although many universities recognize the importance of CT and LLL and have embedded the use of these terms across their curricula, a common understanding of what these terms mean or how they should be taught and assessed is missing. Indeed, the terms CT and LLL are often presented in syllabi as distinct concepts and skills, despite being interconnected. In addition, the aptitude for CT and LLL among newly admitted students appears to be often taken for granted. Students, for example, may be assigned tasks requiring effective use of CT and LLL skills while many assessment tools evaluate the ability of students to apply such skills. However, a disconnect between readiness and aptitude likely results in poor academic performance and reduced well-being among students. Therefore, identifying where students are in terms of their readiness for CT and LLL at the beginning of their university life could be critical to their academic and personal success at and beyond college.

283

The impetus for this paper stems from the researchers' desire to better understand the meaning and significance of CT and LLL for freshman students. To this end, a brief literature review of the terms CT and LLL and their interaction are provided first. Next, we report the results of a small-scale study aimed at identifying freshman students' readiness for CT and LLL in the researchers' teaching context will be reported. Then, the results of research into the correlation between the participating students' CT and LLL tendencies will be reported. This is followed by a discussion of the results, and recommendations.

2. CRITICAL THINKING

Critical thinking is considered to be an important metacognitive skill necessary for academic and professional success (Cummings, 2015; Nosratinia & Zaker, 2014). Like most concepts, however, seemingly countless definitions of critical thinking exist in the literature and across disciplines (Ahern, O'Connor, McRuairc, McNamara, & O'Donnell, 2012; Claris & Riley, 2012; Facione & Gittens, 2012; Moore, 2013). Nonetheless, these definitions share a number of basic tenants, including the notion that critical thinking involves some sort of process. For example, Scriven and Paul (2007) see critical thinking as a "*process* of . . . evaluating information . . . as a guide to belief and action" (p. 1), while Brookfield (2012) defines it as "the process of hunting and checking assumptions" (p. 5). Wade (1995) also sees it as "the ability and willingness to assess claims and make objective judgments on the basis of well-supported evidence" (p. 25).

The researchers of this current study have adopted Paul and Elder's (2008) detailed definition of critical thinking because it effectively captures the essence of the term as it applies to their context: "The intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action" (p. 58). This definition is also linked to engineering education (Paul, Niewoehner & Elder, 2006) in that it reflects a number of Accreditation Board for Engineering and Technology (ABET) program outcomes (Claris & Riley, 2012), including the ability to apply knowledge, analyze and interpret data, and synthesize and evaluate information (ABET, 2013).

While Socrates, more than 2,400 years ago, is often credited with first introducing the concept of critical thinking (Fisher, 2001; Xiaoli & Huibin, 2016), John Dewey is typically cited as the one who integrated it into modern educational practice at the start of the 20th century (Hickman, 2006). In the early1980s, the so-called Critical Thinking movement in the United States began and quickly gained prominence after universities required CT as part of their general education courses and state education agencies included CT in their curricular frameworks and standardized testing programs (Facione, 1990). This led to the creation of the Delphi project in 1987, which set out to gather experts to come to a consensus as to the assessment and instruction of critical thinking (Facione, 1990). From 1988 to 1989, the Delphi panel met and generated a wide-range of statements on various aspects of critical thinking, culminating in the following statement: "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 is based" (Facione, 1990, p. 3). This statement has come to influence the discourse on critical thinking, including the design of the California Critical Thinking Skills Test (CCTST), a widely used test upon which one of the surveys used in this current study is based.

Although many see critical thinking as an essential skill, it is also perceived as problematic because it is difficult to define and no consensus exists as to how to assess it Liu, Mao, Frankel, & Xu (2016). Brookfield (2012), for example, points out that the term is often used by educators to describe a wide-range of "hunting and checking" assumptions despite their different applications. Similarly, Huitt (1998) believes that it is necessary to define critical thinking carefully in relation to such concepts as "creative" thinking or "good" thinking. Still, others argue that critical thinking is simply good thinking, has taken on undeserved importance, and is a "watered-down version of an earlier fad called Deconstruction" (Price, 2016, p. 2).

Challenges of assessing critical thinking have also been cited. According to Liu et al. (2016), for example, while assessment of critical thinking skills is widespread, "a number of deficiencies in existing assessments (e.g. ambiguous definitions, unreliable sub-scores and noncomparable test forms) have potentially limited the usefulness of the test results" (p. 677).

284

The combination of divergent perspectives of critical thinking and a lack of consensus of how to assess this concept has contributed to this growing criticism.

3. LIFELONG LEARNING

The early traces of lifelong learning can be found in the arguments of philosophers such as Socrates, Plato and Aristotle, all of whom advocated the use of the mind to cultivate intellectually advanced individuals. This, they argued, should not be limited to a certain phase of life, but rather span across the life cycle (Lewis, 1981). The traces of learning as a life-wide endeavor can also be found in early Islamic teachings. According to El-Din (2001), Islam requires individuals to seek knowledge and skills from the cradle to the grave, and its comprehensive approach to learning includes the development of skills, behaviors and attitudes across the life-span. On the other hand, lifelong learning in the Chinese and East Asian contexts can be traced back to the teachings of Confucius who argued that "[L]ife is limited, while learning is limitless" (Guo-Dong, 1994, p. 272). Confucius advocated "initiative, common commitment to the cultural heritage, appreciation of spiritual awareness, lifelong learning and self-cultivation" (Basharat, Iqbal & Bibi, 2011, p, 37). His teaching encourages "human beings to learn and become what they could be" (Basharat, Iqbal & Bibi, 2011, p. 37), which supports the underpinnings of lifelong learning since the knowledge, virtues and skills required for this to happen can only be gained through experiences throughout one's life.

In the Western context, Dewey, Lindeman and Yeaxle provided a relatively more modern and systematic approach to the notion of lifelong learning through their discussion of learning being an intrinsic part of life itself (Ayhan, 2006). Similarly in his definition of lifelong learning, Titmus (1979) underscored the significance of life being a continuous learning process, but also advocated that learning opportunities should be purposefully created and sequenced so that individuals can have more success in adapting to technical and social change. In keeping with these themes, the Commission of the European Communities (2000) defined the LLL as "all purposeful learning activity, undertaken on an ongoing basis with the aim of improving knowledge, skills and competence" (p. 3). This, they argued, requires "provision and participation across the full continuum of learning contexts" (p. 3), guaranteeing individuals with equal opportunities to meet the demands imposed by social and economic changes taking place at different phases of their lives.

Taken together, these different approaches to lifelong learning share, in common, the idea that learning cannot be confined to the limits of a particular life stage, and that learning takes places in a context wider than just school. It is also evident that in order to attain social and economic well-being, learning opportunities should not be left to chance, but should be planned, executed and evaluated in a systematic manner so that every individual in the society benefits from them.

