

**EFFECTIVENESS OF ENTREPRENEURSHIP
EDUCATION FOR ENGINEERING STUDENTS
OF SRILANKAN UNIVERSITIES**

BY

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“This dissertation was submitted to the Department of Civil Engineering of the University of Moratuwa in partial fulfilment of the requirements for the Master of Science in Construction Project Management”

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August 2019

DECLARATION

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ABSTRACT

Entrepreneurship has been identified as a key factor for economic growth and social transformation. It plays an important role in providing economic development and new technologies as well as decreasing unemployment and eliminating social imbalances. Entrepreneurship skills and knowledge can be transmitted and encouraged through education. Nowadays, entrepreneurship education is one of the most important areas of study in universities all around the world. Universities have a vital role both in supporting research and development and in teaching entrepreneurship to students. Accordingly, most of Sri Lankan universities also have initiated entrepreneurship courses in their curricular. Especially, an awareness of the potential value of entrepreneurship education to engineering students has grown significantly in recent years. Universities are increasingly including entrepreneurship with technology in engineering education to follow the expansion of engineering education. This situation has prompted a significant increase in the delivery of entrepreneurship education to engineering students through new courses, programs, and experiential learning opportunities. Accordingly, this research focuses to investigate the effectiveness of entrepreneurship education at the university level for engineering students in Sri Lankan universities. The research problem is identified as what are the influencing factors for the effectiveness of entrepreneurship education in upgrading entrepreneurial skills and knowledge among engineering students? The major objective is to evaluate the effectiveness of entrepreneurship education for engineering students of Sri Lankan universities.

Five Universities with Engineering Faculties such as the University of Moratuwa, University of Peradeniya, University of Ruhuna, University of Sri Jayewardenepura and the University of Colombo were selected as the study area because all Engineering Undergraduate students are offered entrepreneurship education programs in these universities. The study was based on both primary and secondary data. For the purpose of collecting primary data, a questionnaire survey and key informant interviews were used. The questionnaire survey was conducted as an online survey with selected engineering undergraduates and professional engineers. Key informant interviews were conducted with professional engineers who were selected randomly. 106 engineering

undergraduates and 27 professional engineers were selected through simple random sampling for the questionnaire survey and 04 professional engineers were selected through a purposive sampling method for key informant interviews. Mixed analyzing techniques were applied for data analyzing.

The research reveals the various important factors which are contributed to the effectiveness of entrepreneurship education. It is highlighted that the importance of introducing new course modules that are related to entrepreneurship education and the importance of enhancing the undergraduates to follow these kinds of course modules. It is obvious that the students who have taken one or more entrepreneurship courses have higher levels of entrepreneurial ability. Thus, entrepreneurship courses through formal or informal engineering education can provide a wide range of career choices for graduate students. It can be noted that the undergraduates expected to gain more practical exposure through entrepreneurship education. They highlighted that the requirement of theoretical, technical and more interactive knowledge along the entrepreneurship education to improve and to develop their skills, knowledge, and talent for ensuring their future career. It seems that the undergraduates were not provided with special skills or knowledge to survive or self-sufficient in entrepreneurship because the majority of professional engineers were working in someone else company.

Finally, the findings can be concluded that the effectiveness of entrepreneurship education is determined by the variety of new course modules with such scenarios in theoretical and practical aspect as well which are introduced to overcome the huge issue of lack of knowledge and lack of awareness about the entrepreneurship education among the youth generation. And also, entrepreneurship education should more focus on the barriers that are influenced by the completion of the implementation of new business.

ACKNOWLEDGEMENT

I must thank many people who helped and supported me while engaging in this research.

This research thesis would not have been prepared if not for the help and encouragement given by my research supervisor Prof. Chinth Jayasinghe and I heartily thank her.

Also, I would like to extend my gratitude to Prof. Asoka Perera, Dr. L.L. Ekanayaka and Dr. Chandana for the immense guidance and instructions given throughout the MSc. Course and research period.

Further, I extend my heartfelt thanks to all the interviewees who sacrificed their valuable time sharing their experience and thoughts.

And also, I offer my best regards and sincere appreciation to all the academic and non-academic staff of the Department of Civil Engineering who supported me in any respect during the completion of the research.

Finally, I would like to thank my beloved wife, parents, and friends who helped me in various ways to make this research a success.

Kushan Hirimuthugodage

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CHAPTER 01: INTRODUCTION

1.1. INTRODUCTION

In this modern global world, entrepreneurship plays an important role in providing economic development and new technologies as well as decreasing unemployment and eliminating social imbalances. It has been identified as a key factor for economic growth and social transformation.

Precisely, there is no consensus definition of entrepreneurship. It can be defined as the willingness and ability of an individual to seek out investment opportunities in an environment and be able to establish and run an enterprise successfully, based on the identifiable opportunities (Opara, 2000). Accordingly, entrepreneurship is the starting of a new business or refreshing an existing one which has some problems. Entrepreneurship is a multifaceted endeavor that is affected by a variety of social, cultural, environmental, demographic and economic factors. (Gaddam , 2007). It is inherently multidisciplinary in nature.

The entrepreneurship skills and knowledge can be transmitted or imparted mainly through education (Pulka, Aminu, & Rikwentishe, 2015); entrepreneurship can be encouraged through education.

Nowadays, education in entrepreneurship is one of the most important areas of study in universities all around the world. Entrepreneurship education is an educational activity formed in the process of economic and social value creation accompanied by modern social production and consumption (Yang & Alex, 2014). It is meant to change students' behavior pattern in the desired direction. Therefore, entrepreneurship education is a continuing development of relevant entrepreneurial skills and habits whose understanding and application enable the students to contribute meaningfully towards the growth and development of the country's economy (Pulka, Aminu, & Rikwentishe, 2015).

General agreement about entrepreneurship is an important factor for economic expansion all around the world. Entrepreneurship and new business operations are potentials of

economic development and growth in modern society. It is a potentially promising field of scholarly inquiry. Therefore, universities have a vital role both in supporting research and development and in teaching entrepreneurship to students. (Basci & Alkan, 2015). The emphasis of university entrepreneurship education is like preparation for the business world for turning theoretical knowledge to information (Gaddam , 2007). University education can teach people how to run a business. And also, the high quality of education in innovative fields provides a great opportunity for the establishment of new entrepreneurship. Young people learn organizational skills, time management, leadership development, and interpersonal skills through entrepreneurship education. Not only that, entrepreneurship education creates high job satisfaction and enhances life status. Higher levels of entrepreneurship education achievement lead to higher earnings and reduce the level of unemployment.

But, the lack of knowledge and awareness of entrepreneurship among our youth is a big challenge nowadays. Entrepreneurial ideas and implementing those ideas among graduates are very less in Sri Lanka. Almost all the graduates try to find a job by the time they pass out from the university. They want to find a job with a fixed salary and other benefits where they are secured with a monthly income. Because after having twenty to twenty-two years of education and being a dependent of someone else, they do not want to take any risk in their life in earning money. Finding jobs for all graduates passed out from the university system has been a huge problem. Accordingly, the high unemployment rate among graduates is not a new issue in Sri Lanka.

Consequently, the government has taken several steps to address the unemployment problem among youths. Many authors and scholars have identified entrepreneurial intentions as a better solution for unemployment. One strategy is to promote entrepreneurship education and to encourage for starting own enterprises. Accordingly, most of Sri Lankan universities have initiated entrepreneurship courses in their curricular (Premaratne & Jayasundara, 2016). However, a growing interest in entrepreneurship education emerged at Sri Lankan universities after the year 2000. Nowadays, many universities are in the process of strengthening their entrepreneurship education programs in order to create more young entrepreneurs in the future.

Especially, an awareness of the potential value of entrepreneurship education to engineering students has grown significantly in recent years based on economic and workplace trends that have driven a demand for more versatile employees (Premaratne & Jayasundara, 2016). Universities are increasingly including entrepreneurship with technology in engineering education to follow the expansion of engineering education in recent years. To prepare students for the new reality of the modern world, universities are increasingly aware that they must graduate engineers who not only understand science and technology, but who are also able to identify opportunities, understand market forces, commercialize new products and have the leadership and communication skills. Consequently, this situation has prompted a significant increase in the delivery of entrepreneurship education to engineering students through new courses, programs, and experiential learning opportunities.

Accordingly, this research focuses to investigate the effectiveness of entrepreneurship education at university level for engineering students in Sri Lankan universities.

1.2. RESEARCH PROBLEM

What are the influencing factors for the effectiveness of entrepreneurship education in upgrading Entrepreneurial skills and knowledge among Engineering students?

Entrepreneurship is introduced as a career in many countries. It is considered as an area that can be studied (Da Silva, Costa, & De Barros, 2015). Accordingly, it depends on the effectiveness of entrepreneurship education and training provided. The effectiveness of entrepreneurship education and training is recognized as an important factor to help youth to improve their entrepreneurial attitudes and skills (Da Silva, Costa, & De Barros, 2015).

Often, young entrepreneurs face barriers that influence and prevent the completion of the implementation of new businesses. Therefore, the interest of university graduates in entrepreneurship has been traditionally low. Although there are lot of course modules that relate to entrepreneurship in our universities, the number of entrepreneurs coming out of the universities is very few. There should be some problem that why graduates are not willing to take a risk as a new entrepreneur. The challenge of how to encourage young people to launch knowledge-intensive businesses confronts academics and policymakers.

Universities should produce graduates who create jobs rather than those who are just looking for jobs.

Accordingly, this research attempts to identify the Influencing factors for the effectiveness of Entrepreneurship education in upgrading entrepreneurial skills and knowledge among engineering students of universities.

1.3. RESEARCH OBJECTIVES

The main objective of this research is:

- To evaluate the effectiveness of entrepreneurship education for engineering students of Sri Lankan universities

The sub-objectives are:

- To understand the engineering students' s level of interest and their perception on entrepreneurial intention and their involvement of entrepreneurship
- To identify the existing way of teaching and learning entrepreneurship education in the state university system and to assess its ability to support the new entrepreneurs
- To find out the percentage of graduates become entrepreneurs when they passed out from university
- To determine the effects of entrepreneurship education for engineering students

1.4. METHODOLOGY

1.4.1. Research Design

This research has to be designed under the descriptive research design. Since it is mostly based on the combination of quantitative and qualitative research techniques, the descriptive research design is used. And also, as a study with regards the entrepreneurship education and engineering students in Sri Lankan Universities, the research is conducted under a very familiar background and it is just wanted to describe the facts that influence the effectiveness of entrepreneurship education for engineering students which is founded. Accordingly, the descriptive research design is used.

1.4.2. Study Area

The study area of this study is undergraduate students that selected from five Universities with Engineering Faculties such as University of Moratuwa, University of Peradeniya, University of Ruhuna, University of Sri Jayewardenepura and University of Colombo. This is because all Engineering Undergraduate students are offered entrepreneurship education programs in these universities.

1.4.3. Sample of the Study

Purposive Sampling Method was used to select the five universities and Simple Random Sampling was used for selecting engineering undergraduates from the universities and professional engineers for a questionnaire survey. Accordingly, it was distributed a sample of 106 from engineering undergraduates and 27 professional engineers. Other than that, a sample of 04 professional engineers was selected from using the Purposive Sampling method for key informant interviews.

1.4.4. Source of Data

This study is based on both primary and secondary information pertaining to the study area. The primary data was collected from selected engineering undergraduates and professional engineers. Secondary data was collected using previous reports, published books and internet sources.

1.4.5. Data Collection

This study was based on both quantitative and qualitative data. Then, in this study, the methods utilized for data collection were both quantitative and qualitative methods. For the purpose of collecting primary data, Questionnaire Survey and Key Informant Interviews were used. The questionnaire survey was conducted as an online survey with selected engineering undergraduates in the selected universities and professional engineers in the field. Key informant interviews were conducted with professional engineers who were selected randomly.

1.4.5. Data Analysis

The mixed analyzing method (quantitative and qualitative) was used for the data analysis in this study. The data and information which were obtained from the different sources were processed using the computer packages for the quantitative analysis. Similarly, frequency tables, simple percentage, and descriptive statistics were also used. The narrative analyzing method was used to analyze qualitative data. Finally, relevant theories and finalized data were synthesized to reveal the findings through this research.

