# ENTREPRENEURIAL PEDAGOGY, INCUBATOR USE AND STUDENT INNOVATIVE CAPABILITY IN INSTITUTIONS OF HIGHER EDUCATION, KENYA

**BY**
**MERCY MURREY**

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF DEGREE OF DOCTOR OF PHILOSOPHY IN ENTREPRENEURSHIP DEVELOPMENT, TO THE SCHOOL OF BUSINESS AND ECONOMICS**

**MOI UNIVERSITY**

**2021**

# DECLARATION

**Declaration by the Candidate:**

This thesis is my original work and has not been presented in any other University or educational institution for any academic award. No part of this thesis should be reproduced without my approval or that of Moi University.

Signature: …… Date ……

**Murrey Chebet Mercy**

**SHRD/Ph.DE/01/16**

**Declaration by the Supervisors**

This research thesis has been submitted for examination with our approval as University Supervisors.

Signature …… Date ……..

**Prof. Bernard Kibeti Nassiuma (PhD)**

Department of Management Science and Entrepreneurship,

School of Business and Economics,

Moi University, Kenya

Signature …… Date ……..

**Dr. Joash Ogolla Ogada (PhD)**

Department of Management Science and Entrepreneurship,

School of Business and Economics,

Moi University, Kenya

## DEDICATION

I dedicate this work to my beloved husband, Daniel Kipkorir Biwott and our children Ariel Chepkoech Biwott and Dylan Kipchumba Biwott for their undying love, support and patience during the entire journey towards the attainment of this award. Above all I thank the Almighty God for taking me through this Journey.

**ACKNOWLEDGEMENT**

I express great thanks to the Almighty God for the blessings which are beyond everything else and for the far that I have come. This thesis would not have been possible without the strong support of a number of people. First, my profound gratitude goes to my supervisors at Moi University, Prof. B. K. Nassiuma and Dr Joash Ogolla Ogada for their enormous intellectual help and encouragement they accorded me. Their contribution enabled me to explore and discover more information in the field of entrepreneurship and academic research. For this reason, I indeed acknowledge and appreciate the efforts you rendered me. Secondly, I wish to thank in particular the lecturers who facilitated the development of the research idea in my Doctor of Philosophy in Entrepreneurship in particular: Prof. B. K. Nassiuma, Prof. Peter Omboto, Prof. Michael Korir, Dr. Kefa Chepkwony, Dr. Kere and Dr. Argwings Otieno Thirdly, this work would not have been complete without the support, collaboration and cooperation of my colleagues in the 2016 Doctor of Philosophy in entrepreneurship class; Beatrice Kitigin,Joseph Koech and Paul Kirwa I really thank you colleagues.

Finally, I wish to extend my special thanks to the family members, especially my parents Mr. and Mrs. Joel Murrey and Mrs. Alice Ngetich and to all my siblings for their support during the writing of this thesis. May God bless you.

## ABSTRACT

Student innovative capability in Institutions of Higher Education is of major interest in most economies. This has ignited the presumption that innovativeness is anchored on Entrepreneurial Pedagogy. However, there is limited understanding on the interactive effect of incubator use on the relationship between entrepreneurial pedagogical approaches and student innovative capability in higher education. This study was designed to examine the moderating effect of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability in institutions of higher education in Kenya. A post-positivist philosophy was the basis upon which the study was anchored. The specific objectives of the study were to establish whether problem based learning, competence based learning, direct learning and case study based learning approaches enhanced student innovative capability. The study was guided by the Social cognitive theory, Schumpeter's theory of Entrepreneurship economics and the componential theory of creativity. An explanatory research design was employed. This study targeted 1545 fourth year finalists taking entrepreneurship as their primary discipline in the sampled institutions of higher education in Kenya. In selecting a sample of 380 respondents, proportionate stratified sampling and simple random sampling was employed.. Questionnaires were the primary data collection instruments in the study. The reliability of the device was tested using Cronbach Alpha while factor analysis was used to validate the tool. Pearson's pair wise correlation coefficient was used to determine the relationship between the independent and the dependent variables. Results were presented using descriptive and inferential analytical techniques. Standard multiple regression and moderated multiple regression analysis were used to test the hypotheses. The results showed that problem-based ($\beta = 0.187, p < 0.05$), case study ($\beta = 0.318, p < 0.05$), and direct learning ($\beta = 0.297, p < 0.05$) significantly affected student innovative capability. Incubator use moderated the relationship between problem-based learning ($\beta = 0.242, p = 0.05$), competence-based learning ($\beta = 0.218, p = 0.05$) and case study ($\beta = 0.268, p = 0.05$) on student innovative capability. The outcome of the study provides valuable information to institutions of higher education as it creates new insights on the relationship between entrepreneurial pedagogy and student innovative capability.The findings indicated that problem based, direct and case study learning had a significant effect on student innovative capability. It was further revealed that incubator use has a significant moderating effect on the relationship between entrepreneurial pedagogy and student innovative capability when three predictor variables were measured. From the findings conclusion was drawn that entrepreneurial pedagogy approaches are closely associated with student innovative capability and that incubator use moderates the relationship between the two.The findings that case study learning approach accounted for the highest significance variance on student innovative capability and that at a higher incubator use the pedagogical approaches had a higher effect on student innovative capability presents major contributions of this study as it extends both Schumpeter's theory of Entrepreneurship,Social cognitive theory and componential theory of creativity. Therefore, the study recommended that institutions of higher education, should adopt policies that take into account, case study, problem based, direct and competence based learning approaches to enhance innovative capability of students.

# TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF FIGURES

## ACRONYMS

| | |
|---|---|
| **AUC:** | American University in Cairo |
| **BIIC:** | Business Innovation and Incubation Centre |
| **CPGT:** | Conceptual problem gases test |
| **KENIA:** | Kenya National Innovation Agency |
| **KMO** | Kaiser Meyer Olkin |
| **LIF:** | Leaders in Innovation Fellowship |
| **PCA** | Principal Component Analysis |
| **PEOU:** | Perceived ease-of-use |
| **QPGT:** | Quantitative Problem Gases test |
| **RAENG:** | Royal Academy of Engineering |
| **TIE:** | Technology, Innovation and Entrepreneurship |
| **UCT:** | University of Cape Town |
| **UK:** | United Kingdom |
| **UTAUT:** | Unified theory of Acceptance and Use of Technology |
| **VIF:** | Variance inflation Factor |

## OPERATIONAL DEFINITION OF KEY TERMS

**Case Study Based Learning:** It is a learning method that students get provided with opportunities where they get to apply their knowledge, conceptual skills they used when faced with complex life scenarios and their analysis as well (Giacalone, 2016).

**Competence Based Learning:** It is an approach considered as pedagogical approach designed to evaluate a student's mastery in learning where instructional delivery and assessments in form of attitudes, experiments, values and skills and behaviors are presented (Alvarez-Bell et al., 2017).

**Direct Learning:** In this type of learning, students are enabled to experience the processes of knowledge creation. It acts as an instructional strategy where students take charge of their learning process (Iversen et al., 2015).

**Entrepreneurial Pedagogy:** It is the innovative processes and practices or methods of teaching and learning (Koehler & Mishra, 2009). In this study, it is the teaching of entrepreneurship to the students in higher learning institutions to enable them to become innovative and capable entrepreneurs.

**Incubator Use:** Programs or networks by some universities and colleges meant to promote economic development organizations (Lindholm & Politis, 2013). In the study it refers to the programs by universities to mentor and develop entrepreneurship students.

**Innovative Capability:** refers to the potential to innovate or the ability to come up and transform ideas into new products, processes, systems and new sources (Saunila et al., 2012). This study refers to coming up with solutions, to solve community challenges by the entrepreneurship students.

**Problem Based Learning:** an approach where problems are carefully designed challenges to ensure students get to use problem solving techniques, skills, and self-directed learning (Frambach et al., 2012).

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background of the Study

Increasing attention has been paid to innovative capability within higher education institutions in the recent past (Alderman et al., 2012; Goldsmith et al., 2005).This upsurge in research attention on this variable could be attributed to the importance of innovativeness. Innovative capability can be viewed as an institutions or firms capacity to develop new ideas products or apply novel methods to produce new products (Rajapathirana & Hui, 2018). As such, it is seen as a way in which higher education institutions convert ideas into new and improved methods and thus become more innovative (Bowman et al., 2015).It resembles mutation, the biological process that keeps species evolving so that they can better compete for survival (Hoffman & Holzhuter, 2012).

Innovative capability involves the creation of new products,services,markets,ideas and raw material, for the benefit an organization. For a positive change to be felt, innovative capability is essential. In any given country, higher education institutions have been considered engines of development because of their innovations and the amount of nurturing they provide to students (Crosling et al., 2015). Besides, universities in their creations,generate a novel of improved products and services. In their trainings they provide human resource who have the required expertise for various organizations and societies.

Bowman et al. (2015), argued that for university students to penetrate any given labour market, they should have passed through universities or higher learning institutions. This supports them build up themselves in terms of their attitudes, behaviors they

portray, competence, and values as they emerge into adults. In return their values get determined by their outcomes and competence on various activities they are experienced as well as innovativeness. The approach by which institutions nurture innovative capability and creativity is the central research focus of entrepreneurship (Ndemo & Aiko, 2016). Creativity is a process of coming up with something new that had not existed before, but is of value; discovering of new ways of doing things which are cost effective, discovery new sources of raw material inputs; finding out of new markets for existing products and being entrepreneurial within an organization (Schumpeter & Nichol, 1934).Whereas being innovative involves changing the physical characteristics of a product which makes it look fresh in the eyes of a customer (Drucker, 1985).

Entrepreneurial pedagogy in higher education institutions in the world emphasizes the realization of students' cognitive, affective and psychomotor skills. Such skills when fully realized are likely to enhance the student's innovative capability and creative thinking. Therefore, entrepreneurial pedagogy is paramount because it promotes creativity and enhances innovative capacity of the learners. Creativity and innovativeness on the other hand assists learners to come up with ideas that can be translated into business opportunities that are; viable and profitable (Hodgetts & Kuratko, 2004; Rwigema, 2004).

Entrepreneurial pedagogical approaches have in the recent past been studied as predictors of graduate outcomes other than student innovative capability. In most of these studies, pedagogical approaches have been recognized as significant predictors of student outcomes. There are a few known studies however on the relationship between entrepreneurial pedagogy and student innovative capability, one example is the study

by Bozic (2014), which utilized both case study and problem, based learning approaches as predictors of student innovative capability. Direct and competence-based learning approaches were not focused on the research to predict the students' innovative capacity. The findings of the study revealed that both the approaches enhanced the innovative behavior of students collectively.

The pedagogical approaches often claimed to be appropriate in entrepreneurial education are ,problem based, project based, direct, case based teaching and competence based learning (Fayolle & Gailly, 2015). Competence-based learning approach has been found to affect students' innovative culture within higher learning institutions, while direct and problem-based approaches enhance students' learning (Kouwenhoven, 2010).

Qureshi et al. (2016) also found out that entrepreneurial pedagogical approaches are related to the cultivation of entrepreneurial spirit among the students and the creation of a robust entrepreneurial climate to help students stimulate an entrepreneurial interest and innovative behavior.

Since there are limited known studies on the relationship between entrepreneurial pedagogy approaches and student innovative capability,the current study utilized much theoretical literature from entrepreneurial pedagogy approaches and other student outcomes.

By exploring the relationship between entrepreneurial pedagogy approaches and student innovative capability research, and by using problem-based, competence-based, direct, and case study learning in the context of Kenyan higher education institutions,

the study advanced entrepreneurial pedagogy approaches and student innovative capability research.

The establishment of incubators in higher education institutions can have positive impacts on research and innovation among students. This justifies why universities geared towards the promotion of students' innovativeness have established incubators that have helped foster innovative ideas (Lasrado et al., 2016).

Jamil et al. (2015), noted that university-based incubators do encourage the transfer of technologies developed in universities to society by creating new businesses via university–industry interaction. This has been achieved through active learning techniques which encourages and engages students to be more creative and innovative (Lindholm  Dahlstrand & Politis, 2013).

The need for incubators to be integrated into higher education institutions in order to foster students' creativity and innovativeness has been a hot topic of debate around the world. Universities are adding campus spaces where students can interact with fellow entrepreneurs and interested financiers in order to stay relevant and allow students to follow more secure paths to success (Lassnigg et al., 2017). Incubators have sparked a rethinking among higher education institutions about their role in creating an entrepreneurial atmosphere and preparing the next generation of entrepreneurs (Birx, 2019).

According to the National Science Foundation in 2014, universities in the United States have established programs to increase investment in university research and development centers, challenging educators to concentrate on educational initiatives that encourage new ideas. This has been accomplished through the formation of the

Council on Competitiveness, a national body of CEOs, university presidents, and labor leaders who collaborate to ensure that the United States remains at the forefront of technical progress and growth (Yonezawa & Shimmi, 2016).This implies that higher education institutions are required to be more innovative particularly on the technical perspective to be competitive. The Council on Competitiveness emphasizes the utilization of talents particularly the engineering talent, which is an essential innovative driven asset for the country. It is deemed a key driver of development, despite the number of engineers joining the field not being sufficient to replace retirees (Galama & Hosek, 2008).

In European countries, an innovative education is now regarded as a top priority, strategy agenda (Bender et al., 2010) .The strategy emphasizes on education and training needed to transform the country into a competitive and inclusive economy. The design is also linked to several flagship initiatives that lead to innovative ideas and opportunities; digital agenda, youth on the move, new skills and jobs, and the innovation Union agenda, which entails the tertiary attainment levels (Bender et al., 2010). The same innovative competitive story in higher education institutions in Europe is replicated in the developing countries like Kenya due to globalization. The role of ICT is an essential aspect as it brings forth a transformative change to education. It should be disruptive in nature, changing both the teachers and the student's role setting. It should also enhance pedagogical innovative drive accompanied by change at the institutional level and beyond, especially those linked to assessment practices (Law et al., 2011).

Universities across the African continent have been encouraging on-campus entrepreneurship to help play a more creative and meaningful role in tackling the

continent's growing unemployment problem. Students' innovative capability is meant to create better opportunities for the youth a large number being university graduates. The graduates will be able to employ themselves by starting their own entrepreneurial ventures that will earn them income. Unemployment among the university graduates in Africa is almost 50%. With the increase in employability uncertainty, universities believe they need to expose students to the possibilities offered by entrepreneurship. Stellenbosch University, located in South Africa's Western Cape, has established an incubator for campus startups called the Launch Lab, which provides infrastructure and support and invests in startup companies. The University of Cape Town (UCT) in South Africa hosts several events and projects and spots entrepreneurship challenges facing entrepreneurial culture promotion. The lab also offers scholarships to prospective entrepreneurs. Funding is also available from time to time, and it also has a specialized unit focused on entrepreneurship in form of the Bertha Centre for Social Innovation and Entrepreneurship. American University of Cairo in the year, 2013 launched the first university-based incubator in Egypt, the AUC Venture Lab. The lab has worked with 46 high potential startups and succored them launch their businesses.

According to Kenya National Bureau of statistics (KNBS 2016), 70% of university graduates do not get absorbed in the economy's formal sector upon graduation (GOK, 2016). High level of unemployment among Kenyan youths is of great concern to the Kenyan government because of the social, economic and political impacts associated with unemployment. Hence, the Kenyan government perceives that one of the ways of solving the problem of unemployment facing the country, is to encourage the teaching of entrepreneurship as a discipline in our institutions of higher education as it incorporates innovative teaching and practical skill development, so that the graduates of our institutions of higher education can go out into the world with innovative

knowledge and skills that can enable them to initiate growth and manage their own businesses.

Promotion of the informal sector has been of great concern to the Kenyan government since the year 1953 when the Royal commission got appointed to look into ways of promoting the industry. After the Royal Commission Report, the Government has come up with several reports and Sessional papers that have spelled out how the informal sector can be promoted to solve unemployment in this country. The Sessional Report No. 10 of 1965 on Africa Socialism and its Application to Kenya, the Kericho Conference of 1966 on Education and Manpower Development in the Twentieth Century and Beyond, The ILO Report of 1972, Sessional Paper No. 1 of 1986 on Economic Management for Renewed Growth, Sessional Paper No. 2 of 1992 on Small Enterprises and the ILO Report of 1972 are among the statements and sessional documents.

One common thing about all the reports and Sessional papers mentioned above is that they all score the importance of the informal sector in terms of job creation, promotion of the dual economy (that is, promoting both the large scale and the small-scale enterprises simultaneously).This is because Small Scale Enterprises (SSEs) act as markets for large scale enterprises (LSEs) for they buy the processed output of those enterprises similarly the LSEs also act as market for SSEs because they by the raw materials from those enterprises. The reports and the sessional papers also emphasize the growth of the informal sector as a way of promoting the degree of a country's economic, political and social independence through minimization of reliance of foreign imported goods; promoting import substitution industries;that is, industries that manufacture goods which used to be imported,thus saving the country much needed

foreign exchange and also generating foreign exchange for the country. This is made possible through exportation of domestically produced goods. The promotion of the Jua Kali Sector for instance acts as breeding ground for new technologies. These can only be made possible if the country can promote the teaching of entrepreneurship in higher education institutions (Mutai, 2011).

A number of Kenyan universities have also attempted to establish incubator centers. Kenyatta University, for example, founded the Chandaria Business Innovation and Incubation Centre in 2017. This center is said to be East Africa's first of its kind. The center's primary goal is to support the projects of at least 50 students per year. The centre also promotes daily contact between students and a team of experts and mentors from Kenyatta University as well as leading East African industrialists who plan the products' commercialization (Chirchietti, 2017).

The Jomo Kenyatta University of Agriculture and Technology in partnership with KuzaBiashara Ltd. are also setting up a business mentoring programme known as Innovation and Entrepreneurship center. The mission of the center is to translate student innovative ideas into viable business outputs. The Technology, Innovation and Entrepreneurship (TIE) initiative launched has a mission to build the capacity of young and innovative entrepreneurs through training, mentorship, networking, and extending seed capital for business startups (Robb, A. 2014).

However, there is a need to examine how these incubators set up by the universities globally, regionally and in Kenya influence the student innovativeness and, in particular, the entrepreneurship students (Muigai, 2012; Allan,1996).This is chiefly because these incubators' impact has not been measured, especially at the local level and hence their contribution cannot be determined effectively (Jamil et al., 2015).

Therefore, it is against this background that the study will seek to assess entrepreneurial pedagogy, incubator use, and student innovative capability in higher education institutions in Kenya.

### 1.2 Statement of the Problem

Innovative capability of individuals has long been known as a leading force of competitiveness, growth, profitability, and enduring values. It is one of the most incredible opportunities for the Entrepreneurship sphere (Maital & Seshadri, 2012) An innovation-focused institutional action allows higher education institutions to concentrate on new ideas that lead to new markets, products, or processes and opportunities. Institutions of higher education in Kenya play a critical role in ensuring that students are innovative regarding innovation measures of product, process, ideas and venture creations.

Innovative capability among students continues to face a myriad of challenges which include: lack of innovative ecosystem that can support the emergence and development of new ventures, lack of capital, lack of venture creation information and inter-university oriented competitive challenges, market oriented competitive challenges (Bjørgum & Sørheim, 2015; Lee, 2012). The inability to anticipate and adapt new innovative technologies also has its risks (Christensen, 2013).There is undoubtedly a risk that some universities might be swept away due to being idle or slowly responding (Grace et al., 2015).

According to Kenya National Bureau of Statistics (2016), 70% of students who graduate annually in Kenya fail to venture into own businesses despite the provision of creative and innovative skills offered in higher education institutions, which in most cases is compulsory in all programmes at the university. (Boldureanu et al., 2020) point

out that the teaching of entrepreneurship is inadequate and not practical enough to equip students with creative and innovative skills. Lack of student's abilities is evident in higher education institutions attributed to deplorable entrepreneurial approaches and low innovativeness. Having the right entrepreneurial approach remains essential in spurring innovativeness among students. This is seen in the extant studies that consents a positive relationship between entrepreneurial pedagogy approaches and student innovative capability in past instances(Tuckman, 1965; Zhang et al., 2014).

Though several studies have dwelt on student innovative capability and pedagogical approaches, they were done in their specific areas and focused on specific objectives and specific situations. Ndofirepi (2020) carried out a study on entrepreneurship education and action-oriented pedagogical approaches and found out a positive relationship. Several studies have been conducted on student innovative capability antecedents in western and non-western contexts, but the findings still appears to be ambiguous. Koe et al. (2018) and Rwigema (2004) carried out a study on entrepreneurial pedagogy and innovativeness, and found out that creativity and innovativeness assists learners come up with ideas that can be translated to business opportunities.

Besides, there are other institutional factors, antecedents or moderators that can affect the relationships' outcome though limited in literature.Allahar and Brathwaite (2016) carried out a study on business incubation as a tool for innovation, the findings showed a positive relationship. In addition, few empirical studies have been done to simultaneously analyze the three concepts specifically the moderating role of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability in higher education institutions in Kenya. In response to this knowledge gap,

the present study is an effort to further interrogation and gain a deeper and profound understanding of the moderating role of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability in higher education institutions in Kenya.

## 1.3 Objectives of the Study

The objectives of this research were categorized into, the main objective and the specific objectives

### 1.3.1 Main Objective

The main objective of the study was to examine the moderating effect of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability in institutions of higher education in Kenya.

### 1.3.2 Specific objectives

The specific objectives of the study were;

1. To determine effects of problem-based learning on student innovative capability in institutions of higher education in Kenya.
2. To establish the effect of competence-based learning on student innovative capability in institutions of higher education in Kenya.
3. To analyze the effect of the direct learning approach on student innovative capability in higher education institutions in Kenya.
4. To examine the effect of case study learning on student innovative capability in higher education institutions in Kenya.

5. a) To determine the interactive effect of incubator use on the relationship between problem-based learning and student innovative capability in institutions of higher education in Kenya
   b) To determine the interactive effect of incubator use on the relationship between competence-based learning and student innovative capability in institutions of higher education in Kenya
   c) To determine the interactive effect of incubator use on the relationship between direct learning and student innovative capability in institutions of higher education in Kenya
   d) To determine the interactive effect of incubator use on the relationship between case study learning and student innovative capability in institutions of higher education in Kenya

### 1.4 Research Hypotheses

The objectives of the study were hypothesized that.

**$H_{01}$:** There is no statistically significant effect of problem-based learning on student innovative capability in institutions of higher education in Kenya

**$H_{02}$:** There is no statistically significant effect of competence-based learning on student innovative capability in institutions of higher education in Kenya

**$H_{03}$:** There is no statistically significant effect of direct learning on student innovative capability in institutions of higher education in Kenya

**$H_{04}$:** There is no statistically significant effect of case study learning on student innovative capability in institutions of higher education in Kenya

**$H_{05a}$:** There is no statistically significant interactive effect of the incubator use on the relationship between problem-based learning and student innovative capability in institutions of higher education in Kenya

**$H_{05b}$:** There is no statistically significant interactive effect of the incubator use on the relationship between competence-based learning and student innovative capability in institutions of higher education in Kenya

**$H_{05c}$:** There is no statistically significant interactive effect of the incubator use on the relationship between direct learning and student innovative capability in institutions of higher education in Kenya

**$H_{05d}$:** There is no statistically significant interactive effect of the incubator use on the relationship between case study and student innovative capability in institutions of higher education in Kenya

### 1.5 Significance of the Study

The study is of great significance to the curriculum designers and implementers in institutions of higher education. It shades light on an understanding of the need to have effective business incubators that can support entrepreneurship students' training. This can enable the learners to gain competencies that can assist in addressing community challenges such as unemployment.

The study is of immense significance to students in higher education institutions as they will be able to appreciate advantages of the business incubators. This can result in the development of strategies on how these incubators can be made effective for learning.

The study is of importance to other scholars who may be interested in using the methodology employed in this study to investigate issues on the effect of incubator use

on the relationship between entrepreneurial pedagogy and student innovative capability in higher education institutions.

The study is considered to be of great significance to entrepreneurs because higher education institutions may increase partnership with them and therefore provide these entrepreneurs with an opportunity to help develop the next generation entrepreneurs.

The policymakers; industry, government, and decision makers in higher education institutions would use the findings to craft policies that will provide more valuable information regarding setting up, financing, operation and general support of university-based business incubators thus, be able to make better informed decisions.

Finally, the study findings adds to the body of knowledge in entrepreneurship and business incubation given that the results support entrepreneurial pedagogies, the social cognitive, Schumpeter's theory of Entrepreneurship and componential theory of Creativity. This shows that the student innovative capability is reflected in the outcomes of Entrepreneurial Pedagogies.

The study also contributes to further academic research on the subject based on the current findings.

### 1.6 Scope of the Study

The study aimed to establish the moderating effect of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability. The study was conducted in Kenya's selected institutions of higher education, consisting of University of Nairobi, Strathmore University, Technical University and Catholic University. These universities were all located in Nairobi County and were selected based on years of operation. University of Nairobi and Strathmore University were the two universities

selected on basis of having incubators as they have been established for long (1970 and 2001 as the years of establishment respectively). They also are deemed to have the longest serving incubators. Technical and Catholic universities were also selected based on operation as they are the oldest institutions offering entrepreneurship studies in the list of Universities in Nairobi. The study's sample size was 380 fourth-year finalists' students from the higher education institutions who participated in the study. The study focused on gathering primary data from the fourth-year entrepreneurship finalists of the institutions as mentioned earlier in the study variables.

The unit of analysis was the fourth-year entrepreneurship finalist in the selected universities in Nairobi County, Kenya. The study adopted Post-Positivism philosophy and explanatory research design to explain the causal effect between variables of interest in the study. Questionnaires were the main data collection instruments in the study. Data collection was undertaken in a period of 3 months beginning September to December 2019.The data was analyzed using both descriptive and inferential statistics.

### 1.7 Assumptions of the Study

The study made the following assumptions

i. That the study findings despite being conducted in Nairobi could be generalized to represent the opinions of the country in terms of the moderating role of incubators to enhance student innovative capability
ii. The incubators in the selected universities were functional and operational. This ensured universities were tested based on the effect of the incubator
iii. The population sample is a representative of the entire population

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

This chapter presents an overview of the concepts of student innovative capability, entrepreneurial pedagogy and incubator use, and their theoretical and empirical evidence. The status of research regarding the relationship between the key concepts of student innovative capability, entrepreneurial pedagogy and incubator use in the hypothesized model is explored. The chapter also presents a conceptual framework, chapter summary, and research gap that reflects the study's hypothesis.

## 2.2 Concept of Student Innovative Capability

Innovative capability can be viewed as an institutions' or firms capacity to develop new ideas products or apply novel methods to produce new products (Rajapathirana & Hui, 2018).It has become one of the most celebrated concepts of our era. It is a principle element in enterprise independent innovation. For a success in future innovations and ideas, university students have got considered as the major force behind it (Ailing, 2013). Academicians have been looking into how members of societies and organizations may be inspired and empowered into creation of innovative ventures. Scholars are also puzzled with the structures needed to promote emergence of innovations (Hurt et al., 1977). Noteworthy, academics are not alone with their questions. Classically, innovative capability has been associated with entrepreneurship and entrepreneurial spirit. From this perspective, creativity and innovativeness can be, at least in some aspects, promoted through entrepreneurship education. Innovative capability is one of the key entrepreneurial preconditions espoused by (Mahat et al., 2012). Bezemer (2014), suggests that an entrepreneur is "...an idea man and a man of action involved in identifying new opportunities".

According to Carland (2015), entrepreneur innovation is motivated by their desire to grow and profit, and the desire to succeed is most evident among creative entrepreneurs. He went on to say that creativity is a specific process that has allowed entrepreneurs to take advantage of new opportunities to start and operate companies as a result of environmental changes. Entrepreneurs have used new resources, environmental shifts, and signals as indicators of potential innovative opportunities.

Another research,by Law and Breznik (2017), suggested that innovative capability is the creativity of doing activities in a more improved gain for maximum outcomes. In the aspect of entrepreneurship, he suggested that innovative capabilities are where different ideas are used to change the physical outlook. Its role in entrepreneurship is significantly growing with people researching and reading more about its role and nature. On the other hand, entrepreneurship literature has defined innovative ability as an entity that represents the growth of current enterprises or the creation of new enterprises.

Robinson (2015) also defined innovativeness as an entrepreneur's ability to recognize an opportunity and act on it in a creative manner, leading to the provision of innovative goods and services that a consumer needs.Hian (1996) also defined innovativeness as “the intentional introduction and application of ideas, process, products or procedures, new to the relevant unit of adoption”. Ülgen (2014) further explains that an entrepreneur's innovative capability is an important aspect as it determines the growth and ability of an entrepreneur.

Researchers Mueller and Thomas (2001) describe innovative capability as more or less the same as the other precursors, significant in determining entrepreneurial behaviors. Carland (2015) suggests that an entrepreneurial personality's innovativeness is the most

essential element to success or failure. In addition, Carland's literature supports the claim noting that entrepreneurial intention is directly proportional to innovativeness. Finally, Abu-Al-Aish and Love (2013) states that an entrepreneur is an innovator who uses his or her skill to present products and utilities to a market audience that needs it.In agreement with that, entrepreneurs having enough skills and techniques are more innovative than those who without.

According to Lao (1970) research on the determinants of entrepreneurial intentions, entrepreneurs need to be creative in order to have a positive impact on intentions and entrepreneurial conduct.In addition, there has been several studies that have been done to determine the connection between innovative behaviour and entrepreneurs. Carland (2015) conducted an investigation on two different groups whereby he wanted to know the difference on how innovativeness is viewed. He discovered that entrepreneurs who are highly creative and innovative are primarily focused on profit and growth, while those who are less innovative see business only as a way to achieve personal goals and provide for their families.

According to Vaithilingam 2014, higher learning institutions gets considered as the main drivers of a countries development and growth since they are the ones who nurture innovativeness.He stated that universities have empowered those who support various communities and organizations by providing creativity, new and improved products and services, training, skills, and human capital. Over the last few decades, creativity has developed a reputation as a primary performance production in the workplace. However, a great deal of both creativity and innovativeness has been valued. It has been shown to be ineffective at times, even counteracting the productivity of other facets of efficiency in various workplaces (Zhou et al., 2014). However, with the continuous

introduction of improved ways of getting done, there is the need for societies and organizations to adapt to the new ways because innovations comes with rapid market changes. By doing this they will be effectively able to fit in the broader market environment.

Innovative capabilities across all organizational level generally rely on their working individuals. Today, an individual joining a university gets considered an undergraduate but tomorrow’s potential employee. Hence, there is the need for higher learning institutions to develop long-term skills, attitudes, and values that will go a long way in ensuring they emerge as prosperous adults with innovative behaviours (Bowman et al., 2015). Moreover, graduate outcomes or competences can be widely defined as the final product or result of the whole university experience and innovative behaviour is one of those expected graduate outcomes.

However, as Ailing (2013) points out, there are few practical ways to encourage undergraduates to be more innovative. This may be because of the current focus of student creativity and innovative research, which is mainly concerned with the study of university students' innovativeness the other hand, this can be thought of as an activity that involves coming up with different ways of doing things, which is aided, among other things, by having autonomy in carrying out one's own tasks and assignments. This study may be of interest to a broad academic audience interested in the development of curricula in higher education institutions that encourage student innovative behaviour.This is the most important factor in determining the innovativeness and creativity of university students: To date, the focus of a literature review has been on university students' innovativeness, especially in the sense of entrepreneurship.

Innovativeness is regarded as a personality trait that implies willingness to adapt, according to Mueller and Thomas (2017), innovativeness is linked to entrepreneur's potentiality. Individual creativity, according to research has been proven to be important to prosperity,and is more than just their ability to think creatively. However, it is more of an entrepreneurial behavior that entails "the deliberate implementation and deployment inside a job of new concepts, systems, goods, and procedures that have been designed to benefit from it."

Research that has got done previously on individual innovation from a perspective of behavior concluded that, some job design characteristic can foster a personal innovation through autonomy (Janssen et al., 2017). Another researcher noted that autonomy can get used by works as a mode of adjustment to various transitions on the workplace (Schein, 2019) or can get used as a strategy to cope with high volumes of work in jobs. In addition to the input that research has put on entrepreneurship, more research has suggested that innovation has helped in improving the social and psychological wellbeing of individuals. An example is when in workplaces, new ways of doing thing get introduced, ways which can help individuals cope with needing job demands and reduce stress. There is also additional empirical evidence showing that individual innovation and well-being have shown a positive association.

In line with the above view, individual innovativeness as a coping strategy has helped fresh undergraduates buffer detrimental impacts of demands that most of them get faced with which ultimately leads to an improved psychological wellbeing, and needs such as their cognitive ability and psychological distress. As a scholar it is important to note that the well being of a graduate is detrimental to development as they are the resources of tomorrow hence their wellbeing should not be taken as a minor issue. Research has

suggested that an undergraduate have the ability and time to meet the learning outcomes set for them and successfully adapted to the university life (Bowman, 2018). First year in any higher learning institution has been considered the most crucial and stressful period because that is where a student's university life transition begins. This is a period that comes with many new demands and expectations that they were not ready for, which in turn can negatively influence the student's performance, adjustment, and well-being. On the other hand, most first year students and generally university students have used this chance to be an exciting time where they get an opportunity to thoroughly learn and experience relationships and their newly found freedom far away from home (Mudhovozi & Nyanga, 2015).

On the other hand, these phase entails new academic, social, and personal demands, as well as the need to adjust to the higher education institution's specific practices and academic standards. For undergraduates in the classroom, teaching speed, external pressure, difficulty/complexity of learning assignments, poor performance on an assignment, job pressure, and continuous attention are all possible sources of stress.

It's worth noting that sustained focus, a mental load construct known as the ability to maintain high levels of awareness on a particular stimulus for an extended period of time, has been described as highly important in academic settings. Problem solving, which is described as "cognitive thinking directed at achieving a goal when no clear solution method exists," requires a high degree of sustained focus for all phases of a complex processing plan (Cheung et al., 2003). Although problem solving is a valuable skill in both academic and professional settings, it can also be stressful due to the cognitive demands it imposes. Having a large number of academic activities to

complete, for example, would cause students to engage in more imaginative practices in order to cope with the demands.