However, it is argued that LLL has been stripped of its broader humanitarian and social implications due to such things as the reductionist human capital approach adopted by organizations like the World Bank and the Organisation for Economic Co-operation and Development (OECD) that place a heavy emphasis on the regulation of employment

285

encouraging individuals to prioritize the need for employment over social needs (Sayılan, 2015). It is also suggested that globalization has played a role in causing this with the world being viewed through an economic prism (Saul, 2005). Such a view often considers human beings as capital goods and wealth that can be increased through human resource development, reducing their value to a material component (Schutz cited in Jarvis, 2007).

4. INTERPLAY BETWEEN CRITICAL THINKING AND LIFELONG LEARNING AT TERTIARY EDUCATION

Critical thinking and lifelong learning skills intertwine in powerful ways. It is with the help of these conjoined skills that individuals make informed decisions about different aspects of learning. This also helps to empower individuals to manage themselves and persevere in the face of challenge. Indeed, given that problem solving, critical thinking, and reasoning skills are essential for lifelong learning (Hager & Holland, 2006), these skills allow university students to acquire the knowledge, skills and attitudes necessary not only for academic success but also for their overall well-being. However, as Wei (n.d.) warns, critical thinking exercised only for employment purposes is not lasting because, as he points out, we do not work lifelong. Indeed, if the only objective is "to stay relevant to envisaged industrial ends" and "it is only thinking and being creative within restricted parameters that is valued," then the actual purpose of critical thinking will be defeated. Consequently, critical thinking requires individuals to engage in as much careful thought and assessment as possible over the mandates of economic institutions in order to not lose sight of their needs as social beings and what makes life worthwhile. The aim of a university education, therefore, should not be limited to preparing students for future employment alone, but should also seek to develop the tools necessary for a fulfilling life. This requires university education to devote much energy to instilling critical thinking skills as a lifelong endeavor. As, Green (2015) observes, however, critical thinking at universities is often taught as a stand-alone course, which prevents students from reaching the desired levels of critical thinking. He suggests that university courses be redesigned in a way that allows students to become lifelong learners who continue improving their critical thinking skills beyond their university courses. He notes that one way of achieving this is to embed critical thinking in curricula across the university. Geertsen (2013) also points out that students' ability to transfer thinking across different domains is of great importance for self-directed learning, which, according to Candy (1991), doesn't only supplement learning in formal settings, but it also allows people to pursue learning beyond formal settings throughout their lives.

For example, in their Qaulity Enhancement Plan, the University of Houston-Clear Lake (2012) identified curiosity, connection, creativy and communication as the key components of critical thinking in academic contexts. Curoisity, fueled by 'desire to know more,' encourages people to ask questions about themselves and their environment. Connection, on the other hand, is about seeing how different ideas, information, and data relate to each other. It requires people to be able to notice consistencies, conractions, and biases. Creativity assumes that people interpret the world in unconvential ways and that they take risks through unorthodox modes of actions. Lastly, communication refers to "the successful and effective

expression of thoughts, interpretations, evaluations, findings, and/or arguments using presentation skills, writing skills and/or visual images" (p. 10). It is argued that the use of these four components by university students to fulfil academic expectations is one way of regularly applying critical thinking skills. It is suggested that this can only be achieved through student-centered learning activities involving real-life problem solving. This translates into skills necessary for them to be lifelong learners.

5. PROBLEM STATEMENT AND SIGNIFICANCE OF STUDY

As is discussed above, university students should develop critical thinking skills in order to be effective learners and consumers of information and build the requisite skills necessary to become life-long learners. Indeed, universities often include in their vision and mission statements the need to develop CR and LLL, while syllabi often incorporate the terms "critical thinking" and "life-long learning" in their course outcomes. A review of syllabi from a number of universities around the Gulf region, for example, covering a wide-range of courses, reveal that CT and LLL are central learning objectives. This is the case for the teaching context at the Petroleum Institute which offers degrees in various engineering disciplines.

Research suggests that critical thinking is central to engineering education and practice (Ahern et al., 2012). Indeed, critical thinking is integrated into the 11 outcomes of the Accreditation Board for Engineering and Technology (ABET) accreditation. Many engineering educators also believe life-long learning involves critical thinking (e.g. Shuman, Besterfield-Sacre, & McGourty, 2005; Jiusto & DiBiasio, 2006).

These skills are particularly important at the freshman level, because it is recognized that students' level of readiness directly impacts CT and LLL skill development (Mayhew, Wolniak, & Pascarella, 2008; Willingham, 2008). If a lack of readiness in these skills is not adequately identified and addressed early on, doing so later in a students' academic career can be more difficult and result in lower academic performance and overall well-being (Willingham, 2008; DiBenedetto & Myers, 2016). Yet there is a seeming disconnect between rhetoric and practice. While CT and LLL are perceived as essential skills for university studies and beyond, students' aptitudes for and skills of both are rarely assessed (Liu et al. 2016). The benefits of identifying the level of student readiness to develop CT and LLL skills and the lack of assessment of those skills also suggests that the overuse of these terms is adding little value to stated objectives (Mulnix, 2012; Weissberg, 2013).

A sample of syllabi at PI reveal that critical thinking and lifelong learning are indeed included as course learning outcomes, but none explicitly state how those outcomes are assessed. For example, in a team-based engineering problem solving course, students are expected through writing to demonstrate "one's level of participation, quality of understanding and ability to think critically." In an introduction to a course on engineering, it is simply stated that students should develop "critical thinking, reasoning, and reflection skills." Similarly, in an introductory course combining math, science, and physics, one of the learning outcomes states that "Students will be able to use critical thinking competency standards to demonstrate knowledge with understanding to fundamental chemistry concepts and apply

knowledge to new situations." The same kind of language is used in an introductory chemistry course where students are expected to use "critical thinking skills to apply knowledge and understanding to key concepts in chemistry" in order to fulfill a learning outcome. Two companion courses in communication include both CT and LLL in their syllabi. However, each is listed as a separate outcome. For example, the first learning outcome states that students will "extract detailed information from dense scientific academic texts and visuals, and apply critical thinking on the information in texts," while the second learning outcome indicates that students will be "engaged in independent study and the development of life-long learning skills." While it appears that these skills are an important part of the curriculum and may even be formally taught, there is no indication as to how student readiness for these skills are assessed. This similar pattern was found in other courses at other universities in the region and in other parts of the world. This compelled the researcher of this current paper to examine their own context in relation to CT, LLL, and the levels of student readiness. Unfortunately, there is a lack of studies in the region correlating a student's level of readiness and CT and LLL. This is despite the emphasis of CT and LLL among universities in the Gulf. The researchers are interested in identifying the level of student readiness to develop CT and LLL skills. Doing so will offer insight into the challenges inherent in developing CT and LLL skills and help ensure that our practice matches our rhetoric. This current study, therefore, is an attempt to help better understand the problem of this apparent disconnect and offer recommendations on how to remedy this issue.

