ASSESSING THE RELATIONSHIP OF CREATIVITY DOMAINS WITH PERSONALITY TRAITS, ACADEMIC ENVIRONMENT, AND ACADEMIC ACHEVMENT AMONG MALAYSIAN UNDERGRADUATE STUDENTS

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by

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DEDICATION

To my parents, the scent of heaven, may Allah bless them for all the kindness and generosity they give, the one who supported and loved me unconditionally, I ask Allah to protect them and give them a long life in his obedience and bless them with health and prosperity. To my brothers and sisters (Mohammad, Heba, Anas, and Nesreen).

To my one and only true love, the one who shared my journey with her affection and patience, to my wife (Dana), thank you for saying "yes". To my hero and best friend, my son (Hashem). To my little princess, my daughter (Bana). You were my rock in my hard time.

To them, I am dedicating this work. Asking Allah to make it beneficial for all the people and to be purely seeking His generosity.

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ABSTRAK

Kajian ini bertujuan untuk membangunkan satu model pentaksiran kreativiti individu yang valid dan reliabel serta mengkaji hubungan Domain Kreativiti (kendiri/ harian, kesarjanaan, prestasi, saintifik mekanikal dan artistik) dengan Trait Personaliti (ekstraversi, kebersetujuan, keberhemahan, neurotisisme, keterbukaan kepada pengalaman), Persekitaran Akademik (pembangunan pelajar, hubungan sosial, tahun pengajian, dan jenis sekolah) dan pencapaian akademik (CGPA) dalam kalangan prasiswazah di pengajian tinggi Malaysia. Seramai 436 orang prasiswazah (253 menjawab secara atas talian dan 183 menjawab borang soal-selidik) yang terlibat dalam kajian ini. Terdapat 21 responden digugurkan kerana data yang tidak leangkap atau tidak menjawab dengan betul. Oleh itu, saiz akhir sampel yang diakreditasi untuk tujuan analisis dalam kajian ini ialah 415 orang prasiswazah dari empat buah pusat pengajian di Universiti Sains Malaysia. Data telah dikumpul dengan menggunakan tiga laporan skala kendiri yang diterima pakai untuk mengukur konstruk, iaitu skala kreativiti domain Kaufman (K-DOCS) untuk mentaksir domain kreativiti, Big Five Inventory (BFI) untuk mentaksir sifat keperibadian, dan soal selidik pengalaman pelajar kolej (CSEQ) untuk mentaksir persekitaran pendidikan tinggi. Data telah dianalisis menggunakan PLS-SEM dalam SmartPLS. Model dibuktikan adalah valid dan reliabel dari segi reliabiliti konstruk, validiti konvergen,validiti diskriminasi dan ketepatan padanan. Hubungan antara variabel eksogenus dan variabel endogenus

adalah signifikan. Trait personaliti adalah berkorelasi secara signifikan dengan domain kreativiti. Kajian ini telah memberikan bukti empirikal bagi hubungan antara persekitaran akademik dan domian kreativiti. Pencapaian akademik pelajar (CGPA) didapati berkorelasi secara signifikan dengan empat domain kreativiti. Kajian ini telah memberi sumbangan kepada literatur dengan menggunakan SEM untuk memberikan pemahaman yang lebih baik tentang dapatan kajian yang bertentangan dalam penyelidikan kreativiti, dan melibatkan faktor persekitaran akademik; di mana kajian tradisional sebelum ini hanya terbatas pada sifat keperibadian.

ASSESSING THE RELATIONSHIP OF CREATIVITY DOMAINS WITH PERSONALITY TRAITS, ACADEMIC ENVIRONMENT, AND ACADEMIC ACHEVMENT AMONG MALAYSIAN UNDERGRADUATE STUDENTS

ABSTRACT

This study aimed to develop a valid and reliable creative person assessment model to investigate the relationship of creativity domains (self/everyday, scholarly, performance, mechanical/scientific and artistic) with personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience), academic environment (students development, social relations, year of study, and type of school), and academic achievement CGPA among undergraduate Malaysian higher education students. There were 436 (253 responded through online and 183 responded the survey form) undergraduate students involved in this study. 21 respondents were deleted due to missing data or answering incorrectly. Therefore, the final size of the sample accredited for analysis purposes is 415 students from four schools in Universiti Sains Malaysia. Data was collected using three adopted self-scale reports to measure the constructs, namely the Kaufman domains of creativity scale (K-DOCS) to assess the creativity domains, the Big Five Inventory (BFI) to assess personality traits, and the college student experience questionnaire (CSEQ) to assess higher education environment. Data were analyzed using PLS-SEM in SmartPLS. The model has proven to be valid and reliable in the term of construct reliability, convergent validity, discriminant validity, and xv goodness of fit. The relationship between the exogenous variables and endogenous variables were significant. Personality traits were significantly correlated with creativity domains. The study provided empirical

evidence for the relationship between the academic environment and creativity domains. Students' academic achievement (CGPA) was found to be significantly correlated with four creativity domains. This study contributes to the literature by using SEM which provides a better understanding of conflicting results in creativity research, and by adding the academic environment to the traditional previous studies that were limited to personality traits.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