1.5. ARRANGEMENT OF CHAPTERS

The research report is structured in the following manner. The first chapter discusses the basic introduction and background of entrepreneurship and entrepreneurship education, research problem, research objectives and whole methodology of the research. Chapter two consists of existing literature on entrepreneurship, entrepreneurship intention, entrepreneurship education and entrepreneurship culture and education in the Sri Lankan scenario. Chapter three explains the justification for using quantitative and qualitative methods for the research and it is carried out about the questionnaire survey and key informant interview used for the data collection of the study. Chapter four consists of quantitative and qualitative analysis and the results of the study. Chapter five concludes the report by understanding the effectiveness of entrepreneurship education in Sri Lankan Universities which is discussed in the previous chapter summarizing the main research analysis and explains how they contribute to the literature on entrepreneurship education in Sri Lanka.

CHAPTER 02: LITERATURE REVIEW

2.1. INTRODUCTION

This chapter provides an overview of the literature relating to entrepreneurship and entrepreneurship education. This includes the definition of entrepreneurship, its history, factors affecting entrepreneurship and barriers of entrepreneurship, the definition of entrepreneur and entrepreneurship intention. Further, it includes existing literature regarding entrepreneurship education, entrepreneurship education for engineering students and entrepreneurship culture and education in the Sri Lankan scenario.

2.2. ENTREPRENEURSHIP

Entrepreneurship is an attitude that manifests an individual's inspiration and ability to discover an opportunity, proceed with it and to fabricate new value or economic development.

The significance of entrepreneurship is its imperative contribution to the national economy by increasing economic efficiencies, introducing innovations, creating new jobs and sustaining employment levels. Accordingly, in recent years entrepreneurship is considered as an important driver of economic growth, productivity, innovation and employment. It is a global process and a phenomenon of recent decades, and it seems it will be even more prominent in the coming years.

Entrepreneurship was deriving from the French word *entrepreneur*. The entrepreneur is a derivative of the French verb *entreprendre*; that means literally, to 'undertake'. The German equivalent, *unternehmer*, closely translates to 'owner' or 'manager' (Drucker P. , 1985).

Traditionally, entrepreneurship has been defined as the process of designing, launching and running a new venture and existing venture expansion with the social, technological and economic development of the country (Henderson & Robertson, 2000). It's a process of creating a business enterprise capable of entering new or established market.

Precisely, there is no specific definition for entrepreneurship. However, According to Nwachukwu, it can be defined as an ability to see and evaluate business opportunities, gather the necessary resources to take advantages of them and initiates appropriate action to ensure success (Nwachukwu, 1990). Karimi, Chizari, Biemans, and Mulder define entrepreneurship like the behavior of a person who displays the traits (need for achievement, need for power, risk-taking tendency, and competitiveness) necessary to obtain or attain something in life, to research and become self-sufficient (Karimi, Chizari, Biemans, & Mulder, 2010). United Nations Industrial Development Organization (UNIDO) provide another definition that the process of using initiative to transform business concept to a new venture, diversifying existing venture or enterprises to high growth venture potential (UNIDO, 2015). Cristian-Aurelian and Cristina consider entrepreneurship as an innovative process through which entrepreneurs identify business opportunities and exploit them by allocating resources and creating value (Cristian-Aurelian & Cristina, 2012).

Accordingly, entrepreneurship can be concluded as the process of creating something new with value by sacrifice the required time and effort, assuming the accompanying financial, psychic and social risks for receiving the monetary rewards, personal satisfaction and independence of the life.

2.2.1. History of Entrepreneurship

2.2.1.1. The Beginnings of Entrepreneurship

The first entrepreneurs can be traced back to nearly 20,000 years ago. The first known trading between humans took place in New Guinea around 17,000 BCE, where locals would exchange obsidian (a volcanic glass prized for its use in hunting tools) for other needed goods such as tools, skins, and food. This early type of entrepreneurship continued for millennia. Hunter-gatherer tribes were trade goods from different parts of their respective regions to provide an overall benefit for their tribe (Carlen, 2016).

The earliest entrepreneurs in human civilization emerged with the agricultural revolution which occurred about 12,000 years ago (Carlen, 2016). They specialized in different areas

such as hunting and gathering, fishing, cooking, tool-making, shelter-building, and clothes-making. Accordingly, farmers could grow more food than they needed to support their own families. Thus, they would sell food at the market to say, a clothes-maker. The farmer's family no longer needed to make their own clothes. So, they could rely on the specialized services within a community to provide for them. Over time, these specialists became better and better at their unique areas of specialization. Tricks of the trade would be passed down through families. The pace of innovation sped up. With the specialists became better and better at their unique roles, they brought increased benefits for the entire community. Consequently, towns and cities grew to include thousands of people. Dependable sources of food encouraged people to build permanent settlements and homes. Different social institutions arose around these permanent structures, including religious centers, courts, and marketplaces. This provided a new business opportunity for entrepreneurs to explore. As time went on, new areas of specialization began to emerge. Early entrepreneurs would work in areas such as pottery, carpentry, wool-making, masonry, etc. Standards of living continued to increase. Entrepreneurs were constantly at the forefront of innovation. If a problem needed to be solved, these early entrepreneurs recognized that they could profit by solving that problem.

2.2.1.2. The Expansion of Trade Routes from 2000 BCE Onward

Between the Agricultural Revolution and 2000 BCE, cities started to appear around the world which concentrated around rivers particularly Nile, Tigris, Euphrates, Indus, etc.

With cities spread up around the world, entrepreneurship took an important turn. Though entrepreneurs were still specializing in all of the areas, they began to realize that profits could be made by trading between cities and cultures. Accordingly, some of the popular trade routes were:

- Trading salt from Africa across the Roman Empire
- Trading technologies like Chinese paper-making around the world
- Trading rice from China across Asia
- Trading coffee, lemons, and oranges from Arabia into Europe
- Trading complex ideas like the Arabic number system into Europe

- Trading gun powder (a combination of carbon, sulfur and potassium nitrate) from China to other parts of the world
- Trading weapon (Carlen, 2016)

And also, trade routes were about more than just raw resources and goods. They were also about ideas and technologies. In this way, entrepreneurs were responsible for spreading ideas around the world.

2.2.1.3. Entrepreneurship and the Invention of Money

One of the key developments in the history of entrepreneurship was the invention of money. Prior to the invention of money, all entrepreneurship and trade took place through the barter system. The limits of the barter system were known as a ‘coincidence of wants’. Understandably, this vastly limited trade and entrepreneurship in early history (Carlen, 2016).

Currency changed all that. Some of the earliest forms of currency were found in ancient Iraq in the forms of silver rings and silver bars. Starting in 2000 BCE, early forms of money have been discovered. These forms of money were called specie and changed widely throughout the world; some cultures used seashells, for example, while others used tobacco leaves, beads or large round rocks.

Over time, paper money and coinage would be developed. Currency gave entrepreneurs several important things:

- It facilitated long-distance trade
- It acted as a medium of exchange
- It provided a way for entrepreneurs to store value (Carlen, 2016)

2.2.1.4. Entrepreneurship and the Beginnings of the Marketplace in the Medieval Period

Starting in the medieval period, markets became more and more popular. Larger populations required larger marketplaces where they could purchase foods, clothing, services and other important things.

There are some of the important developments that took place in entrepreneurship during this period:

- Banking grew to new heights and complexities as small business owners had greater financing needs.
- The guild system expanded, giving skilled craftsmen and other entrepreneurs a way to organize their business together, regulate the quality of the goods produced and develop reputations for certain goods in towns across medieval Europe.
- Entrepreneurs were able to purchase goods from abroad, turn those goods into finished products and then sell those goods for a profit at a wider scale than ever before (Carlen, 2016).

2.2.1.5. Mercantilism, Explorers and the New World from 1550 to 1800

The period from 1550 to 1800 gave rise to the philosophy of mercantilism. Followers of this philosophy believed that there was only a finite amount of wealth in the world. A country's wealth and the value was solely based on how much treasure and gold it could obtain and how many more exports it could sell compared to imports (Carlen, 2016).

During this period, entrepreneurs were known more as merchants and explorers than as entrepreneurs. These individuals would raise capital, take risks and stimulate economic growth. This period is the beginning of capitalism. Some of the key advances of this period were related to the goods and materials brought back from the new world; silver and gold were provided in similar motivation.

2.2.1.6. Entrepreneurship and the Industrial Revolution

The Industrial Revolution marked another profound shift in the history of entrepreneurship. Starting in the 18th century, entrepreneurship moved from small-scale production in small towns to large-scale production in big cities.

Two things fueled this fundamental change in entrepreneurship, including:

- Availability of Energy Production: Businesses were no longer restricted by small-scale energy powered by wind (which was weather-dependent) or falling water (which was location-dependent). Instead, they could rely on technologies like electricity, steam, the internal combustion engine, the locomotive, the automobile, and oil. This gave them the means to make large-scale factories.
- Availability of Labor: Huge populations began moving to industrial revolution cities starting in the 1700s. This gave entrepreneurs a large pool of cheap labor with which to work (Carlen, 2016).

Eventually, these powerful market forces were given rise to some of the world's greatest entrepreneurs and innovators. America played a particularly prominent role during this period, giving rise to entrepreneurs.

2.2.1.7. Entrepreneurship and Post World War II

After World War II, entrepreneurship began to change for a few different reasons. First and most importantly, the economy was increasingly global and becoming more global every decade. Shipping and communication made it easy for entrepreneurs to sell products and services to a global audience (Carlen, 2016).

There were also microeconomic factors like the number of people owning cars. Especially in America, car ownership made it more important to have highways between major cities. As highways became more important, restaurants were needed where people could eat while traveling. This is the environment where entrepreneurs made their millions. Other companies that prospered during this period included General Electric, aircraft companies like Lockheed, IBM, and Holiday Inns.

And also, other countries around the world experienced similar boosts in growth following World War II. For example, Japan became one of the world's largest economies by exploiting a large population available for cheap wages. Germany experienced a similar trajectory (Carlen, 2016).

2.2.2. Factors Affecting Entrepreneurship

Entrepreneurship is a multifaceted endeavor that is affected by a variety of social, cultural, environmental, demographic and economic factors. Many scholars have identified that there are six factors to lead to the successful pursuit of entrepreneurship (Gaddam , 2007):

1. Economic Factors

Economic factors are crucial for the effective exercise of entrepreneurial activities, as entrepreneurship is based on the economic theories of supply and demand for goods and services. In particular, the economic factors that act as catalysts for entrepreneurship are the policies and especially monetary policies of nations, trade policies and interventions of governments, taxation, and income (Huisman, 1985).

2. Psychological Factors

Psychological factors refer to the personal characteristics of the entrepreneur. According to Kuratko and Hodgetts, psychological characteristics most commonly associated with entrepreneurs, five relate to motivation: commitment, perseverance, achievement, drive and opportunity orientation (Kuratko & Hodgetts, *Entrepreneurship: A Contemporary Approach*, 1995). Herron and Robinson found that the behavior and skills of the entrepreneur have a significant impact on performance (Herron & Robinson, 1993). Carter, Gartner, and Reynolds have indicated that personality also has a considerable impact on the startup decision and behavior, as some individuals are relatively passive and engage more in talk than action (Carter, Gartner, & Reynolds, 1996)

3. Social Factors

The sociological factors refer to those components affecting people's lifestyle: consumer habits, standards of entertainment and fun, the way that people work or the city where they work, etc. (Weber, 1948)

4. Environmental Factors

Environmental factors are divided into intrinsic and extrinsic and perceived at various levels. Access to resources depends on the natural and socio-economic environment and the number of new firms entering an industry is affected by the number of incumbents in the industry. The economic environment affects the number of firms will enter the industry, the business transformation or even the termination of a business (Singh, 1990).

5. Demographic Factors

Demographic trends include population size, the age of people, population structure, geographic distribution, ethnicity, education, etc. As far as entrepreneurial activity is considered, the most significant demographic variables are age, experience and educational level (Gaddam , 2007).

6. Cultural factors

Culture is defined as a set of common values, beliefs and expected behaviors. According to Weber (1948), shared values, beliefs, and behaviors of individuals and organizations, significantly affect entrepreneurship (Huisman, 1985). Significant attention is paid to organizational culture and its influence on entrepreneurship.