288

Although CT and LLL appear to be targeted separately in official documents like the syllabi mentioned above, the researchers have chosen to look at the correlation between CT and LLL scores because, as a number of studies suggest, these two concepts inform one another in powerful ways (Alcantud-Diaz, 2013; Jiusto & DiBiasio, 2006). In addition, there is a dearth of studies exploring the correlation between CT and LLL and understanding how CT and LLL intersect can offer insight into the role these concepts play in shaping learning.

6. RESEARCH QUESTIONS

This research aimed at answering the following questions:

1. a) What are the critical thinking disposition levels of first year students at the Petroleum Institute?

   b) Does gender impact critical thinking levels?

2. a) What are the lifelong learning orientation levels of freshman students at the Petroleum Institute?

   b) Does gender impact critical thinking levels?

3. What relationship exists between the students' levels of critical thinking and lifelong learning dispositions?

7. METHOD

7.1 The Respondents

A total number of 87 freshman students from the Petroleum Institute (PI) participated in this study. Fifty-six percent of the participants were male, while 44% of them were female. All the participating students were Emirati, and their ages ranged from 17 to 21, with a mean age of 19.

7.2 The Data-collection Instruments

Data for this study were collected using two instruments:

a) The California Critical Thinking Dispositions Inventory (CCTDI). CCTDI was originally developed by Facione, Facione & Giancarlo (1998), and it was initiated by the American Philosophical Association in a two-year Delphi project which involved experts from a variety of disciplines. In this study, an adapted version of CCDTI (Kökdemir, 2003) was used. The adapted version consists of six sub-scales: Analyticity, Open-mindedness, Curiosity, Self-confidence, Searching for truth, and Systematicity. A six-point Likert scale is used to collect data on the respondents' level of (dis)agreement with response choices ranging from strongly agree to strongly disagree.

Kökdemir's Turkish version of the inventory was translated back to English. Some modifications were made to language in order to enable the participants as language learners to understand the statements better. For example, the direct translation of item 36 is, "Similies and analogies are only as useful as a boat on a highway." The translation was simplified to read: "Similes and analogies are not useful." The researchers also provided the definitions of the terms 'similie' and 'analogy.' In order to ensure its validity, the translated instrument was cross-checked by two native-born English speakers.

Kökdemir (2003) calculated the Cronbach's alpha of the scale as a whole to be 0.88. In this current study, the Cronbach's alpha of the scale was found to be 0.87. Kökdemir (2003) calculated the minimum score for each sub-scale to be 10, and the highest to be 60. The lowest total score of the scale as a whole, on the other hand, is 60 and the highest is 360. A score below 240 is considered low and a score above 300 is considered high.

b) The Lifelong Learning Tendency Scale (LLLTS). Originally developed in Turkish by Coşkun and Demirel (2012), LLLTS is a 27-item survey aimed at identifying participating individuals' lifelong learning tendencies. LLLTS has four subsections: Motivation, Perseverance, Self-regulation, and Curiosity. For the purpose of the current study, the instrument was translated into English, and the translated version was cross-checked by multiple translators. The validity and reliability of the original LLLTS were tested by Coşkun and Demirel (2012) who found that the Cronbach alpha internal consistency coefficient was 0.89. In this current study, it was found to 0.91.

289

A six-point Likert scale is used to collect data on the respondents' level of (dis)agreement with response choices ranging from strongly agree to strongly disagree. The minimum score possible for the twenty-seven items is 27, while the maximum score is 162. The midway score is 94.5, which indicates a non-fixed orientation.

7.3 The Analyses

The data collected were analyzed using SPSS (Version 18.0) (SPSS Inc., Chicago, USA). Descriptive statistics including frequencies, mean, minimum and maximum were used to describe the data. Student's t-test was used to identify the significance levels of the participants' critical thinking dispositions and lifelong learning propensities according to gender. Student's t-test was chosen for this statistical analysis owing to the relatively small number of participants in each gender group, and the unknown variances of the two normal distributions. On the other hand, the Pearson product-moment correlation coefficient (r) was used to measure the strength of association between the scores from the two instruments. A p-value of 0.05 was considered statistically significant.

8. RESULTS

The first research question asked what the PI freshman students' critical thinking disposition level is, and whether or not gender impacts critical thinking levels. The results of data analysis in response to this question can be seen in Table 1.

Table 1
Students' Critical Thinking Scores

Participants	Scores			t	p*
	Minimum	Maximum	Average		
Female (N=38)	158	262	225		
Male (N=49)	164	282	210	-2.7714	0. 0034
Whole Population (N= 87)	158	282	218		

*p < 0.05

Table 1 reveals that students' overall CT score is 218, which is considered low. When gender is factored in, it is evident that female students scored higher than the male students (225 vs. 210) with a difference at a statistically significant level (p=0.0034 < 0.05). This finding suggests that female students have a higher level of aptitude for CT than males, although it still is in the low band.

The second research question concerned the participants' level of lifelong learning orientation, and whether or not gender impacts critical thinking levels. Table 2 below shows the results of data analyses for this question.

Table 2
Students' Lifelong Learning Orientation Scores

Participants	Scores			t	p*
	Minimum	Maximum	Average		
Female (N=38)	83	156	116		
				3.2110	0. 0009
Male (N=49)	49	141	102		
Whole Population (N= 87)	49	156	109		

*p < 0.05

According to Table 2, the students' overall LLL score was 109, which is above the average score of 94.5. This indicates that the students' aptitude for lifelong learning is at a moderate level. It also appears that both male and female students scored above the medium. However, the average score for female students was higher than that of the male students (116 vs. 102), which was found to be statistically significant (p=0.0009 < 0.05).

The third research question sought to understand the relationship that exists between the students' CT and LLL scores. Scores for females and males were compared using Student's t-test, the results of which can be seen in Table 3.

Table 3
Comparison of CT and LLL Scores

Participants	CT scores			LLL scores			t	p*
	Min	Max	Av	Min	Max	Av		
Female (N=38)	158	262	225	83	156	116	22.8902	0.0000
Male (N=49)	164	282	210	49	141	102	23.0975	0.0000
Whole Population (N= 87)	158	282	218	49	156	109	30.9502	0.0000

*p < 0.05

According to Table 3, students' overall LLL scores were higher than their overall CT scores with a difference at a statistically significant level (p=0.000 < 0.05). Female and male student CT and LLL scores differed from each other at a statistically significant level (p=0.000 < 0.05 for both). These data suggest that students have more tendency for LLL than CT.

The correlation between the students' CT and LLL scores was also examined to identify the strength of association between them. The results can be seen in Table 4.

Table 4
Pearson Product-moment Correlations of CT and LLL Scores

			CT	LLL
Whole population (N=87)		CT	-	0.4959*;0.0000 ª
		LLL	0.4959*;0.0000 ª	-
Gender	Female	CT	-	0.5423*;0.0004ª
	(N=38)	LLL	0.5423*;0.0004ª	-
	Male	CT	-	0.3838*;0.0065 ª
	(N=49)	LLL	0.3838*;0.0065 ª	-

*Values are product-moment correlation coefficient (r);
ªp<.05 (2-tailed)

Table 4 illustrates that the Pearson product-moment correlation coefficient computed to assess the relationship between CT and LLL scores for the whole population revealed that there was a weak positive correlation between the two variables (r=0.4956, n=87, p=0.0000). When only male students' scores are considered, a technically positive correlation is evident, but the relationship between their CT and LLL scores was weak (r=0.3838, n=49, p=0.0065). On the other hand, the Pearson product-moment correlation coefficient computed to assess female students' CT and LLL scores reveals that there is a moderate positive correlation between the variables (r=0.5423, n=38, p=0.0004).