In the last decade, creativity has increasingly become one of the most wanted skills of the 21st century that students in higher education need in order to achieve success in the information age. Creative individuals establish a powerful aspect of facing complex changes and challenges in different aspects of future life (Kilgour, 2006). As a result, "a great deal of research effort has been directed towards the understanding of creativity and its determinants" (Said-Metwaly et al., 2017). Hence, new and valid creativity assessment researches are required to help measure creativity and identify creative individuals in higher education.

Creativity assessment is the cornerstone of active creativity development in higher education. In particular, it provides a valid and reliable measure of a students' learning and knowledge. It also guides the institutions, educators, and scholars on a consistent foundation. The measurement of creativity is one of the main topics in creativity research; creativity is one of the most challenging skills to measure in any of the 21st century skills (*The Future of Jobs Employment, Skills and Workforce Strategy for the Fourth Industrial Revolution*, 2016). The search for valid and reliable instruments to measure creativity has been the most challenging subject opposing creativity researchers. This study employs Structural Equation Modeling (SEM) to investigate the relations between creativity and different construct for higher education students. The resulted assessment model can provide valuable insights for teachers' evaluation and professional development as well as decision and policy-making in fostering creativity in higher education.

1.2 Background of Study

With the world-altering rapidly more than ever, creativity has become the key to success in the working world. The personal, cultural, and economic roles of education are to develop students' talents and sensibilities, to deepen understanding of the world, and to provide the skills required to earn a living and be economically productive. It is essential to promote these roles equally and concerning each other. Understanding how they are linked is the key to transform the educational system around the world into a 21st century process that has creativity at its center (Robinson, 2011). In education, assessment plays a critical role. To meet the needs of today's world educational systems are required to make a shift in assessment methods to measure soft skills, now known as 21st century skills. Such a shift is dynamic to the widespread adoption of 21st century skills in the educational system.

1.2.1 Education and the 21st Century Skills

In the remaining century, educational systems around the world have centered on preparing college students to accrue knowledge. As a result, faculties centered on presenting hard skills to their students; developing skills were mainly notably by the needs of the industrial age. As these skills were apparent as essential to gain knowledge, the current developments in technology have made knowledge and information easily reachable in the 21st century. Hence, while hard skills are still related and required, they are no longer enough. In order to respond to technical, demographic, and socio-economic changes, education systems started to make a shift in the direction of offering their students with a variety of soft skills that relied not only on cognition but also on the interdependencies of cognitive, social, and emotional characteristics (Care & Anderson, 2016).

21st century skills are essential for individuals to improve their potential in different fields of work. Soft skills help higher education graduates students to participate in the working world. They are corresponding to the academic qualifications held by students and a significant advantage for graduates in the working world additionally to excellent academic achievement. Academic superiority does not grant a job for higher education graduates. This is due to the powerful rivalry among graduates for specific job places (Che-Ani et al., 2014). In a new era, in order for students to succeed both academically and professionally, higher education have a duty to offer a set of essential soft skills for the students. This points out the significance and obligation of obtaining soft skills while studying at universities (Sejzi et al., 2013).

21st century skills include skills that have been recognized as being essential for success in 21st century workplaces by educationalists، industry front-runners، scholars, and governmental activities. Numerous of these skills are connected with deeper learning, which is a set of student educational outcomes (Dede, 2010). The Partnership for 21st Century Learning (P21) research and publications identify deeper learning abilities and skills as the Four Cs of 21st century which are critical thinking, collaboration, communication, and creativity (Lai et al., 2018).

The challenges within the working world are substantial once employees want strong competition to grow their businesses. Outstanding employees generally have higher possibilities for advancement. Thus, an employee should have practical soft skills to be a superb employee. For instance, creativity and critical thinking. Higher education students can acquire these skills within the university (Che-Ani et al., 2014).

In 2016, the World Economic Forum "The Future of Jobs" discussed the future of employ skills and workforce strategy, creativity is one of the top skills employees need in today world. Employees have to more creative in order to benefit from new technologies and new ways of working. The problem of increasing jobless graduates has affected many countries economically, socially, and politically. Economic and political factors are one of many reasons for the problem. Other than lack of skills in higher education students that is obligatory by the businesses. In addition, they lack inspiration and, most importantly creativity, which is a skill highly required by most industries and companies (Palaniappan, 2013).

1.2.2 Creativity in Higher Education

In today's world, creative individuals are becoming a high demand for higher education. Creativity provides several advantages for educational outcomes, and the creative student can reclaim ideas in multiple ways, which increases student engagement and achievement. In addition, creativity offers support for students to become initiating, smart risk-taking, self-regulating learners and it also helps hold attention (Littleton et al., 2010).