If a person considers the academic tasks to be beyond their capacity and finances, they become demands. As a result, stress can be thought of as a continuous and complex interaction between an individual and their environment, in which the resulting appraisals are dependent on both at the same time and can change over time. Changed environmental requirements, coping efforts, or personal resource changes are just but are few examples (Cheung et al., 2003). One of the most valuable resources in helping people deal with workplace demands has been cited as autonomy, or the degree of flexibility individuals have in carrying out their duties or organizing their employment. Based on various theoretical frameworks, such as self-determination theory (Deci & Ryan, 2004), job demands-control model, job demands-control support model, and job demands-resources model, research has widely supported the critical role that such job control plays in a plethora of positive psychological outcomes, including motivation, satisfaction, innovative behavior, and well-being. According to the last three models, autonomy could mitigate the negative effects of demands on a variety of psychological and behavioral outcomes. For example, Chandrasekar (2011) discovered that workers working in stressful workplaces with plenty of resources displayed the highest levels of motivation thus gearing to innovativeness.

Furthermore, autonomy has been shown to boost a variety of undergraduate outcomes, including intrinsic motivation, more productive learning, improved academic success, ease in dealing with setbacks and defeats, study self-efficacy, and psychological well-being (Cowart et al., 2008). Using the Demands-Control-Support model, Jekel et al. (2015) investigated autonomy as a predictor of undergraduate well-being. According to

their results, students who felt they had no control over their environment faced more psychological stress.The authors came to the conclusion that ‘attention should be paid to improving student success and innovative behaviour through a positive work climate.' (Jekel et al., 2015). If what students do at university is conceptualized as a "task," as Jekel et al. (2015) indicate, it would be possible to explore proposed ties between work climate, well-being, and success, leading to realistic recommendations on how to improve undergraduates' well-being and performance, and eventually their creative and innovative behaviors.Job autonomy fosters innovative practices, according to previous studies on individual creativity in the workplace. Undergraduates, like workers, may use innovative habits as an active coping mechanism to control their demands and, as a result, improve their mental health. However, as previously mentioned, the means and methods for promoting undergraduates' innovativeness competence remain unknown.

There is a paucity of research on the academic setting determinants of undergraduates' innovative behaviors, especially from a cross-sectional perspective. Individual innovative efforts in research at this level will help us better understand how innovativeness emerges in higher education. Bagheri et al. (2013) conducted a one-year analysis to fill in the gaps by looking at the factors that influence undergraduates' innovative behaviors. Using the analogy that studying is a student's career, and the educational institution is their workplace, the research was based on observations of employee innovative behaviors (Tuomi, 2013). The expectation was that autonomy and cognitive demands would encourage undergraduates to engage in innovative behaviors. The research investigated whether independence and mental needs have a common impact on innovative behaviors, using the Job Demands-Resources model (Lin et al., 2013). It was possible to develop a constructive relationship.

## 2.3 Concept of Entrepreneurial Pedagogy

Entrepreneurial pedagogy refers to a variety of creative methods and techniques for teaching entrepreneurship (Chinonye et al., 2015). In a social context, entrepreneurial pedagogy is also described as action-oriented teaching and learning in which the learner is dynamic in his or her learning and where unique features, strengths, familiarity, and skills provide foundation and direction for the learning processes (Gibb & Price, 2014).

According to Walder (2017), pedagogical innovation is a deliberate action aimed at incorporating something new into a given context, and it is pedagogical because it aims to significantly enhance student learning in a collaborative and interactive setting. It is essential to note that entrepreneurial pedagogy is viewed as a lifelong learning perspective that warrants an understanding as one that forms a life cycle in which creativity is a core aspect (Lund, 2011). Entrepreneurial pedagogy in higher education institutions and in the world all over emphasizes the realization of the cognitive, affective and psychomotor skills of the students, which when fully realized are likely to enhance the student's innovative and creative thinking.

Entrepreneurship pedagogy promotes creativity and innovativeness of the learners. Creativity and innovativeness help the learners come up with ideas that can be translated into business opportunities that are viable and profitable businesses (Rae, 2012; Tan, 2021).

Institutions, the government, and other organizations are increasingly interested in entrepreneurial growth and how it helps to improve innovativeness among different segments of society, Hattab (2014). Entrepreneurship has long been regarded as a significant contributor to economic growth, creativity, and development. Politicians,

higher education institutions, and students are all expressing an interest in entrepreneurship education.

Many teachers are finding that when given the chance, students can and do take charge of their education (Zaremba & Sutskever, 2015). However, providing such opportunities can be difficult for teachers, who must also ensure that students meet defined academic goals. Tutors that encourage student-directed learning offer students the opportunity to choose goals from a variety of options. In essence, the tutor's choice of learning style for the student, along with input from other tutors who are familiar with the student, decides how the student meets those goals (Hardwick & Celnik, 2014).Teachers devise activities to assist students in achieving the learner outcomes while also presenting choices. The activities also ensure that students achieve specific goals. Teachers must be flexible because when students are given options, their methods vary. Direct learning, as a pedagogical process, is worth adapting because it appeals to students' interests and allows them to become more emotionally interested as their studies become more meaningful. Student preferences also aid in narrowing the focus of curriculum units (Liu et al., 2014).

### 2.3.1 Problem Based Learning

Problem-based learning is a teaching method in which students are able to learn by consciously addressing important problems. Problem-solving abilities, disciplinary experience, self-directed learning, and peer evaluation are all part of it (Leary, 2012; Pandiangan et al., 2017). Through practice and reflection, students are given the opportunity to solve problems in a collaborative environment, develop mental models for learning, and shape self-directed learning habits. Lecturers have a central role, as they have a substantial impact on educational attainment. They enable the students

acquire skills and experience (Afsharid et al., 2014). To give entrepreneurship education real track there is a need to develop learning out- comes related to entrepreneurship.

The methods that teachers use to teach their students have an effect on their imagination and innovation. Some teachers teach to cover the necessary subjects, but they overlook the value and potential usefulness of these skills for students (Fayolle & Gailly, 2015). Problem-based learning, project-based learning, and service learning are three popular pedagogical methods that are often believed to be similar to or relevant in entrepreneurial education.

According to (Hoidn & Kärkkäinen, 2014), project-based learning is described as allowing students to work on a problem and produce an artifact that provides a solution to the issue, such as a study, a model, or a video.

Problem-based learning often begins with a specific situation, but it does not end with the creation of an artifact that addresses the question, but rather with the discussion of potential solutions and the guidance of students (Jamil et al., 2015). Classroom teaching combined with community service, such as cleaning parks, helping the elderly, and delivering meals to those in need, is known as service learning. When students are involved in the preparation of the project, the period is one semester or longer, and student reflection is specifically encouraged, service-learning is most effective (Hattab, 2014).

Colleges and universities are building innovative centers, to foster entrepreneurial innovations and goods that lead to social change (Allan 1996).University-based entrepreneurial ecosystems are increasingly expanding because they create maker

spaces that provide design and problem-solving workshops, provide resources and sponsor events to foster awareness of the Maker Movement (Jamil et al., 2015). The maker movement is a way to bring together people from all over the country who are interested in creation, fabrication, design, and innovation. Maker spaces are physical gathering places for makers to learn new skills, work on projects, and collaborate with one another (Amabile et al., 1996).

Typically, these spaces provide makers with a range of tools, materials, equipment, and training sessions to allow them to build anything they want (Barrett et al., 2015). Maker spaces are designed to encourage entrepreneurship and provide the inspiration and tools needed to create new products. Schools, universities, public libraries, and neighborhoods are now beginning to capitalize on this trend by fostering entrepreneurial ideas and opportunities in students and other environments (Jamil et al., 2015).

The maker movement has come with a promising unearthing, hence universities are joining because the spaces allow for students to come together and create products which is of benefit to all societies worldwide (Cronbach & Bierstedt, 1955). Within the last three to five years, there has been a significant shift of students being passive learners to being innovators in most learning institutions. The students have now joined the maker spaces which offers and allows them to engage actively in hands-on learning experience (Drucker, 1985). In our societies, universities and colleges have been instrumental in development of young people entrepreneurial skills as they get trained to invent creative ideas which are of great help in leading tomorrow's innovations to the next level. Universities have also changed the curriculum to suit the current trend by

creating different maker spaces, encouraging and supporting those events that bring about responsiveness and presenting of courses on product plan (Yusoff et al., 2017).

Although university maker spaces have been viewed as opportunities for learning by creating, limited research has investigated the impact of these maker spaces on college communities. The practice of teaching is reformed. Firstly, the direct course experiment is improved because each student must complete a particular prepared report before beginning the investigation. The purpose, equipment, method and future result data table of the experiment must be given beforehand (Jamil et al., 2015). When the teacher checks and accepts the above, the students can engage in the lab experiment. The final experiment score will be decided by the whole experiment process rather than experiment result, phenomenon and report (Himwich, 2016).

Some students who find or submit new question and want to do further experiment are supported and encouraged. If they can solve the problems, they are bound to more harvest than the others. They are also allowed to submit a high level paper or get the social recognition. The sense of achievement makes the students thrive to excellence and be more interested in the science theory/s and technology practices (Jamil et al., 2015). Through the reform, the innovation and creation thought of the student will be significantly encouraged. In fact, more and more students are encouraged to enjoy the various national or province science and technology competition. Some of them get good grades and join better school for further study. On the other hand, the students learn, cultivate and solidify better learning and innovative practices.

It also emphasizes on rational division of labor and logical thinking ability (Himwich, 2016). Through these practices, the students study much knowledge outside textbooks and cultivate their creative ability. The training process lays a solid foundation for

students in the future. Electronic information specialty reform can be driven leading to promotion and generation of innovative talents on electronic information specialty (Himwich, 2016).

In addition, some outstanding students get the priority of exemption in the postgraduate qualification and a scholarship. If the condition is appropriate, the students can be taken in the scientific research project following the teachers' instruction (Kuh et al., 2011). These students participate in various scientific research activities and do the work reports in the term given. At the same time, some outstanding students obtain research allowance. This approach greatly inspire undergraduate's learning initiative and scientific research enthusiasm, and can repeatedly act as the critical role in the scientific research work. In the innovation of scientific research, finding an innovative question may be more important than getting an innovative solution to problem. The undergraduates should not be restricted by the direct theories and thinking and should dare to query and innovate. These undergraduates often propose some novel and interesting questions (Kuh et al., 2011).

Innovativeness comes from the intensive observation and analysis of things(Kuh et al., 2011). Therefore, there is the need to strengthen the students' observation and analysis ability to these things and phenomena. In the process of experiments and research, the students should not ignore these phenomena and problems but carefully study every detail, because innovations may arise from the unusual discovery, analysis and research. There is need to cultivate students to find some "differences" in the ordinary, so as to analyze and study the inner meaning of these "differences" combining with theoretical analysis (Amabile et al., 1996). Students' innovative ability and potential

are improved and stimulated by continually finding a one by one novel question (Kurti, Kurti, & Fleming, 2015).

According to Amabile et al. (1996) students should be guided correctly and inspired so that they can move away from the simplified learning of books and mathematical operations. At the same time, institutions should nurture the students' enthusiasm in the processing of cultivation and stimulation. At the start of research, it should be understood that they may generate some erroneous judgment because of their very high warmth and a lacking on the theoretical basis. In the process, teachers need to help and guide the students to find the question by themselves rather than merely pointing out their mistakes or even laughing at them. Students can realize their mistakes and understand that cultivating an innovative behavior is not a simple and easy thing, but one that requires cognitive thinking. (Agbim et al., 2013). The students should also understand the need of hard work and that failure is part of the process, irrespective of finding a novel question and a suitable solution method. Through exercise of own observation and analysis, accompanied by training, the students are to also raise their faith, internal toughness and confidence(Peppler & Bender, 2013).

### 2.3.2 Competence Based Learning

Competence Based learning is a type of learning that employs the pedagogical approach. This means that teaching is by mode of instructional delivery as they assess the students, helping in gauging the mastery level of students as they demonstrate their knowledge, attitude, values, behaviour and skills (Gervais et al., 2016). Eventually the students taught by this system get gauged on their ability to practice what they learn. Researchers Zhang et al. (2014) in their studies on competence based learning and it role in predicting entrepreneurial ability of students, reported that competence based

learning plays a critical role in entrepreneurial intention growth. This implies that competencies facilitate students' entrepreneurial sense thus enhancing innovativeness among students (Zhang *et al* 2014).There has been an abudance of literature on entrepreneurship basing on competence based teaching which has concentrated on many different aspects. Among the areas studied include the extent of environmental characteristics favourability for entrepreneurs and enterpreneurship or not, if the available opportunities can get transformed from thoughts to ideas and finally if there are enough motivations that can drive students to become future entrepreneurs (Agbim et al., 2013).

Favourability of the environment to support or not support entrepreneurship means both the physical and psychological characteristics. An example is the cultural environment. Cultural determinants are essentials in entrepreneurship because beliefs changes from one country to the other and a society cannot only get defined by their economic value but majority the cultural aspect. Culture according to researchers, is defined as the state of mind, in that it is a set of values and norms that programmes an individual and which defines an entire community (Zhang et al., 2014). Cultural characteristics are more important because that is what sets the basis for interactions, thoughts and act as functionality motivator for an individuals life. The most dominant characteristic gets to affect an individuals psychology is Sociotropy and Autonomy (Beck et al., 2013). Sociotropy is generally what makes an individual to continuously seek approval as a way of security mostly in interpersonal relationships. On the other hand autonomy is a persons attitude that gets considered as more focused toward wanting to control and self-achieve (Hopwood et al., 2013).

Sociotropy and autonomy has generally played a greater role in determining how characteristics affects behaviors towards people in their environments(Agbim et al., 2013). For instance, a teacher or a tutor will act according to the characteristics she has and which directly or indirectly gets to affect the student. Therefore before employing a teacher, it is important to do a background check to ascertain if her personal characteristic aligns with the professional approach. This is because characteristics will not only affect the thoughts of an individual but also gets to shape the progressive attitudes and skills of an individual (Yeager & Dweck, 2012). Sociotropic and autonomous characteristics have greatly got reduced by the university education since they get to interact with different individuals with different characteristics and get taught to think according to the curriculum provided (Papis, 2015). It is always the base of national quality-oriented education and talent education. In solving innovative ability training in undergraduate education, institutions need to study the status quo and characteristics of undergraduate education students and find a suitable solution according to the status quo characteristics (Agbim et al., 2013). A university may obtain good results, which may affect the students' innovative strategies (Tharayil et al., 2018).

The universities' teachings still embrace the end of session exams as a gauge for students as opposed to students' self-study and supplement method. These teaching modes only inherit the teaching form of the middle school students, who are still in a passive learning state and whose goals are still teaching to the test. Concentrating on the class, doing various exercises training, preparing lessons before class, and reviewing can help the students get the outstanding test score (Rogers, 2010).The students though can’t understand the true meaning of being innovative (Jöreskog & Sörbom, 1993).

On the other hand, some universities ask for and train the students to dare to doubt the academic authority. It is a good idea, but then doubt cannot be oversimplified, unless the student has mastered the content and essence of the theory which is suggested by the academic authority. The students need to absorb and understand deeply the nature and the core idea of the educational authority's approach (Agbim et al., 2013). In the base of these thought, they can begin to doubt some insufficient preciseness and mistakes of the academic authority's theory, not to simply and blindly follow them. This can be made effective by using an appropriate teaching method to improve self-confidence and stimulate the students' innovative ability. Competence based learning looks into the undergraduate education reformation; both introductory courses and specialized courses are equipped with a certain amount of talent and experiment teaching (Bagheri et al., 2013). It is well known that the internship and practical training is critical to the higher education. It affects the effect of undergraduate teaching quality and influences the cultivation of students' practice and creative ability.

To improve students' quality, the method's analysis has the vital significance to solve the problem (Hitt & Duane Ireland, 2017). However, the establishment of the experiment link does not mean that the experiment's success on improvement of undergraduate teaching quality. On the contrary, inappropriate experiment teaching link will seriously affect the students' practical ability and creative ability, and further affect the students' understanding of theory. In order to solve this problem, many schools visit some famous abroad universities to reform the experiment teaching. (Hills et al., 1997) noted that by adopting the basic experiment to combine with the extended experimental teaching mode, using the expansion of the laboratory resources can give students free play experiment project based on a step-by-step basic experiment. At the same time, we build the academic advisor scheme (Agbim et al., 2013).

According to Duke et al. (2013) the lecturers should acquaint students to a laboratory, guiding them on various experiments. The experiments in most cases attract the students to join the scientific research team/s. The students can propose their own viewpoints to the project and even ask the teacher to provide some devices to verify their idea. By training, they can obtain more progress and self-confidence. This is a kind of progress is required as it enhances innovativeness among the students. A progressive rigid teaching pattern alone is not sufficient enough to drive students towards being innovative (Yang, 2017).

### 2.3.3 Direct Learning

Many teachers are discovering that students can, and do, take ownership of their learning (Zaremba & Sutskever, 2015). Nevertheless, offering such prospects can prove difficult for instructors who have the obligation of ensuring that established academic objectives get met by students. A tutor directing the students in a direct learning approach allows students to choose within a possibility of potential goals. Possibility to how a student gets to achieve the set objectives gets determined by factor such as the learning style a student used and the support that a teacher who knows the child contributes (Himwich, 2016). Teachers plan activities which are geared towards helping a student achieve their learning outcome while providing them with a choice. Teachers' designed action should ensure that students meet distinct objectives. Educators have to be flexible because once apprentice are given a choice they take diverse ways. Direct learning is worth adapting because it meets students' interest and it makes lessons interesting since they are invested in it. In addition the interests that learners develop along the way helps teachers determine how and when they can narrow down their focus on curriculum units (Liu et al., 2014).

There have been numerous studies which have suggested that an individual's particular personality trait has greatly acted as entrepreneurial motivators. Individuals are now enabled to engage more in entrepreneurial activities with a growing need for achievement, innovativeness, ability to take risks, being tolerant to ambiguity and having an internal locus that drives them to succeed (Agbim et al., 2013). Development and innovative culture in today's world has greatly been affected by economic development which has made it hard to thrive.Researchers Matlay et al. (2013) reported that personality traits and socio-cultural characteristics are what critically affects an individuals entrepreneurial behaviors,which means that amid the entrepreneurial activities, personality factor plays the most vital role. This narrative got demonstrated by Rauch and Hulsink (2015) who used all the applicable factors that impacts entrepreneurship finding that an entrepreneurs' intentions can be explicated as an individual's perceived control of behavior and personality traits.

Moreover, subjectivist entrepreneurship theory is a major constitutes of the basis of entrepreneurship and they include; resources an individual has, knowledge, amount of exploration and eventually level of innovativeness (Zhang et al., 2014).

As discussed in recent years, an individual behaviour and attitude towards entrepreneurship has frequently been described alongside personality traits. Personality traits has been portrayed as those factors that can be used to describe patterns of behavior in an individuals life. Researchers have investigated different personality traits and how they are different to individuals. Of importance is that the investigations have shown that these traits are entrepreneurship prerequisite characteristics that gets to determine success or failure (Zhang et al., 2014).Such prerequisites are an individual strong will and need of success, if they have control of their internal locus, levels an

individual possess of risk-taking, levels of self-confidence in activities they undertake and finally tolerance to ambiguity either high or low.

Those individuals who have a strong will and need to succeed are famously known as the gamblers. This is because they are ready and willing to engage in any form of risky activity and challenge themselves on their ability to reach their set targets. This group of individuals are always changing since they are always looking for more innovative ways of doing their activities hence are up to date with the market dynamics. This group of individuals engage in entrepreneurship with an aim of rewarding themselves by the values they add to the society and for them its not necessarily for financial gains. In entrepreneurship, this characteristic is the most critical as these are the people who succeed in their innovations. The concept of having control over an individual locus gets considered as a trait that enables an individual take control of their life and innovations because they believe they are the controllers of their destiny. Another researcher (Kaur et al., 2013) in an attempt to understand the influence that locus control has on an individual found out that an individual driven by this is alert has the ability of recognizing opportunities in the environment and acting on it. His conclusion was that a person who has an internal locus is essentially alert and this inturn affects the individuals innovativeness and spontaneous learning.

According to (Yıldız & Çolakoğlu, 2015) direct learning is directly related to self-efficacy. Direct learning gets defined as an individuals measure of their ability to achieve their set goals by completing the tasks at hand. On the other hand self-efficacy has got defined as an individuals capability to react to a given situation or coping with a given task by subjectively convicting themselves. Individuals self-efficiency gets influenced by external factors that are contextual such as the units they are doing at

present of previous experiences they have gone through unlike other personality traits discussed previously (Gaglio, 2004). Factors that affect self-efficacy include their ability to receive information, their social networking capabilities and their readiness to access capital in aiding of innovative ideas, which in turn directly or indirectly has an effect on entrepreneurial intentions. Ability to access capital also gets affected by factors such as availability of financial assistance from stakeholders in cases where new businesses have to be build. For ventures, most especially those that are starting up, availability of enough capital is essential for its survival (Agbim et al, 2013). Starting entrepreneurs get affected by lack of capital in support of their innovative ideas and opportunities because in most instances, they don't have direct access to finances, they have to make use of the modest savings and borrowings from family and friends.

Access to information is an important aspect to an entrepreneur as its their ability of seeking and gaining information that is essential for a business to achieve its objectives as well as finding prompt solutions and clarification incase there is a business problem.

Private and non-governmental organizations, according to (Macdonald, 2016), inspire people to participate in entrepreneurial activities. Awareness is how experience shapes perspectives which requires an understanding of attitudes (Agbim et al., 2013). An ongoing system of positive or negative assessments of an object is referred to as attitude. It represents a person's method of assessing and comparing an item to other alternatives based on their thoughts (cognition), beliefs (values), and feelings (affection) toward the object.

Personal perceptions and perceived behaviors interact with social norms to determine a person's willingness to engage in entrepreneurship. In a similar vein,Drazin and Schoonhoven (1996) discovered that undergraduate students' attitudes positively

influence their desire to pursue entrepreneurship as a career, which leads to students becoming more innovative. A person's understanding of how simple or difficult it is for them to participate in entrepreneurial activity is referred to as perceived behavioral control (Covin & Miles, 1999).Internal and control values, which have a different impact on a person's intent, must be separated from the indicator of perceived behavioral control. Inner control beliefs are linked to a person's personal capabilities, such as having the self-confidence to start a company,(Covin & Miles, 1999), while external control beliefs are linked to situational control.

Choo and Wong (2006) in their research found that behavioral management (creativity and risk-taking) had a positive relationship with entrepreneurial purpose and innovativeness. External power can be viewed as situational characteristics that indicate a person's willingness to behave in a certain way, such as a person's perception of financial support as a necessary condition for starting a company.

Student-directed learning necessitates a significant change in how teachers approach science instruction (Chen et al., 2015). Since many teachers do not consider themselves to be scientifically literate, they instigate from the beginning. Although they will be unable to admit to students that they don't know everything, these educators must change how they see themselves (Coffman et al., 2014). It's okay not to know the answers because they have opportunity to model what a learner is. Most educators agree that teachers must embrace the role of co-learner in the classroom because students have such a wide variety of information sources available, literally, at their fingertips because of technology advancement (Ottersten et al., 2014).

### 2.3.4 Case Study Learning

The case study teaching method is a flexible teaching method that enables students to improve analytical skills through problem-based learning (Bonney, 2015). To encourage group discussion and problem-solving, present knowledge in the form of a story with questions and activities. Bloom's taxonomy of cognitive learning's higher stages, such as knowledge recall, comprehension, evaluation, and implementation, benefit from case studies (Herreid, 2007).

Case studies can also be used to show connections between abstract theoretical topics and real-world social issues and applications, making interdisciplinary research easier (Jonassen & Hernandez-Serrano, 2002). This is said to increase student motivation to participate in classroom activities, encourage learning, and enhance assessment outcomes (Krain, 2016).

Working in groups to complete case studies increases student expectations of learning and can improve the performance of evaluation questions, according to Bunterm et al. (2014). Clickers may help students become more engaged in case study activities (Nkhoma et al., 2017). Students' ability to synthesize complex philosophical questions about real-world problems associated with different class topics increases with case study learning. For the learners' comprehension and inventiveness, the case study results in substantial increases in self-reported control of learning, task value, and self-efficacy. Because of the increased student interest, this motivates students and increases their academic performance. Thistlethwaite et al. (2012) goes on to point out that using case studies encourages students to think critically, understand, and participate, particularly in terms of being able to see a problem from different perspectives and grasping the practical application of core course concepts.

Case study learning methods, according to Sarazin (2017), foster creative activity among many undergraduate students. In almost all disciplines, case study learning is an important teaching method. It has not been investigated to what degree case study teaching facilitates the development of science communication skills and an appreciation of the links between biological principles and daily life. Nonetheless, these are popular learning objectives in a variety of science courses. While some instructors have developed case studies for their own classes, developing new case studies takes time and requires experience that not all instructors have. As a result, it's critical to figure out whether case studies written by teachers who aren't associated with a specific course can be used effectively, obviating the need for each teacher to create new case studies for their own courses (Krain, 2016).Case studies also increases overall student perceptions and learning gains related explicitly to written and oral communication skills and the ability to grasp connections between scientific topics and their real-world applications (Chowning et al., 2012).

Case study learning, according to Tuckman (1965), allows students to identify with a real-world situation (a case) that presents a thought-provoking problem or dilemma. Students are asked to assume the position of decision-maker and to explain how they will fix the issue. The real-life existence of cases, according to (Nkhoma et al., 2017), adds interest and importance to the application of abstract principles and theory in reality.Collaborative learning is crucial in uncovering different ideas, knowing each other's pros and cons, and weighing the benefits through teamwork and whole-class discussion (Krain 2016).

Case study, according to Hooshyar et al. (2019), promotes the development of a variety of learning skills, allows for educational integration, increases students' intrinsic and

extrinsic motivation to learn, encourages learner self-reflection and critical reflection, allows for scientific inquiry, integrates knowledge and practice, and allows for scientific inquiry. Bonney (2015) claims that using case study learning to achieve learning outcomes is successful.Case study is a vehicle of interaction for teaching, according to Herreid (2007), and it promotes an atmosphere in which students can create information.

According to Tuckman (1965), many students are inductive rather than deductive reasoners, meaning they learn more from examples rather than logical development starting with fundamental principles. As a result, incorporating case studies into the classroom can be extremely beneficial. Case studies have long been used in business schools, law schools, medical schools, and the social sciences, but they can be used in any area where teachers want students to apply what they've learned in class to real-life situations.Cases that are descriptive are less interesting than cases that are decision-based. The teacher should start the class discussion by asking a basic, noncontroversial question that all students should be able to answer quickly (Dunne and Brooks, 2014). On the other hand, some of the most effective case discussions begin by forcing students to take a position. Some professors will ask a student to do a formal case opening, outlining his or her basic research. Others may prefer to direct discussion with questions, moving students from problem identification to solution. A knowledgeable teacher manages questions and discussions to keep the class on track and going at a consistent speed (Nkhoma et al., 2017).

### 2.4 Concept of Incubator Use

An incubator aims to support the development and scaling of growth-oriented entrepreneurs with an enabling environment in the start-up stage (Mason & Brown,

2014).Incubator has been identified as a powerful entrepreneurship tool to support the growth and survival of new ventures. Incubators' existence can have adverse impacts on research and innovation among students in higher education institutions. That is why many universities geared towards the promotion of innovativeness of students have established business-based incubators that have helped foster innovation (Lasrado et al., 2016).

Allahar and Brathwaite (2016), viewed the concept of incubator use as a strategic activity that encompasses three interrelated pillars; entrepreneurship, creativity and innovation which should be incorporated into the business incubation model. Incubators for early-stage, high-growth companies and innovations will help students develop entrepreneurial skills and provide personalized support (Barbero et al., 2014). They can also generate a virtuous cycle of job growth, university-industry cooperation, revenue for local companies and governments, and demonstrate tangible benefits of academic effect when they are at their best. The incubator engages in a variety of activities, including capital access, office support services, physical resource access, process support, and networking services (Somsuk & Laosirihongthong, 2014).

Incubators have been shown to improve the chances of a company thriving, according to Salem (2014), which is only one of the many advantages of active incubator programs. The effects of incubating and accelerating start-ups have also been recognized by communities and universities. Incubators, accelerators, venture capital, and entrepreneurship training all assist entrepreneurial students in developing start-up services (Wang et al., 2013).

Incubators promote the transition of university-developed innovations to society by fostering the creation of new businesses through university–industry collaboration. This

is accomplished using constructive learning methods that inspire and involve students in the process of innovation and creativity (Ozkazanc-Pan, 2018).

### 2.4.1 Role of Incubators

#### 2.4.1.1 Practical Learning role of Incubator Use

As students evolve through education and creativity in school, college campuses are rife with innovation (Kolympiris & Klein, 2017). Many colleges and universities have established business incubators to help students and others in their communities realize their creative dreams (Lasrado et al., 2016). These incubators provide an excellent opportunity for students who are smart and fortunate enough to join, whether they are providing tricked-out laboratories or amazing funding opportunities.

#### 2.4.1.2 Mentorship Role of Incubator Use

According to Lindholm  Dahlstrand and Politis (2013), the incubator provides students with opportunities to learn by practice by allowing them to work through a business idea in the student business lab, get involved with startups, and compete in entrepreneur competitions and conferences.

Dedicated students chose to live in Entrepreneurs Hall, a residential environment that provides them with co-ops, mentoring, classes, and daily access to the incubator (Jamil et al., 2015). Undergraduates who want to get a head start on starting a company can minor in entrepreneurship, while MBA students can major in it. With programs in social and digital entrepreneurship, a comprehensive curriculum for promising start-ups has emerged, as well as another incubator that expands an impressive variety of company incubation opportunities (Agbim et al., 2013). Boasting resources for life sciences, bio-tech, medical devices, photonics, clean energy, and engineering can help incubate businesses in just about any physical technology.

The incubator's key objectives, according to Culkin (2013), are to promote technology transfer, exchange student learning experiences, provide professional support, and facilitate partnerships and collaborations with other campuses. Innovation Depot's facility and program for technology sector development focuses on biotechnology, life science, and technology service businesses. It's an ideal location for a technology startup because it's a cutting-edge facility with plenty of facilities in both office and laboratory rooms. The business incubator brings innovation to the water, serving as a catalyst for the agricultural and environmental industries (Somsuk & Laosirihongthong, 2014).

#### 2.4.1.3 Business Support Role of Incubators

Incubators for early-stage, high-growth companies and innovations will help students develop entrepreneurial skills and provide personalized support (Barbero et al., 2014). They can also generate a virtuous cycle of job growth, university-industry cooperation, revenue for local companies and governments, and demonstrate tangible benefits of academic effect when they are at their best.

Incubators have been shown to improve the chances of a company succeeding, according to Salem (2014). One of the many advantages of effective incubator programs is increased entrepreneur success rates. Incubating and accelerating start-ups has a positive effect on communities and universities. Incubators, which include incubators, accelerators, seed funds, and entrepreneurship training, assist entrepreneurial students in developing start-up services (Wang et al., 2013).

## 2.5 Theoretical Foundations

This study employed the following theories: Social cognitive Theory, Schumpeter’s Theory of Entrepreneurship Economic and Componential Theory of Creativity

### 2.5.1 Social Cognitive theory

This theory was introduced by Albert Bandura in 1963. It states that by watching others, people will learn new habits. Thinking and reasoning, processing, problem solving, interpretation, and vocabulary are all covered by the social cognition theory. The reciprocal relationship between the environment's social characteristics, how individuals interpret them, and how inspired and capable a person is to replicate behaviors they see happening around them is the focus of social learning. People have an impact on the world around them and are affected by it. People learn by observing what other people do, pondering the apparent consequences, speculating about what would happen in their own lives if they followed the other people's behaviour, acting by attempting the conduct themselves, comparing their experiences with what happened to other people, and confirming their beliefs (Hofmann et al., 2012).

This theory of cognitive development tries to find explanations of the changing procedures whereby human beings' minds grow and change from infancy all through the lifetime. Notably, these theory's key objective is to elucidate mechanisms of dynamism, therefore development, instead of referring to just the capabilities of children transversely through ages or amongst children, adults together with the ancient populations. Therefore, this aims to analyze chronological thinking concerning whether cognitive development is because of particular characteristics or of the surroundings and deliberates the present-day replicas of cognitive change. Historically, social cognitive learning theories clamp a unique place because they unfold the mind's captivating depths from the viewpoint of process. Following the proponents of these theories, an individual's ability to learn emanates from the way one observes, sort out, stores, and recovers information. Methodologies of this theory can be used in any

discipline. Most important emphases consist of problem-solving and the easing of storage and recovery of data for usage.

According to the founders of this theory, the students or the learners are seen to be comprehensively assimilated with the surrounding where one is learning. The cognitive reactions of learners, their behavior together with the surrounding are integrated together to form learning. According to Jones et al. (2013), the mental procedures and preferences are well-known to influence the manner in which an individual perceives information, instigating a considerable influence upon identification and utilization of chances. In reality, these preferences suggest shortcuts in the brain that entrepreneurs incline to utilize during difficult circumstances with limited information and insufficient time to make realistic judgments. Cognition is a significant determining factor in the entire process of developing new ideas or innovation. A study by Davis et al. (2017) concluded that an entrepreneur's creative ability is guided by how one perceives and interprets the outside world. Studies on social cognitive proposes that there are significant dissimilarities on people’s perception and how they organize and analyze information to resolve arising issues amicably in a way that shows a high creativity Aureli and Schino (2019). To see cognition as the manner or processes of the brain gives rise to exciting questions of how individuals come to be developers of new ideas or inventions which can be brought into reality. An individual can think of a novel and visionary idea and decide to put it into practice. The process of cognition involves one's intents to carry out an activity, developing and finally implementing it.