9. DISCUSSION

The results for the first research question revealed that students' CT score was below the average level, indicating that their readiness for CT as freshman is limited. One possible reason for this is the lack of attention paid to CT skills prior to their freshman studies. Although there needs to be a concentrated effort for providing individuals with critical thinking skills as early as possible—even before they begin formal schooling—the role of secondary and high-school education may be key to preparing them for the rigors of tertiary education. There is empirical evidence that high school students receiving critical thinking strategy instruction outperform those who do not receive such training (Hove, 2011). However, Thabet (2008) found that public schools in the UAE do not seem to reflect the tenets of critical thinking in their teaching despite the requirements of the Ministry of Education. This research showed that rote-learning and deductive teaching in public schools cause a barrier to students' development of critical thinking skills. The UAE government also recognized that this is an issue by noting that high school students are not effectively prepared to take full advantage of tertiary education (Evans, 2014). The lack of CT training faced by freshman students, especially those coming from rote-learning oriented primary and secondary schools in the Gulf, is also noted by Sperrazza and Raddawi (2016). Indeed, part of the UAE government's 2021 mission is to develop "A progressive national curriculum [that] will extend beyond rote learning to encompass critical thinking and practical abilities, equipping [the] youth with essential skills and knowledge for the modern world " (United Arab Emirates Government, 2010, p. 23).

The results also showed that female students' CT scores were higher than those of male students although they were still below the average CT score. Although research in other context (e.g. Turan, 2016) supports this finding, the lack of previous research in the UAE context prevents comparison with a similar population. Nonetheless, this finding is noteworthy and adds to our understanding in this region.

The female students' higher level of CT propensities is also important to note. There may be several reasons for this. First, Emirati female students are underrepresented in engineering studies (Mahani & Molki, 2011). It is likely, therefore, that female students with a high motivation to enter an engineering discipline are inclined to confront the challenges they may face as they progress in their studies. This should lead them to engage in critical reflection on societal expectations and their skills to overcome challenges, an experience that would promote critical thinking skills. Being admitted to an engineering program could give them extra motivation to excel in their studies. Considering the nature of courses they are to take, they may be more motivated to develop and use CT skills. Second, PI students study on segregated campuses. It has been noted that women in such learning environments have higher career aspirations than males (Watson, Quatman & Edler, 2002). To achieve this, they may feel more compelled to use CT skills, a prerequisite for academic success. It has also been found that because females do not have to compete against males in single-sex mathematics and sciences classrooms (Shapka & Keating, 2003), many develop greater self-confidence which may encourage them to apply critical thinking strategies more often.

The second research question, which is relatively understudied in the UAE context, aimed at identifying students' lifelong learning orientation level and whether or not it changed according to gender. Results indicate that the students' score (109) was slightly above the average (94.5). This suggests that participants have an aptitude for lifelong learning albeit not strong. This finding is supported by earlier research conducted in the same institution on freshmen's LLL orientations, which showed that the students' average was reduced due to their comparatively lower scores for the subscales perseverance and self-regulation (Deveci, 2015a). Another study conducted at PI with foundation students, revealed that they had an average level of lifelong orientation (Deveci, 2015b). This suggests that students' lifelong learning orientations do not change during their foundation and freshman years. Freshman students' lower lifelong learning orientation in comparison to that of juniors and seniors was also reported in the Turkish context (Garipağaoğlu, 2013), where students' level of interest in their country's political, social and economic agenda predicted higher lifelong learning scores. It may be that the freshman students' in Garipagaolgu's study were yet to develop such interests. This is likely the case for the students in this current study. Elsewhere, the concerns over college students' lower levels of civic-engagement have given way to the practice of service learning that provides students with opportunities to apply theory to community-based issues (Wilson, Rosentraub, Manning, Simson & Steele, 2007). Such an approach to learning at college allows for the incorporation of real-world experiences in the design of effective pedagogical strategies and supports the development of students' lifelong learning skills (Zlotkowski, 2002). PI students' relatively limited engagement in similar initiatives may be a reason for their comparatively lower level of LLL score.

Concerning gender, the results of this study showed that the female students' LLL orientation score was higher than that of the male students at a statistically significant level. Another recent study in the same institution found similar results (Deveci, 2015b). Similarly, in their research conducted on female PI students, Mahani and Molki (2011) found that 20% of them did not believe that Emirati men and women had equal job opportunities upon

graduation. Deveci (2015b) also found that female students often felt the urge to achieve more to survive in the engineering disciplines considered as male dominated. This is in line with Hewlett and Rashid's (2010) observations that the Emirate female students are highly motivated to have top positions in their jobs. Similarly, Engin and McKeown (2016) found that female Emirati students in particular see university education as a way to fulfill their dreams of an ideal job. Data from these studies suggests that motivation is a central, perhaps *the* central, factor encouraging female students to acquire and use more LLL skills in comparison to male students.

The third research question sought to understand the relationship that exists between students' levels of critical thinking and lifelong learning dispositions. Understanding this relationship is important, because it offers insight into the role each variable plays in influencing the other and helps identify what might be needed for CT and LLL to be developed further. For example, overall LLL scores were slightly above the average and higher than overall CT scores which were slightly below the average. Given that CT skills tend not to be formally taught in secondary school in the UAE (Thabet, 2008), it is not surprising that students' CT scores are below average. It also makes sense that student readiness for CT when entering university is relatively weak, because they have not had the time or training to develop their ability to think critically. What is surprising, however, is that participants' LLL scores were slightly above the average. This finding is significant, because it runs counter to what one might expect given the relationship that exists between CT and LLL and suggests that students have more tendency for LLL than CT. Based on our observations and experience, a positive CT disposition contributes to a positive LLL disposition, because CT helps learners to be more effective consumers of information rather than simply accept things as they are. Indeed, this ability to question, to wonder, and to thoughtfully analyze information is an essential part of LLL (Cummings, 2015; Green, 2015). That LLL scores, therefore, were a bit above the average despite below average CT scores raises the possibility that students have the ability to develop their LLL even with relatively weak CT skills. One implication of this is that if CT is developed, especially explicitly, LLL should increase that much more robustly.