2.2.3. Barriers to Entrepreneurship

Some of the studies that examine young entrepreneurs' failures and barriers distinguish between endogenous (in the entrepreneur's control) and exogenous (beyond the entrepreneur's control) factors that affect their performance (Ibrahim & Goodwin, 1986). Endogenous factors include personal characteristics and weaknesses in financial and operational management; personal skills such as creativity, ability to take appropriate risks and effective time management tend to affect the success or the failure of a business (Sexton & Bowman, 1983). Several researchers argue that endogenous factors are often the main cause of business failures (Theng & Boon, 1996). However, found that most problems occur due to exogenous factors (Dandridge & Sewell, 1978). Exogenous factors include environmental characteristics such as high-interest rates, taxes and government regulations (Theng & Boon, 1996). Barriers to entrepreneurship may be divided into three categories:

1. Individual entrepreneurship barriers:
 - a. Family: may play an important role in developing confidence, creating new ideas in the family and determining children's career paths.
 - b. Education: experienced and well-trained entrepreneurs are believed to lead the most profitable business.
2. Organizational barriers:
 - a. Financing: attracting and providing funds to start up a small business is a crucial hurdle for the majority of new entrepreneurs.
 - b. Physical resources: tangible assets necessary for the production of products and provision of services.
 - c. Marketing: new companies face the setback of lack of customers.
3. Environmental barriers:
 - a. Socio-cultural factors: attitudes, gender, experience, values, and norms shape the culture that governs conduct and development, progress and innovation.

- b. Rules and regulations: some tenors of labor law and current national regulations may create barriers to the development of entrepreneurship (Kirkwood, 2009).

2.2.4. Entrepreneurship and Entrepreneur

Entrepreneurship can be identified as the backbone of the country's economy and the mandate for the wealth of the nation. It is very important for the existence of the country's economy. Normally the whole economy of the world is based on entrepreneurship. Especially regarding developing country entrepreneurship is a necessary factor. Successful entrepreneurs such as Steve Jobs, Bill Gates and Mark Zuckerberg can be seen on the red carpets and are known by anyone in any part of the world.

Entrepreneurs are known as self-employed people. There is no specific definition for entrepreneurs. Different fields of studies define it differently. An economist defines an entrepreneur as the one who creates the combination of resources to make them produce something valuable (Henderson & Robertson, 2000). While to a psychologist, an entrepreneur is typically driven by certain forces such as needs to obtain or attain something, to experiment and to accomplish the targeted goal (Singh, 1990). To businessmen, an entrepreneur may be a threat, an aggressive competitor. As well as an entrepreneur may also be an ally, a source of supply, a customer, or someone who creates wealth for others as well as finds better ways to utilize resources, reduce waste, and provide jobs to others. (Ying, Sern, Lim, & Lee, 2012)

Accordingly, Drucker described an entrepreneur as someone who searches for change, responds to it and exploits it as an opportunity (Drucker P. , 1985). Bygrave and Hofer added to the definition of an entrepreneur as someone who perceives an opportunity and creates an organization to pursue it (Bygrave & Hofer, 1991). Sexton and Bowman define an entrepreneur as a person who arranges and manages the business while assuming the risk for the purpose of possible gains (Sexton & Bowman, 1983). Essentially, entrepreneurs are agents of change, providing creative and innovative ideas for business enterprises and

helping businesses grow and become profitable (Kuratko & Hodgetts, *Entrepreneurship: A Contemporary Approach*, 1995).

An entrepreneur is a person who moves economic resources from a lower productivity area into a higher productivity area. In modern world entrepreneurship and entrepreneurs have changed the paths of markets and economies. Rather than working as an employee, an entrepreneur runs a small business and assumes all the risk and reward of a given business, ideas, goods, services offered for sale. Generally, we consider the entrepreneur is a risk-taker and innovator of new ideas as well as a business leader. They act as the manager and oversee the launch and growth of an enterprise (Ajzen, 1991). A successful entrepreneur always focuses on innovation and exploitation of entrepreneurial activity.

2.3. ENTREPRENEURIAL INTENTION

Intention plays a key role in explaining human behaviours (Henderson & Robertson, 2000). Many social behaviours such as creating a new business are volitionally controlled and these behaviours have been found to be the best predicted by intentions (Ajzen, 1991).

Similar to entrepreneurship, different understandings of entrepreneurial intentions have been observed. The intention is defined by Bird as a conscious state of mind that directs attention towards a specific goal. Individuals with the intention to start a business not only have a propensity to start but also, adopt a rational behavior to reach their goal (Bird, 1989). Hisrich and Peters defined entrepreneurial intention in terms of looking for information and other resources to start up (Hisrich & Peters, 1998). Rover defined that intention as a state of mind that emphasizes personal attention and experience to accomplish new venture creation (Rover, 2005). Karimi, Chizari, Biemans, and Mulder stated that an intention is a representation of actions planned to perform entrepreneurial behaviour (Karimi, Chizari, Biemans, & Mulder, 2010). Henderson and Robertson understood entrepreneurial intention as the personal commitment of the potential entrepreneur to start up (Henderson & Robertson, 2000). In the same way, Charney and Gary argued that entrepreneurial intention is the commitment to performing entrepreneurial behaviour (Charney & Gary, 2003).

Several studies have examined the antecedents of entrepreneurial intentions. Among the several entrepreneurial intention models, Ajzen's Theory of Planned Behavior (TPB) is widely recognized as a well-tested and a validated model (Ajzen, 1991). TPB focuses on attitudes as the best predictors of intention. The three factors TPB uses to predict entrepreneurial intention are the attitude toward the act, social norms and perceived behavioral control (Pretheeba, 2014).

Shapero and Sokol's Entrepreneurial Event (SEE) is another model that supports the formation of entrepreneurial intention. SEE suggests entrepreneurial intention depends on perceived feasibility and perceived desirability of the prospect of starting a business along with the propensity to act. Attitude towards the act of TPB aligned with perceived desirability and perceived behavioral control approximates perceived feasibility (Autio, Keeley, Klofsten, Parker, & Hay, 2001).

Krueger's intention model was drawn based on the Theory of Planned Behavior with some modifications to adapt to an entrepreneurial environment. Accordingly, intentions toward pursuing an opportunity are best predicted by three critical perceptions such as personally desirable, supported by social norms and feasible (Krueger, 1993).

Another model of intentions was suggested by Bird which considers that entrepreneurial intentions are based on a combination of both personal and contextual factors (Bird, 1989). Further development of Bird's model was made by Boyd and Vozikis to include the concept of self-efficacy taken from the social learning theory (Boyd & Vozikis, 1994).

Accordingly, entrepreneurship intention can be identified as a cognitive representation of actions for exploiting a business opportunity by applying entrepreneurial learning (knowledge and skills). The entrepreneurial intention has been used as a dependent variable in many studies. Researchers have confirmed that entrepreneurial intention effectively predicts entrepreneurial behaviour and attitudes toward entrepreneurship, in turn, predict entrepreneurial intentions (Ajzen, 1991). Therefore, support the entrepreneurial attitudes

and intentions through entrepreneurship education is important to promote the entrepreneurship

The intention is important to launch a new start-up or entrepreneurship effort. Perceived educational support has been recognized as a determinant of entrepreneurial intention. Previous researchers agree that entrepreneurial education is an efficient method to equip the students with the necessary knowledge about entrepreneurship (Din, Anuar, & Usman, 2016). Entrepreneurship education also influences students' career choice (Martínez, Levie, Kelley, Sæmundsson, & Schøtt, 2010). In order to survive in today's intensified business world, the university is required to play a key role in promoting entrepreneurship.

2.4. ENTREPRENEURSHIP EDUCATION

Entrepreneurship education refers to the education for entrepreneurial attitudes and skills of students (Martínez, Levie, Kelley, Sæmundsson, & Schøtt, 2010). It aims to provide the necessary skills and knowledge that enable students to successfully found a new venture. Accordingly, entrepreneurship education is the process of imparting individuals or students with the concepts and skills to recognize opportunities that others have overlooked and to have the insight, self-esteem, and knowledge to act where others have hesitated (Yang & Alex, 2014). Entrepreneurship Education has been view as systematic training and instruction that transmit entrepreneurial knowledge and development of skills in students (Pulka, Aminu, & Rikwentishe, 2015).

The impact of entrepreneurship education has been recognized as one of the crucial factors that help youths to understand and encourage an entrepreneurial attitude (Cristian-Aurelian & Cristina, 2012). Influence on entrepreneurial education could have on the attitudes and aspirations of youth to become an entrepreneur. It tries to prepare people, particularly youth, to be responsible, take risks, manage the business and learn from the outcomes by immersing them in real-life learning experiences (Karimi, Chizari, Biemans, & Mulder, 2010). So there is a necessity to understand how to develop and coach potential entrepreneurs even while they are still students in school also. Their attitudes and knowledge of entrepreneurship are likely to shape their desire to start their own businesses

in the future. This type of study will also help universities and other institutions to develop suitable educational programs to promote entrepreneurship.

Some people believed entrepreneurs are born, not made. However, this myth is broken since many studies were done in the past have reached a consensus where entrepreneurs can be made and are not genetically inherited (Din, Anuar, & Usman, 2016). Everyone has the feasibility to become an entrepreneur especially for those who have undergone an educational process in universities (Premaratne & Jayasundara, 2016). Obviously, according to previous studies university education have great impact on graduates to start their own businesses. It is important to provide entrepreneurship training at the university level for increasing the capacity and capabilities of the individuals as well as for having information about the career opportunity and for their future career. Apart from the training provided in the training and educational, it is also effective to provide information about their future business area, to provide consultancy service for the potential entrepreneurs.

Further, entrepreneurship education consists of teaching students the process, knowledge, and skills required for starting a new business. The skills that the students need to develop during the course are very different from those acquired in other courses. For example, while most IT courses focus on developing inquiry or research and problem-solving skills, the entrepreneurship course places a strong emphasis on writing and speaking skills and aims to improve the broader business, communication and management skills that graduates need in order to succeed in starting a business enterprise (Pardede & Lyons, 2012). According to Yang and Zhao, if universities actively cultivate the entrepreneurial ability in their students, they will improve the system of entrepreneurship education management and entrepreneurship education system and create entrepreneurship training base and so on (Yang & Zhao, 2014). Therefore, in the process of entrepreneurship education, universities should pay more attention to the core and important business knowledge, while simple and easy knowledge can be learned by students themselves. Thus, entrepreneurial universities respond by generating technology transfer, knowledge-based start-ups, and human capital.

Thus, developing countries like Malaysia encourage students to be involved in entrepreneurship and consider entrepreneurship as a career choice. It is widely known that in the future, undergraduates are an important source of nascent entrepreneurship. European countries also emphasize and promote entrepreneurship education at universities. In addition, they also provide relevant supporting measures to encourage graduates to start an enterprise as one of the major measures to increase the employability of students (Da Silva, Costa, & De Barros, 2015). German-speaking countries, in particular, take place ahead on researching and teaching about enterprise. Therefore the concept of entrepreneurship is considered by the community. Recognition and explanation of business circumstances serve to change entrepreneurial thinking and mindset (Basci & Alkan, 2015).

The concept of entrepreneurship related to innovation and business opportunity identification is highly linked with entrepreneurship education. Thus in this study which aims to investigate the impact of entrepreneurship education, both the concepts of innovation and business opportunity are emphasized. This study defines entrepreneurship as an innovation process to exploit a business opportunity by applying entrepreneurial learning (knowledge and skills).

2.4.1. The Effects of Entrepreneurship Education on Students' Entrepreneurial Intention

Some empirical research findings support and gave evidence that entrepreneurship education influence students' intention to become entrepreneurs. According to Ahmad, in his research findings revealed that taking entrepreneurship education courses has positive effects on entrepreneurial carrier choice of students and the effects are significant (Ahmad, 2013). Drucker found a link between offering entrepreneurship education courses and students' intention to start the business. He further explained that entrepreneurship education training might give some students the confidence they need to start their own business (Drucker P. F., 1985). Keat, Selvarajh and Meyer found that entrepreneurship education increase and improve the perceived feasibility for entrepreneurship by increasing

the knowledge of students, building confidence and promote self-efficacy (Keat, Selvarajah, & Meyer, 2011). According to them, it also improves the perceived desirability for entrepreneurship by showing that entrepreneurship education is highly desirable, regarded and socially acceptable and that it can be rewarding. Further, the research findings of several researchers found that entrepreneurship education significantly influences the intention of students to become entrepreneurs (Din, Anuar, & Usman, 2016).