Higher education is becoming more aware of the importance of fostering creativity within students. The benefits of creativity to students has been recognized by higher education as the key role in the information age. Creativity is substantial in higher education, especially in graduate programs. Higher education has an obligation to contribute in the development and fostering of students' creativity due to its role in knowledge production, innovation, society's needs, and the possibility of using creative policies to inspire students (de Alencar & de Oliveira, 2016).

The development of creativity for higher education students has significant effects on their personal and professional careers after graduation. Creativity is an essential skill for students to foster and develop, with implications for their own futures. According to results from a survey at the University of Michigan in 2015, despite the fact that various students report opportunities to develop creative thinking through their experiences within the academic environment, there are more possibilities for growth. The study suggests that supplementary efforts to foster creativity would benefit a significant number of students and It will be significant for existing and new efforts to include careful assessment measures so that effective approaches to develop creativity among higher education students (Hallman et al., 2014).

1.2.3 Creativity Development in Malaysia

Transformation in Malaysian higher education is part of the Malaysia plan (2016-2020) to ensure inclusivity set in international standards and agenda as outlined by the Sustainable Development Goals (SDG) 2030. The Malaysia Education Blueprint 2015-2025 (Higher Education) was launched by the Ministry of Higher Education, preparing students for the 21st century universal demands. Endowing in Malaysia's higher education students is vital. Malaysia must adjust in order to succeed in an increasingly competitive global economic environment. This includes the transformation of Malaysia's higher education system. Future jobs require a greater burden on engineering, technology, engineering, and mathematics, to convert Malaysia's higher education system to meet the new challenges.

In a determination to become a high-income country, Malaysia is transforming into a knowledge-based economy, this is a step to achieve the main goal to be a fully developed country by the year 2020. The center of the transformation is education and

higher education. In this new transformation plan, Malaysia's higher education need to encourage creative students. Skills that includes creativity are becoming more and more imperative and are in higher demand, it is extremely seen that the most essential resource of any country must be creativity (Hashim et al., 2017; Mohamad, 1991).

Higher education has an obligation to prepare students for future demands and challenges. In a recent study, the average graduate student will likely change jobs more than ten times in their lifetime, 65% of primary school students will be employed in jobs that do not currently exist. Technologies jobs such as advanced robotics and the automation of knowledge work are expected to fundamentally reshape industries and economies. Given these changes, Malaysia needs graduates with transferrable skills such as creative thinking (*A "Missing" Family of Classical Orthogonal Polynomials*, 2015).

Creativity is an essential concept in the Malaysian educational system. Malaysian education has involved creativity into its school curriculum in the transformation plan. The Standard Curriculum for Primary School (Kurikulum Standard Sekolah Rendah, KSSR) has been fulfilled for primary school students since 2010 is fostering creativity along with entrepreneurship and information technology and communication as an added value (Husien, 2014).

The development of creativity in Malaysia started earlier of the 21st century, the Ministry of Education in Malaysia launched Intelligent School which centered on the use of Information Technology in the process of teaching and learning. According to Hashim et al. (2017), the Malaysian Ministry of Higher Education, which unquestionably plays a vital role in helping and impeding the Malaysian Government Transformation Plan, started as well in fostering creativity in higher education. Numerous public universities in Malaysia have incorporated creative and critical

thinking courses in their programs. Universiti Sains Malaysia (the only APEX University in Malaysia), introduced a course called thinking skill to students to help them in new ways of thinking, including creative thinking. Creative thinking is a key component in higher education that try to implant creativity in students' engagement, which inspires students to think further than looking for a job in the public sector.

In transforming USM for the APEX program, the university reviewed its activities in all areas through nurturing and learning, improving innovativeness and creativity, creating a student-centered environment. This is to ensure that USM is relevant to society and engaged in the community through sustainable outreach programs. It is ultimately serving as a point of reference in community engagement on a global platform. This required creativity in ensuring that the target community is provided with skills and knowledge so that the change to their livelihood is sustainable (Accelerated Programme for Excellence APEX, 2008).

1.2.4 Creativity Assessment

Several challenges face the measuring of the 21st century skills. Researchers have access to limited direct metrics to assess performance on the full range of skills. There are large gaps in coverage in the measurement of many-core skills (World Economic Forum, 2015). The primary issue regarding creativity measurement is whether it can actually be measured. The concept of creativity as the making new ideas is at odds with customary ideas of assessment that reward the production of the one (Lai et al., 2018).

Measuring creativity in higher education has its benefits. Firstly, such assessment diagnoses the creativity in the educational system; it helps to understand if future professional students may display creativity in their work. Secondly, the

assessment of creativity gives more understanding of whether a student will be an important expert worker in a domain of work. Finally, the assessment of creativity offers advice to both scholars and faculty members, it provides information on needed changes in the university or school environment to foster creativity (Charyton et al., 2009).