The fact that statistical analyses show that there is a weak overall positive relationship between the two variables offers additional evidence that CT and LLL are inexorably linked. For example, the relationship between female students' CT and LLL scores was found to be moderately positive. This suggests that these students may experience greater growth and development over time than males relative to CT and LLL. Unfortunately, no studies could be found that explore this relationship between CT and LLL. While the researchers of this current study cannot point to previous studies to explain why females have a moderately positive relationship between these two variables, there may be two specific reasons why female students in this study experienced a stronger positive relationship than males. One likely reason stems from the nature of engineering study. Given that only a small percentage of those studying engineering locally or globally are female, it may be that CT skills are developed as a coping mechanism to ensure success in an otherwise male-dominated profession. Madsen and Cook (2010) also note that Emirati women, who have fewer postsecondary employment opportunities, seek ways of maximizing their educational opportunities. These students may

recognize the benefits of enhanced CT skills as an effective tool to help them achieve their goals. In this way, they may feel more capable of competing with their male counterparts and counter other pressures associated with studying in an atypical field. This, in turn, likely helps them develop stronger LLL tendencies. Over time, then, the relationship between CT and LLL would be expected to grow stronger.

Another related reason is linked to the lack of encouragement to study math and science many females report feeling in high school. This has been widely documented in many countries around the world (Hatchell, 1998; Kelly & Zhang, 2016). The females in this study may have also experienced a lack of encouragement or even outright discouragement by teachers to study the "hard sciences." It is possible that these participants found that one way of overcoming this lack of support is to develop the kinds of CT necessary for success in these subjects. This, in turn, may have led to growth in their LLL.

10. CONCLUSIONS AND RECOMMENDATIONS

The findings of this current research are particularly important since they offer at least some insight into students' CT and LLL propensities. Given that LLL scores are slightly above average suggests that students have the potential aptitude and skills necessary for lifelong engagement. However, students' comparatively lower CT propensities, may, unless supported and improved, limit their success at university and beyond over time. Although such skills appear to be acknowledged as important across the college by their heavy emphasis in syllabi, as previous research in the UAE context showed, students may still opt for an 'unthinking' way even if they are considered to be familiar with critical literacy skills (Clarke, 2007). Therefore, it is reasonable to suggest that freshman students' CT propensities should not be taken for granted. Otherwise, curriculum content, tasks and assessment geared towards students assumed to possess higher levels of CT may be misplaced. This may limit the success of increasing the CT skills of these university students. It may also cause some students to develop negative attitudes towards university studies, lower their overall well-being, and, ultimately, negatively impact their LLL.

Nonetheless, it is worth noting that, as Celuch and Slama (2002) found, CT can be developed, but it requires deliberate planning on the part of the instructor and a willingness to be open to new ways of thinking on the part of the learner. Consequently, being intentional about promoting CT skills through a variety of pathways in and out of the classroom is essential (Sadeghi, Hassani, & Rahmatkhah, 2014; Larmar & Lodge, 2014). Doing so in conjunction with promoting LLL can make a meaningful difference in the development of CT and LLL skills. Several actions can be taken to achieve this.

One such way is by ensuring that the classroom environment is nurturing and supportive. While it is generally accepted that creating a climate that makes students feel safe and comfortable is necessary to develop all sorts of learning, it has been found to be particularly true relative to CT and LLL (Abrami et al. 2008; Facione & Gittens, 2012). To create a safe, intellectually risk-free learning environment, an instructor can, on a daily basis,

model respect by being sensitive to the diverse backgrounds and needs of students, present all sides of an issue, and demonstrate   active listening skills to reinforce the notion that everyone's voice matters in the classroom. Finally, using "wait-time" can enhance CR and lead to greater LLL by allowing students a moment to process questions before actively encouraging them to express their viewpoints, ask questions, or contribute to discussions in small and large groups.

Another way to promote CT and LLL is by using a variety of teaching strategies and assignments that create learning experiences in which students have an opportunity to think and write reflectively (Jacobson & Lapp, 2010; Nosich, 2012). For example, encouraging students to maintain a reflective journal in which they detail their beliefs and positions, provide reasons to justify what they think and show awareness of opposing positions while critiquing their own position can be very powerful. In addition, modeling metacognitive strategies and asking questions that encourage thoughtful responses supported by evidence can help students develop a deeper understanding of the process of reflection. So too can the creation of study guides or advance organizers that prompt students to reflect on their learning. Similarly, using problem-based learning as an organizing structure to generate questions that prompt students to consider alternatives and the implications of their ideas has also been shown to be effective (Nunn, Brandt, & Deveci, 2016). Finally, asking students to research a viewpoint with which they are uncomfortable and then advocate for can be a memorable lesson in seeing an issue from a very different lense.

296

A third way to promote CT and LLL is through inquiry. While this can take many forms, depending on the subject, one goal of such inquiry would be to develop a community of inquiry whereby students learn to question, wonder, and reflect on privately and publically held epistemic beliefs and assumptions (Lipman, 2003; Getahun, Saroyan & Aulls, 2016). Learning by questioning, exploring, and discovering can help enhance CR skills and sustain LLL. While developing curiosity in students is not necessarily easy, Deveci (2013) recommends that lecturers start their classes with some kind of impact in the form of anecdotes, mind-teasers or attention-grabbing realia related to lecture contents, which would induce attention and arouse interest. On the other hand, Lomax and Moosavi (2002) advocate the use of humor as a warm-up activity in lectures that may be challenging or cause discomfort due to the nature of the topic. This, they argue, would reduce the anxiety levels among students, which could otherwise stifle their LLL aptitude. As Deveci (2013) also notes, students' curiosity can be stimulated if they are given the chance to ask questions. Students that are not accustomed to generating questions can be provided help by their instructors.

These and other similar activities would create greater student motivation, something that has been shown to effectively promote CT and LLL. Indeed, understanding the critical role motivation and perseverance skills play in developing CT and sustaining LLL is important. As Baxendell (2007) suggests, instructors can help students improve perseverance skills by getting to know them as individuals in terms of their aspirations, values, interest, previous success and failure stories.

REFERENCES

Abrami, P. C., Bernard, R. M., Borokhovski, E., Wade, A., Surkes, M. A., Tamim, R., & Zhang, D. (2008). Instructional interventions affecting critical thinking skills and dispositions: A stage 1 meta-analysis. *Review of Educational Research*, *78*(4), 1102–1134.

Ahern, A., O'Connor, T. O., McRuairc, G., McNamara, M., & O'Donnell, D. (2012). Critical thinking in the university curriculum-the impact on engineering education. *European Journal of Engineering Education*, *37*(2), 125-132.

Alcantud-Diaz, M. (2013). Fighting the myths and misconceptions on evil stepmothers: Lifelong learning by means of digital storytelling. *E-Teals: An E-Journal of Teacher Education & Applied Language Studies*, *4*, 1-18.

Ayhan, S. (2006). Lifelong learning in the past and today. In F. Sayılan & A. Yıldız. (Eds). *Lifelong Learning* (pp. 2-23). Ankara: Educational Sciences Institute and Pegem A.

Basharat, T., Iqbal, H. M. & Bibi, F. (2011). The Confucius philosophy and Islamic teachings of lifelong learning: Implications for professional development of teachers. *Bulletin of Education and Research, 33*(1), 31-46.