And also, according to Ajzen based on the understanding of the belief, attitude and intention relationship, individuals' beliefs and attitudes regarding entrepreneurship would inform their intention to become entrepreneurs (Ajzen, 1991). Opara found attitude towards entrepreneurship, favorable social norms, and strong entrepreneurial self-efficacy positively influence the intention of an individual or student to become entrepreneurs (Opara, 2000). Another researcher reported that students perceived desirability and self-efficacy influenced their intention to become entrepreneurs (Krueger, The Impact of Prior Entrepreneurial Exposure on Perceptions of New Venture Feasibility and Desirability, 1993). This means that offering entrepreneurship education positively increases the students' Perception of feasibility and desirability of entrepreneurship. Galloway and Keogh state that lack of entrepreneurship education leads to a low level of entrepreneurial self-efficacy and intention (Galloway & Keogh, 2006).

2.4.2. Entrepreneurship Education for Engineering Students

Engineering students are appeared to be very well suited to become entrepreneurs (Duval-Couetil, Reed-Rhoads, & Haghghi, 2012). In an article about de-industrialization and its effect on engineering education, Wei states that 'research and development in manufacturing companies used to be viewed as a glamorous career for the brightest engineering graduates, but the number of attractive job offers has been declining for many years' (Wei, 2005). Today, a glamorous job for an engineer might be to work in a smaller, more entrepreneurial company, which requires 'a broad range of skills and knowledge beyond a strong science and engineering background'' (Wei, 2005). To prepare students for this new reality of the economic world, universities are increasingly aware that they

must graduate engineers who not only understand science and technology but who are also able to identify opportunities, understand market forces, commercialize new products and have the leadership and communication skills to advocate for them. This has prompted a significant increase in the delivery of entrepreneurship education to engineering students through new courses, programs and experiential learning opportunities (Duval-Couetil, Reed-Rhoads, & Haghghi, 2012).

As Wei states, engineering graduates who go on to become successful entrepreneurs ‘are often vocal in praise of the virtues and benefits of their engineering education and they believe they acquired a number of positive attributes that are useful outside of a career in manufacturing and construction such as rigorous discipline, a general knowledge of science and technology, the habit of collecting relevant information followed by quantitative analysis of data to construct conclusions and recommendations, teamwork and strong oral and written communication skills’ (Wei, 2005).

Accordingly, an awareness of the potential value of entrepreneurship education to engineering students has grown significantly in recent years based on economic and workplace trends that have driven a demand for more versatile employees (Premaratne & Jayasundara, 2016). Universities are increasingly including entrepreneurship with technology in engineering education to follow the expansion of engineering education in the last decade.

Although the number of entrepreneurship programs at universities targeting engineering students has grown sustainably, few research studies have examined the practices and beliefs of instructors in these programs. Understanding these practices and beliefs will help the development of pedagogical and theoretical models to drive entrepreneurship education for engineering students (Zappe, Hochstedt, Kisenwether, & Shartrand, 2013). The bibliometric tool is one of the models to trace the knowledge and to develop an exploratory study about entrepreneurship education in engineering. Guedes and Borschiver define Bibliometrics as a statistical tool that allows mapping and generates different indicators of treatment and management of information and knowledge, necessary for the planning,

evaluation, and management of science and technology of a particular community or scientific parents (Hood & Wilson, 2001). Others related terms are Informetric; more recent term that used Bibliometric concepts in a non-academic context, Scientometrics used for the study of all aspects of the literature of science and technology, Web metric; as an emergent area in information science that consists in the application of informetric methods in the World Wide Web (Hood & Wilson, 2001).

Further, the objectives and content of entrepreneurship programs have been varied widely for engineering students. Henry, Hill, and Leitch stated that the 'content of syllabus of courses developed by entrepreneurship scholars differs to such an extent that it is difficult to determine if they even have a common purpose' (Henry, Hill, & Leitch, 2005). Shartrand, Weilerstein, Besterfield-Sacre and Olds described that there has been documented by engineering faculty developing courses and programs in entrepreneurship as descriptive case studies, 'addressing the process of gaining administrative approval and student interest, describing content knowledge that is covered, pedagogical approaches utilized, challenges of implementation and some cases of assessment plans' (Shartrand, Weilerstein, Besterfield-Sacre, & Olds, 2008). A review of assessment instruments in the field of entrepreneurship education shows that there are few valid and reliable instruments being used widely in the field and very few are intended specifically for engineering students (Duval-Couetil, Reed-Rhoads, & Haghighi, 2010).

Accordingly, due to its great importance in the establishment of companies to contribute to economic growth around the world, entrepreneurship is one of the most currently discussed academic subjects nowadays. The entrepreneurial profile of engineering students and confirm the positive effect that entrepreneurship education affects their intention to create a new business.

2.5. ENTREPRENEURIAL CULTURE IN SRI LANKA

The traditional professions such as a doctor, lawyer, engineer, and accountant are still widely considered as more secure and stable professions in Sri Lanka when comparing the feeding of the dreams of budding entrepreneurs with lots of potentials. The perception of the role of an entrepreneur has less attention and less publicity in society. Although, Sri Lankan entrepreneurs have very innovative ideas and valuable business plans which could be easily converted into successful businesses, but there is no good mechanism to encourage them; there are plenty of individuals with plenty of ideas, but these parties are held back by the lack of finance, advice, guidance, information, and education on entrepreneurship in general.

And also, starting a business in Sri Lanka is harder than in other countries, as it is difficult to get financial assistance from state or private banks for new businesses due to high-interest rates as well as the long and numerous procedures required to start up a new business (Gamage, 2014). Finding sureties and guarantees are also problems for many small and medium scale businesses. Further, many challenges are awaiting the entrepreneurs: such as enforcing contracts, registering property and taxes are some of the major reasons to start-up business as well as grow business from small to medium scale. Besides, entrepreneurs in Sri Lanka are facing greater challenges within the modern business environment due to huge competition, rapid technological advances, globalization and lack of support from relevant authorities.

On the other hand, most parents have a strong resistance to promote or encourage their children to be entrepreneurs due to the perceived social recognition and interpretation that entrepreneurs are less educated and acknowledged than professionals or government servants.

However, considering the Sri Lankan economy, small and medium entrepreneurs provide 45% of employment and contribute to 52% for Gross Domestic Production (Damayanthi, 2016). They contribute to innovations such as new products, services and wealth creation which are all essential to a healthy economy.

2.5.1. Role of Government and Third Parties in Promoting Entrepreneurial Culture

Youth Business Sri Lanka (YBSL) was established in the year 2007 and it is now linked with the Ceylon Chamber of Commerce to provide holistic support and guidance to youth who want to start up for their own businesses. The organization provides funds, training and builds networks among its activities.

There are lots of projects under the National Enterprise Development Authority (NEDA). Considering Sri Lankan entrepreneurs, there are many successful entrepreneurs who have had an impact from the NEDA to create their greater advantages and success; for instance Chandani Bandara (Forever Natural) and Lal Keerthi Gunawardena (Lucky Dairy) (National Enterprise Development Authority, 2019).

And also, the current government has made positive remarks on entrepreneurship where they proposed to allocate Rs. 500 million from the 2016 budget to support small and medium entrepreneurs (Ministry of Industry and Commerce, 2019)

Further, the universities are involved in offering knowledge and cultivate the necessary skills and techniques to connect students from various fields to create ventures (Premaratne & Jayasundara, 2016). Introducing such concepts into the education system will serve to reduce barriers and issues related to commencing entrepreneurial ventures.

2.5.2. Suggestions for Promoting Entrepreneurship Culture in Sri Lanka

Some suggestions are mentioned for creating a better entrepreneurial culture in Sri Lanka.

- Use of social media, mass media, special documentary programs and award ceremonies on entrepreneurship will further create an enabling environment in promoting entrepreneurship.
- Entrepreneurial culture should be cultivated in the country as well as in the human mind which should subsequently stimulate individuals to think and behave like entrepreneurs.

- Formal entrepreneurship education with recognition for such dynamic personalities will be a great boon to strengthen entrepreneurial culture in the country.
- It is up to the drive and perseverance of all potential entrepreneurs to take advantage of the present business environment to get the maximum out of the opportunities available to win the market favorably.
- More entrepreneurial technology centers, incubations and science parks should be set up in Sri Lanka to acquire the proper skills and knowledge required to create successful ventures.
- Introducing concepts of entrepreneurship and innovation into the wider education system is also an important requirement to fulfill the objective of promoting and increasing access to entrepreneurs. Widening entrepreneurship education will also help to boost entrepreneurial skills and attitudes, which will in turn help to develop the fundamental qualities of entrepreneurs that are driven by innovation (Sujani & Buddhini, 2019)

Such steps will create a more positive environment for budding entrepreneurs to make themselves into great entrepreneurs and help the rapid development of the country. Moreover, proper training is needed on how to create and exploit new and potential business opportunities. Further, it must be given more social publicity for entrepreneurship. And also, technology, literacy, success stories, case studies and overall awareness about the benefits of being an entrepreneur must be shared far and wide for beginning an expanded and developed entrepreneurial culture of the country in the future.

2.6. ENTREPRENEURSHIP EDUCATION IN SRI LANKA

Considering the country's entrepreneurship education, few steps are being taken to promote and encourage an entrepreneurial mindset and innovative thinking. Most of Sri Lankan universities have initiated entrepreneurship courses in their curricular (Premaratne & Jayasundara, 2016). Entrepreneurial Studies as a subject were also introduced into the school curricular since 2007 to address the need for entrepreneurial intention. But the prevailing Sri Lankan education system does not promote or support entrepreneurship

which aims of producing best employees. Even it is expected to produce employable graduates within the higher education sector. Although it was introduced to the school curricular, it hardly reaps the yield of the expected results (Premaratne & Jayasundara, 2016).

Moreover, today, several public, non-profit and private entrepreneurship education or training programs are available in the country. They are primarily targeted at low and middle-income rural people who can start traditional micro or small enterprises (Ministry of Industry and Commerce, 2019). But, these education or training programs are directed towards opportunity-driven and innovative entrepreneurs who are in desperate need of technology, finance, and general assistance, not for the proper education or training (Gamage, 2014).

CHAPTER 03: METHODS AND TOOLS

3.1. INTRODUCTION

This chapter is consisting of the methods and tools adopted in addressing the effectiveness of entrepreneurship education for engineering students at Sri Lankan universities. The chapter begins with a justification for using both quantitative and qualitative methods for data collecting and data analyzing process. Then, it discusses how the fieldwork was conducted, which included the distribution of questionnaires and interviews. The written transcripts of the questionnaire survey and interviews are provided. Finally, the sampling strategies and sample size of the study are discussed at the end of the chapter.

3.2. QUANTITATIVE METHODS

The aim of this research is to find out how the effectiveness of entrepreneurship education for engineering students at Sri Lankan universities prevails. In order to identify the relations among variables related to entrepreneurship education and engineering, quantitative methods were used. As Creswell stated through the quantitative research methods would be easier to specify how and why variables and relational statements are interrelated (Creswell, 2009). Accordingly, the analysis of quantitative data is mainly in the form of percentage analysis. The analysis is supplemented by graphs and charts.

The questionnaire Survey is used as a quantitative tool to collect data regarding entrepreneurship education for engineering students.

3.2.1. Questionnaire Survey

Questionnaires are relatively one of the easiest and economical quantitative tools to reach a large number of respondents. Bertsch and Pham stated that questionnaires are practical means of gathering data as the relevant respondents could be managed the way the researcher wants (Bertsch & Pham, 2012). And unlike other primary data collection tools, the respondents do not feel pressurized in responding as they will take their own time to respond freely (Creswell, 2009).