The social cognitive theory is grounded on causation model. This involves triadic reciprocal determinism. According to this model, mental processes, personal behaviors, and other environmental effects all collaborate as cooperating factors that impact one

another in a bi-directional way. According to Clark (2012) the concept of triadic reciprocity determinism is such that individual cognition, affect and psychological procedures, performance and the impacts of the surrounding creating connections that establishes a triadic reciprocal manner. He further argued that individuals are motivated by either internal or external forces. This concept explains how the brain of a human works. The procedure is that character, cognition, and other personal factors and environmental events work together in unison through interaction. People's interpretation of their own performance achievements notifies and changes their behavior, which finally will cause changes in achievement going forward. In their arguments, the theorists conclude that people are products and producers of their own surrounding and of their social structures. They reason that an individual's agency is grounded on the social and works in the socio-cultural influences.

This concept is grounded on two questions; can this work be done? And can I do it? Jones (2015) defines self-efficacy as personal beliefs concerning one's ability to learn and to actualize activities at any given point in time. Self-efficacy does not mean understanding what to do but being able to do what one is pertained to do, Bandura (1997). The emphasis is on how efficient an individual is. This is gauged by assessing whether or not they can actualize or put into practice their skills and capabilities.

In relation to this study the theory of social learning is deemed relevant because it indicates how students learn from an institution of higher education through experience, cognition and the environment. As they interact with each other and the faculty they learn by experience through imitating what they see and therefore knowledge is passed down from each one of them and thus playing a role in enhancing their innovative capabilities in the institutions of higher learning.

Furthermore, the theory assumes that students should be at the center of learning, and that the teacher's role is to guide students in the construction of knowledge by using differentiated teaching approaches to develop functional and adaptive students with transverse competencies and capabilities such as innovation, creativity, critical thinking, and problem solving.

The social cognitive theory has been criticized by academics for assuming that changes in the environment would inevitably lead to changes in a person. This isn't always the case, however. The perspective is ad hoc, focused solely on the complex interaction of actions, a person, and the environment. Furthermore, since social learning cannot be directly examined, quantifying the impact of social cognition on an individual's success can be difficult.

### 2.5.2 Schumpeter’s Theory of Entrepreneurship Economics

This theory was advanced by Schumpeter’s in (1980). The theory notes that anyone pursuing benefit must innovate. As a result, the current availability of efficient means in the economy can be used in a variety of ways. According to Schumpeter, creativity is a critical engine of competition and economic dynamics. He also believed that nature is at the heart of economic change, triggering "creative destruction," a phrase coined by Schumpeter in his book Capitalism, Socialism, and Democracy.

Inventive thinking, according to Schumpeter, is a "process of industrial mutation that relentlessly revolutionizes the economic system from within, relentlessly destroying the old one and relentlessly building a new one." According to Schumpeter, growth is a historical phenomenon of structural changes fueled by creativity. Invention, creativity, diffusion, and imitation were his four categories for the four phases of innovation. The dynamic entrepreneur is then thrust into the spotlight of his investigation.

Entrepreneurs' skill and actions, based on scientific and technological discoveries, create entirely new opportunities for investment, growth, and employment, according to Schumpeter's theory. In Schumpeter's analysis, the invention phase, or primary innovation, has less of an effect on the state of an economy, while the diffusion and imitation processes have a much greater impact. The macroeconomic effects of any primary breakthrough are barely apparent in the first few years (and often even longer).

What matters in terms of economic growth, investment, and employment is not the discovery of fundamental innovation, but the diffusion of primary innovation, which occurs when imitators recognize the lucrative potential of the new product or process and begin to invest heavily in that technology. It's important to note that imagination isn't the cause: "discovery and execution are two entirely different things," according to Schumpeter. “A new concept by itself is insufficient to contribute to execution. It must be taken up by a powerful personality (entrepreneur) and put into action by his clout.”It is not the power of thoughts that matters, but the power of action. According to Schumpeter, "creative destruction" is "the core of capitalism." A stationary economy is a circular flow that accepts no surprises or shocks, “an unchanging economic activity that flows at constant rates in time and merely reproduces itself.”

A stagnant feudal economy would always be a feudal economy, and a static socialist economy would always be a socialist economy, so staggered capitalism is a contradiction in terms. "Capitalist reality is first and foremost a process of transformation," according to Schumpeter, and "change is the essence of capitalism." Everything that remains without creative destruction is perpetual imitation, which is not at all the essence of capitalism. According to Schumpeter, understanding economic

growth requires understanding innovation, and the "entrepreneur" is the central innovator.

In relation to the study, the theory suggests allocating resources such as business incubators to existing resources in order to achieve student innovative capability, which leads to “new uses and new combinations” and ultimately improves students' innovative capability. His argument that entrepreneurship is both a special force of growth and a rare social input that allows economic history to unfold is one of Schumpeter's most enduring contributions. To put it in another way, entrepreneurship is the “creative destruction” that drives the economy forward, with the entrepreneur as the catalyst.According to Schumpeter, "carrying out inventions is the only role that is central in history." Entrepreneurs are known for their intellect, alertness, motivation, and determination. Entrepreneurship is the process of developing and implementing new ideas. It is important to note that entrepreneurship is distinct from the four complementary roles of invention: risk-taking, error-correction, administrative, distinctive, and non-entrepreneurial in nature.

Most scholars have critiqued this theory for assuming that individual entrepreneurs carry out the act of invention and innovation. In contemporary society, invention and innovation are carried on not only by individual entrepreneurs but also by large corporations as a routine affair. It is nearly impossible to identify entrepreneurs who introduced most actual innovation. Furthermore, the theory heavily focuses on the theory of business cycles and not analysis of economic development. According to Schumpeter, crisis in capitalism is brought about by maladjustments caused by waves of innovation, in contrast big organizations in the modern times can absorb these waves and produce steadier and larger expansions of total output. Further, the main cause of

business cycles is the fluctuations in aggregate demand as pointed out by Keynes, (1936)

### 2.5.3 Componential Theory of Creativity

The componential theory of innovation was first suggested by Teresa,(Amabile et al., 1996) and it has developed greatly since then. The definition is essentially a comprehensive model of the social and psychological factors that affect a person's ability to produce creative work (Covin & Miles, 1999). According to the componential theory, domain applicable skills (expertise in the subject area or domains), creativity-relevant processes (cognitive and personality processes conducive to novel thinking), and work motivation are all influences on creativity (specifically, the intrinsic motivation to engage in the activity out of interest, enjoyment or personal sense of challenge).

The social environment is a dimension outside of the person. According to the theory, all three factors must be present for innovation to occur: When an intrinsically driven individual with high domain experience and innovative thinking skills works in an atmosphere rich in creative supports, innovation should be at its peak (Jamil et al., 2015). Many managers have used methods and strategies built from the idea to promote creativity and innovation within their organisations, which are important concepts in this theory.Domain-relevant abilities, according to the theory, include experience, competence, technological skills, intellect, and talent in the problem-solving domain, such as product design or electrical engineering. A cognitive style and personality traits conducive to independence, risk-taking, and new perspectives on issues, as well as a disciplined work style and skills in producing ideas, are all relevant processes in creativity, Bentler (1998).

The componential theory of creativity is a systematic model of the social and psychological factors that influence a person's ability to create creative work (Hitt & Duane Ireland, 2017). The theory is based on the concept of creativity as the generation of novel and relevant ideas or outcomes for a specific goal. According to this theory, any innovative solution requires four elements: three within the individual domain-relevant abilities, creativity-relevant mechanisms, and intrinsic task motivation and one outside the individual the social atmosphere in which the individual is working (Jamil et al., 2015).The new version of the theory takes into account organizational creativity and innovation, which has consequences for managers' working environments. It describes how the elements of invention affect the creative process, as well as changes to the theory over time. After contrasting the componential theory to other creativity theories, it goes on to explain the evolution and effect of this theory (Hu & Bentler, 1998).

Since it is a detailed model of the social and psychological components required for a person to produce creative work, the theory is considered important for the research (Morris & Kaplan, 2014). The theory is based on the concept of creativity as the generation of novel and relevant ideas or outcomes for a specific goal (Gurol & Atsan, 2006). Students in higher education institutions would be more innovative if they are intrinsically inspired and have strong domain experience and creative thinking skills, as well as if they are in an atmosphere that is conducive and supportive.

Scholars also criticized the existential theory of innovation for focusing solely on the internal factors of the organization while ignoring external influences. Its current form restricts its comprehensiveness due to its inability to provide external data such as

consumer preferences and economic fluctuations. Furthermore, the physical environment has little impact on creativity and innovation, according to the theory.

## 2.6 Empirical Review

This section presents a review of literature on problem based, competence-based, case study and direct learning.

### 2.6.1 Problem Based Learning

Bilgin, (2018) did a study titled “The Effects of Problem-Based Learning Instruction on University Students’ Performance of conceptual and quantitative problems in Gas Concepts. The aim of this study was to see how Problem-Based Learning (PBL) affected pre-service teachers' success as well as conceptual and quantitative problems with gas concepts. The study's main goal was to see how Problem-Based Learning (PBL) teaching affected pre-service teachers' ability to solve conceptual and quantitative problems regarding gas concepts. The participants in this study were 78 second-year undergraduates (aged 18 to 21 years; mean=19.20) from two separate classes enrolled in the department of primary mathematics education's general chemistry course.

The study found that while there is no statistically significant difference in pre-service teachers' quantitative success rates and there was a statistically significant difference in pre-service teachers' conceptual success rates on the subject of gases. On pre-CPGT and QPGT, students in the experimental and control groups obtain identical results. The pre-CPGT scores of students have a huge impact on their post-CPGT scores. According to the findings, students in the experimental community performed better on conceptual problems, and problem-based learning helps students to develop problem-solving skills and basic knowledge.The study recommended teaching institutions to enroll their

students in the experimental group since this would better their performances (Bilgin et al., 2018).

Obstacles to the Implementation of Problem-Based Learning (PBL) in Hong Kong's Local Universities was a research conducted by Lai and Tang (2000). The aim of this study was to look into the barriers to PBL implementation in three Hong Kong universities. The goal of this study was to identify the factors that impede problem-based learning in institutions, especially universities. Data was gathered through semi-structured interviews. Twenty-one faculty members from the participating tertiary institutions were asked about their experiences as problem-based learning tutors. The talks were tape-recorded, transcribed, and interpreted by the project's research assistant.

The results revealed four forms of barriers to effective PBL implementation: university compensation systems, teaching assessment mechanisms, resource distribution, and student responses to PBL. The study found that the main barriers to PBL adoption were the student element, teaching conception, and quality assurance and/or resource support. According to the findings, a systematic approach should be used to implement problem-based learning in elementary and secondary schools so that students are better educated and encouraged in developing the problem-based learning approach (Lai & Tang, 2000).

Inoue et al. (2014) conducted a report titled "The Advantages and Disadvantages of Problem-Based Learning from the Teacher's Perspective." The aim of this research was to focus on a teacher's assessment of a problem-based learning (PBL) experiment and its impact on professional growth. The aim of this study was to figure out what role teachers play in problem-based learning implementation. The descriptive-analytical design of the study necessitated cooperation between the researcher and the instructor

in the planning, execution, and, to some degree, interpretation of the findings.Research data was collected via participant observation of classes and open-ended interviews where teaching was analyzed in light of the literature on PBL, teacher knowledge base, and professional development.

The study findings revealed problem-based approach as a valuable tool in the investigation of teachers' values, conceptions and practices' and makes teaching and learning more fun and classes more dynamic to the students and the teachers. The study concluded that PBL brings about unexpected classroom situations, poses teaching dilemmas and stimulates decision-making. It was also evident that problem based approach emerged as the best strategy in helping students learn the content as well as develop professionally and socially and with desirable skills and attitudes. The study recommended schools to aim beyond the students' mastery of conceptual knowledge with respect to the profession (Inoue et al., 2014)

### 2.6.2 Competency Based Learning

"Student professional development; competency-based learning and evaluation in an undergraduate industrial technology course," a study by Baughman et al. (2012). The aim of the study was to look at student professional growth in an academic setting using competency-based development and evaluation. The pre-course quantitative data was analyzed using descriptive statistics. The paired t-test was used to evaluate both quantitative initial and final evaluation average results (self, peer, and lean knowledge) using SPSS 19 software. With only 26 students enrolled, this study had a small sample size.

The results of the study revealed that higher post-assessment values in particular critical action items within the competencies resulted in professional development gains.

Students expressed both the positive and negative concerns about the 360-degree feedback experiences, learning, fairness, and accuracy, as well as its effect on professional growth.

The study found that when competencies are related to or incorporated within particular courses across the curriculum, they have a greater impact on student learning.Since it includes cohorts of students in various academic programs, with defined competencies consistent with requirements of external stakeholders, the report recommends longitudinal studies. The aspects of community, team movement, diversity, and work/school setting related to the 360-degree feedback process were not examined in this report. To gain a better understanding of these various aspects, further research is needed (Baughman et al., 2012).

Ford and Meyer (2015) conducted research on "Competency-Based Education." The aim of this research was to look at the past, opportunities, and challenges of implementing competency-based education. The goals of this study were to trace some key milestones in the evolution of competency-based education (CBE), such as the introduction of concepts like curriculum mapping and competency frameworks, as well as the current state of CBE implementation and the challenges that remain. The research used a descriptive research methodology and focused on educational institutions and students.

According to the results of the report, the third wave of competency-based approaches was traditionally focused on formative vocational education and training. Instructional design influenced by psychology was possible with competency-based training. According to the findings, CBE will help students become more innovative, obtain degrees quicker, and save money for both the student and the institution. The study

suggests that different educational institutions encourage competency-based learning in their classrooms (Ford & Meyer, 2015).

In Australia, Lassnigg (2015) conducted research on competence-based education and educational effectiveness. The aim of the study was to examine the empirical evidence for policymakers' expectations of competence-based education outcomes and to provide some interpretations of how the subject is approached in political processes. A study of the research literature was carried out using bibliographical databases that cover scholarly journals as well as other more appropriate sources. The searches were wide in scope, encompassing not only basic competence expressions but also ‘outcomes' and ‘learning.'

The results of the study revealed that some promotion of active education, improved planning of teaching sessions, higher test scores, and more caveats resulted in increased self-evaluated competence and trust in students. The study concluded that competency-based education reform can be used to shift Australia's entire economic policy discourse in a neoliberal direction, with staff taking responsibility for their own training and jobs in order to boost productivity. More effort should be made to show (or disprove) the ostensible added value of competency-based education programs, according to the report (Lassnigg, 2015).

### 2.6.3 Direct Learning

Taghinezhad et al. (2016) conducted research on "Comparing the Impact of Direct and Indirect Learning Methods on Iranian EFL Learners' Vocabulary Learning. The study's aim was to see how indirect and direct learning methods affected Iranian EFL students' vocabulary acquisition. The study's aim was to compare the effects of indirect and direct vocabulary learning techniques on upper-intermediate Iranian EFL learners' vocabulary

learning. In this study, ninety students from two English language institutes in Shiraz took part. Data was collected using the following instruments: a proficiency examination, reading comprehension passages, and a multiple-choice vocabulary exam.

The results of the study revealed that students who obtained vocabulary training by indirect methods outperformed their peers. Direct vocabulary learning techniques were not found to be successful in improving learners' vocabulary. The study found that educating students about indirect learning methods may be beneficial for upper-intermediate students. 2016 (Taghinezhad et al., 2016).

“Teacher classroom activities and student performance: How Schools Can Make a Difference,” according to Wenglinsky (2001). The aim of the research was to see how direct learning affected results. The aim of this study was to look at teacher classroom activities and the types of preparation that have an effect on student success. The information was collected in a cross-sectional manner.

According to the findings of the report, teachers who took college-level courses in the subject they were teaching had better student results. According to the findings, schools are important because they provide a forum for active, rather than passive, teachers. Teachers and schools are suggested as important tools for assisting students in meeting high achievement expectations (Wenglinsky, 2001).

Overmyer (2014) conducted a study called "The Flipped Classroom Paradigm for College Algebra Effects on Student Achievement." The aim of the study was to look at the discrepancies in mathematical achievement between students in conventional college algebra classrooms and students in college algebra classes taught using the flipped classroom approach using direct learning. The sections' exam data was analyzed

and compared using regression and ANOVA methods, with instructional form, gender, and ACT mathematics scores as independent variables.

The results of the study revealed that there was no statistically significant difference in the grades of the two groups of students; however, students in the flipped parts did marginally better than students in the conventional regions. The study found that students in the flipped sections performed at least as well as students in conventional sections, despite the fact that the teachers were untrained. The flipped classroom model worked well with instructors who are good at inquiry-based and cooperative learning. The study suggests that educational institutions hire skilled, well-trained instructors (Overmyer, 2014).

### 2.6.4 Case study Learning

Akengin and Aydemir (2012) conducted research on the "Effects of Using Case-Study Approach in Social Studies on Students' Attitudes Toward the Environment." The study's aim was to demonstrate how the case study method aided the learning-teaching process from the students' perspective. This study used a pretest-posttest control group design, with 30 students chosen as the experimental group and 30 students chosen as the control group during the 2008-2009 school year, all of whom were in 6th grade at a primary school. After administering a pre-achievement evaluation and a pre-attitude scale to the experimental and control groups, the implementation process began.

The results of the study revealed that there was no substantial difference in pre-test and pre-attitude test scores between classes. According to the findings, case studies helped students develop emphatic, imaginative, critical, logical, and reflective thinking, problem-solving, and decision-making skills. The case study learning approach was also found to have a positive impact on students' attitudes toward the environment,

according to the study. Case study learning should be implemented as part of a school's teaching process, according to the study. 2012(Akengin & Aydemir, 2012).

(Johansson, 2016) did a study on "Case Studies and their impact on teaching and learning." The purpose of the study was to evaluate and identify the different types of case studies and if so, their impact on teaching and learning. In methodology, secondary information was collected using Halmstad-Högskolan's webpage, with a student log in, on the webpage's library.

The study findings were as follows; Students who studied economy, medicine and psychology mostly use case studies. By using case studies as a teaching method, the students are more motivated to learn. The information that is given enabled both teachers and students transfer their knowledge into different novel situations. Finally, students and teachers can freely interact using case study pedagogy method. The student's ability to solve problems also increases. The study concluded that a case study makes students more motivated to do further reviews and their hunger for more information and knowledge increases. The study recommended for case studies to be used more frequently, not only to satisfy students, but to increase their understanding and knowledge (Johansson, 2016).

Giacalone (2016) did a study on the topic "Enhancing Student Learning with Case-Based Teaching and Audience Response Systems in an Interdisciplinary Food Science Course." This study aimed to discuss the implementation of case-based teaching and use of response technologies to graduate students in a food science course. The research objective was to enhance the learning of students by using case-based teaching. The study used questionnaires and the target populations for this study were 15-20 students who had enrolled in the courses.

The results of the research showed that the course was a rewarding experience, and the majority of the participants concluded that they had gained the competences identified in the case study learning outcomes for the time period. Finally, the students appreciated the use of case study learning and ARSs (Audience Response Systems), which was made possible by the course's applied profile, which involved the incorporation of many disciplinary areas to solve "real-world" problems in the context of food product production. In food science education, the report proposed the usefulness of various approaches with various student profiles and subject matters (Giacalone, 2016).

## 2.7 Moderating Role of Incubator Use In Enhancing Student Innovative Capability

Business incubator use has its roots in the field of entrepreneurship education. It is understood as programs or networks offered by institutions which are intended to support economic development,(Lindholm  Dahlstrand & Politis, 2013). As such, these programs facilitate learning experiences, provide professional support and collaborations. Indeed, the use of incubation facilities positively impacts institutions as it furthers an incredible array on business incubation opportunities (Agbim et al., 2013).

Despite the substantial empirical literature suggesting that entrepreneurial pedagogy approaches and student innovative capability are correlated positively (Lorz et al., 2013; Rideout & Gray, 2013), there is also literature to suggest that the relationship between the two variables can be moderated. Studies have indicated that incubator use may be a potential moderator. For instance, (Stal et al., 2016) study showed that incubator use moderates the effect of entrepreneurship learning on successful venture creation. The study results concluded that these incubators give preference to new ventures arising from research carried out at the university or with potential to interact

with research in progress. The study recommended for more efforts to be put in attracting ongoing students and alumni, for the business incubators needs to be sufficient to fulfill all available places.

Allahar and Brathwaite (2016) study titled “Business Incubation as an instrument of innovation and examined the effects of business incubation as a tool for innovation in the market.While most incubators are still in their early stages, the study found that there are striking similarities among the incubators studied in terms of their links to universities, services provided, and funding challenges. Nevertheless, there is growing acceptance of incubation as a potential moderating tool, valid for fostering business growth and innovation. The study concluded that the creation of an effective innovation ecosystem is critical to the success of incubation in the more extensive Caribbean islands, especially in the development of innovative businesses. The study suggests that incubator managers be trained and that accelerators for innovation be developed in the Caribbean.

Janssen et al. (2017) investigated how schooling, stimulation, and the use of incubators can inspire students to become entrepreneurs. In three case studies, the entrepreneurial inspiration offerings at MIT in the United States, IIIT in India, and Utrecht University in the Netherlands were used. Incubators are advantageous and important in encouraging students to pursue a career as an entrepreneur, according to the results of the three case studies. A model for effectively promoting entrepreneurship among scholars is suggested, as well as numerous successful examples of student entrepreneurship encouragement offers.The model aims to assist universities in convincing students to pursue careers as entrepreneurs by assisting them in developing an atmosphere that promotes student entrepreneurship and innovative actions.

Omweri (2016) conducted research on "The Role of Incubation Centers in Fostering Youth Entrepreneurship in Kenya: A Case of the Nailab Centre's Youth Entrepreneurship Program." The aim of the study was to look into the role of business incubators in fostering youth entrepreneurship in Kenya. The study's goal was to figure out what role business network support in incubation centers plays in encouraging young people to start businesses in Kenya. The results of the study revealed that management preparation, financial support, and networking opportunities are all important factors in encouraging young people to start businesses. Incubator centers provide an entire environment for entrepreneurs to experiment, start up, develop, and find the right strategic investors for their companies so that they can compete on a national and global scale. According to the findings, incubators act as a critical link in bridging the gap between youth unemployment and the country's 2030 vision. To ensure sustainability, the study suggested better collaborations with stakeholders in fostering youth entrepreneurship, better more centralized government policies, and better incubator models.The study suggested that other scholars and academicians carry out further studies on the same topic, focusing on other factors not considered in the study (Omweri, 2016).

### 2.8 Summary of Literature and Research Gaps

This chapter has reviewed related literature on entrepreneurial pedagogy, incubator use and student innovative capability in institutions of higher learning in Kenya. Tutors, institutions of learning, and students have central roles in students' innovativeness in higher learning institutions. Teachers have a substantial impact on the attainment of skills in education because they are the ones that enable the students to acquire skills and experience. The approaches that the teachers use in teaching the students affect their creativity and innovativeness.

A number of tutors teach to coat the required topics not putting into consideration the significance and the utility of these skills by students in the future. Institution of higher education affects students' innovative capability by developing problem-based learning and service learning, which also starts with a preferably exact problem, but does not end with the production of an artifact addressing the issue, but instead with discussing possible solutions guiding students.. Higher education institutions also generate opportunities that are turned into innovations, personal incentives to become entrepreneurs, and characteristics of an entrepreneur-friendly community. Institutions also engage in entrepreneurial practices, such as a strong need for accomplishment, inventiveness, risk-taking proclivity, uncertainty tolerance, and internal locus of control. Since innovation is dependent on personal characteristics such as attitude, interest, and social cultural context, students in higher education institutions have a direct impact on their innovativeness.

Problem based learning research has been done to investigate effects of problem-based learning (PBL) on pre-service teachers' performance on conceptual and quantitative issues, obstacles to the implementation of PBL and teacher's evaluation of an experiment with problem-based learning and how they implement PBL. All these studies have focused on the teacher use of PBL. Limited studies are focusing on student's role in PBL which will be investigated in this study. Therefore, there exists a gap on the effects of PBL on the external student factor and how practical and implementable PBL is in other educational stages. This study aims at filling this gap.

Studies on competency based learning include examining student professional development utilizing competency-based development and assessment within an academic environment, the history, opportunities and challenges faced in implementing

competency based education and assessing the empirical evidence for competence-based education outcomes.There is a gap in understanding various aspects of competency-based learning and measures that can be implemented to resolve the challenges facing competency-based education. This study aims at filling these gaps.

Several studies on direct learning have been conducted, including the effects of indirect and direct learning methods on vocabulary learning, achievement gaps between students in conventional college classes taught using the flipped classroom process, and the impact of direct learning on success. Since all of the research examined concentrated on lower levels of education, there is a discrepancy in direct learning as to whether it can be effective in higher education institutions. The aim of this research is to close the gap described above.

Studies done on case study learning include the students' thoughts and feelings about the case study aided learning- teaching process and different types of case studies and their impact on teaching and learning. There is a gap in the effects of case study on students' perceptions towards the environment; the impact of case study learning on teaching and the effect of case study teaching approach on actual academic performance output which will be to be addressed in this study.

The success of technology-based university incubators in attracting spin-off companies founded by university members has been studied in business incubator studies. The studies also discussed and generated results that provide a better image of the incubation environment and business incubation centers in Kenya in terms of fostering youth entrepreneurship. In terms of the growth of graduate businesses and the degree to which innovativeness has been stimulated, there is a gap in the evolution of incubators and their results. As a result, the study's goal is to close the gap described above.

According to the studies mentioned in the table below, there is minimal empirical evidence on the moderating effect of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability in Kenyan higher education institutions. Furthermore, none of the empirical studies looked into the moderating impact of a incubator use on the relationship between entrepreneurial pedagogy and student innovative capability in institutions of higher education. This research will attempt to close the gap.

**Table 2.1: Summary of literature and Research Gaps**

| Author(s) | Objective | Methodology | Findings | Research Gap |
|---|---|---|---|---|
| Bilgin et al. (2018) | Investigate effects of conceptual and quantitative problems on teacher's performance | Questionnaires and interviews were used to collect data | Found out that based on the pre-service teaching exposed to the teachers, problem-based learning allows students acquire better problems solving skills and basic knowledge | -The study focused more on one dimension of problem based learning rather than focusing on all the four dimension which could be more encompassing<br>Replicated the study in Kenyan context<br>Focused on teachers while this study will focus on students<br>Emphasized on the chemistry undergraduates, current study focused on entrepreneurship undergraduate students<br>A longitudinal study was employed, current study used cross sectional design<br>Used secondary data information, while this study focused on primary data |
| Lai and Tang (2000) | Explore the obstacles to the implementation of Problem based in institutions | Used secondary data where interviews were employed in data collection | Found out that university reward system teaching evaluation mechanism, resource allocation and student responses to problem-based learning (PBL) hindered the successful implementation of PBL. | -Replicating study in Kenyan context<br>The study focused on faculty members while current study focused on students. The research utilized a qualitative approach current study was purely quantitative.<br>The study employed a systematic sampling technique current study employed simple random and stratified sampling |
| Wenglinsky (2001) | To determine the impact of direct learning on performance | It followed a cross-sectional research design | Found out that the exposure teachers received in their respective subjects taught led to better student performance | -Study focused on performance rather than student innovative capability<br>Used logistic regression as opposed to multiple regression, which was adopted in current study<br>Study recommended replication of the same study, by using a larger sample and more so in higher institutions of learning<br>Replicating the study in Kenyan context |
| Giacalone (2016) | To enhance the learning of students by case-based teaching | Questionnaires and interviews were used to collect data | Case study learning was a rewarding experience to the students | -Replicating study in Kenyan context and more so in institutions of higher education<br>It used a triangulation method current study was purely quantitative<br>Focus was on students of food and science this study focused on entrepreneurship students<br>The study assumed a linear relationship without either a moderating or mediating variable to the relationship, hence the inclusion of the moderator in this study |

| | | | | |
|---|---|---|---|---|
| Lassnigg (2015) | Competence based significant outcomes to students | Longitudinal research design | Found out that competence-based education, positively influenced student learning outcomes. | -Replicating the study in Kenyan context<br>Study was done in Australia and focused on students at the tertiary level, while the current study was carried out in higher education institutions in Kenya.<br>Used secondary data was used while this study utilized primary data.<br>Utilized a longitudinal design, current study employed cross sectional method |
| Akengin and Aydemir (2012) | To find out the thoughts and feelings of students about case study teaching method | It followed a longitudinal research design<br>Used secondary data<br>Used attitudinal tests | Found out that case study method made contributions to development of students, emphatic, creative and analytical skills.<br>Case study method positively influenced students' attitude towards the environment | -Replicating study in Kenyan context<br>Study related case study learning with innovativeness of students but in secondary schools, current study was carried out in institutions of higher education<br>Followed a longitudinal design current study followed an cross sectional design<br>Replicating study in institutions of higher education<br>Used both a qualitative and quantitative approach while this study focused on quantitative approach<br>Employed convenience sampling, current employed stratified technique |
| Johansson (2016) | Investigate the impact of case study method on teaching and learning | Used secondary data to arrive at findings<br>Used moderated multiple regression | Found out that the use of case studies enhances student's motivation to learning | -Replicating study in Kenyan context<br>Used secondary data, while this study used primary data<br>It showed the a positive relationship between use of case study in enhancing learning but not innovative capability of the students |
| Rideout and Gray (2013)Ribeiro (2014) | To determine the role of teachers in the implementation of problem-based learning | Used interviews and observations | Found out that PBL may be a valuable tool in the investigation of teachers,values,conceptions, and practices | -Study adopted a qualitative approach, current study is quantitative in nature<br>-Replicating study in the Kenyan context<br>Utilized case study design, while this study used explanatory design<br>The study looked at one construct of entrepreneurial pedagogy, problem based learning, and did not test for association with other elements of innovative capability<br>Used a simple analysis. This study used both the multiple regression and moderated multiple regression models<br>Teachers were the major unit of analysis, students are the main unit of analysis in current study |

| | | | | |
|---|---|---|---|---|
| Overmyer (2014) | To investigate the mathematical achievement differences by use of direct learning,between students in traditional college algebra classroom and flipped classroom method | Used secondary data in analysis | Found out that untrained instructors in flipped classrooms had students who performed as well as those in traditional sections | -Replicating study in Kenyan context<br>Replicating study in institutions of higher education<br>Study focused on both faculty and graduates current study only focuses on students,and specifically entrepreneurship students<br>Study used secondary data in analysis, current study used primary data<br>The empirical evidence on case study remained inconclusive. Hence, a similar research to be done in a different sector such as higher education institutions but with different outcomes such as student innovative capability. |
| (Omweri, 2016) | To find out the role of business incubation Centers in promoting Youth entrepreneurship in Kenya | Used primary data to arrive at findings<br>Use of questionnaires | Found out that incubators give preference to new ventures arising | -The study focused more on venture creation rather than focusing on innovative capabilities which could be more encompassing<br>Focus of the study was on youth in the community but focus of the current study is on students institutions of higher learning.<br>Current study conceptualized incubator use as a moderator |

## 2.9 Conceptual Framework

The conceptual framework was used to provide the foundation on which the research is to be based (Sekaran & Bougie, 2016).The conceptual framework presented in Figure 2.1 shows the relationship between the three study variables namely ; entrepreneurial pedagogy (independent variable),Incubator use(moderator) and student innovative capability (dependent variable). Furthermore, it elucidates how the problem under study generates testable hypotheses. Four elements defined entrepreneurial pedagogy; problem based, competence based, direct and case study learning in institutions of higher education in Kenya. This study's conceptual framework was informed by literature review and aimed to touch upon every aspect related to student innovative capability and be as comprehensive as possible. It forms a grounding upon which further development can be based. The model proposed that entrepreneurial pedagogy and incubator use influence student innovative capability. Another linkage suggested was the moderating effect of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability

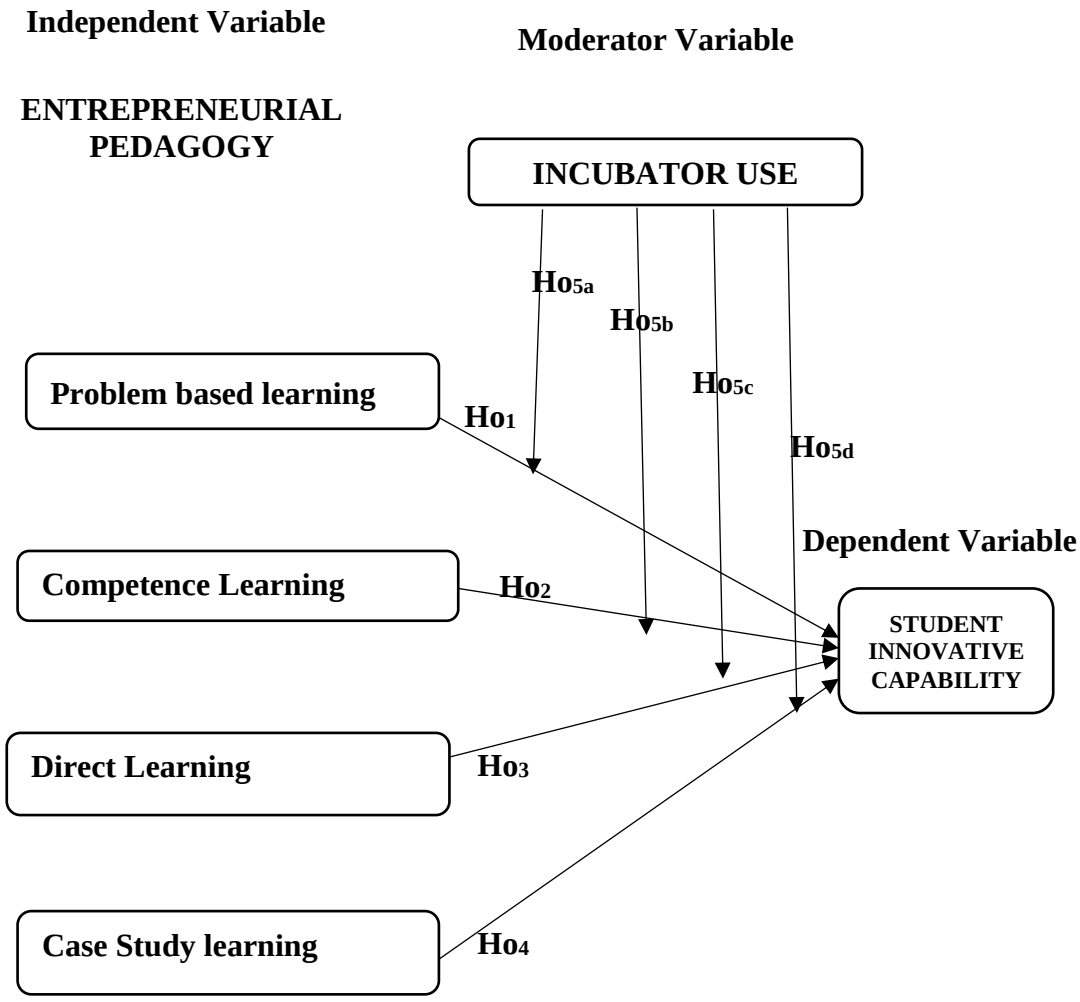


**Figure 2.1: Conceptual Framework**

*Source: Researcher, 2021*

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.0 Introduction

This chapter presents the research methodology and procedures used in the study. It consists of description of research philosophy, research design, target population, sample size and sampling procedures, research instruments, validity and reliability of the research instruments, data collection procedures, data analysis techniques, and ethical considerations in the study.