Baxendell, E. (2007). *Learning perseverance for the workplace and for life*, Fieldnotes for ABLE Staff Retrieved from http://www.pema.state.pa.us/portal/server.pt/document/895406/fn07perseverance_pdf.

Brookfield, S., (2012). *Teaching for critical thinking: Tools and techniques: To help students question their assumption*. Jossey-Bass and Willey, San Francisco.

Candy, P. C. (1991). *Self-direction for lifelong learning*. San Francisco: Jossey-Bass.

Celuch, K., & Slama, M. (2002). Promoting critical thinking and life-long learning: An experiment with the theory of planned behavior. *Marketing Education Review*, *12*(2), 13-22.

Claris, L. & Riley, D. (2012). Situation critical: critical theory and critical thinking in engineering education. *Engineering Studies*, *4*(2), 101-120.

Clarke, M. (2007). Language policy and language teacher education in the United Arab Emirates. *TESOL Quarterly, 41*(3), 583-591.

Clore, G. & Palmer, J. (2009). Affective guidance of intelligent agents: How emotions control cognition. *Cognitive Systems Research, 20*, 21-30.

Coşkun, Y. D. & Demirel, M. (2012). Üniversite öğrencilerinin yaşam boyu öğrenme eğilimleri *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 42*, 108-120.

Cummings, C. (2015). Engaging new college students in metacognition for critical thinking: A developmental education perspective. *Research & Teaching in Developmental Education*, *32*(1), 68-71.

Deveci, T. (2013). Promoting lifelong learning, *The Asian EFL Journal Professional Teaching Articles, 7*, 4-19.

Deveci, T. (2015a). Freshman students' emotional intelligence and team-work satisfaction levels. *Journal of Higher Education, 5*(1), 35-43.

Deveci, T. (2015b). A comparative study on the lifelong learning propensities of English language learners: Nationality, gender and length of study. *Learning and Teaching in Higher Education: Gulf Perspective*s, 12 (1). http://the.zu.ac.ae.

DiBenedetto, C., & Myers, B. (2016). A conceptual model for the study of student readiness in the 21st century. *NACTA Journal*, *60,* 28-35.

El-Din, N. G. (2001). The Islamic roots of lifelong learning culture: How to make use of them in creating an inclusive learning environment. In G. Youngs, T. Ohsaka & C. M. Anonuevo (Eds), *Creative and Inclusive Strategies for Lifelong Learning: Report of International Roundtable* (pp. 21-35). Hamburg, Germany: UNESCO Institute for Education.

Engin, M. & McKeown, K. (2016). Motivation of Emirati males and females to study at higher education in the United Arab Emirates, *Journal of Further and Higher Education*, DOI: 10.1080/0309877X.2016.1159293

Evans, H. P. (2014, June). *The importance of cultural understanding in teaching and learning in the UAE*. Paper presented at the 1st European Conference on Teaching and Learning Politics, International Relations and European Studies, Maastricht.

Facione, P. A. (1990). *Critical thinking: A statement of expert consensus- The Delphi Report*. California: California Academic Press.

Facione, P. A., Facione, N. C. & Giancarlo, C. A. F. (1998). *The California critical thinking disposition inventory*. California: Academic Press.

Facione, P. A., & Gittens, C. A. (2012). *Think critically*. Prentice Hall PTR.

Fahim, M., & Zaker, A. (2014). EFL learners' creativity and critical thinking: Are they associated? *Humanising Language Teaching, 16*(3). Retrieved from http://www.hltmag.co.uk/jun14/mart01.htm.

Fisher, A. (2001). *Critical thinking: An introduction*. Cambridge: Cambridge University Press.

Garipağaoğlu, B. C. (2013). The effect of self-efficacy on the lifelong learning tendencies of Computer Education and Instructional Technologies pre-service teachers: A case study. *International Journal of Human Sciences*, *10*(1), 224- 236.

Geertsen, R. (2013). Barriers to critical thinking across domains. *Review of Management Innovation & Creativity, 6*(20), 52-60.

Getahun, D. D., Saroyan, A., & Aulls, M. W. (2016). Examining undergraduate students' conceptions of inquiry in terms of epistemic belief differences. *Canadian Journal of Higher Education*, *46*(2), 181-205.

Guo-Dong, X. (1994). Lifelong Education in China: New policies and activities. *International Review of Education, 40*(3/5), 271-281.

Green, P. (2015). Teaching critical thinking for lifelong learning. In M. Davies & R. Barnett (Eds.) *The Palgrave Handbook of Critical Thinking in Higher Education* (pp. 107-121). New York, NY: Palgrave Macmillan.

Hager, P. J. & Holland, S. S. (2006). *Graduate attributes, learning and employability*. Dordrecht: Springer.

Hatchell, H. (1998). Girls' entry into higher secondary sciences. *Gender & Education*, *10*(4), 375-386.

Hewlett, A. A., & Rashid, R. (2010). The battle for female talent in emerging markets. *Harvard Business Review,* 101-106.

Hickman, L. A. (2006) Socialization, social efficiency, and social control: putting pragmatism to work. In D. T. Hansen (Ed.), *John Dewey and Our educational prospect: A critical engagement with Dewey's democracy and education* (pp. 67-80). Albany, NY: State University of New York Press.

Hove, G. (2011). *Developing critical thinking skills in the high school English classroom* (Master's thesis, University of Wisconsin-Stout). Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.389.4692&rep=rep1&type =pdf

Huitt, W. (1998). Critical thinking: An overview. *Educational Psychology Interactive*. Valdosta, GA: Valdosta State University. Retrieved from, http://www.edpsycinteractive.org/topics/cognition/critthnk.html

Jacobson, J., & Lapp, D. (2010). Revisiting Bloom's taxonomy: A framework for modeling writing and critical thinking skills. *California Reader*, *43*(3), 32–47.

Jarvis, P. (2007). *Globalisation, lifelong learning and the learning society*. New York: Routledge.

Jiusto, S. & DiBiasio, D. (2006). Experiential learning environments: Do they prepare our students to be selfdirected, life-long learners?. *Journal of Engineering Education*, *95*, 195-204.

Kelly, S. & Zhang, Y. (2016). Teacher support and engagement in math and science: Evidence from the high school longitudinal study. *High School Journal*, *99*(2), 141-165.

Kökdemir, D. (2003). *Belirsizlik durumlarında karar verme ve problem çözme* (Doctoral thesis, Ankara Universitesi, Ankara).

Larmar, S., & Lodge, J. (2014). Making sense of how I learn: Metacognitive capital and the first year university student. *The International Journal of the First Year in Higher Education, 5*(1), 93-105.

Lipman, M. (2003). *Thinking in education*. Cambridge, UK: Cambridge University Press.

Liu, O. L., Mao, L., Frankel, L., & Xu, J. (2016). Assessing critical thinking in higher education: the HEIghten™ approach and preliminary validity evidence. *Assessment & Evaluation in Higher Education*, *41*(5), 677-694.

Lewis, R. B. (1981). *The philosophical roots of lifelong learning*. Abstract retrieved from ERIC database, (ED213356).