Accordingly, a questionnaire survey was distributed as an online survey and two types of questionnaires were developed such as from Engineering Undergraduates in the selected universities (Annex 1) and Professional Engineers in the field (Annex 2). It was decided to distribute a sample of 106 engineering undergraduates and 27 professional engineers who were selected through the Simple Random Sampling method. And also a Questionnaire was found with a scoring system which can be used to identify the attributes of the undergraduates (Annex 3).

The use of questionnaires helped to gather the relevant data more easily for the huge sample and from the various universities. However, there were differences in interpreting and understanding certain questions by respondents that acted as a barrier to gather accurate data.

3.3. QUALITATIVE METHODS

Apart from using quantitative methods, to find out how entrepreneurship education for engineering students at universities prevails and success, qualitative methods were also used. Qualitative methods attempted to explore the attitudes and experiences of successful professional engineering entrepreneurs in the field that would help to bring out what societal, community and individual perception with regards the entrepreneurship education for engineering students and the relationship between this education and their successes as engineering entrepreneurs. Qualitative research methods can capture the real-life experiences in the words of the participants individually which enables them to gain an in-depth understanding of the prevailing situation. Further, qualitative methods are selected because they are intended to uncover the real situation and to enable the researcher to produce authoritative and valid knowledge about participants' experiences in their natural settings (Creswell, 2009).

Accordingly, The Key Informant Interviews were chosen as a qualitative tool to get an in-depth understanding of entrepreneurship education and successful engineering

entrepreneurs in the field. It was possible to hear about participants' experiences in their own words to emphasize the situation.

3.3.1. Key Informant Interviews

The interview is an interactive process and the interviewer can probe to clarify answers and both the interviewer and interviewee can go into depth on topics that emerge during the interviews (Bryman, 2016). Accordingly, it was decided to conduct in-depth and semi-structured key informant interviews with successful engineering entrepreneurs in the field. Semi-structured interviews are particularly useful as it allows the more scope for clarifications because the interview proceeds as a conversation between the interviewer and interviewee. It was very helpful to gather more appropriate information with regards to the real-life stories and the situations of successful entrepreneurs.

Key informant interviews were used to enable the interviewees to express their views freely. To ensure that the same information is obtained from all of the participants, an interview schedule was used as a guide (Annex 04). Although an interview guide was used, the interviewers could significantly depart from the interview guide. Accordingly, key informant interviews were conducted with the 04 successful engineering entrepreneurs who were selected through purposive sampling method.

3.4. SAMPLING

Purposive Sampling Method was used to select the five universities and Simple Random Sampling was used for selecting engineering undergraduates from the universities and professional engineers for the questionnaire survey. Accordingly, it was distributed a sample of 106 from engineering undergraduates and 27 professional engineers. Other than that, a sample of 04 professional engineers was selected from using the Purposive Sampling method for key informant interviews.

CHAPTER 04: DATA ANALYSIS

4.1. INTRODUCTION

This chapter presents the analysis of the data collected using the questionnaires and key informant interviews which were held with engineering undergraduates and professional engineers. The chapter consists of the analysis of the responses on various sections of the questionnaires and analysis of the cases made from the key informant interviews. Accordingly, the researcher made an attempt to highlight the effectiveness of entrepreneurship education among undergraduate students in the universities of Sri Lanka.

4.2. KEY FINDINGS OF THE STUDY

Transformative changes are happening in Higher Education Institutions worldwide in entrepreneurship education. These changes are conceptual as well as technological due to the upheaval in the global, social, political, and technological environment. Accordingly, we can argue that entrepreneurship education does not always have the same results on the undergraduate students in the university and after they graduate. Entrepreneurship education has advanced as a means to educate the new twenty-first-century workforce by giving students the skills to take any area of study or discipline and be creative, innovative, and entrepreneurial. Through entrepreneurship education, flexibility, adaptability, and resilience are taught and applied so that success can be achieved as workforce demands change over time (Barba-Sánchez & Atienza-Sahuquillo, 2017).

The current study was based to understand the effectiveness of entrepreneurship education among undergraduate students. Thus, a questionnaire survey was used as a technique of primary data collection from a sample of 106 undergraduates and 27 professional engineers selected through simple random sampling method. Other than that, a sample of 04 professional engineers was selected from using the Purposive Sampling method for key informant interviews. Consequently, the primary data which is collected from the questionnaire survey and key informant interviews can be analyzed as follows.

Q1 Name of your University:

Answered: 106 Skipped: 0

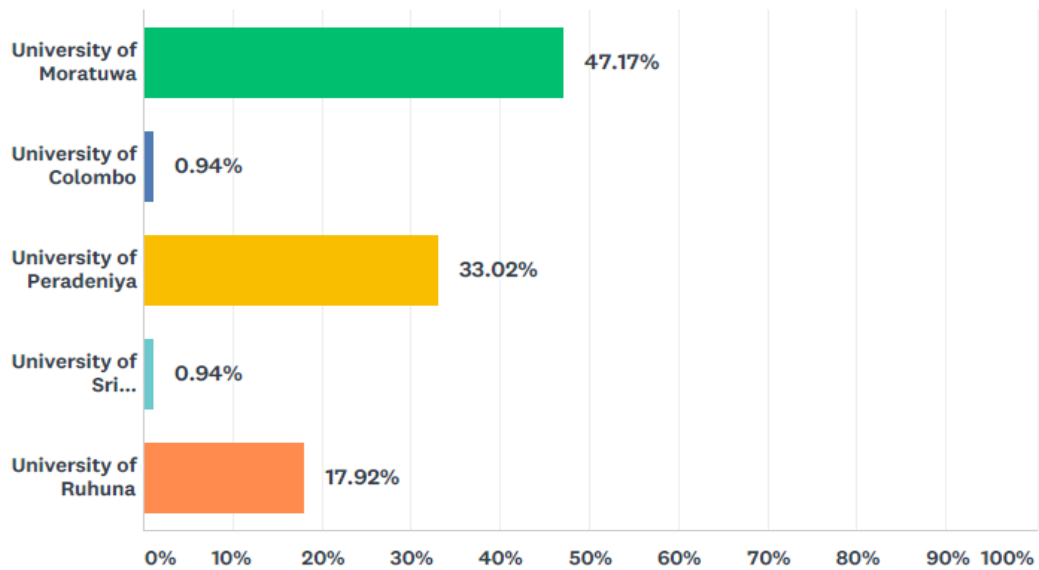


Figure 1: Respondents' Represented Universities

Source: Questionnaire Survey, 2019

As it is shown in Figure 1 the research data was collected from the undergraduates who were from University of Moratuwa (47.17%), University of Colombo (0.94%), University of Peradeniya (33.02%), University of Sri Jayewardenepura (0.94%) and University of Ruhuna (17.92%). The majority of respondents were from University of Moratuwa and University of Peradeniya.

Q4 No of Course Modules Followed Relating to Entrepreneurship

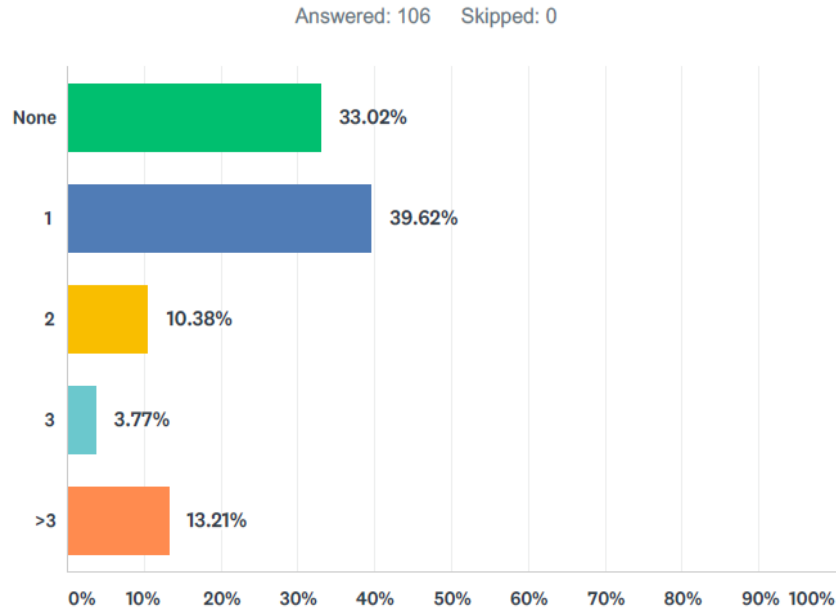


Figure 2: Course Modules Followed Relating to Entrepreneurship

Source: Questionnaire Survey, 2019

According to this study's estimated data, 39.62% of students have followed only one course module relevant to entrepreneurship education, especially 33.02% of students have not studied the subjects which are related to entrepreneurship education. Moreover, 13.21% have followed more than three course modules that have associated with entrepreneurship education. It is obvious that one of the main reasons for the unemployment of university graduates is the lack of skills to launch a new business. So one of the principal objectives of entrepreneurship education is to teach different skills to create jobs however, educational efforts are not always successful. As a result of that, the majority of undergraduates have not known the advantages of entrepreneurship education or are not interested to follow the subjects that are related to entrepreneurship education. Anyhow, entrepreneurship education has a different effect on developing entrepreneurial skills of different student groups those who are studying at a university.

Entrepreneurship education is a systematic, goal-oriented and conscious process. During this education through the provision of knowledge and information needed, to non-entrepreneurs with entrepreneurial potential, will help to gain skills and attributes required

for entrepreneurship. Training of young entrepreneurs is an investment for the future (Autio, Keeley, Klofsten, Parker, & Hay, 2001). Therefore, it is important to introduce new course modules that are related to entrepreneurship education in the universities and should enhance the undergraduates to follow and to study these kinds of course modules, because they can gain and develop their own skills, knowledge as an entrepreneur in the labour market. Accordingly, the following case study will reveal the importance of entrepreneurship education at the university level and how does this scope effect on the new entrepreneurs.

Interview 4.1- Importance of Entrepreneurship Education at the University Level

I am Pathi Sarachchandra and now I am the Director of Tritech Engineers (Pvt) Ltd. I graduated from University of Moratuwa as a Chemical Engineer in 1993. I have been followed a Post Graduate Diploma in Engineering and Master of Business Administration at University of Jayewardenepura. When I was an undergraduate, I started my own business, because I had a vision for being a businessman. At that period, we took government tenders and provided desks and chairs to the schools. Moreover, we carried out building construction projects as well. After I left the university, I worked at the United Tractors Pvt Ltd. This job provided me an excellent opportunity to build up my future career. And I had a dream to work with more than 500 employees. As a result of this dream, I started Tritech Engineers Pvt Ltd in 1999. I would like to elaborate on my perception as an entrepreneur. I believe that entrepreneurship education is an essential subject scope to the universities nowadays especially in University of Moratuwa. Particularly, entrepreneurship education is not just a subject it is affected to combine and to balance technology and finance. The young entrepreneurs should get practical exposure to this subject and they should have moral and confidence to start up a new business by bearing their own risk. According to my point of view, setting the targets and achieving the targets are the most important factors as a beginner of the labour market. Moreover, I trust that formal entrepreneurial education is not enough, but the way of thinking, self-attitudes, and experiences are also important to being an entrepreneur. And the young entrepreneurs should interact with the people who are from every level and should interact with the whole

world as well. Thereafter, they can be learned more things and can be adapted to the real system as well.

-Mr. Pathi Sarachchandra, Trittech Engineers (Pvt) Ltd.

Table 1: Level of Satisfaction of the Course Modules

Q5 Level of Satisfaction of those Course Modules

Answered: 106 Skipped: 0

ANSWER CHOICES	RESPONSES	
>90%	12.26%	13
90% - 70%	17.92%	19
70% - 50%	32.08%	34
<50%	13.21%	14
Not Relevant	24.53%	26
TOTAL		106

Source: Questionnaire Survey, 2019

As it is shown in table 1, 32.08% of respondents have satisfied 70% - 50% level regarding their course modules which are related to entrepreneurship education. Moreover, 17.92% and 12.26% respondents have satisfied 90% - 70% level and > 90% level respectively about their course modules. It is obvious that the majority of respondents (32.08%) are satisfied with their entrepreneurship-related course modules to some extent. Particularly, unemployment may not allow graduates to establish a good career in their respective fields, but it is the responsibility of graduates to avoid limiting the opportunities available to them. Graduates can discover opportunities in entrepreneurship without depending on job opportunities in their respective fields of study (Md Zain et al, 2013). Students who have taken one or more entrepreneurship courses (Refer figure 2) have higher levels of entrepreneurial ability. Thus, entrepreneurship courses through formal or informal engineering education can provide a wide range of career choices for graduate students.