## 3.1 Philosophical Orientation

This study adopted post-positivism research philosophy. This paradigm is based on belief that reality is independent of social norms and assumptions(Hesse-Biber & Leavy, 2010).

Post-positivism research philosophy adopted in this research used two philosophical dimensions: ontology and epistemology (McGregor & Murnane, 2010). Ontology is concerned with determining the essence of truth in the universe, while epistemology is concerned with the researcher-research object relationship (Koppensteiner, 2018).

Since it assesses the cause that affects the research variables' outcome, the study will be influenced by post-positivism theory. In addition, the research grew expertise by evaluating objective data using questionnaires as the primary research tool (Gratton & Jones, 2014). Since the observed data were numerical, the analysis was quantitative in nature(Ghauri & Grønhaug, 2010).

Quantitative analysis, also known as analytical research, is a method for analyzing the relationship between variables in order to test objective hypotheses (Osler, 2012).

The variables of the instrument were calculated in this analysis, and the numbered data was statistically analyzed. Formulating a problem, creating a theory, testing it, and drawing conclusions is all part of the scientific process. Deductive analysis was used in this study. A deductive method defines the situation in which a researcher derives a hypothesis that is tested empirically based on what is observed in a specific domain and theoretical considerations in that area (Rauch et al., 2014). The aim of using a quantitative research design was to determine the relationship between variables. The hypothesis for this study was that there were links between entrepreneurial pedagogy, incubator use, and student innovative capability.

This study's central research problem was to examine the moderating effect of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability in institutions of higher education in Kenya. Entrepreneurial pedagogy was considered as the independent variable in. While incubator use was a moderating variable, Student innovative capability was a criterion variable. The main data collection instrument was a questionnaire. Data was analyzed using descriptive, inferential statistics and regression analysis. The justification in the choice of the quantitative approach was based on the research problem, audience and research personal experience. All the variables were operationalized and information was obtained from questionnaire distributed to the respondents with independence and privacy on the part of the respondents maintained.

### 3.2 Research Design

The study employed explanatory design. Explanatory design is used in studies that create causal relationships between variables, according to (Akhtar, 2016). The application of the research definition is essentially a precursor to the interpretation

(Creswell & Zhang, 2009). Since it is concerned with defining, documenting, analyzing, and interpreting relationships among variables, research design is required. It also deals with the formulation of hypotheses and the testing of relationships between non-manipulated variables (Rovai et al., 2013).Therefore, the explanation of why and how there is a relationship between Entrepreneurial Pedagogy and student innovative Capability was established. Furthermore, the data's statistical analysis showed that the variation in Entrepreneurial pedagogies caused the variation in student innovative capability. The moderation by incubator used represented the indirect causal link in the relationship between Entrepreneurial pedagogy and student innovative capability.

### 3.3 Study Area

The study was conducted in some selected institutions of higher education in Nairobi County, which is one of the 47 counties in Kenya. Some of the institutions of higher education situated this county are University of Nairobi, Technical university of Kenya, Catholic University, Jomo Kenyatta University of Agriculture and Technology, United States International University, Riara University, Kenyatta University, African Nazarene University, KCA University, Strathmore University among other Campuses of the main universities in Kenya. The public universities selected were University of Nairobi and technical university while the private universities which were included in the survey were Catholic University and Strathmore University. All these institutions teach entrepreneurship as a discipline. Four universities were the study's focus,and this was inclusive of two universities with incubators two universities, without incubators. These universities were selected based on the years of operation. Under the universities with incubators, the public and the private universities selected were the university of Nairobi and Strathmore University. They have been established for long (1970, and 2001 years of establishment respectively) and have the longest serving incubators. For

the universities without incubators but offering entrepreneurship studies the public and the private university included Technical University and Catholic University as they are the oldest institutions offering entrepreneurship studies in the list of universities without incubators in Nairobi.

### 3.4 Target Population

The target population consisted of 1545 fourth-year entrepreneurship finalist students from selected Nairobi's institutions of higher education in Kenya. The research was carried out in Nairobi County's public and private universities. Cooperative University of Kenya, Kenyatta University, Multi-Media University, Technical University of Kenya, and University of Nairobi are among the public universities. Africa International University, Catholic University, East Africa School of Theology, KAG University, KCA University, Kenya Methodist University, Riara University, Strathmore University, USIU, and Zetech University are among the private universities in Kenya.

Therefore, the distribution per university is indicated in Table 3.1

**Table 3.1 Population Size**

| Universities / Main Campus in Nairobi | Fourth Year Entrepreneurship Finalist Students |
|---|---|
| **Public Universities** | |
| Cooperative University of Kenya | 66 |
| Kenyatta University | 298 |
| Multi- Media University of Kenya | 101 |
| Technical University of Kenya | 101 |
| University of Nairobi | 338 |
| **Total** | **904** |
| **Private Universities** | |
| Africa International University | 68 |
| Catholic University of Eastern Africa | 92 |
| East Africa School of Theology | 35 |
| KAG University | 34 |
| KCA University | 98 |
| Kenya Methodist University | 55 |
| Riara University | 35 |
| Strathmore University | 94 |
| United states international university of Africa | 98 |
| Zetech University | 98 |
| **Total** | **641** |
| **Grand Total** | **1545** |

### 3.5 Sampling Size and Procedure

A sample is a portion of a population (Sekaran & Bougie, 2016). It can be defined as the number of items that can be nominated from a universe (Kothari & Garg, 2014) which should not be too large nor too small but rather a representation of the target population that can be reached physically (Kombo & Tromp, 2006). Thus, to get the required sample size, the study adopted the sampling formula proposed by Cochran (1963) to obtain 385 respondents. Cochran sampling formula adopted shows that when the study population is more than 10,000 then the sample size is calculated as:

$$n_0 = \frac{Z^2 pq}{e^2} \quad \text{.....3.1}$$

Where; $n_0$ = Sample size, $Z^2$ is the abscissa of the normal curve that cuts off an area $\alpha$ at the tail. $p$ is the estimated proportion of the attribute that is present in the proportion

and $q$ is 1-$p$. $e$ is the desired level of precision. The value for $Z$ is found in statistical table which contain the area under the normal curve i.e. $Z = 1.96$ for 95% level of confidence. Therefore,

$n_0 = \frac{1.96^2(0.5)(0.5)}{0.05^2} = 385$ Fourth year entrepreneurship students

The sample size for the study was therefore 385 respondents selected to participate in the Study.

In addition, sampling is selecting a group of content units to analyze. Therefore sample selection depends wholly on the target population's homogeneity, target population's size and the required degree of precision. As a result, this data's characteristic was divided into two strata; that is the selected institutions of higher education of the study. Therefore, stratified sampling technique was used. Stratified sampling is a process in which certain subgroups or strata are selected for the sample in the same proportion as they exist in the population (Kothari, 2004).Thus, the sample size for each stratum was obtained by the proportionate stratified allocation formulae, in which the sizes of samples as obtained from different strata were proportionally kept to the sizes of the strata. As a result, by the application of this formula, the size of each sample in the stratum was obtained as indicated in table 3.2.

### 3.5.1 Sampling Technique

The study used simple random technique to select the samples from each stratum. Simple random sampling can be seen as a subset of the respondents chosen from a large population, Kothari (2004) asserts that respondents are chosen randomly and entirely by chance from the entire population or from each strata. Each respondent has the same probability of being chosen. The sampling technique allows one to externally make

valid conclusions about the whole population based on the sample obtained. The technique is free from errors of classification, besides its requirement for minimum advance knowledge about the population (Saunder *et al.*, 2014). Therefore, respondents from every sub-group were selected for inclusion in the sample size using the simple random sampling technique. To determine each category's sample size, the calculations were done proportionately as indicated in Table 3.2.

**Table 3.2: Sampling Frame**

| **Universities in Nairobi** | **TargetPopulation ($NK$)** | **Sampling Proportion** | **Sample Size ($nk$)** |
|---|---|---|---|
| Public Universities | 904 | (904/1545) *385 | 225 |
| Private Universities | 641 | (641/1545) *385 | 160 |
| **Total** | **1545** | | **385** |

**Source: Researcher, 2020**

| **Universities / Main Campus in Nairobi** | **Fourth Year Entrepreneurship Finalists** | **Procedure** | **Sample Size** |
|---|---|---|---|
| **Public Universities** | | | |
| Technical University of Kenya | 101 | (101/439) *225 | 52 |
| University of Nairobi | 338 | (338/439) *225 | 173 |
| **Total** | **439** | | **225** |
| **Private Universities** | | | |
| Catholic University | 89 | (89/183) *160 | 78 |
| Strathmore University | 94 | (94/183) *160 | 82 |
| **Total** | **183** | | **160** |

**Source: Researcher, 2020**

### 3.6 Data Collection Methods and procedures

#### 3.6.1 Data Sources

This section describes the data collection procedures and tools used in the study. The researcher used structured questionnaires as the main tools for data collection. The questionnaires were issued to the fourth-year entrepreneurship finalists.

### 3.6.2 Data Collection Instrument

A questionnaire was the main data collection instrument in the study. The tool was administered to fourth year entrepreneurship finalists. The questionnaire was structured using likert format with five-point response scale. It contained four sections; the demographic background of the respondents which contained age and gender. Part A contained questions relating to problem-based learning, competence-based learning, direct learning, and case study learning. Part B contains questions relating to incubator use and Part C contained questions relating to student innovative capability.

A questionnaire, according to Johnston (2017) is made up of a set of questions printed or typed in a specific order on a form or forms. A questionnaire is a valuable tool for collecting vast volumes of data from large numbers of people in a limited period of time.

Since the respondents were literate and could provide information in writing, the questionnaire approach was deemed suitable. The data collected from the analysis was simple to identify and analyze. It also catered to a population that was high in comparison to the amount of time available (Ghavifekr & Rosdy, 2015). There were both open-ended and closed-ended questions in the mix. To elicit the most important and accurate answers, closed-ended questions were used. As a result, the study's results could be more concentrated.The closed ended questions were also used to collect quantitative data. Questionnaires are generally more preferred because of ease in processing answers; it enhances the comparability of answers and makes them easier to show relationship between variables, they can also be used to gather data quickly from geographically dispersed sample population. They are deemed appropriate as many respondents can be reached (Mugenda & Mugenda, 2003).

### 3.6.3 Data Collection Procedure

Research approval was obtained from the university used to seek a research permit from the National Council for Science, Technology, and innovation (NACOSTI). Once the permits were granted appointments were booked. Research assistants were recruited to administer the questionnaires after briefing them on ethical issues and how to conduct the research. The information was gathered through on-the-spot questionnaire filling for the respondents consented to take part in the study. This ensured high return rate of the questionnaires and rule out the problems likely to be encountered by collecting them later.

## 3.7 Validity and Reliability of the Research Instrument

### 3.7.1 Validity of Research Instruments

The validity of the analysis was established by ensuring that the instrument measured what it was designed to measure (Patrick et al., 2011). Validity, according to Muijs and Lindsay (2008), is concerned with the issue of whether or not one is measuring what one believes one is measuring. As a result, validity refers to the measure's significance, the precision with which it can be measured, and the number of inferences that can be drawn from the score's information. Measures are assessed in terms of their internal and external validity, according to (McDermott, 2011).

Internal validity refers to a metric's precision in calculating what it claims to measure. There is only a limited body of research conducted in higher education institutions, in testing the validity of entrepreneurial pedagogy, incubator use, and student innovative capability. The study addressed a number of approaches to establishing validity; predictive validity, nomological, convergent, content validity, face validity and external validity.

Predictive validity of scores was employed to test the validity of the research instruments. This was examined to determine the extent to which a measure is a good predictor of another variable. Nomological validity was employed to test how the instrument assesses the specific constructs that it is designed to assess. Convergent validity was also employed to test the degree of relatedness between the constructs. The content validity of the questionnaire was assured by conducting a rigorous literature review analysis on which it was based. Face validity was assured by the study supervisor pre-testing the data collection method and scrutinizing the instruments. If the findings of a study may be applied to other individuals and environments, the study is said to have external validity. The degree of trust in which the sample findings can be conferred on the population, as well as whether similar findings may be obtained at other times and locations, are factors in generalization.This study also employed the factor analysis technique to confirm validity. Factor analysis is a technique that allows for the reduction of large numbers of variables or questions to smaller number of variables.To enhance the research instruments' validity, a pre-test (pilot study) was conducted at University of Eastern Africa Baraton that did not take part in the study.

### 3.7.2 Reliability of the Research Instrument

The degree to which a measurement instrument can produce consistent results each time it is used under similar conditions is referred to as reliability. It is a component of a measurement system that causes it to produce similar results or outcomes for similar inputs. In terms of statistics, reliability is characterized as the percentage of inconsistency in survey responses due to differences in respondents. This means that answers to a credible survey differ because respondents have differing viewpoints, not because the questionnaire elements are vague or confusing.The instruments' reliability may be calculated mathematically or by pre-testing. Since the questionnaire items were

adapted from previous research but tailored to entrepreneurship students in this study, a pilot test was conducted to fine-tune the instrument. As a result, the questionnaire items were pilot tested to reduce the number of ambiguous terms and increase the consistency of the question items in order to improve the questionnaire's reliability. Cronbach alpha is also used to evaluate an instrument's reliability. Many scientists consider reliability values of 0.70 or higher to be sufficient (Cooper & Schindler, 2006).

To ensure reliability of the questionnaires, a pilot study was done in Kabarak University and Egerton University Kenya, within Nakuru County.Extant literature indicates that a pilot research sample should be 10% of the sample expected for the larger parent study, according to Connelly (2008). As a result, 30 respondents were chosen for the pilot study, which provided sufficient representation for the study. A pilot study helps the researcher to test the prospective study on a smaller group of people who have the same characteristics as the target respondents. It aids in the identification of potential issues in the planned study and enables the researcher to update the procedures and instruments prior to the actual study in order to increase the study's success and effectiveness (Polgar & Thomas, 2011)

The reliability results indicated that, problem based learning (0.8209), competence based learning (0.8159), direct learning (0.8198), case study learning (0.8195) student innovative capability (0.8228)and incubator use (0.8210) and the overall Cronbach alpha was (0.8229)

### 3.8 Data Processing and Analysis

#### 3.8.1 Data processing

Inspection and editing of data for completeness was done initially. Coding of data that involved assigning numerical symbols for quick data entry and minimizing errors and

facilitating further analysis was done. Each item was coded and entered the STATA software. Checking and cleaning of data which involved checking for missing responses, inconsistencies, accuracy, and completeness was done. In this study accuracy was maintained during data coding and entry. Data of a random nature was replaced with mean of data set as explained by Tabachnick and Fidell (2007).

### 3.8.2 Data Screening

It involved the initial proof reading of the original data against data entered in the computer. The process also entailed investigating the preliminary data output of descriptive statistics for example the mean, ranges, and standard deviation. It also involved examining for correlations to examine their patterns and to determine whether there was extremely high or low correlation or uncorrelated items. Additionally, data was also screened for regression assumptions. Detection of regression assumptions was considered a vital action as they could alter the study findings, leading to wrong conclusions and recommendations.

### 3.8.3 Data Analysis

#### 3.8.3.1 Descriptive Statistics

Descriptive statistics involves transformation of raw data into a form that would be easy to understand (Zikmund et al., 2003).Therefore, it presented insights of the characteristics and of the samples. Hence, the study used descriptive statistics that described and compared variable numerically such as mean, median, mode, standard deviations, kurtosis, skewness, and frequency distributions(Abbott, 2014). The study further utilized the measures of variability, such as the standard deviation, to check how spread out each variable's scores. Analysis was done using STATA version 12 which was deemed appropriate since it provided several transformations and manipulations of

the data set. The descriptive statistics analyzed provided a basis for inferential analysis. Once the relationship was estimated, it was possible to use the equation:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.3$$

Where: $Y$= the dependent variable (student innovative capability)

$X_1$ = Problem based Learning
$X_2$ = Competence based Learning
$X_3$ = Direct Learning
$X_4$ = Case Study Learning
While: $\beta_1, \beta_2, \beta_3, \beta_4$ are model estimates or coefficients
$\alpha$= the constant
$\varepsilon =$ is the error term assumed to have zero mean and independent across time period.

**3.8.3.2 Correlation Analysis**

This was undertaken to ascertain whether there was an association between variables of interest. In correlation analysis, two sets of measurements are obtained on the same individual variables or pairs of individual variables matched in the same way. The correlation coefficients' values vary from the value of +1.00 to value of -1.00 which represents extremely perfect relationships. When independent variables are highly correlated, it becomes difficult to establish each independent variable's effect on the dependent variable (Hair, 2009).Therefore in this study Pearson pair wise correlation (ρ) was utilized to test the association between the variables. For this reason, the direction and strength of the relationship between the independent variables (problem based, competence based, direct learning and case study learning) and the dependent variable (student innovative capability) was observed using Pearson pair wise Correlation analysis. Correlation tests were also carried out to establish the relationship between entrepreneurial pedagogy, incubator use and Student innovative capability.

### 3.8.3.3 Regression Analysis

Multiple regression technique was used to show the amount of variations explained by the independent variables on the dependent variable through the coefficient of determination (R-Square).

### 3.8.3.4 Model Specification

This involved the conceptualization of the multiple regression and moderated multiple regression model to analyze the moderating effect of incubator use on the relationship between Entrepreneurial pedagogy and student innovative capability in institutions of higher education, Kenya. Regression of the outcome variable, which is student innovative capability, with respect to the independent variables problem based, competence-based, direct and case study learning was conducted. This produced a model for prediction. Hence multiple regression analysis was used to analyze data for this study. $R^2$, the coefficient of determination provided a measure of the predictive ability of the model. When the value is close to 1, the regression equation's better fit for the data (Hair, 2009).

The model specification was as follows:

$Y = \beta\ 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$ ……direct effects

Where: $Y$ = Student innovative capability, $\beta 0$ = Constant, $X_1$ =Problem based learning, $X_2$ =Competence based learning, $X_3$ =Direct learning, $X^4$ = Case study learning, $\beta 1 - \beta 4$ = coefficients of regression or change induced $\varepsilon$ = error term

### 3.8.3.5 Moderated Regression

Moderated multiple regression was used to test the moderator effects. The MMR analysis was conducted to test for the moderating effect of incubator use on the

relationship between entrepreneurial pedagogy and student innovative capability in institutions of higher education. This regression method was chosen as it permits estimating the percentage of variance of each regression co-efficient due to moderator variable/s (Dooley & Prause, 2003).This method also creates regression outputs for moderation and simple slopes analysis (Robinson et al., 2013). At every stage of the interaction the $R^2$ is calculated to show the incremental change in variance accounted for Y. This model also creates graphs for every interaction, to illustrate the nature of interaction and to estimate its practical significance (Aguinis & Gottfredson, 2010).

Therefore, to evaluate whether incubator use had a moderating effect, the values of the independent and moderator variables were mean centered by standardizing the values in Z-scores (Aguinis & Gottfredson, 2010). Standardizing variables enabled the study variables avoid high multi-collinearity with the interaction term. The moderating effect of incubator use using the moderated multiple regression was analyzed by interpreting the $R^2$ change in the model summaries' models and the regression coefficients for the product term obtained from the coefficient tables. Moderation was confirmed with the interaction term of the predictor and moderating variable being significant and supported and with a significant increment in the variance($R^2$).

The moderated multiple regression equation was:

$Y = \alpha + aX + bZ + cXZ + \varepsilon$…….3.1

Where:

Y= Student innovative capability

Z- Incubator use

X-Entrepreneurial pedagogy (Problem based, competence based, direct learning, case-study learning)

ε- Error terms

**Table 3.3: Summary of Hypotheses Testing**

| $H_o$ | Statement | Test Statistics | Critical values/Decision Point |
|---|---|---|---|
| $H_{o1}$ | There is no statistically significant relationship between problem-based learning and student innovative capability in higher education institutions in Kenya. | $\beta 1, p1, F, R^2$ | P $\leq$ .05 significant |
| $H_{o2}$ | There is no statistically significant relationship between competence learning and student innovative capability in higher education institutions in Kenya. | $\beta 2, p2, F, R^2$ | P≤.05 significant |
| $H_{o3}$ | There is no statistically significant relationship between direct-learning and student innovative capability in higher education institutions in Kenya. | $\beta_3, p3, F, R^2$ | P $\leq$ .05 significant |
| $H_{o4}$ | There is no statistically significant relationship between case study learning and student innovative capability in higher education institutions in Kenya. | $\beta 4, p4, F, R^2$ | P≤.05 significant |
| $H_{o5a-5d}$ | There is no statistically significant relationship between the moderating role of incubator use on the relationship between problem based, competence based, direct, case study learning and student innovative capability in institutions of higher education in Kenya. | $, p4, F, R^2$ | P≤.05 significant |

**EP =** $\beta_{0,p1+}\beta_{1,\ p2\ldots\ldots\ldots\ldots\ldots\ldots} = R^2$

**Source: Researcher, 2020**

### 3.9 Measurement of Variables

The main variables used in the study were Entrepreneurial pedagogy as the independent variable, incubator use as the moderating variable and student innovative capability as the dependent variable.

### 3.9.1 Student Innovative Capability

Innovative Capability refers to the potential to innovate or the ability to come up and transform ideas into new products, processes, systems and new sources(Saunila et al., 2012).Student innovative capability was measured using six items: new products, new sources of raw materials, novelty of ideas, new markets and new processes as proposed by Schumpeter and Nichol (1934).The items were based on a 5 point scale ranging from 1(strongly disagree ) to 5(strongly agree).

### 3.9.2 Entrepreneurial Pedagogy

Entrepreneurial Pedagogy refers to the different innovative strategies and approaches in teaching of entrepreneurship (Moses et al., 2015).It promotes creativity and innovativeness of the learners. The construct was measured using four dimensions; problem-based learning, competence-based learning, direct learning and case study learning, (Moses et al., 2015)

#### 3.9.2.1 Problem based learning

Problem based learning is an approach that consists of carefully designed problems that challenge students to use problem solving techniques, self-directed learning and skills. (Frambach et al., 2012). This technique promotes the students' ability to explore a single problem in-depth, emphasize independent learning, and enhance stronger resource-utilization skills. Problem based learning was measured using the following five items: peer assessment, trial and error problem solving, self-directed learning, field research and practical learning as proposed by Frambach et al., 2012

#### 3.9.2.2 Competence Based Learning

Competence-based learning is a pedagogical approach that incorporates modes of instructional delivery and assessment efforts designed to evaluate students' mastery of

learning through their demonstration of knowledge, attitudes, experiments, values, skills, and behaviors (Alvarez-Bell et al., 2017). Competence based learning was measured using four items: assessment-based learning, skill matching, talent development and experimental learning as proposed by Alvarez-Bell et al., 2017.

#### 3.9.2.3 Case Study Based Learning

It is an approach that provides students with the opportunity to apply their knowledge, analytical, and conceptual skills to complex real-life scenarios (Giacalone, 2016). It was measured using 4 items: analytical skills, conceptual skills, experiential learning and review of literature as proposed by Giacalone (2016).

#### 3.9.2.4 Direct Learning

It is a pedagogical approach which enables students to experience the processes of knowledge creation. It is a student-centered approach (Iversen et al., 2015). This technique acts as an instructional strategy where students take charge of their learning process. This construct was measured using the following 4 items: question and answer session, assessment tests, presentations and tutor and learner session as proposed by Taghinezhad et al. (2016).

#### 3.9.2.5 Incubator Use

Incubators are programs or networks by some universities and colleges meant to promote economic development organizations (Lindholm  Dahlstrand & Politis, 2013).Incubators have a positive impact on research and innovation among students in institutions of higher education. It promotes students' innovativeness (Lasrado et al., 2016).Incubator use was measured using five items: networking, mentoring, size of the infrastructure, business processes and business support as proposed by (Barbero et al., 2014).

### 3.9.2.6 Control Variables

The control variables of the study included the age and gender of the students. The variables were held constant. A number of empirical studies on gender and innovative behavior have recommended the exclusion of gender biases in order to improve research and innovative capability of students. The researchers have argued that gender status are imperative bid mechanism that contributes to issues of gender inequality in amassed rates of entrepreneurship that eventually affects the prospects that a novel institution will emerge and survive (Nählinder et al., 2015).

Operationalization on measuring innovative behaviour among graduates in the institutions is generally biased. In most cases one set appears less innovative, which, in turn, leads to less visibility, (Thébaud, 2015).Gender perspectives are very seldom employed in measuring level of student innovativeness within institutions of higher education.

According to Nählinder, (2015) using gender to operationalise innovative behavior among students creates a barrier to development of innovative ideas and behaviours.

Hampton et al. (2004) supports this view and echoes that gender bias is a central deficiency of student ratings in terms of pedagogical innovative practices. Therefore, the continued use of rating innovative teaching on the basis of gender should be discouraged in academia.

Studies on entrepreneurship and innovative development have alluded that in as much as age is a factor to consider, little emphasis should be placed on it when measuring the innovative capability of students within the same age set (Florida, 2005).

Excluding one age set as being less innovative as opposed to the other could pose a strain to students abilities, (Hong et al., 2013). Age does not impede both the innovative nature of students and cognitive skills. Life time engagement/s in a cognitively stimulating environment promotes innovativeness of the students as opposed to the age factor, (David et al., 2017).

**Table 3.4: Measurement and Description of Variables**

| **Dimensions** | **Elements** | **Measurement scale** |
|---|---|---|
| **Problem based Learning** | **Independent**<br>• Peer assessment<br>• Trial and Error Problem Solving<br>• Field research<br>• Self-directed learning<br>• Practical learning | Five-point Likert type scale |
| **Competency based Learning** | **Independent**<br>• Assessment based learning<br>• Skills Matching<br>• Talent Development<br>• Experimental learning | Five-point Likert type scale |
| **Direct Learning** | **Independent**<br>• Question answer sessions<br>• Presentations<br>• Tutor Learner Session<br>• Assessment test | Five-point Likert type scale |
| **Case Study Learning** | **Independent**<br>• Analytical skill<br>• Conceptual skill<br>• Experiential Learning<br>• Review of literature | Five-point Likert scale |
| **Student Innovative capability** | **Dependent**<br>• New market<br>• New products<br>• New sources of raw materials<br>• New processes<br>• New ideas | Five-point Likert type Scale |
| **Incubator Use** | **Moderator**<br>• Networking<br>• Mentoring<br>• Size of Infrastructure<br>• Business processes<br>• Business support | Five-point Likert type scale |

Source: Authors' Data (2020)

### 3.9.3 Testing Direct Effects

The model specification was as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \quad \text{.....3.4}$$

Where:

Y = Student innovative capability, $\beta_0$ = Intercept, $X_1$-Problem based learning, $X_2$ -Competence based learning, $X_3$ -Direct learning, $X_4$ = Case study learning

$\beta_1 - \beta_8$ = coefficients of regression and $\varepsilon$ = error term

### 3.9.4 Testing Moderating Effects

In testing for moderating effect of incubator use, the following model was used

$$Y = \beta_0 + \beta_1 X_i + \beta_2 Z + \beta_3 X_i Z + \varepsilon \quad \text{.....3.5}$$

In correlation analysis, a moderating variable (Z) according to Baron and Kenny (1986) is a third variable which could affect the amount of correlation and or change the direction of the dependent (Y) and the independent variable (X). The effect of a moderator can be shown via the interaction of X and Z (Kang et al., 2015; Wu & Mohi, 2015).

### 3.9.5 Analytical Model

The model specification in the study was anchored on an interactive effect. According to Rose *et al.*, (2004), a moderator is a third variable that adjusts a causal relationship's strength. Baron and Kenny (1986) it is a “variable that affects the direction or strength of the relationship between study variables. The study’s statistical diagram is depicted in Figure 3.1 below.

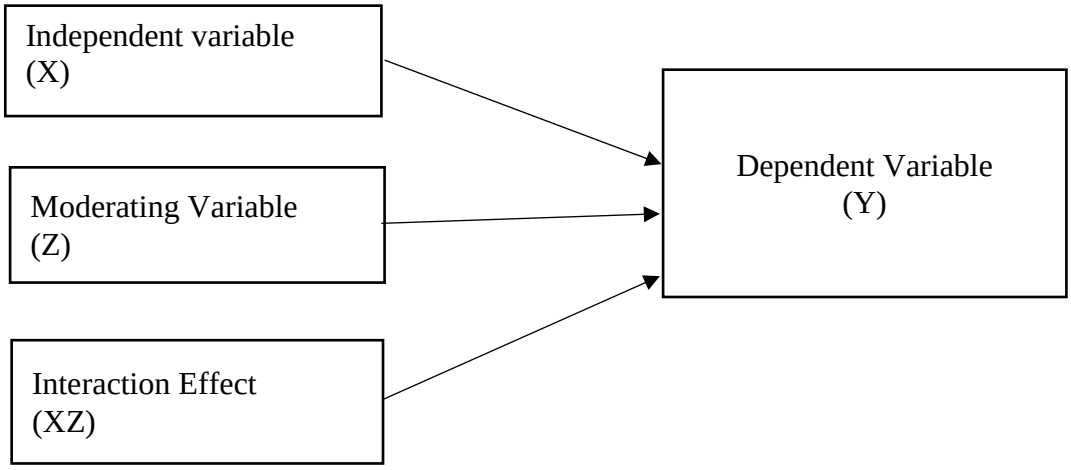


**Figure 3.1: Testing Interaction Effect**
***Source Baron and Kenny (1986)***

To estimate the simple and interaction effect, first X and Z is incorporated into the model as predictors of Y. Next, the interaction term XZ is incorporated into the model, if the interaction effect is significant, then the moderating effect exist (Baron & Kenny, 1986). Note that in multiplying X and Z, a problem of multicollinearity may exist, and to correct this, centering or standardizing data is done (Frazier et al., 2004).

Fitting each of the variables into equation 3.5 concerning the test of moderation is as shown below. In this study, the following are the independent variables; Problem Based Learning (PBL), Competence Based Learning (CBL), Direct Learning (DL) and Case Study Leaning (CSL). The moderating variable is Incubator Use (IU) while Student Innovative Capability (SIC) is the dependent variable.

The following equations will be used to test for moderating effect of the incubator use on each of the independent variables and the dependent variable.

$$SI = \beta_0 + \beta_I PBL + \beta_2 IU + \beta_3 (PBL * IU) + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.6$$

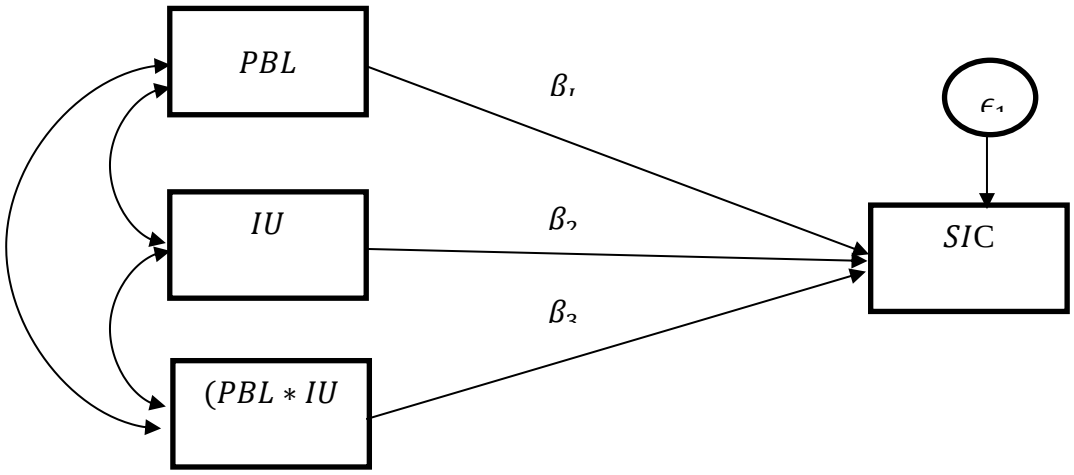


**Figure 3.2: Graphical Path Analysis of moderating role of IU on PBL and SIC**

Equation 3.6 Testing the moderation effect of incubator use on the link between problem-based learning and student innovative capability. Figure 3.2 represents a path diagram of the relationship. $\beta_1$Measures the effect of PBL on SIC, $\beta_2$measures the moderating effect of IU on SIC while $\beta_3$ measures the interaction effect.