Lomax, R. G. & Moosavi, S. A. (2002). Using humor to teach statistics: Must they be orthogonal? *Understanding Statistics, 1*(2), 113-130.

Madsen, S. R. & Cook, B. J. (2010). Transformative learning: UAE, women, and higher education. *Journal of Global Responsibility, 1*(1), 127–148.

Mahani, S. & Molki, A. (2011). Factors influencing female Emirati students' decision to study engineering. *Global Journal of Engineering Education, 13*(1), 26-31.

Mayhew, M. J., G. C. Wolniak, and E. T. Pascarella. (2008). How Educational Practices Affect the Development of Life-Long Learning Orientations in Traditionally-Aged Undergraduate Students. *Research in Higher Education* 49 (4): 337-356.

Moore, T. (2013). Critical thinking: Seven definitions in search of a concept. *Studies in Higher Education, 38*(4): 506–522.

Mulnix, J. W. (2012). Thinking critically about critical thinking. *Educational Philosophy and Theory*, *44*(5), 464-479.

Nosich, G. M. (2012). *Learning to think things through: A guide to critical thinking across the curriculum*. Boston: Pearson.

Nosratinia, M., & Zaker, A. (2014). Metacognitive attributes and liberated progress: The association among second language learners' critical thinking, creativity, and autonomy. *SAGE Open, 4*(3), 1-10.

Nunn, R., Brandt, C. & Deveci, T. (2016). Project-based learning as a holistic learning framework: integrating 10 principles of critical thinking. *The Asian ESP Journal Special Issue, 12*(2), 9-53.

Paul, R., & Elder, L. (2008). *The miniature guide to critical thinking concepts and tools*. Retrieved November 10, 2016 http://www.criticalthinking.org/files/Concepts_Tools.pdf

Paul, R., Niewoehner, R. & Elder, L. (2006). *The thinker's guide to engineering reasoning*. Dhillon Beach: The Foundation for Critical Thinking.

Price, B. D. (2016). Critical Thinking: Not all that critical. *Nonpartisan Education Review/Essays, 12*(2). Retrieved from http://nonpartisaneducation.org/Review/Essays/v12n2.pdf

Quality Enhancement Plan (QEP). (2012). *Applied critical thinking (ACT) for lifelong learning and adaptability*. Retrieved from http://prtl.uhcl.edu/institutional-effectiveness/qualityenhancementplan.pdf

Sadeghi, B., Hassani, M. T., & Rahmatkhah, M. (2014). The relationship between EFL learners' metacognitive strategies, and their critical thinking. *Journal of Language Teaching & Research*, *5*(5), 1167-1175.

Sayılan, F. (2015). Some critical reflections on lifelong learning policy in Turkey. *Journal for Critical Education Policy Studies*, 12(3), 156-170.

Saul, J. R. (2005). *The end of globalism*. Toronto: Viking Canada.

Scriven, M., & Paul, R. (2007). *Defining critical thinking.* The Foundation for Critical Thinking. Berkeley, CA: The Foundation for Critical Thinking.

Sperrazza, L. & Raddawi, R. (2016), Academic writing in the UAE: Transforming critical thought in the EFL classroom. In A. Ahmed & H. Abouabdelkader (Eds.). *Teaching EFL writing in the 21*[st] *century Arab world* (pp. 157-187). UK: Palgrave Macmillan.

Shapka, J. D., & Keating, D. P. (2003). Effects of a girls-only curriculum during adolescence: Performance, persistence, and engagement in mathematics and science. *American Educational Research Journal, 40,* 929 - 960.

Shuman, L., Besterfield-Sacre, M. & McGourty, J. (2005). The ABET "professional skills": Can they be taught? Can they be assessed? *Journal of Engineering Education*, *94*, 41-55.

Thabet, R. (2008). *Do public schools in UAE foster critical thinking as one of the main objectives of education?* (Master's thesis, British University in Dubai). Retrieved from http://bspace.buid.ac.ae/bitstream/1234/149/1/60041.pdf

The Commission of the European Communities. (2000). *A memorandum on lifelong learning*. Brussels

Titmus, C. (1979). *Terminology of adult education,* UNESCO, Paris: UNESCO.

Turan, H. (2016). Comparison of critical thinking dispositions of prospective teachers. *Educational Research and Reviews, 11*(8), 867-876.

United Arab Emirates Government. (2010). *UAE Vision 2021*. Retrieved from https://www.vision2021.ae/sites/default/files/uae-vision2021-brochure-english.pdf

Wade, C. (1995). Using writing to develop and assess critical thinking. *Teaching of Psychology, 22*(1), 24-28.

Watson, C. M., Quatman, T. & Edler, E. (2002). Career aspirations of adolescent girls: Effects of achievement level, grade, and single-sex school environment. *Sex Roles*, *46*(9), 323-335.

Wei, T. T. (n.d.). Critical thinking and lifelong learning. Retrieved from http://www.mss.edu.mo/eafae/eafae/events/doce_09.htm

Weissberg, R. (2013). Critically thinking about critical thinking, *Academic Questions*, *26*, 317–328.

Willingham, D. T. (2008). Critical thinking: Why is it so hard to teach?. *Arts Education Policy Review*, *109*, 21-32.

Wilson, L. B., Rosentraub, K. H., Manning, T. Simson, S. & Steele, J. (2007). Civic engagement and lifelong learning. *Generations, 30*(4), 90-94.

Xiaoli, W., & Huibin, Z. (2016). Reasoning critical thinking: Is it born or made?. *Theory & Practice in Language Studies*, *6*(6), 1223-1231.

Zlotkowski, E. (2002). Introduction. In E. Zlotkowski (Ed.), *Service-Learning and the First-Year Experience: Preparing Students for Personal Success and Civic Responsibility* (Monograph No. 34) (pp. ix- xiv). Columbia, SC: University of South Carolina, National Resource Center for the First-Year Experience and Students in Transition.