Assessments of student's creativity skills can be either direct assessments (e.g., The Torrance Tests of Creative Thinking and Guilford creativity test) which are linked to student's production and signify real learning. The other type that was used in this study is the indirect assessments that are linked to students' estimation and attitudes, for example, responding to a self-rate scale questionnaire. It is useful to use more than one scale of the variable (s) due to the known variances in the sensitivity of measures for the same variable, and having several measures rise the capture ability for the results. According to Silvia et al. (2012), students' creativity self-assessment (indirect) is more considerable to be used. They are considered relatively stress-free to manage and they benefit to recognize to what extent motivational goals precede behavior or performance, they also exhibit acceptable reliability and validity In addition, in a study by Polston (2016), "students felt that creativity was too subjective to attempt to objectively measure and found a proposed rubric was too prescriptive to capture creativity". using direct or indirect measures is both suggested to catch different viewpoints on student knowledge, skills and involvements (Hallman et al., 2014).

In order to measure creativity, some major parts need to be identified. These parts include Rhodes (1961) work where creativity is a procedure prejudiced by several structures; a classification was designated with different dimensions that interact when creativity takes place. frequently recognized as "the 4 P's of Creativity", These dimensions consist of the creative Person (or personality), who participates in the

creative process, that consequences in the creative Product, which is a reaction to and results in a change in the creative Press, or the environmental that makes the creative person.

Creative personality studies has been recognized as a main path of research on creativity. Through the work on personality traits, many studies have observed attitudes, preferences, characteristics, and further personal potentials that perform to discriminate greatly creative persons. Studies of the personality of highly creative individuals have helped identify scholars with the possible creative productivity. In addition, it help the empathetic of such apparent contradictions and improve the aptitude to foster and develop creativity. This loans the situation to the hypothesis that all undergraduates have creative prospective that can be foster and developed. Aiding undergraduates grow their creative potential can allow them to be more effective when engaging their skills of solving problem in particular domains of creativity (Selby et al., 2005).

The early work of Guilford (1950, 1975) and Torrance (1966, 1972) led, in part, to what is often referred to as the psychometric approach to creativity assessment (Kaufman & Sternberg, 2010). The Psychometric Approach is recommended to study the creative personality, it includes Trait Theory and Field Theory; in psychology, trait theory is an approach to the study of human personality. Field Theory suggests that human behavior is a function of the interaction of individuals and the environment (Kaufman et al., 2008).

Different kinds of personality traits are needed for creativity that varies by domain. It has been argued that intrinsic motivation is contributing to creativity (Amabile, 1996; Baer, 1998; Hennessey & Zbikowski, 1993). However, intrinsic motivation is not similar across domains. Correspondingly, there is evidence from

personality testing that conscientiousness, one of the Big Five personality traits, has a significant positive impact on creativity in some and a significant negative impact in others (Baer, 2016b).

Creativity could not be successfully developed or in a vacuum (the environmental factors). Providing an environment can be very successful if it is personalized to develop creativity in a specific domain and taking into account the multidimensionality and domain specificity of the construct of creativity. Creativity researchers argue that creativity does not exist, and cannot be taught, in a vacuum. But if it is foster in the context of the content, content that matters to students, then students will successfully become more creative thinkers, they will acquire the skills and content knowledge that the standards and accountability movements value so highly (Baer, 2016b). Environmental factors such as the institute and colleagues are among the most effective factors for creativity. Creating a progressive academic environment for undergraduates to acquire from specialists is an essential factor in fostering and developing creativity (Park et al., 2017).

Sternberg (2018) proposed that creativity is a decision, which mean that many individuals are creative to some level and other individuals have a tendency to be more creative. Scholar discusses creativity as a domain-general attribute, meaning individuals are creative in one domain are to be expected to be creative in other domains. Not surprisingly, The domain-general approach is connected with the psychometric approach of creativity study of individual personality (Silvia et al., 2009). Expanding on this work, Kaufman (2012) developed the Kaufman Domains of Creativity Scale (K-DOCS), a five creativity dominos of self-scale creative behaviors: artistic, scholarly, self/everyday, mechanical/scientific, and performance (encompassing writing and music).

1.2.5 Personality

Define as something novel and in some way valued the phenomenon of creativity shape the impending for developing and fostering creativity through educational systems, particularly as enlarged by the application of creative resources and technology to increase the efficiency of learning and teaching. Creativity theories concentrated on a wide range of traits and aspects. The most common and dominating one is the 4 Ps of creativity, which center on the creative person nature, is consider as an overall intellectual behaviors, such as levels of ideation, honesty, independence, knowledge, experimental performance and so on. Being a creative person help to be more efficacious than less creative people in life (Singh & Kaushik, 2015). Vincent and Kouchaki (2015) reported that more than 1,500 business and public division leaders described creativity as one of the most essential skill for leading requirement. At large, creative individuals tend to be open to fresh experiences, self-accepting, less predictable, self-self-assured, ambitious, determined, leading, and thoughtless (Feist, 1998).