To test interaction effect of IU on CBL and SIC,Equation 3.7 will be estimated. The results can also be expressed in form of path analysis as shown in figure 3.3

$$SI = \beta_0 + \beta_I CBL + \beta_2 IU + \beta_3 (CBL * IU) + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.7$$

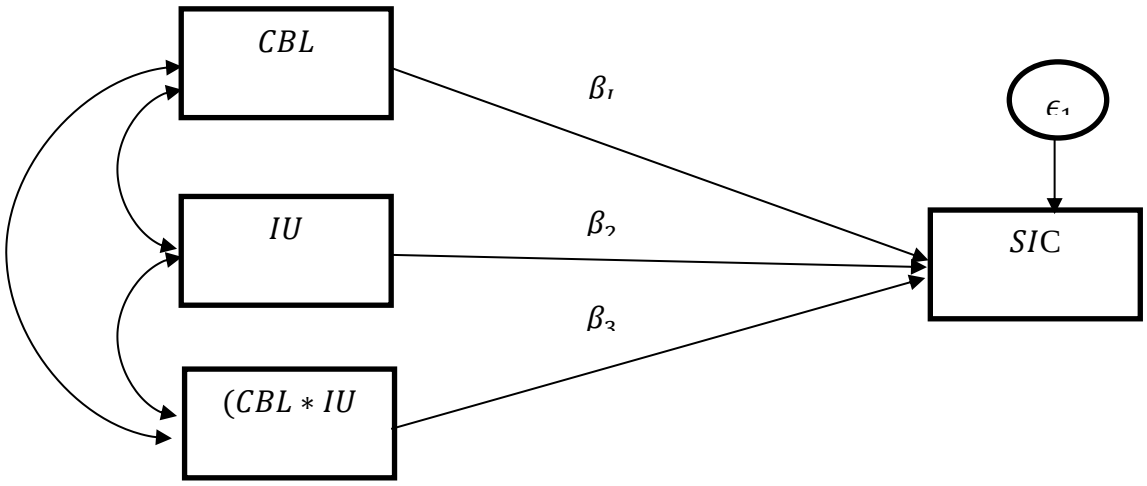


**Figure 3.3: Graphical Path Analysis of Moderating role of IU on CBL and SIC**

Testing moderation effect of incubator use on the relationship between DL and SIC is estimated by equation 3.8 and results will be presented in path analysis as shown in figure 3.4.

$$SI = \beta_0 + \beta_I DL + \beta_2 IU + \beta_3 (DL * IU) + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.8$$

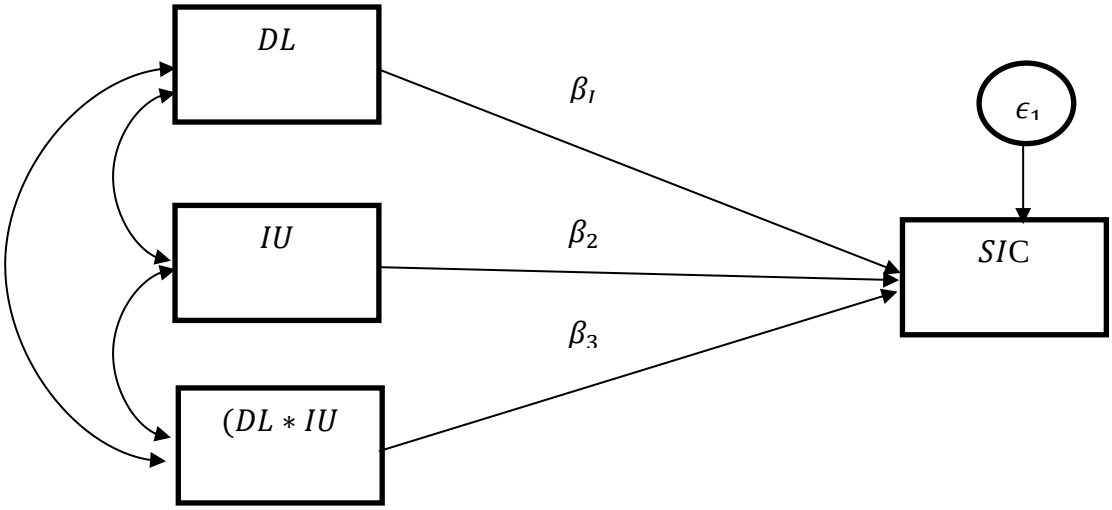


**Figure 3.4: Graphical Path Analysis of moderating role of IU on DL and SIC**

Finally, the moderation effect of incubator use on the relationship between case study learning and SIC is estimated by equation 3.9 like in the preceeding models. Further the results can be demonstrated in form of path analysis as shown in figure 3.5

$$SI = \beta_0 + \beta_I CSL + \beta_2 IU + \beta_3 (CSL * IU) + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.9$$

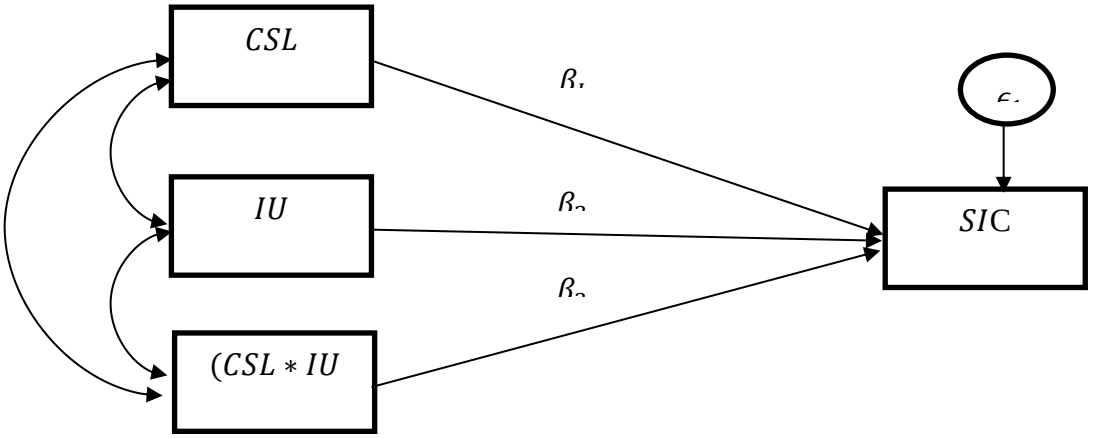


**Figure 3.5: Graphical Path Analysis of Moderating role of IU on CSL and SIC**

Note: If the interaction between the independent variables and moderator variable (IU) is not statistically significant ($\beta_3$) then IU is not a moderating variable, it is just an independent variable. If it is statistically significant, then IU is a moderating variable, and thus moderation is supported.

### 3.10 Diagnostic Tests

Regression analysis describes the statistical association or correlation between study variables (Guerard, 2013). A regression model is thus a statistical procedure that is used to estimate or predict the relationship between variables (Baron & Kenny, 1986; Campbell & Campbell, 2008). A regression model has a number of assumptions that must be met. If such assumptions are violated, expected results would be unreliable, biased, inconsistent, and inefficient, resulting in misleading conclusions and recommendations for future scholars. The following assumptions were assessed under the multiple regression model of analysis:

#### 3.10.1 Normality

In multivariate analysis, normality is a crucial assumption Hair (2009). It is assumed that the errors in the Y (dependent variable) prediction value are normally distributed. The degree of skewness and kurtosis of the study variable were used to measure the data's normality. The Shapiro-Wilk test is used to determine if a data set is normal. It can detect deviations from normality due to skewness, kurtosis, or both. The ShapiroWilk statistic ranges from 0 to 1, and if the measured likelihood (p-value) is less than 0.05, the data deviates greatly from the usual distribution (Razali & Wah, 2011). Histograms and standardized residuals were used to screen for normality in this analysis.

### 3.10.2 Test for Linearity

Linearity is an important assumption because; correlation, regression, and other general linear models assume linearity. Linearity is that amount of change or rate of change, between scores on two variables which is constant for the entire range of scores for the variables. Scatter plots was used to examine the relationship existing in the study variables.

### 3.10.3 Homoscedasticity

The assumption of Homoscedasticity refers to equal variance of errors across all levels of independent variables(Osborne & Waters, 2002). The present study reduced the chances of violating this assumption by ensuring that the data utilized in testing the hypotheses is normally distributed. In this regard Breusch-Pagan / Cook-Weisberg test was employed.

### 3.10.4 Multicollinearity

A multicollinearity test was used to see whether two or more variables were strongly correlated (i.e., not independent of one another), which might influence the regression parameter estimation (Hair, 2009). The presence of multicollinearity makes it difficult to determine and evaluate hypotheses regarding regression coefficients, which frustrates model coefficient interpretations (Gujarati & Porter, 2003), resulting in incorrect regression results (Palaniappan, 2017). If the VIF is greater than 10, there is an issue with multicollinearity (Stevens, 2009). VIF and tolerance were used to test for multicollinearity among the explanatory variables in the sample.

## 3.11 Ethical Considerations

The study adhered to the ethical guidelines for science, which include anonymity, confidentiality, and informed consent. The study's anonymity was maintained by not

gathering or identifying the details of individual participants (e.g., name, address, Email address.). The respondents' or their organizations' identities were not revealed, ensuring confidentiality. Informed consent was obtained from the study participants. These measures enhanced the willingness and objectivity of the respondents. A research permit from NACOSTI was sought before the study's commencement and consent written and verbal was also to be sought from the respondents before engaging them.

# CHAPTER FOUR

# DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION OF THE FINDINGS

## 4.0 Introduction

This chapter provides a presentation of the research findings of the study. It provides findings on the interactive moderating effect of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability in higher education institutions in Kenya. The chapter presents descriptive and inferential statistics results of the study. The chapter opens with a section of demographic description of participants who were involved in data collection. This is followed by reporting of data about the research objectives posed in the study, factor analysis, correlation, regression analysis, and the moderating effect of incubator use.

## 4.1 Response Rate

A total of 385 fourth year entrepreneurship finalists were selected for the study. From the data collected, out of the 385 questionnaires administered to fourth year entrepreneurship finalists as shown in Table 4.1. 380 were correctly filled and returned translating to a response rate of 98.7%. A high response rate facilitated gathering of sufficient data that could be generalized to determine the relationship between entrepreneurial pedagogy and student innovative capability in institutions of higher education, in Kenya.

Hence, in this regard, the response rate is an essential yardstick of survey quality as it ensures accurate and valid results of the survey (Earl-Babbie, 2013; Hair et al., 2010). A high response rate assures for more accurate survey results (Nulty, 2008).Response rate denotes the number of people who completed the survey process divided by the

number of people who made up the total sample (Kalton, 2020) or response rate refers to the proportion of individuals in a sample population that participates in a survey and is perceived as a significant component for the quality of survey-based research. It ensures accuracy and valid results (Hair et al., 2010). Response rates provide valuable insight into the accuracy of the data collected.(Fincham, 2008) suggested that a response rate of 70 percent and above is large enough to perform the analysis.

**Table 4.1:Response Rate**

| **Questionnaires** | **Number** | **Percentage** |
|---|---|---|
| Questionnaires Administered | 385 | 100.00 |
| Questionnaires Returned | 380 | 98.70 |
| Unreturned | 5 | 1.30 |

**Source: SurveyData, 2020**

### 4.2 Data Preparation and Screening

The Survey data was screened for several potential problems concerning missing data according to guidelines provided by Tabachnick and Fidell (2007). On receipt of any completed questionnaire, they were prepared for further screening by numbering them to ensure that every questionnaire was accounted for. In line with the recommendation of Tabachnick& Fidell (2007) this study used Mahalanobis D2 measure to identify and deal with multivariate outliers.

The data was coded into statistical software STATA. Qualitative statements were coded as, 5-Strongly Agree, 4-Agree, 3- Disagree, 2 strongly Disagree, 1 Not Decided.To ensure the data was reliable; the study performed a reliability test as suggested by Lee Cronbach in 1951.

### 4.3 Demographic Characteristics

Age of the respondents was categorized into 18 to 25 years and between 26 to 30 years. The results on age cohorts and gender are presented in Table 4.2. The results showed that the majority (n = 249, 65.5%) were in the age cohort of 18 to 25 years while the cohort of 26 to 30 years were (n = 131, 34.5%).On the gender of the respondents, the majority (n = 218, 57.4%) were males while females (n = 162, 42.6%). Results were presented as follows;

**Table 4. 2: Age Group and Gender of the Respondents**

| Variable | Category | Frequency | Percentage |
|---|---|---|---|
| | 18-25 | 249 | 65.5 |
| Age Group | 26-30 | 131 | 34.5 |
| | **Total** | **380** | **100.0** |
| | Male | 218 | 57.4 |
| Gender | Female | 131 | 42.6 |
| | **Total** | **380** | **100.0** |

**Source: Survey Data, 2020**

### 4.4 Analysis of Outliers

Detecting outliers in survey studies is a critical phase before conducting data analysis. A current definition of an outlier is one that tends to deviate substantially from the rest of the sample members in which it occurs (Mertler & Reinhart, 2016).

An outlier, on the other hand, is an observation in a data set that appears to be inconsistent with the rest of the data (Rahman et al., 2012). As a result, an outlier is a point that deviates significantly from other observations. Outliers can occur as a result of measurement variance, and they can reveal an experimental error (Aggarwal, 2015). Outliers are a common occurrence in any random distribution, but they are also indicative of measurement error or a hard-tail distribution in the population. Outliers must be thoroughly examined because failing to do so will cause statistical analyses to be skewed if there are any troublesome outliers (Hair et al., 2010). It distorts statistics

in particular, and it may result in findings that do not generalize to any sample but one with the same form of outliers (Tabachnick & Fidell, 2007).

According to Tabachnick & Fidell, the Mahalanobis D2 measure was used to classify and deal with multivariate outliers (2007). Furthermore, dealing with multivariate outliers will also address univariate outliers. However, treating univariate outliers does not guarantee that multivariate outliers would be addressed (Hair et al., 2010). As a result, Mahalanobis D2 was calculated using linear regression methods in STATA , followed by the computation of the Chi-square value. This means that any case with a probability Mahalanobis D2 value of less than .001 is a multivariate outlier and should be omitted. As a result, cases with a value of less than .001 were eliminated.

### 4.5 Descriptive Statistics Results for the Study Variables

In this section, the various mean scores (M), standard deviation (SD), skewness, and kurtosis were computed and analyzed for all the measurement items or statements related to student innovative capability, problem-based learning, competence-based learning, direct-learning and case-study learning, as well as incubator use. The results are shown in the following section.

#### 4.5.1 Student Innovative Capability

The outcome variable of the study was student Innovative Capability. The study measured the variable using various constructs. The response was categorized and coded as 5=strongly agree, 4 = agree, 3 = not decided, 2 = disagree and 1= strongly diagree. Results showed that on average, the students agreed to have the capacity to produce unique ideas ($Mean = 4.15, std.dev = 1.09$).The students' focus is to look into better ways to produce new and unique ideas so as to enhance their creativity and innovativeness. Students showed they were constantly seeking for unusual novel

solutions to solve problems ($Mean = 3.88$). This could imply that students made an effort towards generating original solutions to problems based on the experience and knowledge gained. Furthermore, respondents slightly agreed that they can be innovative by generating new ideas that can be translated into viable and profitable businesses ($mean = 3.8, skewness -0.82 \; and \; kurtosis \; of \; 0.032$). In addition, respondents agreed that they can modify the features of an existing product or service (mean 3.75) and that they can discover new products and services (3.71), meaning that students can transform viable ideas into services for uniform application within their institutions. The values for skewness and kurtosis presented in table 4.3 conformed to the acceptable values of below <3 for skewness and <10 for kurtosis thus normal distribution (Wai et al., 2019).,

**Table 4.3: Descriptive Statistics for Student Innovative Capability**

| **Descriptive Statistics (*N=380, Minimum=1, Maximum =5*)** | | | | |
|---|---|---|---|---|
| **Student Innovative Capability** | **Mean** | **Std. Dev** | **Skewness** | **Kurtosis** |
| 1.I can produce unique ideas | 4.15 | 1.09 | -1.451 | 1.583 |
| 2. I am constantly seeking for unusual novel solutions to solve problems | 3.88 | 1.132 | -0.978 | 0.277 |
| 3. Actively searching for better products and services | 3.8 | 1.214 | -0.929 | -0.007 |
| 4. I have come up with new products that has benefited my business | 3.75 | 1.183 | -0.738 | -0.256 |
| 5. Developed new ideas and concepts overtime | 3.61 | 1.2 | -0.608 | -0.492 |
| 6. I have actively identified new services and products that has enhanced my capability | 3.77 | 1.129 | -0.808 | -0.015 |
| 7. I have come up with new products that has benefited the business | 3.6 | 1.161 | -0.648 | -0.344 |
| 8. Constantly seeking for new ways to do things | 3.72 | 1.207 | -0.793 | -0.28 |
| 9. I prefer work that requires originality in thought | 3.77 | 1.202 | -0.845 | -0.207 |
| 10. I can generate new ideas and be able to translate them into viable and profitable businesses | 3.8 | 1.115 | -0.82 | 0.032 |
| 11. Ability to present new methods and ideas | 3.7 | 1.176 | -0.691 | -0.307 |
| 12. I can modify the features of an existing product or service | 3.75 | 1.139 | -0.823 | -0.046 |
| 13. I can come up or discover original ideas | 3.71 | 1.132 | -0.798 | -0.124 |
| 14. I can discover new products and services | 3.75 | 1.132 | -0.845 | 0.048 |

*Note: 5=Strongly Agree, 4= Agree, 3=Disagree, 2=Strongly Disagree 1= Not Decided*

**Source: Survey Data, 2020**

### 4.5.2 Problem Based Learning

This section of the analysis highlights the descriptive results on Problem-based learning. The study respondents were asked to show the extent to which they agreed on the constructs relating to problem-based learning that would enhance their innovative capabilities. The data was analyzed and the results presented in table 4.4. Students agreed that they are responsible for their learning ($mean = 4.42, Std.dev = 0.872$). This implies that students can responsibly take initiative in their learning and thus enhance their learning needs and goals. The respondents also agreed to the fact that they are actively involved in the process of learning ($mean = 4.09$) and that problem tasks stimulate their thinking, analysis and reasoning ($mean = 4.11, std.dev = 1.021$).

Further they are agreed that problem-based design of the courses requires active and critical reflection ($mean = 3.84$). This implies that students must be present in tutorial groups as it enables them to master the learning goals. Problem based learning is essential in determining students' innovative capability in the sense that multiple trials are encouraged in developing solutions for classrooms problems($mean = 3.86$).

In addition, students are encouraged to work in peer groups which in essence help them assist each other in solving entrepreneurial quizzes and encouraging group participation($mean = 3.76$). Skewness and kurtosis which measures normal distribution of the items were <3 for skewness and <10 kurtosis which are acceptable,Kline (2005). The above findings are as presented in table 4.4 below.

**Table 4.4: Descriptive Statistics for Problem Based Learning**
**Descriptive Statistics (*N=380, Minimum=1, Maximum =5*)**

| Problem Based Learning | Mean | Std. Dev | Skewness | Kurtosis |
|---|---|---|---|---|
| 1.We have responsibility for our learning | 4.42 | 0.872 | -1.946 | 4.37 |
| 2. Actively involved in the process of learning | 4.09 | 1.045 | -1.168 | 0.849 |
| 3. Problem tasks stimulate thinking, analysis and reasoning | 4.11 | 1.021 | -1.178 | 0.858 |
| 4. We have autonomy in the process of learning | 3.9 | 1.111 | -0.919 | 0.174 |
| 5. We have an opportunity to interact with the faculty | 3.77 | 1.203 | -0.777 | -0.332 |
| 6. Problems match with students' level of knowledge | 3.8 | 1.139 | -0.879 | -0.003 |
| 7. Emphasize is placed on self-directed learning | 3.76 | 1.207 | -0.857 | -0.207 |
| 8. Problem based design assures self-being in directed learning | 3.84 | 1.182 | -0.857 | -0.177 |
| 9. Being present in tutorial groups is necessary to master the learning goal | 3.97 | 1.108 | -0.998 | 0.228 |
| 10.We take initiative in diagnosing our learning needs | 3.75 | 1.169 | -0.8 | -0.223 |
| 11. I fulfil the task given to me during group work | 3.86 | 1.126 | -0.93 | 0.192 |
| 12. I participate in group work as much as possible | 3.81 | 1.166 | -0.879 | -0.033 |
| 13. Problems are easily solved without much difficulty | 3.74 | 1.195 | -0.767 | -0.392 |
| 14. We choose appropriate learning strategies | 3.79 | 1.158 | -0.756 | -0.34 |
| 15. Multiple trials are encouraged in developing solutions for classroom problems | 3.86 | 1.145 | -0.937 | 0.131 |
| 16. 1We are expected to conduct field research on a given topical issues | 3.73 | 1.177 | -0.832 | -0.131 |
| 17. We can self-monitor the learning process | 3.79 | 1.154 | -0.836 | -0.067 |
| 18. We decided on the resources for learning | 3.55 | 1.275 | -0.61 | -0.684 |
| 19. We are encouraged to work in peer groups where we can conduct peer assessments | 3.76 | 1.189 | -0.817 | -0.205 |

*Note: 5=Strongly Agree, 4= Agree, 3=Disagree, 2=Strongly Disagree 1= Not Decided*

**Source: Survey Data, 2020**

### 4.5.3 Competence Based Learning

This section describes findings related to competence-based learning, which was one of the explanatory variables used to determine the effects on student innovative capability. Descriptive analysis was carried out and the findings indicates that teaching geared towards enhancing students' capabilities was achieved($mean = 4.2$, $skewness = -1.433$ $and$ $kurtosis$ $1.367$). This implies that the teaching strategies in place were effective thus enhancing students abilities. Moreover, Students agreed that the exams conducted, are key in determining the competence of their learning ($mean = 3.87, std.dev = 1.238$). This implies that the exams given improved and sharpened student's ability, thus leading to improved performance on the entrepreneurship students. The results also revealed that all the entrepreneurship students take up skills matching classes in determining businesses they run or manage

($mean = 3.81$). Finally, the results revealed that students agreed to shared group results which encouraged them to do their best to achieve good results ($mean = 3.95$).Therefore, it implied that students were allowed to perform group discussions which encouraged them to do their best, hence achieving the best results.

These results are presented in Table 4.5

**Table 4. 5: Descriptive Statistics for Competence Based Learning**

**Descriptive Statistics (*N=380, Minimum=1, Maximum =5)***

| Competence Based Learning | Mean | Std. Dev | Skewness | Kurtosis |
|---|---|---|---|---|
| 1.Teaching is geared towards enhancing students' capabilities | 4.2 | 1.075 | -1.433 | 1.367 |
| 2. Exams conducted is key to determining the competence of the learner | 3.87 | 1.238 | -0.915 | -0.205 |
| 3. Skills matching is conducted to determine courses students should undertake | 3.82 | 1.252 | -0.79 | -0.498 |
| 4. All entrepreneurship students take up skills matching classes to determine businesses they can run/manage | 3.81 | 1.102 | -0.695 | -0.317 |
| 5. Various talent development programs/ projects are conducted at the university relating to entrepreneurship | 3.74 | 1.158 | -0.729 | -0.277 |
| 6. Talent development as an activity is part of the university calendar | 3.67 | 1.194 | -0.745 | -0.28 |
| 7. The assessment given enhance our entrepreneurial skills | 3.68 | 1.156 | -0.703 | -0.248 |
| 8. The teaching is based on class experiments so as to enhance our abilities | 3.78 | 1.15 | -0.873 | 0.008 |
| 9. We take initiative to start tasks | 3.8 | 1.113 | -0.776 | -0.128 |
| 10. We take responsibility for the choices we make | 3.83 | 1.122 | -0.934 | 0.267 |
| 11. During group experiments I make valuable contributions | 3.85 | 1.141 | -0.908 | 0.069 |
| 12. I contribute to shared group results by performing class duties | 3.95 | 1.066 | -1.049 | 0.645 |
| 13. With my expertise I help others perform their tasks | 3.8 | 1.158 | -0.844 | -0.07 |
| 14. We are encouraged as a group to do our best to achieve the best results possible | 3.82 | 1.221 | -0.937 | -0.062 |

Note: 5=Strongly Agree, 4= Agree, 3=Disagree, 2=Strongly Disagree 1=Not Decided

**Source: Survey Data, 2020**

### 4.5.4 Direct Learning.

This section of the analysis shows the descriptive results of the direct learning approach. The results revealed that the respondents agreed that direct learning influences their innovative capabilities when teachers employ question and answer session whilst

teaching ($mean\ score = 4.04$). This denotes that when teachers employ questions and answers when teaching, students grasp concepts better.

In addition, students slightly agreed that they are encouraged to ask questions when learning to ensure they grasp concepts ($mean\ score = 4.03$).The results suggest that the more the students ask questions, the more likely they are to better grasp the concepts and become more equipped.

The results also revealed that the class discussions enhanced students understanding($mean = 3.96$). This implies that students should freely engage in class discussions and group work as this creates better and enhanced material understanding.

In addition, entrepreneurial students consented to the fact that discussions in class broaden their skills during class work and that these skills are more enhanced when they are encouraged to brainstorm on questions and answers ($mean = 3.78$,std.dev =1.086).Skewness and kurtosis were <3 and <10 respectively. This as per Kline (2005) is acceptable.

Results are presented in Table 4.6

**Table 4.6: Descriptive Statistics for Direct Learning**

**Descriptive Statistics(*N=380, Minimum=1, Maximum =5)***

| Direct Learning | Mean | Std. Dev | Skewness | Kurtosis |
|---|---|---|---|---|
| 1.Teachers employ question and answer session when teaching | 4.04 | 1.197 | -1.197 | 0.447 |
| 2. We are encouraged to ask questions when learning to ensure they grasp concepts | 4.03 | 1.131 | -1.223 | 0.761 |
| 3. Presentations are compulsory when studying various units | 3.86 | 1.206 | -0.832 | -0.333 |
| 4. Presentations are pre-defined in terms of number of presentations and mode of presentations | 3.81 | 1.124 | -0.871 | 0.12 |
| 5. Teachers must appear in class for every lesson | 3.61 | 1.281 | -0.639 | -0.655 |
| 6. We are required to attend all classes | 3.75 | 1.224 | -0.837 | -0.269 |
| 7. Class discussions are encouraged in class to enhance our understanding | 3.96 | 1.085 | -1.117 | 0.778 |
| 8. We are allowed to create own questions to test their ability | 3.71 | 1.21 | -0.708 | -0.396 |
| 9. Discussions take up most of the course time | 3.7 | 1.226 | -0.698 | -0.517 |
| 10. Class presentations have a positive impact on us | 3.75 | 1.149 | -0.841 | -0.008 |
| 11. We are given an open arena of the questions and answers to enhance our ability | 3.76 | 1.164 | -0.851 | -0.037 |
| 12. Discussions broaden our skills during class work | 3.74 | 1.116 | -0.821 | 0.036 |
| 13. We are encouraged to brainstorm on questions and answers to enhance our skills | 3.78 | 1.086 | -0.804 | 0.123 |
| 14. We are motivated to work based on the class assessment deadlines | 3.69 | 1.205 | -0.827 | -0.173 |
| 15. We take responsibility for the class presentation given | 3.8 | 1.154 | -0.828 | -0.098 |

**Source: Survey Data, 2020**

### 4.5.5 Case Study Learning

This section of the analysis shows the descriptive statistics on Case study learning. The results for case study learning revealed that respondents clearly understand and articulate the main concepts ($mean = 4.1, std.dev = 1.047$).The results implied that case study learning was an effective tool for the students as it enabled them to understand concepts more elaborately and give them an overview understanding of the concepts.

Similarly, the results revealed that the respondents have the ability to think through a problem, argue it out and give solutions ($mean = 4.02, std.dev = 1.106$). This could imply that the more students utilized their cognitive ability, the more likely they were to find solutions to the problems and enhance them towards being more innovative. Furthermore, the results showed that the respondents agreed that write-up of well-

known local entrepreneurs' experiences are available for review ($mean = 3.85, std.dev = 1.174$). This suggests that the students' facilities were akin to their expectations as they offered the necessary resources like the current write-ups of entrepreneurs' experiences and mile-stones, thus propelling them toward being more innovative.

In addition, results revealed that the students within higher education institutions education consented to a more structured environment as it enhanced their learning ($mean = 3.83, std.dev = 1.113$).The results suggest that a structured learning environment is likely to encourage better participation, which eventually enhances their learning. Skewness and kurtosis were <3 and <10 respectively. This in accordance with Kline (2005) is acceptable.

**Table 4.7: Descriptive Statistics for Case Study Learning**
**Descriptive Statistics (*N=380, Minimum=1, Maximum =5)***

| Case Study Learning | Mean | Std. Dev | Skewness | Kurtosis |
|---|---|---|---|---|
| 1.I can clearly understand and articulate the main concepts | 4.1 | 1.047 | -1.185 | 0.92 |
| 2. Write-up of well-known local entrepreneurs' experiences are available for review to students | 3.85 | 1.174 | -0.866 | -0.08 |
| 3. I have the ability to think through a problem and argue it out and give possible solutions | 4.02 | 1.106 | -1.191 | 0.854 |
| 4. Review of literature as a skill is taught to students during entrepreneurship | 3.83 | 1.121 | -0.862 | 0.066 |
| 5. It gives an overview understanding of what happens in real life situations | 3.81 | 1.134 | -0.933 | 0.175 |
| 6. I have the ability to understand the relationship between the concepts | 3.8 | 1.168 | -0.965 | 0.129 |
| 7. Case study has improved my learning efficiency | 3.82 | 1.157 | -0.929 | 0.117 |
| 8. I have the ability to apply knowledge gained from cases to solve other problems | 3.77 | 1.162 | -0.843 | -0.092 |
| 9. Case study has helped me learn the entrepreneurship content in a more comprehensive way | 3.77 | 1.133 | -0.829 | 0.029 |
| 10. I have the ability to articulate real life issues based on the cases done in a classroom setting | 3.77 | 1.17 | -0.814 | -0.127 |
| 11. Gives more opportunities for participation | 3.7 | 1.165 | -0.865 | 0.01 |
| 12. We are given more opportunities to apply learning to different cases | 3.81 | 1.099 | -0.83 | 0.058 |
| 13. More structured environments enhance learning | 3.83 | 1.113 | -0.942 | 0.293 |
| 14. Encourages application of analytical skills | 3.75 | 1.163 | -0.804 | -0.092 |
| 15. More opportunities for reviews of literature | 3.66 | 1.169 | -0.708 | -0.307 |

**Source: Survey Data, 2020**

### 4.5.6 Incubator use

This section of the analysis shows the descriptive statistics on incubator use. The results are reported in Table 4.8.

The study findings revealed that the respondents consented to having acquired practical skills through the training given in the incubator ($mean = 3.69, std.dev = 1.161$). As such, students could use the acquired skills as part of their everyday learning and thus enhance their innovative ability. Furthermore, the students agreed that the training policies gained through the incubator has enhanced their understanding ($mean = 3.65, std.dev = 1.242$). Consequently, the training policies equipped the students' entrepreneurial skills and the result was that students gained more knowledge and understanding.

Additionally, the respondents agreed that the incubator has the ability to enhance their etiquette and presentation skills, ($mean = 3.62, std.dev = 1.242$). This implies that the incubator equipped the students with better entrepreneurial etiquette skills, thus fostering more innovative behavior.

Finally, Students agreed that incubator use has enabled them network with entrepreneurs from diverse fields, ($mean = 3.55\ std.dev = 1.219$). This implies that through the incubator use, entrepreneurship students can network with other entrepreneurs within and outside the community and thus open them up to more ideas and eventually enhancing their innovative capability.

Further the respondents, disagreed that the entrepreneurial lab had enhanced their communication skills. ($mean = 3.38\ std.dev = 1.248$). Although they were in disagreement, they still held that the lab provided them with a combination of many

skills, including the ability to plan, organize, and manage resources. ($mean = 3.558\ std.dev\ = 1.21$).

Skewness and kurtosis were <3 and <10 respectively. This in accordance with Wai et al. (2019) is acceptable.

**Table 4.8: Descriptive Statistics for Incubator Use**

**Descriptive Statistics (*N=380, Minimum=1, Maximum =5)***

| Business Incubators | Mean | Std. Dev | Skewness | Kurtosis |
|---|---|---|---|---|
| 1.The business incubator has enhanced my networking abilities | 3.5 | 1.378 | -0.586 | -0.853 |
| 2. I'm able to network with entrepreneurs from diverse fields | 3.55 | 1.219 | -0.541 | -0.585 |
| 3. I am able to meet and work with other entrepreneurs | 3.56 | 1.189 | -0.478 | -0.577 |
| 4. I have acquired sufficient business training through the incubator | 3.58 | 1.187 | -0.594 | -0.413 |
| 5. The incubator has opened me up to better ideas | 3.48 | 1.271 | -0.464 | -0.856 |
| 6. Entrepreneurial lab focuses on key business aspects of training | 3.61 | 1.239 | -0.701 | -0.362 |
| 7. I have acquired practical skills through the training given through the incubator | 3.69 | 1.161 | -0.791 | -0.048 |
| 8. The incubator has enabled me have access to peer mentoring | 3.53 | 1.264 | -0.611 | -0.603 |
| 9. I am able to build my entrepreneurial capabilities and skills | 3.53 | 1.277 | -0.606 | -0.63 |
| 10. I have the ability to enhance my etiquette and presentation skills | 3.62 | 1.242 | -0.633 | -0.531 |
| 11. The entrepreneurial lab has enhanced my communication skills | 3.38 | 1.248 | -0.499 | -0.737 |
| 12. Entrepreneurship training policies gained through the incubator has enhanced my understanding | 3.65 | 1.242 | -0.722 | -0.406 |
| 13. The lab has provided me with a combination of many skills including, ability to plan, organize and manage resources | 3.58 | 1.21 | -0.651 | -0.42 |

**Source: Survey Data, 2020**

### 4.6 Reliability Test

It was important to determine reliability of the constructs used to measure the variables in question. This study tried to determine the internal consistency of the construct. It is

the consistency of the people's response across the items on a multiple- item measure. All the items are supposed to reflect the same underlying constructs so that respondents' scores are correlated with each other. If the individuals' responses to different items are not the same or are not correlated with each other, it could no longer make sense to claim that they are all measuring the same underlying constructs. Internal consistency can be assessed by collecting and analyzing the data. Cronbach alpha was used which is a measure of internal consistency. It is a measure of scale reliability. The results shown in Table 4.9 revealed that all the coefficients were within the accepted thresholds of 0.7 as postulated by Lee Cronbach in 1951 (Cronbach, 1951). Therefore, it was concluded that the constructs used were reliable.