GENİŞ ÖZET

Eleştirel düşünme ve yaşam boyu öğrenme becerilerinin birbirleri ile güçlü şekilde etkileşim halinde olduğu kabul görmektedir. Ancak bu iki kavram arasındaki etkileşime dair alanyazında yapılan araştırmaların oldukça kısıtlı olduğu da dikkat çekmektedir. Örtüşmekte olan bu beceriler sayesinde öğrenmeye ilişkin kararlar daha etkili verilebilir. Bu beceriler aynı zamanda öz-yönetimli öğrenmenin gerçekleşmesine de katkı sağlamaktadır. Dolayısıyla, üniversite öğrencilerinin bu becerileri edinip etkili bir şekilde kullanabilmesi gerek üniversite gerekse üniversite sonrası başarılarını artıracaktır. Ancak üniversite eğitimine yeni başlamış öğrencilerin bu becerilere sahip oldukları ve etkili bir şekilde kullanmaya hazır olduklarını varsaymak gerçekçi değildir. Şayet eğitim ve öğretim içerik ve yöntemleri bu varsayıma dayalı olarak hazırlanırsa öğrencilerin akademik başarıları ve genel olarak memnuniyetlik seviyelerinde azalma görülecektir. Bu durum, öğrencilerin ileriki meslek hayatlarında etkin olmalarına da engel olacaktır. Dolayısıyla, üniversite eğitiminin amacı yalnızca akademik açıdan başarılı bireyler yetiştirmek değil, ileriki meslek ve sosyal yaşamlarında da başarılı bireyler yetiştirmek olmalıdır. Bu amaçla, birinci sınıf öğrencilerinin eleştirel ve yaşam boyu öğrenmeye hazır bulunuşluk seviyelerinin belirlenmesi, ve buna göre eğitim içerik ve yöntemleri belirlenmelidir. Bu gerekçelerden yola çıkılarak yapılmış olan bu çalışmada şu sorulara yanıt aranmıştır:

1) a) The Petroleum Institute'de eğitim almakta olan birinci sınıf öğrencilerinin eleştirel düşünmeye hazır bulunuşluk seviyeleri nedir?

b) Cinsiyet, bu öğrencilerin eleştirel düşünmeye hazır bulunuşluk seviyelerinde rol oynamakta mıdır?

2) a) The Petroleum Institute'de eğitim almakta olan birinci sınıf öğrencilerinin yaşam boyu öğrenmeye hazır bulunuşluk seviyeleri nedir?

b) Cinsiyet, bu öğrencilerin yaşam boyu öğrenmeye hazır bulunuşluk seviyelerinde rol oynamakta mıdır?

3) The Petroleum Institute'de eğitim almakta olan birinci sınıf öğrencilerinin eleştirel düşünme ve yaşam boyu öğrenmeye hazır bulunuşluk seviyeleri arasında nasıl bir ilişki vardır?

Araştırmaya, Abu Dhabi şehrinde bulunan the Petroleum Institute'den toplam seksen-yedi öğrenci katılmıştır. Bu öğrencilerin %56'sını erkek ve %54'ünü kız öğrenciler oluşturmuştur. Katılımcıların yaş ortalamasının 19 olduğu belirlenmiştir. Eleştirel düşünmeye ilişkin veriler Kökdemir (2003) tarafından uyarlanmış olan California Eleştirel Düşünme Eğilimi Ölçeği'nin İngilizce sürümü kullanılarak toplanmıştır. Yaşam boyu öğrenmeye ilişkin veriler ise Coşkun ve Demirel (2012) tarafından geliştirilmiş olan Yaşam Boyu Öğrenme Eğilimlerini Belirleme Ölçeği'nin İngilizce sürümü kullanılarak elde edilmiştir. Verilerin cinsiyet değişkeni dikkate alınarak incelenmesinde Student's t-test kullanılmıştır. Katılımcıların eleştirel düşünme ve yaşam boyu öğrenme puanları arasındaki ilişkinin incelenmesinde Pearson momentler çarpımı korelasyon katsayısı kullanılmıştır.

Birinci araştırma soruna ilişkin sonuçlar, öğrencilerin eleştirel düşünme puanlarının ortalamanın altında olduğunu göstermiştir. Bunun muhtemel bir nedeni, öğrencilerin bu becerilere ilişkin üniversite öncesi yeterli eğitim ve uygulama fırsatından yoksun olmalarıdır. Birleşik Arap Emirlikleri'nde yapılmış olan bir araştırma, Eğitim Bakanlığı'nın zorunlu kılmasına rağmen bölgedeki devlet okullarında eleştirel düşünmeye yeterince odaklaşılmadığını, daha çok ezberci ve öğretmen odaklı eğitim yapıldığını göstermiştir (Thabet, 2008). Diğer yandan öğrencilerin yaşam boyu öğrenmeye ilişkin puanlarının nispeten daha yüksek olduğu belirlenmiştir. Cinsiyet dikkate alınarak yapılan incelemelerde ise, kız öğrencilerin her iki puan türünde de erkeklere oranla daha yüksek sonuç elde ettikleri görülmüştür. Araştırmanın gerçekleştirildiği üniversitede mühendislik eğitimi verilmektedir. Kız öğrencilerin mühendeslik alanlarına kabul edilme ve başarılı olmaları için erkek öğrencilere kıyasla daha fazla gayret sarfetmeleri gerekebileceği düşünüldüğünde, eleştirel düşünme ve yaşam boyu öğrenme becerilerine olan ilgilerinin daha yoğun olması beklenebilir.

Üçüncü araştırma sorusu için elde edilen verilerin incelenmesi sonucunda, katılımcıların eleştirel düşünme ve yaşam boyu öğrenme puanları arasında zayıf pozitif yönlü bir ilişki olduğu belirlenmiştir. Kız öğrencilerin puanları arasındaki ilişkinin orta derecede pozitif yönlü olduğu belirlenmiştir.

Katılımcıların yaşam boyu öğrenme puanlarının ortalamının biraz üzerinde olması, bu becerilerin henüz yeterince gelişmemiş olduğunun bir göstergesi olabilir. Ancak, öğrencilerin bu yönde potansiyel bir ilgi ve güce sahip olduğuna da işaret etmektedir. Bunun yanısıra, öğrencilerin eleştirel düşünme puanlarının ortalamanın altında yer alması özellikle dikkate değer görülmelidir. Özel olarak geliştirilmiş eğitim içerik ve yöntemleri ile yeterince desteklenmemeleri halinde öğrencilerin etkili öğrenme şansı azalacaktır. İki puan türü arasındaki ilişki dikkate alındığında ise, öğrencilerin eleştirel düşünme becerilerindeki sınırlılıklar yaşam boyu öğrenme becerilerini de olumsuz yönde etkileyecektir. İki tür beceri arasındaki etkileşim ve benzerlikler göz önünde bulundurularak eğitim faaliyetleri kapsamlı bir şekilde düzenlenmelidir. Bu beceriler öğrencilerin aldıkları diğer derslerden soyutlanmış bir şekilde sunulmamalı, öğrencilerin gerek eleştirel düşünme gerekse yaşam boyu öğrenme bilgi ve becerileri müfredatlar arası bir tutumla desteklenmelidir. Yansıtıcı düşünme teknikleri kullanılarak öğrencilerin içerik değerlendirmelerine yardımcı olunmalıdır. Bu teknikler yardımıyla öğrencilerin öğrenme sürecini de değerlendirmelerine fırsat verilmelidir. Eğitmenlerin de yansıtıcı düşünmeden faydalanarak öğrencilerinin karşılaştıkları güçlüklerin farkına varması, kendi öğretim yaklaşımları ve teknikleri üzerine öz eleştiride bulunmaları öğrenci ihtiyaçların daha etkili bir şekilde karşılanmasına yardımcı olacaktır. Eğitmenler, öğrencilerine eleştirel öğrenme ve yaşam boyu öğrenme becerilerinin geliştirilmesi ve etkili olarak kullanılması yönünde örnek olmalıdırlar.