The role the universities are currently playing through teaching entrepreneurship and transferring knowledge and innovation to undergraduate engineering students is very essential. Implementation of entrepreneurship education within universities aims to create new educated entrepreneurs and new businesses based on science and technology.

Accordingly, the researcher has included a question in the questionnaire as what are the suggestions to improve those course modules and in line with this, the researcher wanted to highlight the respondents' perceptions, ideologies, barriers, suggestions, and attitudes for improving the entrepreneurship education in the university level. The respondents' responses are indicated as follows.

Q6 Any Improvements Suggested for those Course Modules:

Answered: 40 Skipped: 66

#	RESPONSES	DATE
1	This module should improve with advance management practices and businesses administration and low theories.	11/3/2018 11:42 PM
2	Need risk management professionals and financial professionals for lecturing	11/3/2018 10:30 PM
3	Include actual case and company studies	10/31/2018 5:58 AM
4	Industrial knowledge should be improved	10/31/2018 1:04 AM
5	Thise modules are very good as an engineer	10/30/2018 7:15 PM
6	If the lecturer can arrange a guest lecture from one of proffessional in subject the enthusiasm of the students will be increased.	10/30/2018 7:05 PM
7	It will be better, if the module consists of relevent software that are required to run a successful Entrepreneurship	10/30/2018 5:03 PM
8	More practical modules should be added	10/30/2018 2:22 PM
9	Although there is no direct module called entrepreneurship, there are modules that give you the technical expertise to become an entrepreneur. Better if could include modules to develop creativity.	10/30/2018 10:37 AM
10	Subjects need to harmonize Engineering and Entrepreneurship with real-life examples	10/30/2018 8:38 AM
11	Give a chance for the students to move with well establish entrepreneur during their studies will encourage them to become an entrepreneur	10/30/2018 4:18 AM
12	It should be more practical approach based.	10/29/2018 5:30 PM
13	Should mention more practical scenarios.	10/29/2018 5:14 PM
14	Make it more technical. More interactive. Less pointless brainstorming	10/1/2017 12:27 PM
15	Nothing	9/29/2017 7:43 PM
16	No idea	9/29/2017 6:44 PM
17	Yes. I tend to change my way of thinking	9/29/2017 2:14 PM
18	-	9/26/2017 10:24 PM
19	No idea	9/26/2017 9:45 PM
20	If we can get to meet young an up coming entrepreneurs, that'd be great	9/26/2017 9:11 PM
21	Should not be a course module. But the opportunity to study that area should be open to any student. Something like enterprenual society.	9/26/2017 9:05 PM
22	Want to get Realistic Examples	9/17/2017 11:04 PM
23	With out learning classical theories there should be updated sylabuss with current trends	9/17/2017 1:11 PM
24	It is much relevant after having the industrial training	9/16/2017 6:09 PM
25	Not need special improvements	9/16/2017 2:21 PM

Figure 3: Improvements Suggested by the Respondents

Source: Questionnaire Survey, 2019

According to respondents' responses, it can be noted that the undergraduates expected to gain more practical exposure through entrepreneurship education. As a matter of fact, respondents felt that entrepreneurship education provides more opportunities and career choices to establish their own company. On the same account, they (respondents) highlighted that the requirement of theoretical, technical and more interactive knowledge along the entrepreneurship education to improve and to develop their skills, knowledge, and talent for ensuring their future career. It is obvious that the above kinds of responses proved the effectiveness and impact of entrepreneurship education on undergraduate students in local universities. Moreover, if the undergraduate wants to be an entrepreneur, he or she should have more skills and ability to develop their future career. The following case study will elaborate on what kind of skills and competencies should have to be an entrepreneur at a young age.

Interview 4.2- Skills for Being an Entrepreneur

I am Ranjith Dissanayake and working as a senior professor at the University of Peradeniya. I graduated from the University of Peradeniya in 1991. After finished my university education, I started to import the vehicles in 1992 and that was the first step that I became an entrepreneur. Thereafter, I began my own company called Lego International Pvt Ltd in 1999. So, it was a construction company, except for construction projects we provided consultancies and business education to the other businessman as well. My opinion which is related to entrepreneurship education is we have few subjects that combined with the entrepreneurship education in the universities, but it is not enough to just have the theoretical knowledge only, we should gather the practical knowledge to develop our entrepreneurial intentions. I believe that we should have several skills and competencies to be an entrepreneur. If we want to be smart, we have to think beyond our frame and should maintain the qualities and strengthens step by step without discouraging. When we expected to be an entrepreneur, the most important thing is to have a self-confident and faith of the customers. I trust that engineers should be the entrepreneurs and they should be the employment generators. Moreover, not only educational institutions but also the government can provide the facilities and funds to the young entrepreneurs for starting-up new business. Except for all the above factors, young entrepreneurs should have

an open mind, honest, dedication, good and effective communication skills, organizing skills, systematic planning ability, and updated knowledge to handle their employees.

-Senior Professor Ranjith Dissanayake, University of Peradeniya

Q8 Are you willing to be an Entrepreneur in Future

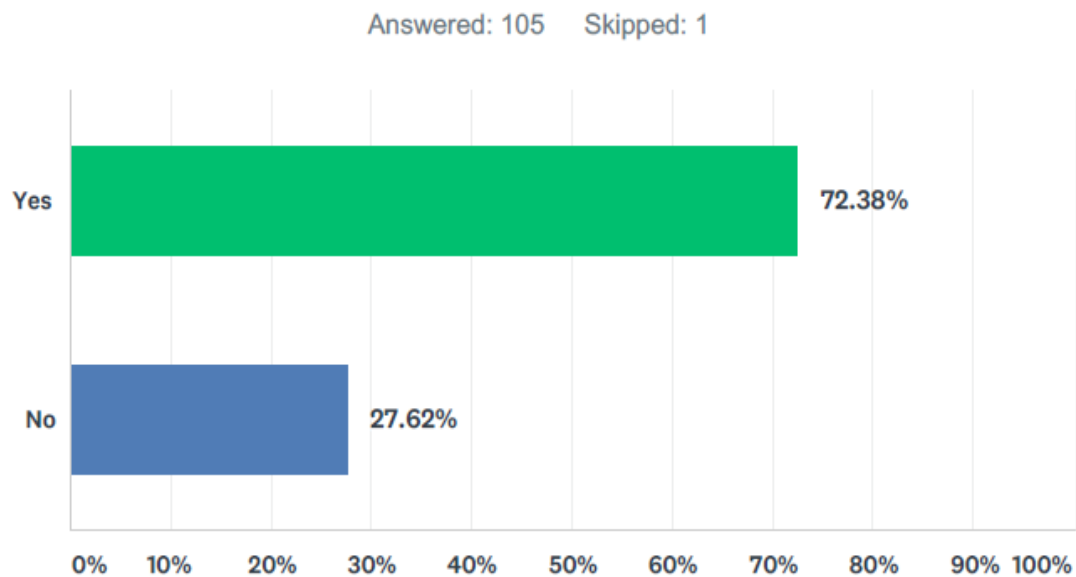


Figure 4: Willingness to be an Entrepreneur in Future

Source: Questionnaire Survey, 2019

The data shows that the intention to become an entrepreneur of undergraduate students is 72.38%. Consequently, they are preferred to become job creators. On the other hand, limitations of job opportunities will potentially lead to the inability of labour market to absorb educated workers that continue to accumulate. Moreover, entrepreneurship education is one of the programs that aim to build and develop creative people, innovative, and create entrepreneurs. It is obvious that the majority of undergraduates (72.38%) are willing to be entrepreneurs, however, the university system and government network should give their hands to enhance these young and talented entrepreneurs for ensuring

their future career. This process will be contributed to generate more educated and creative entrepreneurs in the labour market. Entrepreneurship education is intended to provide students the opportunity to create, plan and manage a real business.

Accordingly, the above indicators have shown that many factors behind the effectiveness of entrepreneurship education within the Sri Lankan universities. On the same account, it needs to evaluate extend the effectiveness of existing entrepreneurship education at the universities to produce a successful entrepreneur. Only the education and the willingness of an undergraduate can't make a successful entrepreneur. One of the most important characteristics of a successful entrepreneur is the desire to be a high achiever (Kuratko & Rao, 2012). Therefore the questionnaire (Annex 3) can be used to identify the high achievers among undergraduates. Then those undergraduates can be directed to learn more on entrepreneurship education and this will give more effective outcome.

The researcher wanted to investigate the practical usage of entrepreneurship education in the professional engineering field. In other words, when the undergraduates become professional engineers, how they utilize their entrepreneurship knowledge and skills to run their own company. Consequently, the researcher selected 27 professional engineers as a sample to highlight the effectiveness of entrepreneurship education at the professional level.

Table 2: Respondents' Job Role

Q1 What is your job role ?

ANSWER CHOICES	RESPONSES	
I am running my own company	7.41%	2
I am working for someone else company and run my own business part time	18.52%	5
I am working for someone else company	74.07%	20
I am an Academic	0.00%	0
TOTAL		27

Source: Questionnaire Survey, 2019

As it is shown in table 2, two professional engineers were running their own company and five respondents were working for someone else company while they are running their own business as a part-time. However, the majority of professional engineers were working in someone else company. The biggest concern is that the highest percentage (74.07%) of employees belongs to the category of "I am working on someone else company". It seems that the undergraduates were not provided with special skills or knowledge to survive or self-sufficient in entrepreneurship. The above-estimated data proved that undergraduates have no clear directions of their future. As a result of that, few of them (7 professional engineers) have engaged in their own business. Moreover, undergraduates are not produced well enough to be creators of jobs, but they are job seekers or work in someone else company instead.

Sri Lanka is a developing country and it consists relatively a large population. Every year there is an increase in the workforce by new graduates from universities. These graduates 'await' job vacancies suitable for their skills. Ironically, the majority of graduates have not gained an occupation that is related to their studied field. As a consequence of that, most of the professionals are not satisfied with their job role. During the questionnaire survey, respondents were asked to categories the satisfaction levels with the opportunities given for professional growth and career advancement at their workplace (Q. 3). Their responses were as follows.

Table 3: Satisfaction Levels with the Opportunities Given for Professional Growth and Career Advancement at Their Work Place

Q3 Are you satisfied with the opportunities given for professional growth and carrier advancement at your work place?

ANSWER CHOICES	RESPONSES	
Very satisfied	7.41%	2
Satisfied	48.15%	13
Neither satisfied nor dissatisfied	25.93%	7
Dissatisfied	11.11%	3
Very dissatisfied	7.41%	2
TOTAL		27

Source: Questionnaire Survey, 2019

According to the above-estimated data, 48.15% of respondents were satisfied and 7.41% of respondents were very satisfied with the opportunities given for professional growth and career advancement at their workplace. Moreover, 11.11% were dissatisfied and 7.41% of respondents were very dissatisfied with their professional growth and career advancement opportunities at the workplace. It is obvious that the majority of professional engineers have gained many opportunities to ensure their career advancement and professional growth as well. These changes have been caused to satisfy the professionals' job role at their workplace.

Transformative changes are happening in Higher Education Institutions worldwide in entrepreneurship education. These changes are conceptual as well as technological due to the upheaval in the global, social, political, and technological environment (Welsh, 2016). Particularly, entrepreneurship education was found to influence personal growth, confidence and identity development, new career intentions and learning applications.

Q6 Have you followed any course modules relating to Entrepreneurship Education at university ?