**Table 4.9: Cronbach Reliability Test**

| Variables | Average inter-item covariance | No. of items in the scale | Cronbach's alpha coefficient |
|---|---|---|---|
| Student Innovative capability | 0.3990 | 14 | 0.8555 |
| Problem-Based Learning | 0.3511 | 19 | 0.8749 |
| Competence-Based Learning | 0.3683 | 14 | 0.8424 |
| Direct Learning | 0.3936 | 15 | 0.8577 |
| Case Study Learning | 0.4109 | 15 | 0.8742 |
| Incubator Use | 0.4408 | 13 | 0.8389 |

**Source: Survey Data, 2020**

### 4.7 Sampling Adequacy using Kaiser-Meyer-Olkin (KMO)

Before conducting factor analysis, data was standardized by creating z-scores for every variable. Data standardization is done to have a common data format. It deals with data transformation by subtracting every variable's mean and dividing it by its standard deviation. In addition, Yong and Pearce (2013) proposed that it is necessary to determine whether the sampling used in any survey is adequate for factor analysis. The constructs used to measure entrepreneurial pedagogy, incubator use and student innovative capability are unobserved and therefore factor analysis is conducted to

reduce a large set of variables into few composite variables. To do this, principal component analysis (PCA), a statistical method that extracts factors from the data is estimated. It finds a set of small unobserved variables accounting for as much variance as possible among a larger set of variables (Park, 2017). Principal component analysis according to Mishra et al. (2017) is a multivariate technique that analyzes a data table in which several inter-correlated quantitative dependent variables describe observations. The table 4.10 shows the results from KMO. To get KMO, PCA is first estimated for identifying various components and then *estatkmo*command using STATA software will estimate the KMO.

According to Kaiser (1974), KMO values range between 0 and 1. Values close to zero show that there are large partial correlations in comparison to the sum of correlation. In other words, there is a widespread correlation and it implies a setback for factor analysis.

**Table 4.10: Sampling Adequacy Using KMO**

| Variables | KMO Sampling Adequacy |
|---|---|
| Students Innovative Capability | 0.8983 |
| Problem Based Learning | 0.8994 |
| Competence Based Learning | 0.8836 |
| Direct Learning | 0.8870 |
| Case Study Learning | 0.9114 |
| Incubator Use | 0.8706 |

**Source: Survey Data, 2020**

The KMO values between 0.8 and above indicate the sampling is adequate for factor analysis whereas values less than 0.6 are not adequate and remedial action should be taken. This study found that all variables were above 0.8 and were acceptable for factor analysis. The results presented shows that the overall coefficient for KMO sampling adequacy for problem-based learning is (0.8994), competence learning (0.8836), direct

learning, (0.8870) and case study learning, (0.9114), were above the accepted threshold. Further the moderator (incubator use) and the dependent variable (student innovative capability) had KMO values of 0.8706 and 0.8983 respectively. Each of the constructs used had KMO sampling adequacy above the threshold of 0.8. Since all the variables met the threshold of having the KMO values over 0.70, the study proceeded to do factor analysis using principal component analysis.

### 4.8 Factor Analysis

Factor analysis is a statistical analysis reduction technique that explains correlation between multiple outcomes due to one or multiple underlying explanations or factors. It attempts to discover the unexplained factor influencing the covariance among multiple observations (Matsunaga, 2010). These factors represent underlying concepts that cannot be adequately measured by a single variable. The significance of this is that it is normally used in survey research in which responses to each question represents an outcome since several or multiple questions are often related. Eigenvalues are used to measure the total variance accounted by each factor. According to Kaiser (1974), those with Eigenvalues equal to or greater than one should be retained.

The study computed Eigenvalues for each variable in the study as presented in Table 4.11. Considering factor 1, Student innovative capability had an Eigenvalue of 4.190; problem-based learning 4.899, competence-based learning 3.934, direct learning and case study learning had Eigen values 4.365 and 4.809 respectively. Incubator use had an Eigenvalue of 3.747. Looking into factor 2, the Eigenvalues for all the variables were less than the 1 and according to Kaiser Criterion, this factor was not retained and therefore only factor 1 was considered in determining the loadings of the constructs.

**Table 4.11: Factor Analysis**

| Variable | Eigenvalues | | Likelihood Ratio Test | |
|---|---|---|---|---|
| | **Factor 1** | **Factor 2** | **Chi2** | **Prob>Chi2** |
| Student Innovative Capability | 4.190 | 0.452 | 1416.56 | 0.000 |
| Problem Based Learning | 4.899 | 0.699 | 1971.14 | 0.000 |
| Competence Based Learning | 3.934 | 0.789 | 1374.52 | 0.000 |
| Direct Learning | 4.365 | 0.511 | 1527.34 | 0.000 |
| Case Study Learning | 4.809 | 0.494 | 1720.59 | 0.000 |
| Incubator Use | 3.747 | 0.363 | 703.93 | 0.000 |
| *LR Test: Independence versus Saturated.* | | | | |

**Source: Survey Data, 2020**

### 4.8.1 Factor Loading

The study extracted factors using factor analysis technique; this was done after confirmation from KMO in which the study found the KMO values for each variable to be above 0.70 (Kaiser, 1974). Factor loadings are weights and correlation between each variable in the study and the factor. The recommended loading for an item according to Hair et al. (2014) is a factor loading of 0.50. Factor dimensionality is relevant when the factor loading is higher. A negative value indicates an inverse impact on the factor. The loadings for factor 1 were positive to each of the variables in question. Uniqueness is the variance that is unique to the variables and not shared with other variables for instance it is clear from the results in Table 4.12 below that the higher the loadings the lower the uniqueness and vice versa. In simple terms low loading means the construct in question is unique to other constructs in explaining the main variable.

#### 4.8.1.1 Factor Loadings on Student Innovative Capability

Principal component analysis (PCA) is widely used in data processing and dimensionality reduction (Naik, 2017). The principal component analysis goal is to extract the important information from the data, represent it as a set of new orthogonal variables called principal components, and display the pattern of similarity between the observations and the variables. PCA may be extended to treat qualitative variables as

correspondence analysis and heterogeneous sets of variables as multiple factor analysis. PCA is based on the Eigen decomposition of positive semi-definite matrices and the singular value in mathematics.

Factor analysis is a technique of looking for trends in data, reducing the number of variables to a manageable number, and grouping variables that have similar characteristics (Abson et al., 2012).

The study extracted factors for the dependent variable (Student Innovative Capability). To do this, first the study estimated the reliability of constructs using Cronbach alpha. Students' innovative capability had a reliability coefficient of 0.8555>0.7 (Lee Cronbach, 1951). The KMO value of 0.8983>0.7 signified that the sample was adequate for factor analysis (Kaiser, 1974). The Likelihood ratio was a significant estimation of independent versus saturated items at (Chi2 1416.56) and prob>Chi2 0.000. Since factor 1 had an Eigenvalue of 4.190>1, the loading on the items defining student innovative capability was based on factor 1. The loadings should be greater than 0.5 to be retained (Yong & Pearce, 2013).

According to Matsunaga (2010) and Ooge et al. (2020), the orthogonal versus oblique data has been the hotly debated issue concerning the data rotation technique. If the constructs in the study feature unrelated factors orthogonality should be verified. For example if the factors are indeed unrelated, it should be revealed via exploratory factor analysis by employing an oblique rotation method. The uniqueness of the specified factors' variance is not affected because rotation only changes the coordinates of the common factor space. The aim of rotation is to make factor loading easier to interpret (Yong & Pearce, 2013). Therefore, this study used varimax orthogonal rotation with Kaiser Normalization.

**Table 4.12: Factor Loading on Student Innovative Capability**

| Variable | Factor 1 | |
|---|---|---|
| **Student Innovative Capability** | **Loadings** | **Uniqueness** |
| 1.I have the capacity to produce unique ideas | 0.435 | 0.687 |
| 2. I am constantly seeking for unusual novel solutions to solve problems | 0.548 | 0.615 |
| 3. Actively searching for better products and services | 0.573 | 0.612 |
| 4. I have come up with new products that has benefited my business | 0.550 | 0.582 |
| 5. Developed new ideas and concepts overtime | 0.558 | 0.624 |
| 6. I have actively identified new services and products that has enhanced my capability | 0.504 | 0.678 |
| 7. I have come up with new products that has benefited the business | 0.580 | 0.558 |
| 8. Constantly seeking for new ways to do things | 0.559 | 0.641 |
| 9. I prefer work that requires originality in thought | 0.568 | 0.637 |
| 10. I can generate new ideas and be able to translate them into viable and profitable businesses | 0.538 | 0.614 |
| 11. Ability to present new methods and ideas | 0.594 | 0.571 |
| 12. I have the capacity to modify the features of an existing product or service | 0.525 | 0.604 |
| 13. I have the capability to come up or discover original ideas | 0.529 | 0.605 |
| 14. I have the ability to discover new products and services | 0.580 | 0.564 |
| **KMO Test** | | |
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy 0.8983 | | |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax Orthogonal Rotation with Kaiser Normalization.

**Source: Survey Data, 2020**

#### 4.8.1.2 Factor Loadings on Problem Based Learning

As discussed earlier, factor loadings are weights and correlation between each variable in the study and the factor. Eigen value for problem-based learning was 4.899 and the (Chi2) of 1971.14 with prob > Chi2 = 0.000. This study considered factor 1. According to factor analysis results on problem-based learning, as presented in table 4.13,the following constructs were not considered since they did not meet the threshold of having loadings greater than 0.50; We have responsibility for our learning( loading of 0.439), Problem tasks stimulate thinking, analysis and reasoning (0.486), Problems match with students' level of knowledge (0.461), Being present in tutorial groups is necessary to master the learning goal (0.482), I fulfill the task given to me during group

work (0.421), Problems are easily solved without much difficulty (0.487), We are encouraged to work in peer groups where we can conduct peer assessments (0.471).The rest of the constructs were retained.

**Table 4.13: Factor Loadings on Problem Based Learning**

| **Variable** | **Factor 1** | |
|---|---|---|
| **Problem Based Learning** | **Loadings** | **Uniqueness** |
| 1.We have responsibility for our learning | 0.439 | 0.669 |
| 2. Actively involved in the process of learning | 0.589 | 0.557 |
| 3. Problem tasks stimulate thinking, analysis and reasoning | 0.486 | 0.635 |
| 4. We have autonomy in the process of learning | 0.532 | 0.583 |
| 5. We have an opportunity to interact with the faculty | 0.540 | 0.597 |
| 6. Problems match with students' level of knowledge | 0.461 | 0.670 |
| 7. Emphasize is placed on self-directed learning | 0.593 | 0.556 |
| 8. Problem based design assures self-being in directed learning | 0.560 | 0.597 |
| 9. Being present in tutorial groups is necessary to master the learning goal | 0.482 | 0.701 |
| 10.We take initiative in diagnosing our learning needs | 0.582 | 0.549 |
| 11. I fulfill the task given to me during group work | 0.421 | 0.663 |
| 12. I participate in group work as much as possible | 0.563 | 0.553 |
| 13.Problems are easily solved without much difficulty | 0.487 | 0.643 |
| 14. We choose appropriate learning strategies | 0.550 | 0.635 |
| 15. Multiple trials are encouraged in developing solutions for classroom problems | 0.521 | 0.664 |
| 16. We are expected to conduct field research on a given topical issues | 0.558 | 0.545 |
| 17. We can self-monitor the learning process | 0.517 | 0.592 |
| 18. We decided on the resources for learning | 0.561 | 0.545 |
| 19. We have encouraged to work in peer groups where we can conduct peer assessments | 0.471 | 0.610 |
| **KMO Test** | | |
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy 0.9124 | | |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax Orthogonal Rotation with Kaiser Normalization.

**Source: Survey Data, 2020**

#### 4.8.1.3 Factor Loadings on Competence Based Learning

Fourteen items were proposed to measure competence-based learning to assess student innovative capability in higher learning institutions in Kenya. The KMO sampling adequacy was 0.8836, which revealed that data was adequate for extraction of principal component analysis. Eigenvalue for factor 1 was 3.934 > 1(Yong & Pearce, 2013). The Likelihood ratio test which tests item independence against saturated items showed that

the Chi2value was 1374.52 and prob >Chi2 was found to be 0.000 implying the items were independent in explaining the variable in question (Competence Based Learning).

**Table 4.14: Factor Loadings on Competence Based Learning**

| **Variable** | **Factor 1** | |
|---|---|---|
| **Competence Based Learning** | **Loading** | **Uniqueness** |
| 1.Teaching is geared towards enhancing students' capabilities | 0.455 | 0.690 |
| 2. Exams conducted is key to determining the competence of the learner | 0.519 | 0.641 |
| 3. Skills matching is conducted to determine courses students should undertake | 0.615 | 0.482 |
| 4. All entrepreneurship students take up skills matching classes to determine businesses they can run/manage | 0.547 | 0.638 |
| 5. Various talent development programs/ projects are conducted at the university relating to entrepreneurship | 0.543 | 0.594 |
| 6. Talent development as an activity is part of the university calendar | 0.429 | 0.638 |
| 7. The assessment given enhance our entrepreneurial skills | 0.625 | 0.539 |
| 8. The teaching is based on class experiments so as to enhance our abilities | 0.563 | 0.628 |
| 9. We take initiative to start tasks | 0.523 | 0.644 |
| 10. We take responsibility for the choices we make | 0.501 | 0.597 |
| 11. During group experiments I make valuable contributions | 0.463 | 0.588 |
| 12. I contribute to shared group results by performing class duties | 0.527 | 0.650 |
| 13. With my expertise I help others perform their tasks | 0.521 | 0.593 |
| 14. We are encouraged as a group to do our best to achieve the best results possible | 0.458 | 0.671 |
| **KMO Test** | | |
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy 0.8836 | | |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax Orthogonal Rotation with Kaiser Normalization.

**Source: Survey Data, 2020**

Four items were dropped since the factors loaded on them were below the threshold value of 0.5 (Hair *et al.,* 2014) and the remaining ten were retained. These four items were; Teaching is geared towards enhancing students' capabilities (factor loadings of 0.455<0.5), Talent development as an activity is part of the university calendar (loadings of 0.429<0.5), During group experiments I make valuable contributions (0.463<0.5) and We are encouraged as a group to do our best to achieve the best results possible (loadings of 0.458<0.5).

#### 4.8.1.4 Factor Loadings on Direct Learning

Direct learning was measured using fifteen items. The Cronbach measure for reliability on this variable was found to be 0.8577 which was above 0.7 (Lee Cronbach, 1951). The Kaiser-Meyer-Olkin coefficient for determining sample adequacy was 0.8870. The principal component analysis method was used in extracting factors.

**Table 4.15: Factor Loadings on Direct Learning**

| Variable | Factor 1 | |
|---|---|---|
| **Direct Learning** | **Loadings** | **Uniqueness** |
| 1.Teachers employ question and answer session when teaching | 0.514 | 0.605 |
| 2. We are encouraged to ask questions when learning to ensure they grasp concepts | 0.538 | 0.614 |
| 3. Presentations are compulsory when studying various units | 0.605 | 0.529 |
| 4. Presentations are pre-defined in terms of number of presentations and mode of presentations | 0.587 | 0.588 |
| 5. Teachers must appear in class for every lesson | 0.554 | 0.550 |
| 6. We are required to attend all classes | 0.507 | 0.584 |
| 7. Class discussions are encouraged in class to enhance our understanding | 0.567 | 0.622 |
| 8. We are allowed to create own questions to test their ability | 0.565 | 0.637 |
| 9. Discussions take up most of the course time | 0.405 | 0.669 |
| 10. Class presentations have a positive impact on us | 0.579 | 0.615 |
| 11. We are given an open arena of the questions and answers to enhance our ability | 0.581 | 0.590 |
| 12. Discussions broaden our skills during class work | 0.513 | 0.622 |
| 13. We are encouraged to brainstorm on questions and answers to enhance our skills | 0.476 | 0.663 |
| 14. We are motivated to work based on the class assessment deadlines | 0.400 | 0.647 |
| 15. We take responsibility for the class presentation given | 0.518 | 0.616 |
| **KMO Test** | | |
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy 0.8870 | | |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax Orthogonal Rotation with Kaiser Normalization.

**Source: Survey Data, 2020**

The eigenvalue for factor 1 loaded on this variable was 4.363>1. The Likelihood ratio tests showed the Chi2 was 1527.34 and the prob>Chi2 was 0.000. Considering factor 1, the following three items presented in table 4.15 did not meet the criteria of the loading being above 0.5 Kaiser (1974), Hutcheson and Sofroniou (1999) and Hair (2006) and were therefore excluded. These items were; Discussions take up most of the course time (loading of 0.405<0.5 and having uniqueness of 0.669), we are encouraged to brainstorm on questions and answers to enhance our skills (loading of 0.476<0.5 and

uniqueness of 0.663), we are motivated to work based on the class assessment deadlines (loading of 0.400<0.5 and uniqueness of 0.647). The remaining twelve items were retained.

#### 4.8.1.5 Factor Loadings on Case Study Learning

Thirteen out of fifteen items were retained to measure case study learning. First, a Cronbach reliability test was done, the items were found to be reliable. The Cronbach alpha coefficient was 0.8742. Further, the KMO value was 0.9114>0.70 (Kaiser 1974), confirming the sample was adequate to extract factor using factor analysis technique. Factors were extracted using loadings. Factor 1 was retained since the Eigenvalue was above 1(Eigenvalue of 4.809). Considering factor 1; two items had to be dropped. These items are; I can clearly understand and articulate the main concepts (with loadings of 0.424 and being unique by 72.5 percent) and Write-up of well-known local entrepreneurs' experiences are available for review to students (loadings of 0.492 and with uniqueness of 63.4 percent as shown in Table 4.16. The remaining items were retained.

**Table 4.16: Factor Loadings on Case Study Learning**

| Variable | Factor 1 | |
|---|---|---|
| **Case Study Learning** | **Loadings** | **Uniqueness** |
| 1.I can clearly understand and articulate the main concepts | 0.424 | 0.725 |
| 2. Write-up of well-known local entrepreneurs' experiences are available for review to students | 0.492 | 0.634 |
| 3. I have the ability to think through a problem and argue it out and give possible solutions | 0.554 | 0.629 |
| 4. Review of literature as a skill is taught to students during entrepreneurship | 0.601 | 0.544 |
| 5. It gives an overview understanding of what happens in real life situations | 0.582 | 0.565 |
| 6. I have the ability to understand the relationship between the concepts | 0.612 | 0.535 |
| 7. Case study has improved my learning efficiency | 0.589 | 0.588 |
| 8. I have the ability to apply knowledge gained from cases to solve other problems | 0.667 | 0.478 |
| 9. Case study has helped me learn the entrepreneurship content in a more comprehensive way | 0.542 | 0.607 |
| 10. I have the ability to articulate real life issues based on the cases done in a classroom setting | 0.579 | 0.584 |
| 11. Gives more opportunities for participation | 0.600 | 0.524 |
| 12. We are given more opportunities to apply learning to different cases | 0.534 | 0.619 |
| 13. More structured environments enhance learning | 0.595 | 0.559 |
| 14. Encourages application of analytical skills | 0.567 | 0.540 |
| 15. More opportunities for reviews of literature | 0.514 | 0.654 |
| **KMO Test** | | |
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy 0.9114 | | |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax Orthogonal Rotation with Kaiser Normalization.

**Source: Survey Data, 2020**

### 4.8.1.6 Factor Loadings on Incubator use

Factor analysis for incubator use was conducted in order to ensure that the items belonged to the same construct. The results confirmed that the constructs were reliable (Cronbach alpha coefficient was 0.8389 > 0.70). Secondly, the sampling was adequate for factor extraction. This is because the KMO value was 0.8706 and thus above 0.7 according to Kaiser Criterion (1974). Thirdly, Eigenvalue for the factor was found to be 3.747>1(Yong & Pearce, 2013). There was a significant Likelihood ratio test of Chi2 value of 703.93 and prob>Chi2 was 0.000.

The extraction of factors in this case was based on factor 1. Four items were dropped since they had loadings below 0.5. Uniqueness is the proportion of the variable's common variance not associated with the factor. According to results shown in Table 4.17 the four items had a high percentage of being unique to the factor. The four items with their respective factor loadings and uniqueness excluded were; I am able to meet and work with other entrepreneurs (factor loadings 0.490, 65.7 percent uniqueness), The incubator has enabled me have access to peer mentoring (factor loadings 0.488, 60.7 percent uniqueness), I have the ability to enhance my etiquette and presentation skills (factor loadings 0.482, 64.5 percent uniqueness), the lab has provided me with a combination of many skills including, ability to plan, organize and manage resources (factor loading 0.492, 67.2 percent uniqueness). The rest of the nine items were retained.

**Table 4.17: Factor Loadings on Incubator Use**

| **Variable** | **Factor 1** | |
|---|---|---|
| **Incubator Use** | **Loadings** | **Uniqueness** |
| 1.The incubator has enhanced my networking abilities | 0.544 | 0.630 |
| 2. I'm able to network with entrepreneurs from diverse fields | 0.597 | 0.608 |
| 3. I am able to meet and work with other entrepreneurs | 0.490 | 0.657 |
| 4. I have acquired sufficient business training through the incubator | 0.539 | 0.657 |
| 5. The incubator has opened me up to better ideas | 0.540 | 0.621 |
| 6. Entrepreneurial lab focuses on key business aspects of training | 0.565 | 0.610 |
| 7. I have acquired practical skills through the training given through the incubator | 0.504 | 0.695 |
| 8. The incubator has enabled me have access to peer mentoring | 0.488 | 0.607 |
| 9. I am able to build my entrepreneurial capabilities and skills | 0.590 | 0.541 |
| 10. I have the ability to enhance my etiquette and presentation skills | 0.482 | 0.645 |
| 11. The entrepreneurial lab has enhanced my communication skills | 0.549 | 0.677 |
| 12. Entrepreneurship training policies gained through the incubator has enhanced my understanding | 0.599 | 0.555 |
| 13. The lab has provided me with a combination of many skills including, ability to plan, organize and manage resources | 0.492 | 0.672 |
| **KMO Test** | | |
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy 0.8706 | | |

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax Orthogonal Rotation with Kaiser Normalization.

**Source: Survey Data, 2020**

## 4.9 Plots

### 4.9.1 Score plots

Score plots showing the loading matrix from the perspective of the observations.

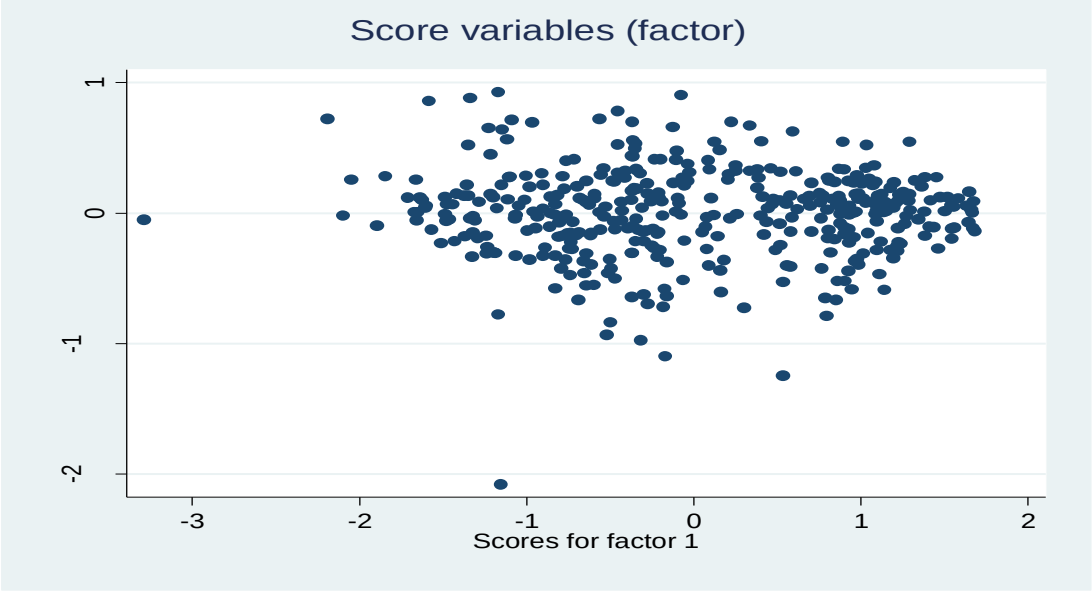


**Figure 4.1: Graph of Score Plots**
**Source: Survey Data, 2020**

A score for an observation from a column of the loading matrix is obtained as the linear combination of that observation's data by using coefficients found from the loading. Figure 4.1 shows a score plot. It is a graphical presentation of one score variable against another generated from the first two factors or components.

### 4.9.2 Biplots

To make an association between the variables and the observations, biplots provide a joint view of the variables and the observations (Carrasco et al., 2019). It simultaneously displays the observation and the relative positions of the variables. The points (marker symbols) are displayed for observation and the arrows for variables (Gower et al., 2011). The observations are projected to two dimensions such that the distance between the observations is preserved. The cosine of the angle between arrows approximates the correlation between the variable (Jolliffe & Cadima, 2016).

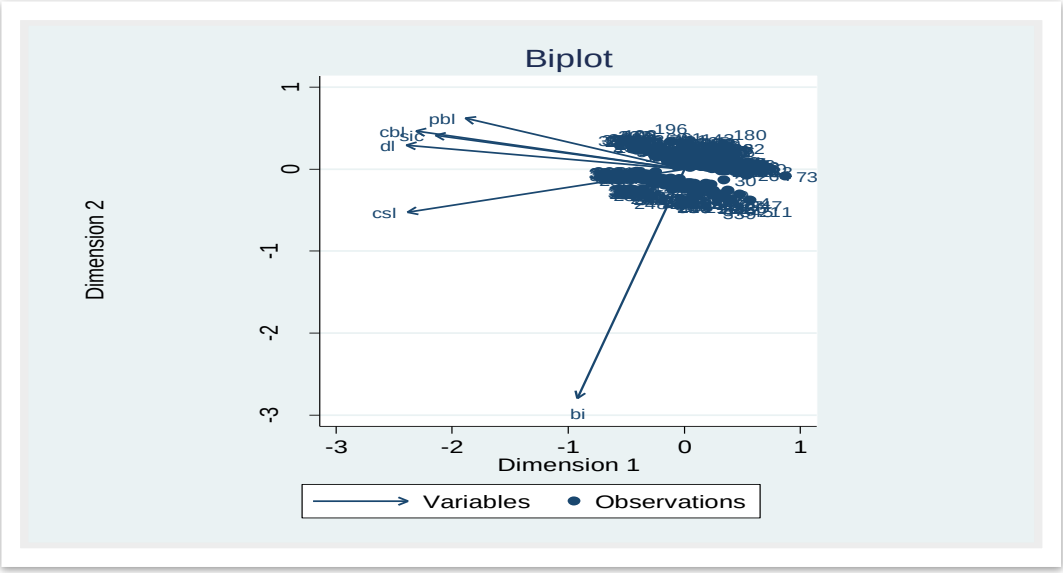


**Figure 4.2: Biplots of Association between the Variables and Observations**
**Source: Survey Data, 2020**

### 4.9.3 Score Plots of the Rotated Loadings

The score plot indicates that variables are related (see figure 4.3).

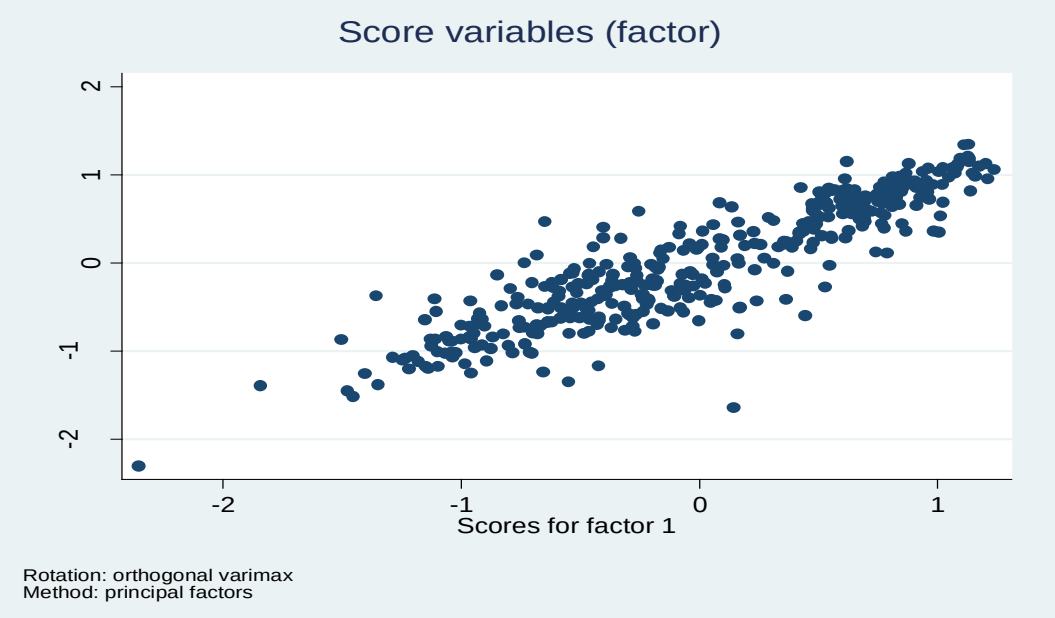


**Figure 4.3: Score Plots of Rotated Loadings**
**Source: Survey Data, 2020**

As discussed earlier the work of rotation is to reveal the un-relatedness via EFA. The dispersion in figure 4.3 shows a correlation pattern compared to score plots as shown in Figure 4.1.

### 4.10 Correlation Analysis

Correlation analysis shows how variables are related to each other in terms of the magnitude and strength of association. Several methods of estimating correlation consist of spearman coefficient, Pearson correlation coefficient, and Kendall's correlation coefficient. In this study Pearson pairwise correlation ($\rho$) was used.Correlation coefficient ($\rho$) ranges from -1 and +1. When the value for $\rho$ is +1 then variables have perfect positive association, -1 implies perfect negative association. Values close to zero are said to be weak correlation otherwise strong correlation.

**Table 4. 18: Pairwise Pearson's Correlation Coefficient Matrix**

| Variables | SIC | PBL | CBL | DL | CSL | IU |
|---|---|---|---|---|---|---|
| SI | 1.000 | | | | | |
| PBL | 0.678* | 1.000 | | | | |
| CBL | 0.689* | 0.742* | 1.000 | | | |
| DL | 0.734* | 0.699* | 0.755* | 1.000 | | |
| CSL | 0.728* | 0.657* | 0.710* | 0.725* | 1.000 | |
| IU | 0.335* | 0.320* | 0.363* | 0.377* | 0.419* | 1.000 |

Note: * indicates significance at 0.05 level of significance. SI-Student innovative capability, PBL-Problem Based Learning, CBL-Competence Based Learning, CSL-Case Study Learning, DL-Direct Learning and IU- Incubator Use

**Source: Survey Data, 2020**

The results presented in Table 4.18 shows a diagonal matrix of the Pearson's correlation coefficients of the association between each of the two variables under this study. It shows that there was significant association between the student innovative capability and the other independent variables. The association between student innovative

capability (SIC) and problem-based learning (PBL) was positive and significant($\rho = 0.678, sig = 0.000$.) It implied that problem-based learning, which entails students' participation in solving problems, emphasizes self-directed learning, and multiple trials encourage and boost student innovative capability. Likewise, competence based learning (CBL) had a significant ($\rho = 0.689, sig = 0.000$) correlation with the innovative capability of the students in institutions of higher education.

From the results, it can be argued that teachings geared towards students' enhancement of their capabilities, conducting of exams to determine the students' competence and skill matching techniques eventually promote students' innovativeness in higher education institutions. Moreover, direct learning was indicated to positively relate with student innovative capability($\rho = 0.734), sig = 0.000$). This implies that the pedagogical approach which encompasses the discussions encouraged in class to enhance students' understanding, creating questions to test students' ability, and encouraging questions to ensure students grasp concepts enhances student innovative capability. In addition, case study learning (CSL) approach and student innovative capability had a positive association with each other($\rho = 0.728, sig = 0.000$). This suggests that the ability to think through a problem and understand the relevance of real-world issues enhances the students' innovative capabilities in higher learning institutions in Kenya. The results also revealed that the relationship between each of the explanatory variables was significant as shown in Table 4.18. Furthermore, Incubator use which is a moderator showed a positive association with the predictor variables.

### 4.11 Diagnostic Tests

In statistical analysis, several multiple regression assumptions should be met before making inference about the results. However, if such assumptions are violated, expected results would be unreliable hence, misleading conclusions and recommendations could be derived. In this study, normality, linearity, multicollinearity, and homoscedasticity tests were done to ensure the data met the threshold. According to Hair *et al.*, (2010), the assumptions of regression analysis are essential to ensure that the results obtained were actually representative of the sample so as to obtain the best results possible.

#### 4.11.1 Normality Test

According to Hair *et al.*, (2010), normality is a critical assumption in multivariate analysis. It assumes that the errors in the prediction value of dependent variables are normally distributed. The normality of the residuals was tested using degrees of skewness and kurtosis of the residuals and checked through histograms and standardized residuals as shown in Figure 4.4.