Assessment of the creative person, which is the main aim of this study, includes personality traits studies, which refer to creative individuals. Personality traits may describe how students may more or less display creativity. Personality traits have been measured in numerous techniques, that include the behavior using as self- scale report on questionnaires (Charyton et al., 2009). The Big Five model of personality traits, also known as big five factor (BBF), has become a favored measure for personality dimensions. It includes agreeableness, conscientiousness, extraversion, openness, and neuroticism. Assessment of personality using the self-scale report is the most economical and reliable way to assess creative personality; these traits are related to creativity in different domains (Charyton et al., 2009).

1.2.6 Academic Environment

One of the requirements of higher education in the 21st century is developing and fostering of the creative potential of students. The educational system should also promote and develop the creativity of individuals. The aim of education is to create people who can put forward new things, not merely repeat what previous generations have done. Educators, being the most crucial factors in the cultivation of creative individuals are required to possess the qualifications necessary to achieve this goal. The level of creativity determines the level of the teaching-learning environment that is to influence the creativity of students (Kaya & Bilen, 2016). According to Buyurganu and Buyurganu (2012) (as cited in Kaya & Bilen, 2016) "providing an environment that is required for creative thinking or output production is among the qualities that should be met by teachers for the development of the creativity of their students."

According to Baer (2016) creative behavior and thinking could not foster nor develop in a void without the motivations, knowledge, attitudes, and skills. Creativity is inextricably tied to the environment. This lead to that creativity cannot be develop and foster along with the motivations or attitudes, which contribute to creativity, without considering the effect of environment and other factors on individual creativity. In addition to personality. Park et al. (2017) investigated factors that may influence students' creative personality in order to identify significant factors that may influence creativity and to explain the relationship between such factors. Environmental factors such as the institute, and colleagues are among the most affective factors for creativity are. Constructing a progressive academic environment for higher education, providing environments and boosting curiosity for

undergraduates to acquire from specialists is an essential factor in fostering and developing creativity.

1.2.7 Academic Achievement

Creativity researchers generally agree that one of the main skills of the 21st century is creativity as it is a means for adjusting with different experiments in addition for knowledge creating in others fields of life. Creativity is believed to be part of the act of teaching and learning in the academic framework (Beghetto, 2019). Creativity is important for gaining original awareness and learning. Which means learning work side by side with creativity, consequently it is rational to assume that students' academic achievement is related to creativity, which is conceptualized as the result of learning (Gajda et al., 2017).

Academic achievement is a result of learning and an important factor for undergraduate's effective growth in modern world. Academic achievement is presumed as an entrance to improved employment in Malaysia (Marina, 2004). The relationship between creativity and academic achievement has been the center of several investigators (Habibollah et al., 2010). Academics studied the correlates of students' academic achievement and identified a several factors that include social and individual influences. Student individualities play a major roles in explaining variations in academic achievement. Student characteristics represent a greatly diverse aspect; Creativity is a "student characteristic that shares a conceptual, albeit equivocal, link with academic achievement" (Gajda et al., 2017). Furthermore, creativity, as one of the main elements success of life such as academic achievement, is required especial attention (Kaboodi & Jiar, 2013).

1.3 Problem Statement

Over the years, researchers have developed many instruments for measuring creativity, although there has been significant progress, there are several challenges and issues regarding creativity measurement: a critical and continuing challenge for creativity in higher education is selecting suitable instruments to measure creativity. Many scholars have highlighted the significance of creativity in higher education. However, researchers believe that creative initiatives in higher education are often devalued and even obstructed. The fact that creativity assessment is recognized as being both complicated and controversial correspondingly give details on the lack of enthusiasm concerning creativity in higher education (Watson, 2014).

According to Loveless (2006) and Said-Metwaly et al. (2017) creativity assessment is problematic and complex in constructions of assessment in which measureable, measurable outcomes are considered to be 'high stakes' and valued for the purpose of making judgments and comparisons between individuals, institutions, and systems. The World Economic Forum (2015) pulls consideration to the challenge of assessing creativity, stating that "For creativity, communication, and collaboration, no direct measurements exist to date" which means we still don't have a way to grade creativity, creativity is too subjective to attempt to measure objectively.