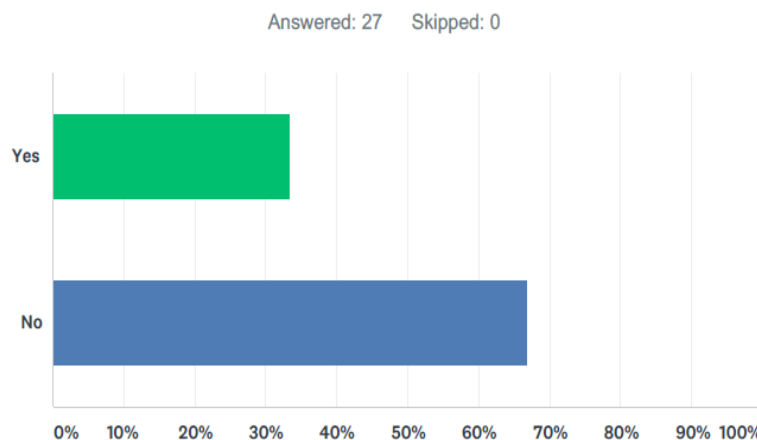


Figure 5: Course Modules Followed Related to Entrepreneurship Education
Source: Questionnaire Survey, 2019

Q7 How satisfied are you with those course modules and their opportunities given for carrier development ?

Answered: 25 Skipped: 2

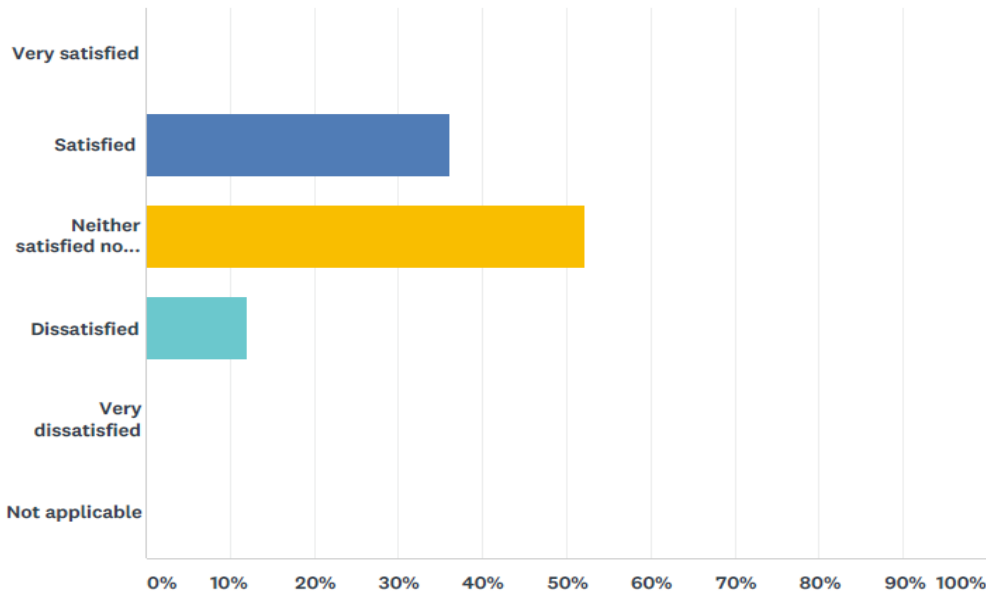


Figure 6: Level of Satisfaction of Course Modules

Source: Questionnaire Survey, 2019

As it is shown in Figure 5, 66.67% of respondents were not followed the course modules which related to the entrepreneurship education and only 33.33% of professional engineers have accepted that they have learned the entrepreneurship education courses. Figure 6 highlighted that the majority of respondents (52%) have responded as neither satisfied nor dissatisfied about the course modules which are related to entrepreneurship education. It seems, though several respondents have some knowledge regarding entrepreneurship education, they were not very much satisfied with these course modules. It should be noted that the university system should pay their attention to develop these course modules properly for giving more and more practical exposure to undergraduate engineering students. Otherwise, they are not enhanced to run their own business and this can be caused to generate less powerful young labour force in the country.

Thus, during the questionnaire survey, the researcher asked the respondents how the practical usage of this entrepreneurship education does relate to their industry. Their responses are as follows.

Q8 Do those course modules practically involved and help you in the industry ?

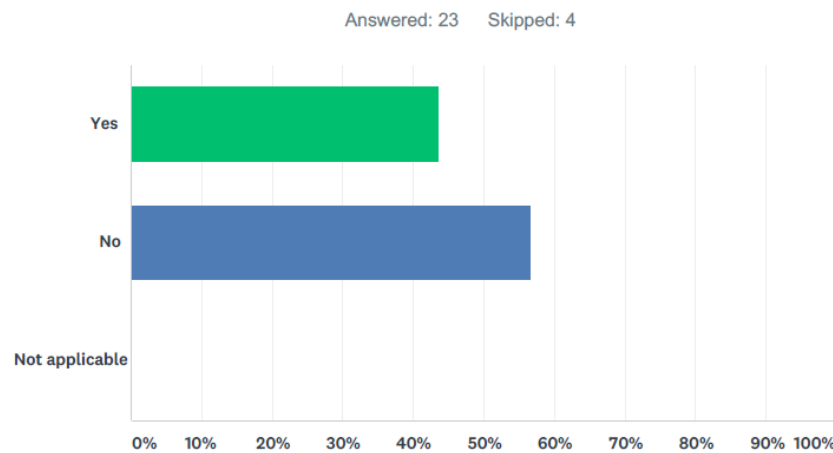


Figure 7: Do the Course Modules Help in the Industry

Source: Questionnaire Survey, 2019

As it is shown in Figure 7, 56.52% of professional engineers have mentioned that those course modules were not practically involved and were not helped for their careers. Moreover, the rest of the others (43.48%) has accepted that those course modules were utilized for their job role. It is clear that the process of entrepreneurial education is not increasing entrepreneurial attitudes, motives, and intentions. Therefore, university network especially engineering field should develop new course modules or should revise the existing course modules of entrepreneurship education. Otherwise, this can be adversely affected to the effectiveness of entrepreneurship education at the university level.

Interview 4.3- Barriers to be an Entrepreneur

I am Dr. Lesly Ekanayake and currently working as a lecturer at the University of Moratuwa. I passed out from the University of Moratuwa in 1996. I followed my Ph.D. from the University of Singapore. When I passed out from the university, I started to work under someone else company. I work as a lecturer, but I needed to be an entrepreneur too. As a result of that, I started my own company as Ranik International Pvt Ltd in 2009. When I started this company, I had middle-level financial status; accordingly, there was a risk at the beginning. Mainly, raw materials also imported from Singapore. So far, my skills and motivations to be an entrepreneur influenced me to develop my business mind. I believe that there are so many barriers to become a successful entrepreneur and that has been seen in the labour market nowadays. Particularly, there are not enough open-minded and talented stakeholders at the top levels. Top-level bodies should give their hands to go forward for new entrepreneurs and they do not have the confidence to open the opportunities for innovations and newcomers. The market is controlled by them and as a result of that, many opportunities are taken by foreign companies; therefore there can be seen lack of chances are getting to the Sri Lankan entrepreneurs. Moreover, another barrier can be recognized as there are no enough loan and banking facilities to start a large level of projects, and we do not have sufficient skillful laborers too. In my opinion, education is only a supportive factor, but the newcomers should try to buildup interaction with the outside world as well.

- Dr. Lesly Ekanayake, University of Moratuwa

Q9 What do you recommend a newly passed out engineering student, when they are to choose their carrier path ?

Answered: 17 Skipped: 10

#	RESPONSES	DATE
1	They shall join to a organization which help to develop their carrier. It is to better to join a reputed company where there are many competent senior employers.	3/16/2019 1:14 PM
2	Follow their passion	3/15/2019 10:25 AM
3	1. Select an organisation which gives u a proper plat form to perform. 2. Chose a job where u have to work hard from technician level. And fine tune your practical exposure so that no one can miss lead you. And do not go behind posh working cultures which gives u nothing. 3. Do not go after the salary. It will come after u if u work hard and smart. 4. Try to practice engineerig before u move on to managerial levels	3/14/2019 1:51 PM
4	They should be job creators. Because most of them have the talent and the capability. First they should get a good overall practical experience on the field that they are going to perform and then they should take the risk and start on their own	3/14/2019 11:22 AM
5	Should depend on their interest, better to have some experience in both construction and design.	3/13/2019 1:06 PM
6	Not relevant	3/11/2019 3:15 PM
7	work with superior officers to gain the experience	3/11/2019 11:28 AM
8	Please be more specific about this. This is totally depends on the type of engineering course he or she follows.	3/11/2019 6:25 AM
9	Frist every one should be understood the practical aspect of engineering fundamentals	3/10/2019 10:42 PM
10	You have to gain experience working under someone and then start your own thing if you have time and money.	3/10/2019 2:31 PM
11	Select a job opportunity where they will be exposed to modern engineering techniques under a genuine & knowledgeable senior engineer. Afr few years of industrial exposure those engineers should decide on their future carrier path	3/10/2019 11:53 AM
12	Get the training and go for your own thing	3/10/2019 9:18 AM
13	Follow the passion	3/10/2019 5:46 AM
14	Get knowledge first	3/9/2019 8:53 PM
15	First need to decide whether you are going to practise as office engineer (structural, procurement, etc) or site engineer. If you chose structural engineer path then your works are mostly related to academic course modules. But if you choose site engineer path then mostly those modules are not practice int he university. Any way even if you choose the office engineer path you must have the site experience at least for one year.	3/9/2019 8:49 PM
16	Go abroad	3/9/2019 6:26 PM
17	Live your dreams but make sure that it's not the horizon (which never occurs)	3/9/2019 6:21 PM

Figure 8: Recommendations for Newly Passed Out Engineering Students
Source: Questionnaire Survey, 2019

Interview 4.4- Suggestions to Overcome the Barriers

I am Dhammika Padeniya and graduated from the University of Moratuwa in 1992/93. When I passed out from the university, I started a job and then gradually moved to business with the experiences from several places. Slowly, I began my own company as Oreta Engineering Pvt Ltd in 2010. I started this company with a loan and with only two staff members. When I started this company, mainly I had to face barriers like financial barriers and find out the new clients. Particularly, good planning, systematic approach and motivational attitudes influenced me to overcome the above barriers. I personally believe that education is mainly based on the theories, but we should accumulate more practical exposure by real experiences. Moreover, the government can also be a focal point to facilitate new entrepreneurs by giving many opportunities and funds.

- Mr. Dhammika Padeniya, Oreta International Pvt Ltd

Entrepreneurship education in universities must create the right attitudes, motives, intentions, and grit to meet failure with a determination to start over again and win. Accordingly, professional engineers have recommended several suggestions, ideas and perspectives for newly passed out engineering students to create and to develop their future careers as above. The majority of respondents highlighted that to get practical exposure first when the new graduates gain enough practical experiences related to their field, then they suggested to start their own business.

4.3. CHAPTER SUMMARY

Thus, this chapter highlights the factors that influence the effectiveness of entrepreneurship education at the university level. Accordingly, the researcher selected undergraduates engineering students and professional engineers as a sample of the study to gain a thorough data analysis. It should be noted that some factors contributed to increase the effectiveness of entrepreneurship education while some other factors have affected to decrease the effectiveness of entrepreneurship education at the university level. Accordingly, the overall objective of entrepreneurship education is the training of creative, innovative, self-reliant people who are aware of opportunities generally educate individuals who are more willing to set up an independent business. Therefore, university network should pay their more attention to develop the existing entrepreneurial education course modules and to introduce new course modules related to entrepreneurship education. As a result of that, more undergraduates will enhance to follow these course modules and will attempt to get practical exposure for creating their own business.

The next chapter is allocated to the conclusion part of the dissertation.

CHAPTER 05: CONCLUSION AND RECOMMENDATIONS

5.1. INTRODUCTION

This study examined the effectiveness of entrepreneurship education among undergraduate students in the universities of Sri Lanka. Within the concluding chapter, a summary of the main findings in relation to the research objectives is presented.

Finding jobs for all graduates passing out from the university system is a huge problem for a country like Sri Lanka. Entrepreneurial ideas and implementing those ideas among graduates are very less in our country. Almost all the graduates try to find a job by the time they pass out from the university. They want to find a job with a fixed salary and other benefits where they are secured with a monthly income. Because after having twenty to twenty two years of education and being dependent on someone else they do not want to take any risk in their life in earning money. For a developing country, they want more people who create jobs than who are seeking for jobs. In Sri Lanka with the free education system, the government spends for students until their university education. Then again if the government is responsible for finding out jobs for the passed out graduates, then it will be a severe burden for the government.