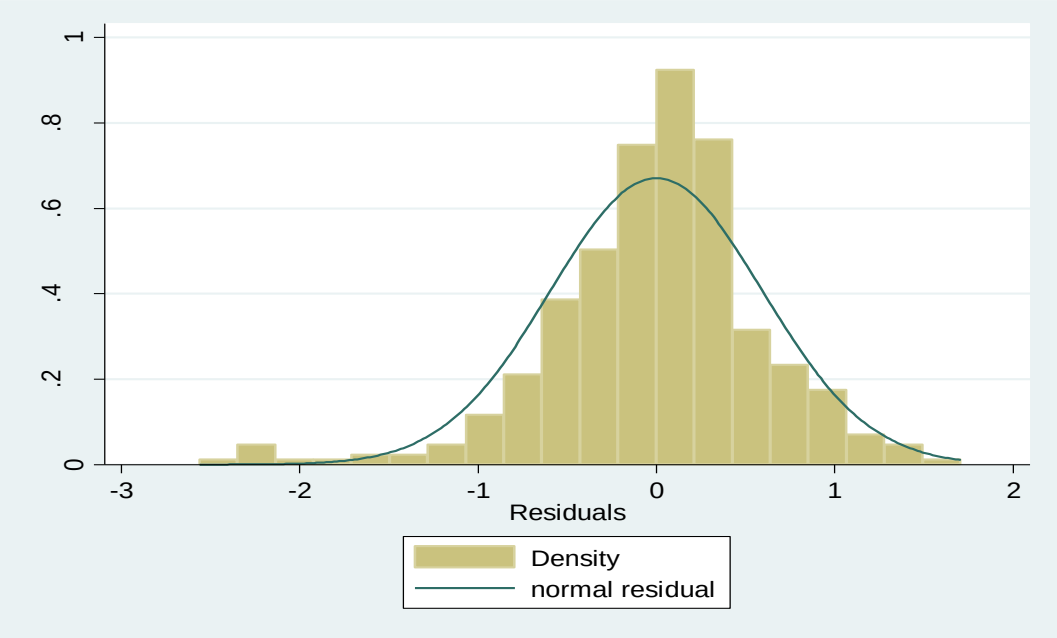


**Figure 4. 4: Graph showing Normality Distribution of Residuals**
**Source: Survey Data, 2020**

### 4.11.2 Linearity Test

The independent variables in a general linear model have a linear relationship with the dependent variable. Linearity is defined as the amount of change, or rate of change, between two variables that is constant over the entire range of the variables' scores.

Scatter plots were used to look at the relationships between the variables in the sample. The relationship between the standardized values of the dependent variable and the residuals of the independent variable was shown to be linear in Figure 4.5.

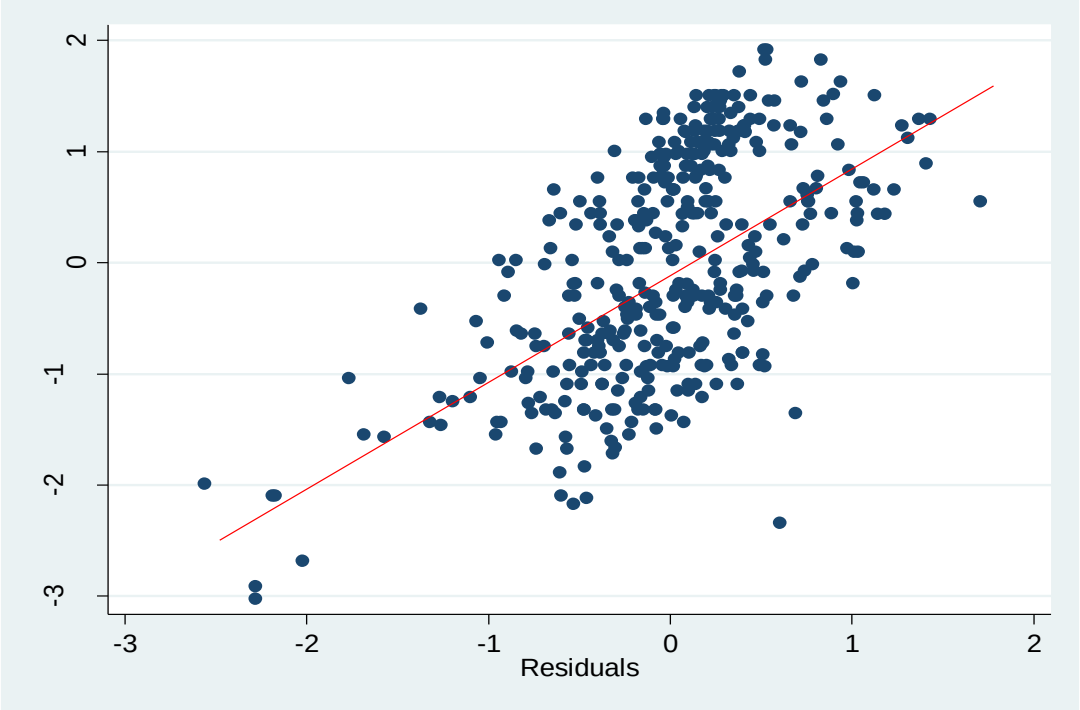


**Figure 4.5: Standardized values of SIC Versus Residuals of Independent Variables**
**Source: Survey Data, 2020**

### 4.11.3 Multicollinearity Test

Another multiple regression assumption is multicollinearity. It refers to a situation where the independent variables are correlated with each other. Multicollinearity occurs when the model includes multiple factors that are correlated not just to the response variable, but also to each other. The presence of multicollinearity can adversely affect the regression results.

Multicollinearity is detected using variance inflation factor (VIF) in regression analysis. It estimates how much the variance of a regression coefficient is inflated due to multicollinearity in the model. A value of 1 as a rule of thumb indicates that there is no correlation between this independent variable and any others. VIFs values between 1 and 5 suggest variables are moderately correlated while those greater than 5 represent critical levels of multicollinearity where the coefficients are poorly estimated and the p-values are questionable. From the results in Table 4.19, inspection of the VIF showed

that multicollinearity was not a concern. No variable was observed to have VIF value above 5 and no tolerance statistics was below 0.100 as suggested by Hamilton (2006).This hence led to a conclusion that no predictor variable had a strong collinear relationship with any of the predictor(s).

**Table 4.19: Variance Inflation Factors test for Multicollinearity**

| **Variable (Standardized)** | **VIF** | **Tolerance (1/VIF)** |
|---|---|---|
| Problem-Based Learning | 2.54 | 0.3930 |
| Competence-Based Learning | 3.16 | 0.3162 |
| Direct Learning | 2.96 | 0.3369 |
| Case Study Learning | 2.59 | 0.3859 |
| Business Incubators | 1.23 | 0.8110 |
| **Mean VIF** | **2.50** | **0.45** |

**Source: Survey Data, 2020**

### 4.11.4 Homoscedasticity Test

Heteroscedasticity in a study usually happens when the errors vary across observations, (Schmidt & Finan, 2018). The study used the Breusch-Pagan / Cook-Weisberg test to test the null hypothesis that the error variances are equal versus the alternative that the error variance is a multiplicative function of one or more variables. The test statistics had a P-value above an appropriate threshold, the significant value was less than 0.05 .The null hypothesis was rejected and Homoscedasticity assumed.

A large chi-square value greater than 9.22 would indicate the presence of heteroscedasticity (Ndururi, 2020). In this study, the chi-square value was 1.34 indicating that heteroscedasticity was not a concern.

**Table 4. 20: Test for Homoscedasticity**

| Ho: Constant variance (Homoscedasticity) | |
|---|---|
| Variables: Fitted values of (standardized SIC) | |
| Chi2(1) | = 1.34 |
| Prob >Chi2 | = 0.0509 |

**Source: Survey Data, 2020**

### 4.12 Results of Tests of Hypotheses

The regression analysis was performed to test the model fit and establish the models' predictive power with respect to the response variable. In this case, students from higher education in selected Kenyan institutions were interviewed using questionnaires concerning the effect of entrepreneurial pedagogy, incubator use and student innovative capability. Regression analysis was conducted, and the results presented in Table 4.21. There were several measurements of entrepreneurial pedagogy; problem-based learning (ZAPBL), competence based learning (ZACL), direct learning (ZADL) and case study learning (ZACSL). Further, the researcher tried to investigate the moderating effect of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability in higher education institutions in Kenya as will be discussed.

Tests of moderation were done following the work of (Preacher et al., 2016) where interaction effect of the moderator was plotted on moderation graphs.

The results presented in Table 4.21 concerning the direct effects of entrepreneurial pedagogy and student innovative capability can be illustrated in an equation as,

$$SIC = 7.16e - 10 + 0.1871PBL + 0.1002CBL + 0.2970DL + 0.3185CSL$$

The F-tests were significant at 0.000 probabilities showing that the model used to estimate the parameters was fit. The variation of entrepreneurial pedagogy explaining student innovative capability was 44.4 percent as explained by the R-squared. Root MSE, which is the standard deviation of the residuals and it measures how far the data points from the regression line was found to be 47.9 percent.

**Table 4.21: Regression Results**

| **Source** | **SS** | **Df** | **MS** | **No. of Observations** | **=380** |
|---|---|---|---|---|---|
| Model | 68.906 | 4 | 17.227 | F (4,375) | =74.96 |
| Residuals | 86.175 | 375 | 0.230 | Prob > F | 0.000 |
| Total | 155.082 | 379 | 0.409 | R-squared | 0.445 |
| | | | | Adj-R squared | 0.438 |
| | | | | Root MSE | 0.479 |
| **SI** | **Coef.** | **Std. Err** | **T** | **P > t** | **[95% Confidence Interval]** |
| ZAPBL | 0.1871 | 0.0478 | 3.92 | 0.000 | 0.0932 0.2810 |
| ZACBL | 0.1002 | 0.0532 | 1.89 | 0.060 | -0.0043 0.2048 |
| ZADL | 0.2970 | 0.0514 | 5.77 | 0.000 | 0.1959 0.3981 |
| ZACSL | 0.3185 | 0.0473 | 6.74 | 0.000 | 0.2256 0.4115 |
| Constant | 7.16e-10 | 0.0299 | 0.00 | 1.000 | -0.0588 0.0588 |

**Source: Survey Data, 2020**

### 4.12.1 Test of Hypotheses on Direct Effects

The first four objectives were hypothesized and tested using multiple linear regression and the results presented in Table 4.21. These objectives were stated as follows; to determine the significant effects of problem-based learning on student innovative capability in institutions of higher education in Kenya , to establish the significant effect of competence-based learning on student innovative capability in institutions of higher education in Kenya, to analyze the significant effect of direct learning approaches on student innovative capability in institutions of higher education in Kenya and to examine the significant effects of case study learning on student innovative capability in institutions of higher education, Kenya. Lastly, to determine the significant

moderating effect of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability in institutions of higher education in Kenya.

The first hypothesis stated that; there is no significant statistical effect of problem-based learning on student innovative capability in higher education institutions in Kenya. Results showed that problem-based learning (ZAPBL) was positive ($\beta = 0.187$) and statistically significant at ($p - value = 0.000 < 0.05$).This implies that the hypothesis was rejected and it was concluded that students' participation in solving problems, emphasis on self-directed learning and interacting with the faculty leads to a positive student innovative capability. The undergraduate students become more skilled at both the content and thinking strategies when they learn through experience. Problem-based learning also helps learners develop several skills: effective problem-solving skills, flexible knowledge, effective collaboration skills, and intrinsic motivation. Problem based learning is a training approach that offers the potential to help students build up a flexible understanding and lifelong learning skills.

The findings are consistent with past research findings which established a positive relationship on problem-based learning and student innovativeness. Problem-based learning (ZAPBL), according to Hmelo-Silver (2004) is an educational method in which students learn by facilitated problem solving and the instructor serves as a facilitator rather than a provider of information. Student learning in ZAPBL is based on a multifaceted problem with no single correct answer. Students work in groups to identify what they need to know in order to solve a problem and come up with an imaginative solution.

The above view is also supported by Krishnan, S. (2009), who investigated first-year engineering students' interactions with a newly implemented engineering problem-

based learning program at Victoria University.He discovered that student learning in PBL teams was largely influenced by the attitudes, behaviors, and learning methods of the team members. Students in problem-based or project-based learning approach learning at a deep level, as shown by the findings, and the approach affects their learning. Furthermore, student groups develop a shared learning community.As a result, it is critical for higher education institutions and teachers to identify and recognize the factors that can affect student learning in their specific PBL environment, as well as to provide the required equipment and ongoing coaching to enable students to use deep learning approaches in a team setting and to encourage student teams to adopt a collaborative learning culture.

The effects of problem-based learning combined with cooperative learning on preschoolers' scientific imagination and creative behavior were investigated by Siew et al. (2017). The aim of the research was to see how problem-based learning combined with cooperative learning and numbered heads affected preschoolers' five attributes of scientific creativity and innovative behavior: originality, abstractness of title, fluency, resistance to premature closure, and elaboration.In Fluency, Originality, Elaboration, Abstractness of title, and Resistance to premature termination, preschoolers taught in the PBL-CL‘NHT' method significantly outperformed their peers in the PBL method, who, in turn, significantly outperformed their peers in the TG method. When comparing PBL-CL ‘NHT' to PBL and TG methods, large effect sizes were obtained. The findings show that using the PBL-CL ‘NHT' approach to promote preschoolers' five trait dimensions of scientific imagination and innovative behavior has an important positive effect.

Similarly, the study results also support previous scholars' propositions that problem-based approach positively influences the innovative culture of students (Tiwari et al., 2006). Correspondingly, the findings of this study are consistent with the proposition that through the problem-based learning approach, students espoused a deep approach to learning throughout the period of clinical education

The study results are also in agreement with the suggestions of Liu (2008), who found out that the use of problem based and case study learning design provides an exhaustive analysis of the challenges and the results of a programme known as "Know about your business". In addition, it served as an effective innovative tool among the graduate students.

The findings also corroborate to Hmelo-Silver (2004), who avers that Problem-based learning method offers learners the arena to freely network and the potential to assist them in becoming reflective and adjustable thinkers who can actualize their thoughts.

Dochy et al. (2003), studied the effect of problem-based learning, a meta-analysis. The study's objectives were to tackle the main effects of problem-based learning on two categories of outcomes: knowledge and skills. The review shows that there is a robust positive outcome from PBL on the skills of students. Therefore the explanations as mentioned above support the findings of the study.

The second hypothesis stated that there is no statistically significant effect of competence-based learning on student innovative capability in higher education institutions in Kenya. This hypothesis failed to be rejected since ($p = 0.060$) is greater than 0.05 level of significance. Though competence-based learning was found to be

insignificant in this study, other studies done from different contexts have established it as significant.

Frank et al. (2010) through his study found out that the adoption of competence-based education in medical schools was aimed at equipping the faculty, students, administrators, regulators and employees regarding the strengths, opportunities and also weaknesses of competence-based education. The study avers that competence-based education compels students to alter familiar pedagogical beliefs, attitudes and behaviors producing graduates equipped to react capably in the rapidly ever-changing world.

Biemans et al. (2009) study accessed competence-based education in higher education using exploratory and qualitative study personal interviews with representatives of study curriculums from eight universities in the Netherlands. The findings aver that competence based education is an effective and innovative pedagogical tool that should be part of the curriculum.

Winterton (2009) study which assessed whether the new (comprehensive) notion of competence and the competence-based education approach are being utilized, and recognized as being fruitful for academic education and the extent to which university embraces mentorship programmes for students.. The study found out that views of the respondents on the convenience of the competence-based education coupled with mentoring of both students and the community were quite affirmative.

Doğan (2015) study, evaluated the factors affecting the intentions of entrepreneurship final year undergraduate students of business administration at a selected university in Turkey. The study also investigated the relationship among the students' success levels

in entrepreneurship class and their intentions on entrepreneurship. The study avers that there is a positive and significant correlation between the levels of student's success in the entrepreneurship class and their entrepreneurship intention. In addition, students whose parents were self-employed have higher intentions of entrepreneurship when compared with those whose parents are not self-employed, and as such they had innovative traits within them.

Working non-traditional learners who have innovative abilities, expertise, and knowledge from job experience benefit from competency-based schooling, according to Horohov (2017). It also allows self-motivated students to accelerate their degree completion time, increasing affordability and productivity. Furthermore, this pedagogical method was found to simplify what a credentialed apprentice would do, rendering assessments more straightforward and applicable to others outside of higher education.

According to Triton (2008), competency-based learning has a place in higher education and can be useful in the fundamentals courses that emphasize procedural responsibilities. Instead of being approved as a full program, it was properly accepted as a component part of an integrated curriculum. The findings also suggested that the design of competency-oriented programs in the vocational education and training field is likely to create a protocol rigidity of thought based on the ability to obey particular procedures, while the goals of higher education require graduates to gain practical knowledge based on analytic inquiry and training.This means that the higher education sector must look "beyond competency" to an approach such as "capability" in order to produce graduates with the requisite generic, networking, and presentation skills based

on the training provided, as well as graduate attributes that are both employable and desirable in the wider community.

A positive partnership was built, according to Sullivan and Downey (2015), based on the change in educational paradigms from conventional to competency-based education for diverse learners. In search of new educational options, the district administration implemented competency-based instruction in their replacement program, which resulted in improved teacher and student participation, more and more advanced educational opportunities, and an improvement in the program's academic rigor. Successes appeared to outnumber obstacles, according to the evidence.

According to Biemans et al. (2004), competence-based education is the most important model of innovativeness, both at the system level and in learning environments. The study examined the definition of competence and its prominence in the context of the Dutch Vocational Education and Training (VET) system, as well as a historical review of the history of competence-based education.It drew attention to potential pitfalls in the areas of competence education, workplace learning, standardization, school and determining learning practices, competency assessment, evolving teacher roles/identity, and competence-based management. The study found that the disadvantages harmed students' ability to innovate and disturbed the learning environment. Taking these pitfalls into consideration will help to pave the way for future growth. The most fruitful way to broaden versatile VET structures that are tailored to the evolving knowledge-based economy is to develop a learning strategy that links governance, practice, and science.

Kouwenhoven (2010) asserts that competence-based learning affects students' innovative culture within higher education institutions. The study found out that higher

education institutions are reliant on a competence-based curriculum framework, as it is one of the pedagogical approaches that forms an innovative culture .This therefore means that curriculum development can reroute to a great extent.

The third hypothesis postulated that there is no significant relationship between direct learning and the student innovative capability.The hypothesis was rejected, , ($\beta = 0.297, p - value = 0.000$). This is an indication that when students are encouraged to ask questions, they grasp concepts more effectively. It also indicates that teachers appear in class for every lesson, they are required to and students are also allowed to create their own questions to test their ability which enhances them to become more innovative.

In support of this finding, a study by Lee et al. (2019) which aimed at investigating Self-directed learning and problem-solving abilities were found to have a positive impact on innovative behavior in a study that looked into the effects of university entrepreneurship education on innovative behavior. Entrepreneurship education by and large facilitates scholars to identify potential opportunities and play an important role in the growth of new societies and industries. This study looked at the cognitive abilities that affect creative actions in terms of generating and realizing new ideas, as well as the importance of team-based learning in influencing these factors.

According to a study by Tekkol and Demirel 2018, direct-learning skills often improve students' creative actions (2018). The study looked into undergraduate students' self-directed learning skills at Hacettepe and Başkent Universities to see if they differed based on university form, gender, field of study, year of study, academic achievement, type of university entrance ranking, income level, and willingness to pursue a graduate

degree. As a result of the study's results, undergraduate students have self-directed learning abilities, which are linked to lifelong learning.

Qureshi et al. (2016) did an exploratory investigation amongst the centers of entrepreneurial education in Pakistan. The study was inquiring on activities and pedagogical strategies taking place in the university campuses.

A connection was found between entrepreneurship passion and entrepreneurial motive, and the two factors were deemed crucial in the teaching of entrepreneurship. Furthermore, the results showed that entrepreneurial zeal effectively stimulates students' entrepreneurial intentions. This finding revealed that entrepreneurship education in universities can help students develop their entrepreneurial spirit and build a conducive environment for them to pursue their entrepreneurial goals and engage in innovative conduct.

The findings of Saeid and Eslaminejad (2017) support the current study's findings since they connect self-directed learning readiness, academic self-efficacy, and motivation to successful teaching. Furthermore, academic self-efficacy and academic motivation prediction potential are strongest when it comes to independence in learning and study skills, as well as problem solving. It has been shown that self-directed learning preparation is needed to teach strategies to students in their studies in order to improve self-efficacy and academic motivation.

The findings are also consistent with Din et al. (2016), study who found out that direct learning strengthens the capacity of learning environments. It creates a learner who is self-directed and can be a contributing factor to improve the individual quality of life or at a workplace. Thus, a self-directed environment acts as the answer to support and

reduce the ability to function with minimal supervision thus improving individual and group responsibilities among tutors and students.

According to Gozukara and Colakoglu (2016), study, direct learning can be defined as a measure of one’s ability to achieve goals. It is driven by Self-efficacy, which is a subjective conviction where an individual is capable of action in each situation, of coping with a task. It also encompasses the need to broaden one's skills and abilities, leading to goal achievement and self-satisfaction and innovative culture.

The findings are also in line with Gaglio (2004), study, which avers that direct learning approach is pinned to self-efficacy which is influenced by contextual factors such as education and previous experiences, instrumental readiness access to capital, information and social network which are considered to influence entrepreneurial intention and innovative behavior.

The research by Diker-Coşkun (2013), whose aim was to look into the relationship between university students' self-directed learning skills and their lifelong learning tendencies, discovered that university students' directed learning skills improved their lifelong learning tendencies.The tendencies were found to be consistent regardless of university, year of study, or income level. Sex, field of study, form of university entrance ranking, academic achievement, and willingness to obtain a graduate degree, on the other hand, had a major impact on university students' self-directed learning skills. In addition, among university students, a moderate positive relationship was discovered between self-directed learning skills and lifelong learning tendencies and innovativeness.

In support of the findings Arranz et al. (2017) found out students at the University of Spain who were taught by use of both curricular and extracurricular activities to enhance their entrepreneurial motivation and competencies exhibited innovative skills. The study found out that students develop positive attitudes towards entrepreneurship training when direct learning pedagogy is used in the universities on student's competencies.

The relationship between innovation, creativity and direct learning of adult students according to Cox (2002) who studied this research in Walters State Community College showed noteworthy positive correlations. Gender differences in creativity and innovation were found, with males having higher mean levels of creativity. There were no gaps in self-directed learning preparation based on gender or birth order. The study also discovered that these related characteristics, particularly when used together, may be able to aid adult community college students' achievement. Assessment of innovative, creative, and self-directed learning, as well as the extension of these skills at the community college level, were among the recommendations.

The advancement of new indicators of innovativeness, imagination, and self-directed learning, as well as the exploration of previous models and the use of qualitative analysis, were among the research recommendations. Furthermore, the study suggested that educators should transform their learning environments into supportive self-directed learning environments by practicing good teaching, motivating students not only to learn but also learn in a way that is relevant and meaningful, having a desire to share their love of the subject with students, supporting independence in learning, and employing a desire to share their love of the subject with students.

Because of the unparalleled and exponentially rising rates of change we all face in all facets of life, according to Guglielmino (2013) report, self-directed learning planning is important in 21st century educational institutions. By incorporating direct learning into formal educational institutions' curricula, students will be better prepared for the lifelong, self-directed learning that the future will demand. Direct learning, according to the study, occurs when a learner takes responsibility for identifying learning needs, developing learning goals, preparing a learning plan, locating learning resources, implementing the plan, and evaluating the results and process basically, for directing his or her own life and learning.

The results of the study are also consistent with those of Merriam et al. (2007), who provided several other examples of the direct learning process while also pointing out that much of the research on self-directed learning has concentrated on self-directed learning as a personal attribute. The degree to which these personal characteristics, attitudes, beliefs, and abilities are shown by a learner determines the individual's readiness for self-directed learning. Self-directed learning readiness levels naturally occur on a spectrum, with some learners showing a clear preference for direct instruction and others showing a high degree of self-directed learning readiness.The aforementioned view therefore denoted that the more the learners exhibited these personal characteristics the more likely they were to have an enhanced readiness for self-directed learning thus drawing them towards being more innovative.

Lastly, hypothesis four on the direct effect stated that there is no significant statistical effect of case study learning on student innovative capability in institutions of higher education in Kenya. From the results, it was established that case study leaning influences student innovative capability positively and is statistically significant at ($\beta =$

$0.319, p - value = 0.000$).Therefore the hypothesis was rejected. The results indicated that if students are taught to have the ability to think through a problem and argue, have the ability to understand the relationship between the concepts, apply previous knowledge gained even more, and also articulate to the real life issues based on the cases done in classroom setting, the ability to innovate new ideas will be enhanced. Case study learning helps students to learn entrepreneurship content in a more comprehensive way and thus improving the learning efficiency.

The finding is consistent with past literature and past research studies. For instance, a study by Bozic (2014), who studied the effect of case based instruction for innovation in engineering students and technology found out that when case studies are incorporated in the curriculum, they are effective in engineering education since they bridge the gap between theory and practice. Scholars report being more innovative when involved in coursework, when case studies are incorporated in the curriculum.

According to Williams *et al,* (2015), study, Case study is significantly related to developing student's intrinsic and extrinsic motivation, encouraging idea generation, self-reflection, and integration of knowledge and development of learning skills hence promoting innovative culture among students. In the same breath, case study learning enhances students ability to understand concepts and ideas and thus achieve learning objectives hence renders them to new ideas during the implementation stage.

In support of the above views,Jonassen (2007), argued that Case study learning promotes development of communication skills and ability to understand connections concepts. In the same breadth it also increases overall student perception, learning gains and opens them up to better ideas.

This study's results are also consistent with those of Martínez León and García (2011), who looked into the capacity of Semantic Web technology to help in teaching and erudition, in a variety of higher education settings where case-based learning was the preferred pedagogy. The empirical review of a major three-year research and development scheme in the United Kingdom on Semantic Technologies was found to be critical for the enhancement of case-based learning, with a focus on gaining a thorough understanding of the essence of case-based learning in various scenarios. Case based learning was a preferred pedagogical approach of choice, as it focused on the emerging web technologies and techniques, which played a major role in supporting learning and innovative behaviour.

In support of the findings, Giacalone (2016), is his study basically aimed at giving an example of how both the case-based teaching and the use of response technologies – were executed into a graduate-level food science course. Technology programs were shown to be beneficial in enlisting student engagement, forming networks, and promoting a more involved learning style. He also claimed that case-based teaching was found to be beneficial because it enabled students to apply their expertise and analytical skills to dynamic, real-world situations related to the subject. Additionally, the use of audience response systems encouraged class discussions and was well received by students, resulting in a more enjoyable classroom experience.

In light of the preceding debate, Bozic (2014) stated that case-based and lecture-based instructional methods were essential to engineering technology scholars' conceptual understanding of innovation curriculum. Case-based instruction, according to the research, is an inductive teaching approach that allows students to participate in curricula by applying a sense of reality to the material. Students were exposed to the

theory of innovative technology by either a case study or a lecture as part of their regular classroom activities. Scholars who obtained both case-based and lecture-based training performed equally well on the knowledge post-test, according to the report. Furthermore, the instructional approach had little effect on students' attitudes and engagement when learning about disruptive innovation, despite the fact that students rated the subjects extremely high in terms of attitude and engagement; they were confident in their ability and skills to bring innovative theory into practice in the classroom and believed it was important in the field of engineering.

### 4.12.2 Testing the Moderating Effect of Incubator Use

In a linear causal relationship where an independent variable X (predictor variable) is presumed to cause a variable Y (the dependent variable or outcome variable), a variable M (the moderator) measures the causal relationship between X and Y by using the regression coefficient. Moderation implies that the causal effect may be weakened, amplified or reversed (Judd & Kenny, 2010).

In general, the moderating effect can be indicated by the interaction of X and Z in explaining Y. the equation 4.1 is a moderated multiple regression equation which is estimated to test for the moderator effect.

$$Y = \alpha + aX + bZ + cXZ + \varepsilon \quad \text{.....4.1}$$

**Y**- Dependent variable (student innovative capability)

**X**-Independent Variables (problem based, competence based, direct and case study learning)

**Z**- Moderator (Incubator use)

**X*Z**- the interaction between the predictors (Independent variable * Moderator)

$\boldsymbol{\varepsilon}$- Error term

The coefficient $c$ measures the effect of a moderator ($Z$). The path $a$ measure the simple effect of $X$ and sometimes referred to as the main effect of $X$ when $Z$ equals to zero (Frazier, Tix and Barron 2004), Hayes (2013) and Cohen *et al.*, (2003). The effect of $X$on $Y$ is $a + cM$ indicates that the effect of $X$ and $Y$ depends on the value of $Z$ (Frazier, Tix and Barron 2004)

In this study, the objective was to investigate the moderation effect of incubator use on the relationship between each of the predictor variables (problem-based learning, competence-based learning, direct learning and case study learning) and the outcome variable (student innovative capability). The moderation in this study was analyzed using R because it has a special type of package;*moderate.lm* package that analyzes the moderating effect and it further provides a graphical representation of the same using *rock-chalk* package.

#### 4.12.2.1 Moderating Effect of Incubator Use on the Relationship between Problem Based Learning and Student Innovative Capability

Hypothesis 5 (a), which was first moderation in this study, presumed that there was no significant moderating effect of incubator use on the relationship between problem-based learning and innovative capability of the students in institutions of higher education in Kenya. The results indicated that incubator use had a positive and significant moderating effect on the association between problem based learning and student innovative capability ($\beta = 0.242$, $\rho < .05$).The findings as presented in Table 4.24 showed that the interaction between problem based learning and incubator use was positive and significantly associated to student innovative capability, $R^2 = 0.468$, $p<0.001$).This implies that the model explains 46 percent of variance in student innovative capability. The findings therefore supported the hypothesis that incubator

use significantly moderates the relationship between problem based and student innovative capability.

The results can be presented in an equation form as;

$$SI = 1.6034 + 0.5454PBL + 0.7929IU + 0.2422(PBL * IU)$$

**Table 4.22: Moderating effect of Incubator Use on relationship between Problem Based Learning and Students Innovative capability**

| **Coefficients:** | **Estimate** | **Std. Error** | **t value** | **P(>\|t\|)** |
|---|---|---|---|---|
| Intercept | 1.60344 | 0.32101 | 4.995 | 0.000*** |
| PBL | 0.54544 | 0.09207 | 5.924 | 0.000*** |
| IU | 0.79286 | 0.36309 | 2.184 | 0.0296* |
| Interaction (PBL*IU) | 0.24220 | 0.10275 | 2.357 | 0.0189* |
| Residual standard error: 0.4603 on 396 degrees of freedom. Multiple R-squared: 0.4687, Adjusted R-squared0.4647. F-statistic: 116.4 on 3 and 376degrees of freedom, p-value: 0.000 | | | | |
| Significance. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 | | | | |

**Source: Survey Data, 2020**

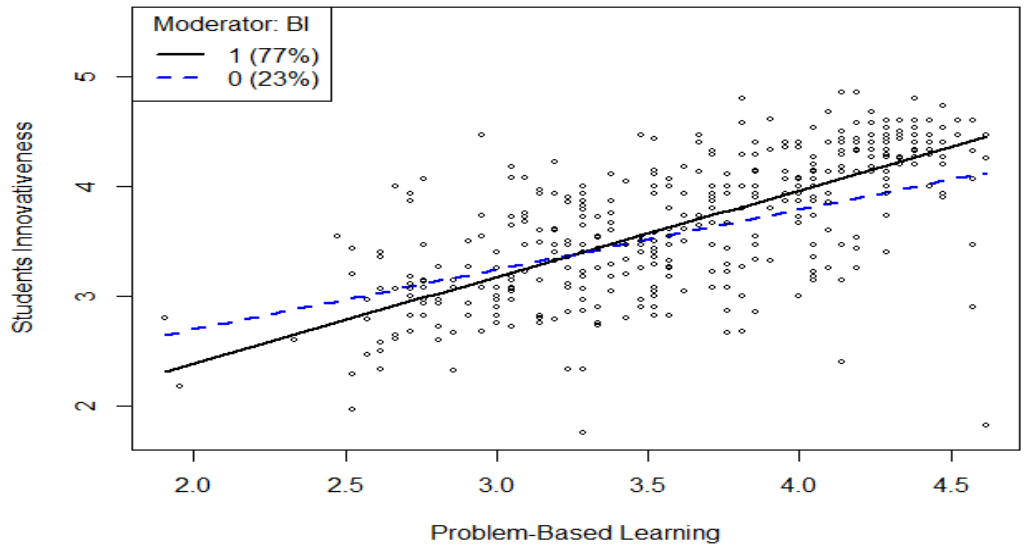


**Figure 4.6: Moderating Effect of incubator use on Problem Based Learning and Student Innovative Capability**
**Source: Survey Data, 2020**

The Figure 4.6 shows the difference in the two lines implying that with an increased incubator use, the relationship between problem based learning approach and student innovative capability was relatively high. Therefore, when problem-based learning is

interacted with incubator use it has a positive effect on student innovative capability. Hence incubator use enhances the effect of problem-based learning approach on student innovative capability in institutions of higher education in Kenya.

#### 4.12.2.2 Moderating Effect of Incubator Use on the Relationship between Competence Based Learning and Student Innovative Capability

Hypothesis 5(b), postulated that there was no significant moderating effect of incubator use on the relationship between competence- based learning and innovative capability of the students in institutions of higher education in Kenya. As it can be seen from Table 4.23, the regression coefficient value for the interaction between competence-based learning and incubator use exerted a positive value on innovative capability of the students. The results indicated that incubator use had a positive and significant moderating effect on the association between competence based learning and student innovative capability ($\beta = 0.218$, $\rho < .05$).The findings from Table 4.23 showed a positive and significant interaction between the predictor and the moderating variable to the outcome variable, $R^2 = 0.486$, $\rho < .0.01$). This implies that the model explains 48 percent variance in student innovative capability with the model being seen to be significant and applicable $\rho < 0.01$).