Despite the significance role of creativity in higher education in Malaysia, few studies assessed higher education student's creative skills in Malaysia. Hilal et al. (2013) studied the most critical barrier to creativity as experienced by Malaysian undergraduate students. Husien (2014) develop a scoring rubric to assess creativity for engineering technology students. Tan et al. (2012) explore the use of Information and Communication Technology (ICT) to measure and foster creativity for student teachers' using brainstorming and Morphological Analysis Method. All studies in

Malaysia used a similar measuring approach, which is direct assessment. Even though direct assessment offer a more affluent understanding of student, they can be costly and time-intensive to quantify for purposes of student comparisons and may fail to tap into the extent to which students are able to apply what they have learned (Baer, 1993; Hallman et al., 2014; Sternberg, 2018).

The almost exclusive dependence on classical psychometric analyses, i.e., correlation using SPSS, is one of the main issues of creativity instruments psychometric properties (Plucker & Makel, 2010). classical psychometric analyses methods only apply a narrow number of variables, which makes it not capable of dealing with the complicated theories being developed (Schumacker & Lomax, 2008). Unfortunately, creativity researchers did not take advantage of advanced psychometric analyses like structural equation modeling (Zampetakis, 2010), unlike SEM, classical psychometric analyses do not include the measurement theory, thus the measurement error is not taken into consideration. Structural equation modeling is a statistical technic form of causal modeling which consist of a varied set of computer algorithms, statistical and mathematical methods that adequate networks of constructs to data that can assess relationships between creativity and other constructs, which is an issue highlighted by researchers like Nusbaum and Silvia (2011) and Silvia (2008). Providing an improved understanding of differing results in creativity research can be done by growing the use of modern analyses (Said-Metwaly et al., 2017).

Assessing the creative person in higher education involve personality traits that describe creative students, the relationship between creativity and personality has been the subject of many studies but the finding is still inconstant, Singh and Kaushik (2015) found a significant positive correlation between creativity and extraversion which go against the results of Parveen and Ramzan (2013) that denies any relationship between

creativity of extroverts. Alternatively, (Karwowski et al., 2013; Werner et al., 2014) found a positive correlation with Openness, Extraversion, and Conscientiousness. Therefore, since the personality traits of an individual play an important role in assessing the creative person, the present study aims to investigate the relationship between personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience) and creativity domains (self/everyday, scholarly, performance, mechanical scientific and artistic) among higher education students.

Researches on gender differences in creativity show the confusion of gender differences in self-reported creativity. Both Goldsmith and Matherly (1988) and Henderson (2003) found no gender differences in self-report measures of creativity. However, others found gender differences in creativity. Matud and Rodrı´guez (2007) found statistically significant gender differences in the figural originality and figural creativity Indices. Ariffin et al. (2011) profiled creativity and innovation based on gender and found several differences between males and females. Naderi, Abdullah, and Aizan (2008) found gender differences in subscales scores, and according to the result, males scored higher than females in the environmental sensitivity factor.

As a result, there continue to be significant gender differences in creativity. A large part of those differences is clearly environmental in addition to differences in the kinds of experiences women and men are likely to have. It is essential but difficult to explain how gender differences in creativity, which may clarify the differences in creative performs. Simultaneously, the large difference in the creative performs between male and female in many arenas make blanket environmental explanations insufficient, and the explanations that have been proposed thus far are at best incomplete (Baer & Kaufman, 2008).

Investigating the differences in students' academic environment affecting personality characteristics and its relation with student learning in higher education and their creative thinking has been the focus of some studies such as (Hilal et al., 2013; Mohammadi et al., 2013; Ramsden, 1979; Sadlo & Richardson, 2007;). Hence, what is the effect of an institution on student creativity? According to (Schepers & van den Berg, 2007) environment, experience, and knowledge is an important condition for creativity. According to Snyder (1967), the institution, the college setting, affect the development of creativity. He suggests that the students' creativity differ from one another in some educational subjects and fields of study.

According to Batey and Furnham (2006), in order to recognize the social and physical settings in which creativity is more likely to develop and foster, researchers need to study the environment. Promoting creativity in higher education is related with the interactions of a student with its environment. The scientific attitude, attentiveness, field correlate with creativity correlated (Park et al. 2017), mainly in science and humanities (de Alencar & de Oliveira, 2016; De Caroli & Sagone, 2010). Hilal et al. (2013) investigate the difference among students from different faculty in relation to creativity barriers in Malaysia.

According to Garcês et al. (2016), Creativity is coming together of personality, scholarly activity, and environment. A creative person is fostered when the suitable environment is current. In higher education, the academic environment may affect the creative person. However, students not being taught in a way that develops creative thinking and the measurement processes do not reward creativity is one of the problem with educational system. According to Olatoye et al. (2010), this is a challenge to the educational system which should inspire contact with technical skills that may be improved through creative thinking. In this study, the relationship between the

academic environment and creativity domains will be investigated to help in understanding and developing higher education students' creativity.

Higher education in the 21st century is determined to produce alumni that will be independent. Higher education offers students the chance to develop abilities, skills, and understanding to perform and progress in particular occupations (Olatoye et al., 2010). Investigating the relationship between creativity and academic achievement (CGPA) is necessary due to the importance of it for students' future careers and success. In Malaysia, a high academic achievement is expected to be a passport or gateway to better employment (Yen, 2012).