Consequently, the government has taken several steps to address unemployment issues among the youth generation. Many scholars have identified the entrepreneurial intentions as a better solution for unemployment. One strategy is to promote entrepreneurship education and to encourage for starting own enterprises. As a matter of fact that, most of the Sri Lankan universities have initiated entrepreneurship course modules in their circulars. However, a growing interest in entrepreneurship education emerged at Sri Lankan universities after 2000. Nowadays, many universities are in the process of strengthening their entrepreneurship education programs in order to create more young entrepreneurs in the near future.

Thus the present study was conducted to understand the effectiveness of entrepreneurship education at the university level for engineering students in Sri Lankan universities.

Mainly, a questionnaire survey supported with four case studies and interviews were used as primary data collection from a sample of 106 engineering undergraduates and 27 professional engineers selected through simple random sampling method. Data analysis was done using both quantitative and qualitative analysis methods.

5.2. FINDINGS OF THE STUDY

It has been observed that one of the important factors that contributed to the effectiveness of entrepreneurship education was course modules related to entrepreneurship education. According to this study's estimated data, 39.62% of students have followed only one course module relevant to the entrepreneurship education, especially 33.02% students have not studied the subjects which are related to entrepreneurship education. Moreover, 13.21% have followed more than three course modules that have associated with entrepreneurship education. It is obvious that one of the main reasons for the unemployment of university graduates is the lack of skills to launch a new business. As a result of that, the majority of undergraduates have not known the advantages of entrepreneurship education or are not interested to follow the subjects that are related to entrepreneurship education. Therefore, the researcher highlighted the importance of introducing new course modules that are related to entrepreneurship education in the universities and should enhance the undergraduates to follow and to study these kinds of course modules.

The study found that 32.08% of respondents have satisfied 70% - 50% level regarding their course modules which are related to entrepreneurship education. Moreover, 17.92% and 12.26% respondents have satisfied 90% - 70% level and > 90% level respectively about their course modules. It is obvious that the majority of respondents (32.08%) are satisfied with their entrepreneurship-related course modules to some extent. It is obvious that students who have taken one or more entrepreneurship courses (Refer figure 4.2) have higher levels of entrepreneurial ability. Thus, entrepreneurship courses through formal or informal engineering education can provide a wide range of career choices for graduate students.

As per the research findings, it can be noted that the undergraduates expected to gain more practical exposure through entrepreneurship education. As a matter of fact, respondents felt that entrepreneurship education provides more opportunities and career choices to establish their own company. On the same account, they (respondents) highlighted that the requirement of theoretical, technical and more interactive knowledge along the entrepreneurship education to improve and to develop their skills, knowledge, and talent for ensuring their future career. It is obvious that the above kinds of responses proved the effectiveness and impact of entrepreneurship education on undergraduate students in local universities.

The data shows that the intention to become an entrepreneur of undergraduate students is 72.38%. Consequently, they are preferred to become job creators. Moreover, entrepreneurship education is one of the programs that aim to build and develop creative people, innovative, and create entrepreneurs. It is obvious that the majority of undergraduates (72.38%) are willing to be entrepreneurs, however, the university system and government network should give their hands to enhance these young and talented entrepreneurs for ensuring their future career.

The research found that two professional engineers were running their own company and five respondents were working for someone else company while they are running their own business as a part-time. However, the majority of professional engineers were working in someone else company. The biggest concern is that the highest percentage (74.07%) of employees belongs to the category of "I am working on someone else company". It seems that the undergraduates were not provided with special skills or knowledge to survive or self-sufficient in entrepreneurship. The above estimated data proved that undergraduates have no clear directions of their future. According to the research data, 48.15% of respondents were satisfied and 7.41% of respondents were very satisfied with the opportunities given for professional growth and career advancement at their workplace. Moreover, 11.11% were dissatisfied and 7.41% of respondents were very dissatisfied with their professional growth and career advancement opportunities at the workplace.

As per the research findings of the study, 56.52% of professional engineers have mentioned that the entrepreneurial course modules were not practically involved and were not helped for their careers. Moreover, the rest of the others (43.48%) has accepted that those course modules were utilized for their job role. It is clear that the process of entrepreneurial education is not increasing entrepreneurial attitudes, motives, and intentions. Therefore, university network especially engineering field should develop new course modules or should revise the existing course modules of entrepreneurship education. Otherwise, this can be adversely affected by the effectiveness of entrepreneurship education at the university level.

The findings of the study discussed so far, have proved that the above factors have been directly affect to increase the effectiveness of entrepreneurship education at the university level.

5.3. CONCLUSION

Based on the key findings of the study, it can be concluded that the effectiveness of entrepreneurship education is determined by the variety of factors that have been taken place in the Sri Lankan universities. However, the lack of knowledge and lack of awareness about entrepreneurship education among the youth generation have emerged as a huge issue nowadays. Because of this situation, the university education systems have introduced many entrepreneurship course modules for university degree programs. But most of the undergraduates follow these courses to fulfill their number of credits they want to cover the semester. They do not take the essence of the course module. It is just another subject for them. And also sometimes those course modules based on more theoretical concepts than practical scenarios. Therefore, the university system has to make such entrepreneurship programs to change the mindset of the undergraduates and give them the courage to start new businesses.

Moreover, young entrepreneurs face several barriers that influence and prevent the completion of the implementation of new business. Entrepreneurship Education for Engineering students at the university level should more focus on those barriers and

construct the course modules to address such scenarios in theoretical and practical aspects as well.

Entrepreneurship Education should more focus on the practical aspect of business and innovation. It should act as an Incubator for young Entrepreneurs to train them self for the real-world challenges that will face by them after they experience.

5.4. FUTURE RESEARCH

This research has not gone indepth of the attributes of the undergraduates to become an entrepreneur. The right attributes of the undergraduates are very essential to create a successful Entrepreneur. And also the lecturers who are lecturing on entrepreneurship education should also have correct attributes to share their knowledge and experience with the students. The combination of these two can be further studied in a future research.

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ANNEXURE

6.1. Questionnaire for Undergraduate Students

Effectiveness of Entrepreneurship Education at University Level

SurveyMonkey

#1

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, September 14, 2017 4:28:54 PM
Last Modified: Thursday, September 14, 2017 4:29:53 PM
Time Spent: 00:00:59
IP Address: 175.157.100.213

Page 1

Q1 Name of your University:	University of Moratuwa
Q2 Year of Studying at the University:	Final Year
Q3 Stream of Studying:	Civil Engineering
Q4 No of Course Modules Followed Relating to Entrepreneurship:	>3
Q5 Level of Satisfaction of those Course Modules:	>90%
Q6 Any Improvements Suggested for those Course Modules:	Respondent skipped this question
Q7 Average GPA or Performance in other Subject Areas:	Respondent skipped this question
Q8 Are you willing to be an Entrepreneur in Future:	Yes
Q9 Any Barriers to become an Entrepreneur:	Respondent skipped this question
Q10 How to Overcome in your Opinion:	Respondent skipped this question

6.2. Questionnaire for Practising Engineers

Effectiveness of Entrepreneurship Education at University Level for Engineering Students

SurveyMonkey

#1

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Saturday, March 09, 2019 6:19:44 PM
Last Modified: Saturday, March 09, 2019 6:21:37 PM
Time Spent: 00:01:52
IP Address: 119.104.103.106

Page 1

Q1 What is your job role ? I am working for someone else company

Q2 Are you satisfied with the current position you hold at your work ? Neither satisfied nor dissatisfied

Q3 Are you satisfied with the opportunities given for professional growth and carrier advancement at your work place? Neither satisfied nor dissatisfied

Q4 Do you feel that you completely involved at your work and you give your best effort at work ? Always

Q5 How satisfied are you with your current work life balance ? Satisfied

Q6 Have you followed any course modules relating to Entrepreneurship Education at university ? Yes

Q7 How satisfied are you with those course modules and their opportunities given for carrier development ? Satisfied

Q8 Do those course modules practically involved and help you in the industry ? No

Q9 What do you recommend a newly passed out engineering student, when they are to choose their carrier path ?

Live your dreams but make sure that it's not the horizon (which never occurs)

Q10 Are you overall satisfied with the decision you have taken about your carrier path ? Satisfied

1 / 31

6.3. Questionnaire to Select High Achievers

Q1. A Lecturer in your university has asked you to choose on three grading options, which of these would you choose?

- (a) Study the course material, take the exams, and receive the grade you earn
- (b) Roll a die and get an A if you roll an odd number and a D if you roll an even number
- (c) Show up for all class lectures, turn in a short term paper, and get a C

Q2. How would you describe yourself as a risk taker?

- (a) High
- (b) Moderate
- (c) Low

Q3. You have asked by your boss to take on a new project in addition to the many tasks you are already doing. What would you tell your boss?

- (a) Since I'm already snowed under, I can't handle any more
- (b) Sure, I'm happy to help out; give it to me
- (c) Let me look over my current workload and get back to you tomorrow about whether I can take on any more work

Q4. Which one of these people would you like to be?

- (a) Steve Jobs, founder of Apple Computers
- (b) Lee Iacocca of Chrysler fame
- (c) Jack Welch, former CEO of General Electric

Q5. Which one of these games would you most like to play?

- (a) Chess
- (b) Ludo
- (c) Roulette

Q6. You decided to become more physically active. Which one of these approaches has the greatest attraction for you?

- (a) Join a neighbourhood team
- (b) Work out on your own
- (c) Join a local health club

Q7. Which one of these groups would you most enjoy playing poker?

- (a) Friends
- (b) High-stake players
- (c) Individuals who can challenge you

Q8. Which one of these persons would you most like to be?

- (a) A detective solving a crime
- (b) A politician giving a victory statement

(c) A millionaire sailing on his or her yacht

Q9. Which one of these activities would you prefer to do on an evening off?

- (a) Visit a friend
- (b) Work on a hobby
- (c) Watch television

Q10. Which one of these occupations has the greatest career appeal for you?

- (a) Computer salesperson
- (b) Corporate accountant
- (c) Criminal Lawyer

Score Table

Answer Question	a	b	c
1	10	0	2
2	2	10	2
3	6	2	10
4	7	10	5
5	10	0	0
6	2	10	6
7	4	2	10
8	10	7	4
9	4	10	4
10	10	5	10

- 76 -100 High Achievers
- 50 – 75 Moderate Achievers
- Less than 50 Low Achieve

6.4. Interview Schedule

- 1) Background details of the resource personal
 - a) Personal Details
 - i) Name
 - ii) University, field and batch
 - iii) Post Graduate Education
 - iv) Family Status
 - v) Current financial position (Satisfactory/non satisfactory)
 - vi) Starting status after graduation (Job/Business/other)
 - vii) Personal reason for being an Entrepreneur
 - b) Company details
 - i) Name and Starting date
 - ii) Conditions in the starting up (financial status/ knowledge/ personal values/No of Employee)
 - iii) Present condition (financial status/ knowledge/ personal values/No of Employee))
- 2) Do you have any formal educational background about entrepreneurship? If so, what is that?
- 3) What are the barriers you encountered during the start-up of the company?
- 4) What skills help you to overcome those and move forward? (formal education, interpersonal skills, chance or luck etc.)
- 5) What are the techniques that you adopt to survive in the industry without getting drop out of the competition as a start-up company in the past?
- 6) What is your opinion about the entrepreneurship education and its benefits to young entrepreneurs?
- 7) What are skills that young entrepreneurs should acquire in terms of being real entrepreneurs in the competitive market?
- 8) Can entrepreneurship education develop a full capable entrepreneur, or we need something extra to become one? What is your opinion?
- 9) What is your opinion about the effectiveness of entrepreneurship education in Sri Lankan context?
 - i. Does it provide proper awareness?

- ii. Does it help to acquire required set of knowledge and skills?
 - iii. Does it push students to become real world entrepreneurs with practical skills or just a theoretical knowledge?
 - iv. Do you feel that entrepreneurship education can be thought to anyone and made them entrepreneurs?
- 10) Finally, what are your suggestions that you propose to develop entrepreneurship education to be effective at university level?