However, academic achievement is not enough to ensure a successful career; according to Palaniappan (2013), the lack of creativity is one of the reasons for the problem of unemployed graduates in Malaysia. Further research is needed to verify the nature of this relationship, and across other nations (Nami et al., 2014). Olatoye et al. (2010) investigated the relationship between students' creativity and academic achievement (as measured by the CGPA scores) findings show negative insignificant relationship between creativity and CGPA scores. Nami, Marsooli, and Ashouri (2014) investigated relationship between students' creativity and academic achievement there were positive significant relationships. Therefor this study aimed to investigate this relationship to help understand its nature among higher education student in Malaysian higher education students.

In addition, Kaufman (2012) point out whether the consistent of the factor structure of creativity domains across different cultures. The majority of cross-cultural work that contrasts insights of creativity emphasizes which concepts are most associated with creativity. For instance, Western conceptions lean towards to emphasize absurdity, curiosity, imaginings, originality, and independence (Murdock

& Ganim, 1993; Sternberg, 1985). In the other hand, eastern conceptions embrace moral goodness, societal contributions, and connections between old and new knowledge (Niu & Sternberg, 2002; Rudowicz & Hui, 1997; Rudowicz & Yue, 2000). It would be interesting to see how these different cultures view creativity by domain. Cheung and Yue (2007) found that students in China view science as more creative than other line of work. Such similar preferences and views may result in different patterns for different cultures, such as Malaysia.

Based on the literature review globally and in Malaysia, as well as the discussion earlier, the assessment of creativity skills is vital to higher education. However, little attention has been given to higher education (student's creativity domains assessment in Malaysia in general and the creative person in particular). This study seeks to fill in the gap in the literature by assessing the relationship of personality, academic environment, academic achievement with creativity domains among Malaysian higher education Students in USM. In addition, from both global and Malaysian contexts, no previous research has assessed creativity domains and their relationship with personality traits, academic environment, and academic achievement for higher education students. Moreover, assessing student's creativity domains will help in fostering and developing creativity in higher educational institutions and instead of answering, "Which student is creative?" a focus on factors affecting creative individuals leads to answering "why is this student creative?".

1.4 Research Aims

This study aimed to develop a valid and reliable creativity assessment model for students in higher education institutions using the self-scale report to assess the domains of creativity and its relations with personality traits, academic environment,

and academic achievement (GPA), aiming to identify significant factors that affect creativity and to clarify the relationship between these factors.

1.5 Objectives of the Study

1. Obtain a valid and reliable measurement and structural model to assess the constructs of creativity domains, personality traits, and academic environment.
2. Examine the relationships between creativity domains (self/everyday, scholarly, performance, mechanical/scientific and artistic) and personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience) among Malaysian higher education Students.
3. Examine the relationships between creativity domains (self/everyday, scholarly, performance, mechanical/scientific and artistic) and academic environment (students development, social relations, year of study, and type of school) among Malaysian higher education Students.
4. Examine the relationships between the students' academic achievement (GPA) and creativity domains (self/everyday, scholarly, performance, mechanical/scientific and artistic).
5. Examine the gender moderator effects on the strength of the relationship between creativity domains (exogenous variables) and personality traits, academic environment, and academic achievement (endogenous variables).

1.6 Research Questions

1. Does the measurement and structural model exhibit acceptable validity and reliability for the constructs of creativity domains, personality traits, and the academic environment?

2. Is there a significant correlation between creativity domains (self/everyday, scholarly, performance, mechanical/scientific and artistic) and personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience) among Malaysian higher education Students?
3. Is there a significant correlation between creativity domains (self/everyday, scholarly, performance, mechanical/scientific and artistic) and academic environment (students development, social relations, year of study, and type of school) among Malaysian higher education Students?
4. Is there a significant correlation between the students' academic achievement (GPA) and creativity domains (self/everyday, scholarly, performance, mechanical/scientific and artistic)?
5. Does gender effectively moderate the relationship between creativity domains (exogenous variables) and personality traits, academic environment, and academic achievement (endogenous variables)?

1.7 Research Significance

Over the years assessment has played a central role in education, this research will provide a valid and reliable way to identify and measure creative individuals in higher education and its relationship with personality traits, academic environment, and academic achievement. The result of the assessment will give valuable insights for teachers' evaluation and professional development as well as decisions and policy-making in educational reform and an indicator for future employees. Furthermore, the study seeks to fill in the gap in Malaysian literature by assessing higher education students' creative personality using indirect assessment and taking into consideration the factors that correlate with creativity in higher education.

Higher education must help and enable students to foster, develop, experience, and understand their own creativity (Jackson, 2006). The moral goal of education is to provide a positive change in students' live (Fullan, 2003). An important and worthwhile educational goal for higher education is that to help students to foster and develop their full potential, and help them to understand their exceptional creativities. Allowing students to be creative must be an obvious part of their higher education experience. This study is significant due to the fact that it aims to assess of creativity for higher education student and its relationship with personality traits, academic environment and academic achievement, the result of such assessment can help understand student engagement and achievement, and provides supports for metacognition assisting students to become initiating, smart risk-taking, self-regulating learners. It can also help diagnose the state of creativity in higher education; it shows whether a student can show creativity in their work and if the student can be a significant professional contributor to a domain of work (Hallman et al., 2014).

The have been a tremendous rise in entrepreneurship education at universities around the globe in the latest decades. An increasing pressures to recruit and retain creative individuals as a core asset in the emerging knowledge economy is rising. It is often academics, who focus on high impact, innovative and interdisciplinary research in universities. However, a lot of those academics face challenges in developing and fostering creativity for their students (Kandiko, 2012). Creativity assessment offer feedback to both faculty and policymakers in universities; it provides information on in what way changes can be made to the classroom environment to develop creativity. The result from the assessment can provide important insights for the professional development of creativity in higher education as well as the decision in educational reform (Charyton et al., 2009; Littleton et al., 2010). And in facing macro-

environmental challenges which are changing role of universities from classical research universities to entrepreneurial universities (Gaspar & Mabic, 2015), which allow universities to developed and implemented new research and transfer relationships within their respective regions.

It can be challenging to measure or operationalize if creativity is believed as being domain-specific. In an ideal situation, a complete creativity assessment might involve of tasks across hundreds of areas. However, in the real world, academics and universities have a limited amount of time to assess someone's creativity. As a result, this study attempt to make the first step by determining which domains should be measured and what factors affect it.

1.8 Conceptual and Operational Definition

Creativity Domains: Refers to the set of representations that trigger and support thinking in a specific area of creativity (the phenomenon whereby something new is created) (Baer, 2011). In this study, these representations are categorized and measured into five broad domains according to Kaufman (2012) as fellow:

i. Self/Everyday: undergraduate students who express themselves against others appropriately and originally in everyday life relations and interactions. Students with higher Everyday scores are likely to engage in cooperative and prosocial situations. In addition to engaging in everyday creative activities in Malaysian universities (like arts and crafts).

ii. Scholarly: Malaysian higher education student's way of thinking about, learning, and producing information in Malaysian universities courses such as science and mathematics. This domain reflects students

engaging in deep analysis and pursuits that involve gaining knowledge in higher education. The domain measures behaviors that involve writing activities and achievements

iii. Performance: high level of capability in an idea or solution applied to solve a problem in an imaginative way resulting in effective action. This domain measures the extent to which Malaysian higher education student perceives oneself to be creative in such activities as music, writing, and acting. Students who report higher scores in this domain are likely to engage in creative activities involving music, dance, writing, and theater.

iv. Mechanical/Scientific: the capacity to have novel-original and useful-adaptive ideas in the domain of natural and social sciences. This domain measures whether Malaysian higher education student perceives oneself to be creative in science, engineering, and math related creative behaviors. Students reporting higher scores should report engaging in creative activities such as computer programming, web development, and (more generally) in the sciences and math.

v. Artistic: Students skills and talent to create exceptional works of art (painting, drawing, sculpting, musical composition). The domain measures whether Malaysian higher education student perceives oneself to be creative in art-related activities. Higher scores on this factor will be related to activities in the Visual Arts domain.

Personality Traits: defined as the characteristic set of behaviors, cognitions, and emotional patterns that evolve from biological and environmental factors. In this study, personality is measured by breaking it into statistically identified factors called

the Big Five, which are openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (Corr & Matthews, 2009).

i. Extroversion: is the personality trait of seeking fulfillment from sources outside the self or in the community. This factor items describe the intensity and quality of Malaysian higher education student relationship to the environment; extroverted students seek connection with the environment and are warm, energetic, and sociable.

ii. Agreeableness: reflects Malaysian higher education student adjust their behavior to suit others. The factor is measured by interpersonal relationships and is described by traits such as sympathy, altruism, honesty, sense of cooperation and hospitality. Agreeable students value getting along with others. They are generally considerate, kind, generous, trusting and trustworthy, helpful, and willing to compromise their interests with others.

iii. Conscientiousness: is the personality trait of being honest and hardworking. This factor measures Malaysian higher education student accountability, academic persistence and ability to organize information. High scores on conscientiousness indicate a preference for planned rather than spontaneous behavior.

iv. Neuroticism: is the personality trait of being emotional. This factor measures Malaysian higher education student differences in one's disposition towards constructing, perceiving and feeling realities in threatening, disturbing or problematic ways. High score indicate emotionally reactive and vulnerability to stress. They tend to be flippant in the way they express emotions.