Results can be presented in an equation form as

$$SI = 1.7406 + 0.4768CBL - 0.7341\,IU + 0.2180(CBL * IU)$$

**Table 4.23: Moderating effect of Incubator Use on Relationship between Competence Based Learning and Students Innovative Capability**

| Coefficients: | Estimate | Std. Error | t value | P(>\|t\|) |
|---|---|---|---|---|
| Intercept | 1.74058 | 0.28032 | 6.209 | 0.000*** |
| CBL | 0.47681 | 0.07558 | 6.309 | 0.000*** |
| IU | -0.73408 | 0.31956 | -2.297 | 0.0221* |
| Interaction (CBL*IU) | 0.21804 | 0.08503 | 2.564 | 0.0107* |

Residual standard error: 0.4526 on 396 degrees of freedom. Multiple R-squared: 0.4862, Adjusted R-squared: 0.4823. F-statistic: 124.9 on 3 and 376 degrees of freedom, p-value: 0.000

Significance. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

***Source: Survey Data, 2020***

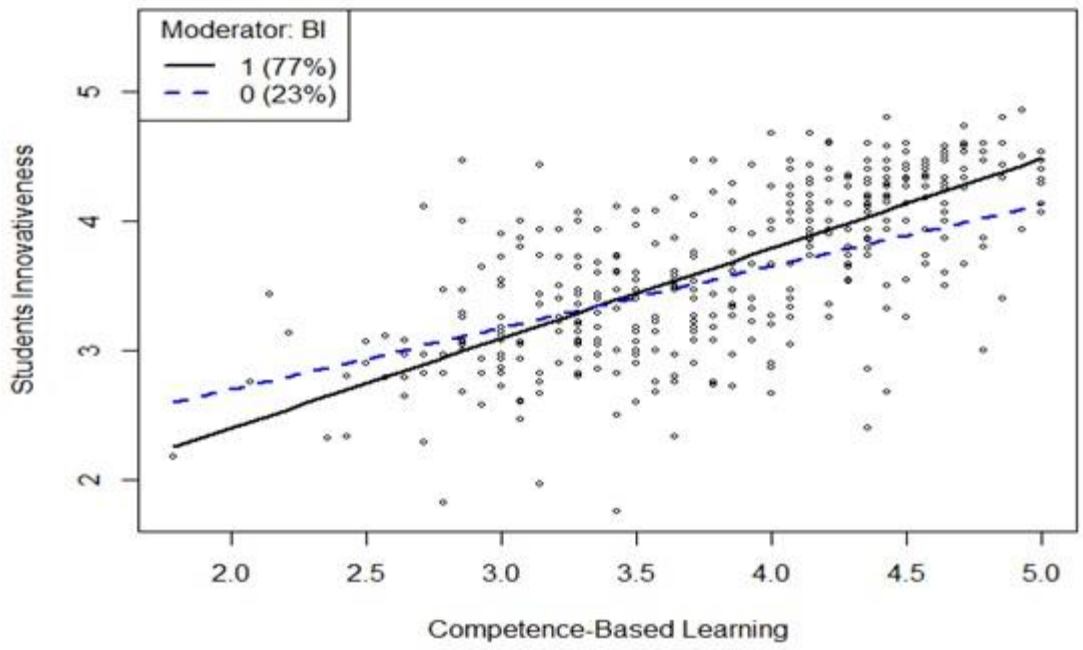


**Figure 4.7: Graph showing Plots of the Moderating Effect of Incubator use on the relationship between Competence-Based Learning and Student Innovative capability**

***Source: Survey Data, 2020***

The Figure 4.7 indicates that with increased use of the incubator, competence based learning approach was associated with a positive and significant effect on student innovative capability. Thus incubator use had an enhancing moderating effect on Competence based learning to positively influence student innovative capability in institutions of higher education in Kenya.

#### 4.12.2.3 Moderating Effect of Incubator Use on the Relationship between Direct Learning and Students Innovative Capability

Hypothesis 5(c) postulated that there was no significant moderating effect of incubator use on the relationship between direct learning and innovative capability of the students in institutions of higher education in Kenya. The hypothesis thus failed to be rejected. The results indicated that incubator use had a positive and insignificant moderating effect on the association between direct learning and student innovative capability (β = 0.090, ρ>.05).The findings from Table 4.24 showed that the interaction between direct learning and incubator use was found to be positive and not significantly associated to student innovative capability. From the table below it was observed that $R^2$ =0.542, ρ>.0.280).This indicates that the model explains 54 percent variance in the outcome variable. Though the model explained a percentage variance in the outcome variable, the relationship was not significant. a conclusion that incubator use does not moderate the relationship between direct learning approach and student innovative capability.

Results can be presented in an equation form as;

$$\boldsymbol{SI = 1.3062 + 0.6029DL - 0.2752IU + 0.0900(DL * IU)}$$

**Table 4.24: Moderating effect of Incubator Use on relationship between Direct Learning and Students Innovative Capability**

| Coefficients: | Estimate | Std. Error | t value | P(>\|t\|) |
|---|---|---|---|---|
| Intercept | 1.30619 | 0.27621 | 4.729 | 0.000*** |
| DL | 0.60294 | 0.07548 | 7.989 | 0.000*** |
| IU | -0.27517 | 0.30888 | -0.891 | 0.374 |
| Interaction (DL*IU) | 0.09004 | 0.08331 | 1.081 | 0.280 |

Residual standard error: 0.4274 on 396 degrees of freedom. Multiple R-squared: 0.542, Adjusted R-squared: 0.5385. F-statistic: 156.2 on 3 and 376degrees of freedom p-value: 0.000

Significance. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

**Source: Survey Data, 2020**

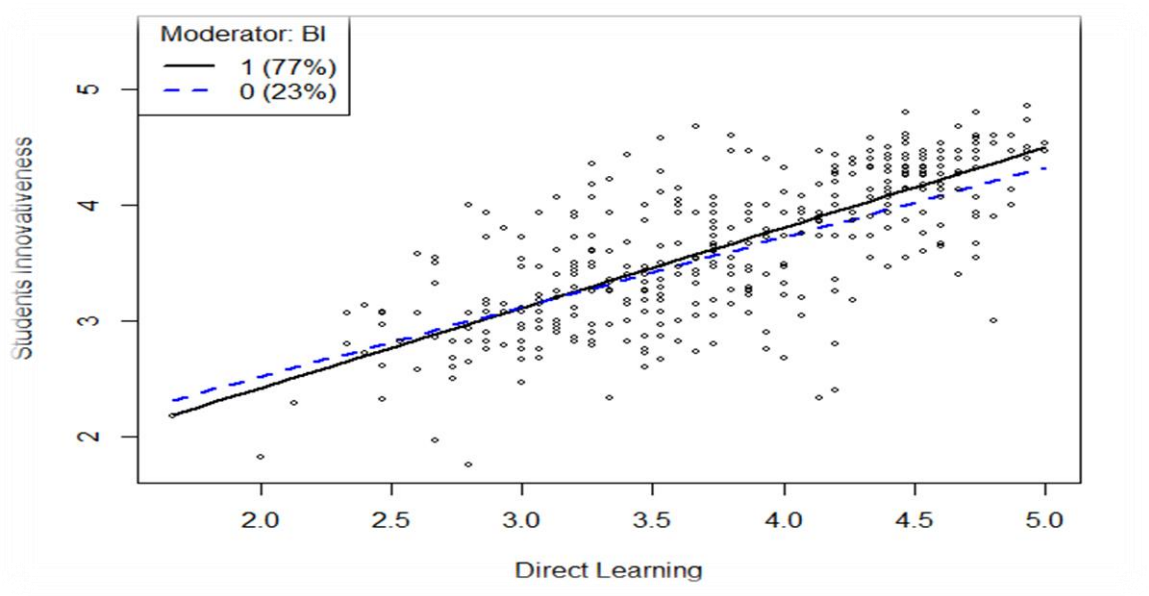


**Figure 4.8: Graph showing Plots of the Moderating Effect of Incubator use on the relationship between Direct Learning and Student Innovative capability**
**Source: Survey Data, 2020**

The graphical representation in Figure 4.8 implies that the use of an incubator, interacted with a direct learning approach was associated with an insignificant effect on student innovative capability. Thus, incubator use had a buffering effect on direct learning to negatively influence student innovative capability in institutions of higher education in Kenya.

#### 4.12.2.4 Moderating effect of Incubator Use on the Relationship between Case Study Learning and Students Innovative Capability

Hypothesis 5(d) postulated that incubator use does not moderate the relationship between case study learning and student innovative capability in institutions of higher education in Kenya.The results indicated that incubator use had a positive and significant moderating effect on the association between case study learning and student innovative capability ($\beta = 0.268$, $\rho < .05$).The findings from Table 4.25 indicated that the interaction between case study learning and incubator use was found to be positively

and significantly associated to the outcome variable.From the table,it was observed that $R^2$ =0.5482, (ρ<.0.000). This implies that the model explains 54 percent variance in student innovative capability with the model being seen to be significant and applicable (ρ<.0.000)

In an equation form, the result can be shown as follows

$$SI = 1.8164 + 0.4551CSL + 0.9101IU + 0.2683(CSL * IU)$$

**Table 4.25: Moderating effect of Incubator Use on relationship between Case Study Learning and Students Innovative Capability**

| Coefficients: | Estimate | Std. Error | t value | P(>\|t\|) |
|---|---|---|---|---|
| Intercept | 1.81643 | 0.24198 | 7.507 | 0.000*** |
| CSL | 0.45509 | 0.06493 | 7.009 | 0.000*** |
| IU | 0.91005 | 0.27951 | 3.256 | 0.001** |
| Interaction (CSL*IU) | 0.26833 | 0.07407 | 3.623 | 0.000*** |

Residual standard error: 0.4245 on 396 degrees of freedom. Multiple R-squared: 0.5482, Adjusted R-squared: 0.5448. F-statistic: 160.1 on 3 and 376degrees of freedom, p-value: 0.000

Significance. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

**Source: Survey Data, 2020**

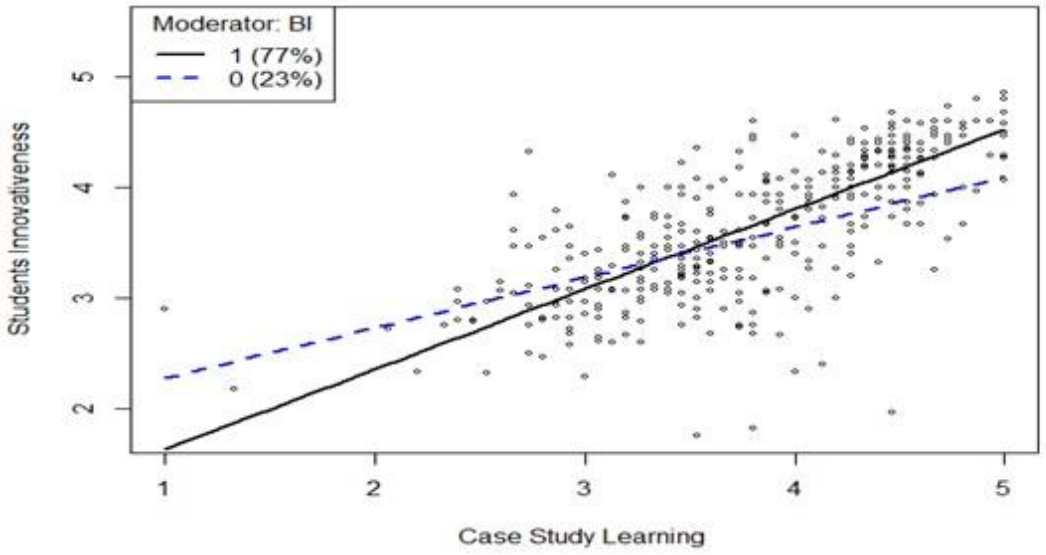


**Figure 4.9: Graph showing Plots of the Moderating Effect of Incubator use on the relationship between Case Study Learning and Student Innovative capability**

**Source: Survey Data 2020**

Figure 4.9 indicated that when incubator use is high, then the relationship between case study learning approach and student innovative capability was relatively high. Therefore, incubator use was found to have an enhancing moderating effect on the relationship between case study learning and student innovative capability.

Overall, the moderation regression results revealed that the interaction terms between the predictor variable and the moderator, had a positive and significant effect on student innovative capability. The interaction between direct approach and incubator use was conversely found to be insignificant to the outcome variable. Therefore, the study results concluded that incubator use moderates the relationship between entrepreneurial pedagogy and student innovative capability.

### 4.13 Summary of Models Estimated

The study summarized the results based on the models estimated as shown in Table 4.26 below.

**Table 4.26: Summary of Model Estimated**

| Variables | Direct Effect Model 1 | Indirect Effects Model 2 | Indirect Effects Model 3 | Indirect Effects Model 4 | Indirect Effects Model 5 |
|---|---|---|---|---|---|
| **Constant** | 7.16e-10 (0.030) | 1.603*** (0.321) | 1.741*** (0.280) | 1.306*** (0.276) | 1.816*** (0.242) |
| **PBL** | 0.187*** (0.048) | 0.545*** (0.092) | - | - | - |
| **CBL** | 0.100 (0.053) | - | 0.477*** (0.076) | - | - |
| **DL** | 0.297*** (0.051) | - | - | 0.603*** (0.075) | - |
| **CSL** | 0.319*** (0.047) | - | - | - | 0.455*** (0.065) |
| **IU** | - | 0.793** (0.363) | -0.734** (0.320) | -0.275 (0.309) | 0.910 |
| **Interaction (PBL*IU)** | - | 0.242** (0.103) | - | - | - |
| **Interaction (CBL*IU)** | - | - | 0.218** (0.085) | - | - |
| **Interaction (DL*IU)** | - | - | - | 0.090 (0.083) | - |
| **Interaction (CSL*IU)** | - | - | - | - | 0.268*** (0.074) |
| **R-square** | 0.445 | 0.469 | 0.486 | 0.542 | 0.548 |
| **R-square change** | - | +0.024 | +0.017 | +0.056 | +0.006 |
| **Adj-R-square** | 0.438 | 0.465 | 0.482 | 0.539 | 0.545 |
| **Root MSE** | 0.479 | 0.460 | 0.453 | 0.427 | 0.425 |
| **F-statistic** | 74.96 | 116.4 | 124.9 | 156.2 | 160.1 |
| **P>F** | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Note: Values in brackets () are the standard errors. *** indicated significance at 1%, ** Significant at 5%

**Source: Survey Data 2020**

The first model shows the results of the direct effects, while the other models are for the indirect effects. It is clear that all the entrepreneurial pedagogies except competence based were significant to affect student innovative capability. Tracing the changes of the R-square, the variation slightly changed from 0.445 to 0.469 in direct effects and the first moderation effects, respectively. This significant change can be argued that the providence of incubators to students enabled them to be more innovative.

Further, there was a high R-square change when incubator use was interacted with competence-based learning (0.486) to (0.542) and when interacted with direct learning

constituting a positive variation of 5 .6 percent (+0.056 R-square change). The probability for F-statistic in all the models are significant at (0.000) implying that the ordinary least square model was fit to explain the relationship between the independent and dependent variables.

### 4.14 Summary of Hypotheses Testing

The results presented in Table below 4.28 indicated the summary of both multiple and moderated regression models.

| $H_o$ | **Statement** | Beta (β) | **ρ – values** | Decision |
|---|---|---|---|---|
| $H_{o1}$ | There is no statistically significant effect of problem-based learning on student innovative capability in institutions of higher education in Kenya | β= 0.187 | **P<0.05** | Rejected |
| $H_{o2}$ | There is no statistically significant effect of competence-based learning on student innovative capability in institutions of higher education in Kenya | β= 0.100 | **P>0.05** | Not Rejected |
| $H_{o3}$ | There is no statistically significant effect of direct learning on student innovative capability in institutions of higher education in Kenya | β= 0.297 | **P<0.05** | Rejected |
| $H_{o4}$ | There is no statistically significant effect of case study learning on student innovative capability in institutions of higher education in Kenya | β=0.318 | **P<0.05** | Rejected |
| $H_{o5a}$ | There is no statistically significant interactive effect of the incubator use on the relationship between problem-based learning and student innovative capability in institutions of higher education in Kenya | β=0.242 | **P<0.05** | Rejected |
| $H_{o5b}$ | There is no statistically significant interactive effect of the incubator use on the relationship between competence-based learning and student innovative capability in institutions of higher education in Kenya | β=0.218 | **P<0.05** | Rejected |
| $H_{o5c}$ | There is no statistically significant interactive effect of the incubator use on the relationship between direct learning and student innovative capability in institutions of higher education in Kenya | β= 0.090 | **P>0.05** | Not rejected |
| $H_{o5d}$ | There is no statistically significant interactive effect of the incubator use on the relationship between case study learning and student innovative capability in institutions of higher education in Kenya | β=0.268 | **P<0.05** | Rejected |

# CHAPTER FIVE

# SUMMARY OF THE FINDINGS, CONCLUSION AND RECOMMENDATIONS

## 5.0 Overview

This chapter contains a summary of findings, hypotheses tested and why they were supported or unsupported. It is followed by conclusions of the study, implications of the study in practice, policy and theory, the conclusions drawn and recommendations made thereof.

## 5.1 Summary of Findings

The purpose of the study was to examine the relationship between entrepreneurial pedagogy, incubator use and student innovative capability in institutions of higher education in Kenya. The hypotheses were formulated and tested using the regression approach. Moderation graphs were used in the study to examine the moderating effect of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability. The social cognitive theory, Schumpeter's theory of entrepreneurship economics and componential theory of creativity guided the study. It is a clear indication from the findings that problem-based, competence based, case study, direct learning and incubator use influenced student innovative capability in the institutions of higher education in Kenya. From the specific objectives of the study, eight research hypotheses were postulated.

The first objective was to determine the effect of problem-based learning on student innovative capability in institutions of higher education in Kenya. The relationship was positive and statistically significant ($\beta = 0.187$, $t = 3.92$, $\rho < 0.05$) .The objective was

attained because there was a significant effect of problem-based learning on student innovative capability.

The second objective was to establish the effect of competence-based learning on student innovative capability in institutions of higher education in Kenya. The relationship was found to be positive and not significant ($\beta$=0.100, t= .89, $\rho$>0.05).The finding suggests that competence-based learning does not have a statistical significance on student innovative capability. Hence, the objective was not supported.

The third objective analyzed the effect of direct learning approach on student innovative capability in institutions of higher education. The relationship was found to be positive and statistically significant (($\beta$= 0.297, t= 5.77 $\rho$< 0.05).Direct learning had a strong and significant effect on student innovative capability; hence the objective was supported.

The fourth objective was to examine the effect of case study learning on student innovative capability in institutions of higher education in Kenya. The effect was found to be positive and statistically significant ($\beta$=0.318, t= 6.74, $\rho$<0.05) Case study learning had a strong and significant effect on student innovative capability. The objective was therefore attained.

Objective five (a) determined the interactive effect of the incubator use on the relationship between problem-based learning and student innovative capability in institutions of higher education in Kenya. The relationship was found to be positive and significant ($\beta$=0.242, t= 2.357, p< 0.05).This shows that incubator use significantly moderated the relationship between problem-based learning and student innovative capability, hence the objective was attained.

Objective five (b) was to determine the interactive effect of the incubator use on the relationship between competence-based learning and student innovative capability in institutions of higher learning in Kenya. The results indicated that incubator use had a positive and statistically significant moderating effect on the relationship between competence-based learning and student innovative capability ($\beta$=0.218, t=2.564, p< 0.05).Hence, the objective was attained

Hypothesis five (c) determined the interactive effect of the incubator use on the relationship between direct learning and student innovative capability in institutions of higher education in Kenya. The results showed that incubator use had a positive and insignificant interaction with direct learning approach ($\beta$= 0.090, t= .081, $\rho$>0.05).This then revealed that incubator use does not significantly moderate the relationship between direct learning and student innovative capability. Therefore, the objective was not supported.

Finally, objective five (d) determined the interactive effect of the incubator use on the relationship between case study learning and student innovative capability in institutions of higher education in Kenya. The findings showed that the interaction was positive and statistically highly significant ($\beta$=0.268, t= 3.623, $\rho$< 0.05).The findings indicated that incubator use significantly moderated the relationship between case study learning and student innovative capability. Hence, the objective was attained.

### 5.2 Conclusion of the Study

The general objective for the study was to examine the moderating effect of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability in institutions of higher education in Kenya. To achieve this purpose specific objectives were derived from the main one. Similarly, from the objectives,hypotheses

were formulated. These hypotheses were then subjected to correlation and regression analysis to establish degree of effect. From the findings, various conclusions were drawn as indicated in the sections 5.2.1 to 5.2.5.

### 5.2.1 Problem based learning and Student innovative capability

Objective one sought to determine the effect of problem-based learning on student innovative capability in institutions of higher education in Kenya. From the findings of the study, it was concluded that there is a positive and significant relationship between problem-based learning and student innovative capability. This implies that when students are taught through problem based learning pedagogy it enhances their innovative capability. Therefore, this means that participation in problem-solving, opportunity to interact with faculty and group participation would enhance the innovative capability of students in the institutions of higher education. Similarly, problem-based learning is ensured through aspects such as, emphasis placed on self-directed learning to the students and active involvement in the process of learning, besides diagnosing of the learning needs and active participation in group discussions.

### 5.2.2 Competence based learning and Student innovative capability

The study also sought to establish the effect of competence-based learning on student innovative capability. From the findings, a conclusion was drawn indicating that the effect of competence based learning on student innovative capability was positive and statistically insignificant. The study concluded that competence-based learning does not have a statistical significance on student innovative capability. Therefore, this means that class assessments, skill matching classes, talent development programmes and task initiative does not enhance student innovative capability. Drawing from the empirical evidence,competence based learning was viewed as an ineffective paradigm to

innovativeness. It fails to take into account the evaluation of competences, talents, determination of learning outcomes and activities to the students. As such it failed to enhance the innovativeness of the students.

### 5.2.3 Direct learning and Student innovative capability

Objective three sought to analyze the effect of direct learning approach on student innovative capability. The results obtained the conclusions that direct learning approach had a positive and statistically significant effect on student innovative capability. Direct learning approach was ensured through aspects such as, open discussions, class presentations and discussions, individual and class assessment sessions, which enhances innovative capability of students.

### 5.2.4 Case study learning and Student innovative capability

Similarly, in the fourth objective, the study sought to examine the effect of case study learning on student innovative capability. From the primary and data analyzed in both correlation and regression analyses, the objective was achieved and the study concluded that case study learning had a positive and significant effect on student innovative capability in institutions of higher education in Kenya. By having the ability to apply the knowledge gained from cases to solve other problems, review of literature and opportunities for participation, besides the capacity to understand the relationship between concepts, all aid in enhancing the innovativeness of students in institutions of higher education.

### 5.2.5 Moderating role of incubator Use

An examination of the moderating effect of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability, in selected institutions of higher education in Kenya was undertaken. From the findings, it was concluded that

incubator use has an enhancing moderating effect on the relationship between problem based, competence based, case study learning and student innovative capability. However, it had a buffering effect on the direct learning approach to negatively influence student innovative capability in institutions of higher education in Kenya. Overalt , the study concluded that incubator use had a significant enhancing moderating effect on the relationship between entrepreneurial pedagogy and student innovative capability in institutions of higher education in Kenya.

## 5.3 Implications of the Study

This study contributes to the literature in many ways which can be grouped according to the theoretical and practical and policy implications

### 5.3.1 Theoretical Implications

Theoretically, the study broadly creates a new insight about the effect of entrepreneurial pedagogy approaches on student innovative capability in institutions of higher education in Kenya, by analysing the primary data obtained from the selected institutions of higher education in Kenya.

Regarding the theory, the study advanced a theoretical argument for the use of social cognitive, Schumpeter's theory of entrepreneurship economics and the componential theory of creativity in Entrepreneurship discipline. The study findings showed that the relationship between entrepreneurial pedagogy, incubator use and student innovative capability was present hence validating the study.

It advances the use of social cognitive theory by investigating the role of problem based, competence based, direct and case study learning approaches in enhancing student innovative capability. These approaches transits students to being functional and

adaptive with transverse competencies and capabilities such as innovativeness, creativity, critical thinking and problem solving and therefore equipping them to being more innovative. Similarly, the study also contributes to the social cognitive theory with respect to the Entrepreneurial pedagogical approaches (problem based, competence based, direct and case study learning) by linking them to the individual constructs of student innovative capability.

In addition it extends both the Schumpeterian theory of Entrepreneurship economics and the creativity theory by reaffirming that the presence of both pedagogical approaches and incubators, as resources, have positive implications on the innovative capability of students as it breeds forth to new combinations and new uses. On the basis of the findings this research broadens the understanding of the effect of incubator use on student innovative capability by showing that it moderates the link between the predictor variable/s and innovative capability of students. Hence this study provides a better understanding and reference point for institutions on how to link the entrepreneurial pedagogies to student innovative capability. Therefore institutions of higher education need to invest in the pedagogical approaches by developing the necessary means by which student innovative capability could be enhanced.

### 5.3.2 Implications for Managerial Practice

The findings of the study provide insightful explanations;

Firstly, Institutions of higher education should embrace entrepreneurial pedagogies with the aim of encouraging innovative capability of students in institutions of higher education.

Secondly, this study has implications on scholars as it demonstrates that the relationship between the moderating role of incubator use on the relationship between entrepreneurial pedagogy and student innovative capability is not standard, many other aspects can be put into consideration. Thus, it may be worthwhile for other scholars to use one dimension at a time.

Findings further reveal a strong interplay between incubator use and student innovative capability. The dimensions of incubator use that includes peer mentoring and training have strong positive effects on the innovative capability of students. This implies that institutions of higher education should encourage constant training and mentoring within institutions. Overall, the study reveals that for institutions of higher education to realize students' innovative capability, they must embrace incubator use, which should be supported by entrepreneurial pedagogies in place.

Fourth, based on the results, problem-based learning and case study learning came out as key drivers to student innovative capability as compared to other variables. This therefore denotes that both the approaches enhance student innovative capabilities in higher education institutions. Further institutions of higher education should ensure that students embrace problem based, competence based case study and direct learning approaches which will eventually lead to an increased innovative capability of students in institutions of higher education.

### 5.3.3 Policy Implications

The study has a number of policy implications;

The study findings have implications for policy makers, as the empirical evidence suggests that incubator use indicators; networking, entrepreneurial training and

building of entrepreneurial capability and skills have a strong positive effect on student innovative capability. Thus, policy and decision makers should be aware of the importance of creating incubator support programs which endorse entrepreneurial pedagogies, so as to enhance the innovative capability of students in higher education institutions.

Secondly, in order to create wider social networks for students, curriculum developers should ensure that university based incubators reach out more to the successful entrepreneurs and the industry players. The incubators also need to organize more training, mentoring programs and workshops thus serving to create a platform for networking, between the students and the entrepreneurs. This will lead to enhancing the innovative capability of the students.

In terms of the knowledge, the study contributed new knowledge by being the first known to investigate entrepreneurial pedagogy, incubator use and student innovative capability. Through the lens of this study it emerged that incubator use is an enhancing moderator.

Secondly, it focuses on entrepreneurial pedagogy approaches and student innovative capability in institutions of higher education in Kenya, as opposed to the dimensions of entrepreneurial pedagogy approaches as mentioned in many other studies.

Thirdly, it fills the knowledge gap by using incubator use as a moderator on the relationship between the predictor and outcome variables used.

### 5.3.4 Limitations and Recommendations for Future Research

First the study focused on few entrepreneurial pedagogy aspects to examine the link between entrepreneurial pedagogy and student innovative capability. Other

pedagogical approaches such as role play, shadowing, elevator pitch as well as brainstorms may be studied in the future.

Secondly, the richness of the study is limited by cross-sectional design. Future research could explore the particular links between entrepreneurial pedagogy, incubator use and student innovative capability to determine the extent of their potential relationship using a longitudinal design.

The study was limited to the moderating role of incubator use on the relationship between entrepreneurial pedagogies and student innovative capability. Further research may contribute to literature by considering incubator use as a moderator between different factors of entrepreneurial pedagogy and student innovative capability. In addition, future research could explore mediating effects, for example; the mediating role of entrepreneurial pedagogy on the relationship between incubator use and student innovative capability. In addition it would also be wise for future researchers to delve into the moderated-mediated effects.

Lastly, this study faced the limitation of research generalizability. The results of the study may not be generalized to all institutions, owing to particularities of different institutions of higher education. Therefore, future research should be conducted in different institutions and more so a fully comparative study between institutions of higher education.

## REFERENCES


Abbott, M. L. (2014). *Understanding educational statistics using Microsoft Excel and SPSS*. John Wiley & Sons.

Abson, D. J., Dougill, A. J., & Stringer, L. C. (2012). Using principal component analysis for information-rich socio-ecological vulnerability mapping in Southern Africa. *Applied Geography*, *35*(1-2), 515-524.

Abu-Al-Aish, A., & Love, S. (2013). Factors influencing students' acceptance of m-learning: An investigation in higher education. *International Review of Research in Open and Distributed Learning*, *14*(5), 82-107.

Agbim, K. C., Oriarewo, G. O., & Owocho, M. (2013). Factors influencing entrepreneurial intentions among graduates of Nigerian tertiary institutions. *International Journal of business and management invention*, *2*(4), 36-44.

Aggarwal, C. C. (2015). Outlier analysis. Data mining,

Aguinis, H., & Gottfredson, R. K. (2010). Best practice recommendations for estimating interaction effects using moderated multiple regression. *Journal of organizational behavior*, *31*(6), 776-786.

Ailing, W. (2013). Research on Digital Literature Resource Service under the Requirements for the Collaborative Innovation among Colleges and Universities. *Sci-Tech Information Development & Economy*, *2013*, 22.

Akengin, H., & Aydemir, G. (2012). Effects of using case-study method in social studies on students' attitudes towards environment. *International Electronic Journal of Environmental Education*, *2*(2), 119-127.

Akhtar, D. M. I. (2016). Research design. *Research Design (February 1, 2016)*.

Alderman, L., Towers, S., & Bannah, S. (2012). Student feedback systems in higher education: A focused literature review and environmental scan. *Quality in Higher Education*, *18*(3), 261-280.

Allahar, H., & Brathwaite, C. (2016). Business incubation as an instrument of innovation: the experience of South America and the Caribbean. *International Journal of Innovation: IJI Journal*, *4*(2), 71-85.

Allan, J. (1996). Learning outcomes in higher education. *Studies in Higher Education*, *21*(1), 93-108.

Alvarez-Bell, R. M., Wirtz, D., & Bian, H. (2017). Identifying keys to success in innovative teaching: Student engagement and instructional practices as predictors of student learning in a course using a team-based learning approach. *Teaching & Learning Inquiry*, *5*(2), 128-146.

Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of management journal*, *39*(5), 1154-1184.

Arranz, N., Ubierna, F., Arroyabe, M. F., Perez, C., & Fdez. de Arroyabe, J. (2017). The effect of curricular and extracurricular activities on university students' entrepreneurial intention and competences. *Studies in Higher Education*, *42*(11), 1979-2008.

Aureli, F., & Schino, G. (2019). Social complexity from within: how individuals experience the structure and organization of their groups. *Behavioral Ecology and sociobiology*, *73*(1), 6.

Bagheri, A., Lope Pihie, Z. A., & Krauss, S. E. (2013). Entrepreneurial leadership competencies among Malaysian university student entrepreneurial leaders. *Asia Pacific Journal of Education*, *33*(4), 493-508.

Bagheri, M., Ali, W. Z. W., Abdullah, M. C. B., & Daud, S. M. (2013). Effects of project-based learning strategy on self-directed learning skills of educational technology students. *Contemporary educational technology*, *4*(1), 15-29.

Barbero, J. L., Casillas, J. C., Wright, M., & Garcia, A. R. (2014). Do different types of incubators produce different types of innovations? *The Journal of Technology Transfer*, *39*(2), 151-168.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173.

Barrett, T., Pizzico, M., Levy, B. D., Nagel, R. L., Linsey, J. S., Talley, K. G., Forest, C. R., & Newstetter, W. C. (2015). A review of university maker spaces.

Baughman, J. A., Brumm, T. J., & Mickelson, S. K. (2012). Student professional development: Competency-based learning and assessment.

Beck, I. L., McKeown, M. G., & Kucan, L. (2013). *Bringing words to life: Robust vocabulary instruction*. Guilford Press.

Bender, K. K., Jonson, J. L., & Siller, T. J. (2010). Improving the Way Higher Education Institutions Study Themselves: Use and Impact of Academic Improvement Systems. Professional File. Number 118, Fall 2010. *Association for Institutional Research (NJ1)*.

Bezemer, D. J. (2014). Schumpeter might be right again: the functional differentiation of credit. *Journal of Evolutionary Economics*, *24*(5), 935-950.

Biemans, H., Nieuwenhuis, L., Poell, R., Mulder, M., & Wesselink, R. (2004). Competence-based VET in the Netherlands: Background and pitfalls. *Journal of Vocational Education and training*, *56*(4), 523-538.

Biemans, H., Wesselink, R., Gulikers, J., Schaafsma, S., Verstegen, J., & Mulder, M. (2009). Towards competence based VET: dealing with the pitfalls. *Journal of Vocational Education and training*, *61*(3), 267-286.

Bilgin, A. C., Timbil, S., Guvercin, C. H., Ozan, S., & Semin, S. (2018). Preclinical Students'views On Medical Ethics Education: A Focus Group Study In Turkey. *Acta bioethica*, *24*(1), 105.

Birx, D. L. (2019). Rethinking Higher Education: Integration as a Framework for Change. *New Directions for Higher Education*, *2019*(185), 9-31.

Bjørgum, Ø., & Sørheim, R. (2015). The funding of new technology firms in a pre-commercial industry–the role of smart capital. *Technology Analysis & Strategic Management*, *27*(3), 249-266.

Boldureanu, G., Ionescu, A. M., Bercu, A.-M., Bedrule-Grigoruță, M. V., & Boldureanu, D. (2020). Entrepreneurship education through successful entrepreneurial models in higher education institutions. *Sustainability*, *12*(3), 1267.

Bonney, K. M. (2015). Case study teaching method improves student performance and perceptions of learning gains. *Journal of microbiology & biology education*, *16*(1), 21.

Bowman, N. A., Park, J. J., & Denson, N. (2015). Student involvement in ethnic student organizations: Examining civic outcomes 6 years after graduation. *Research in Higher Education*, *56*(2), 127-145.

Bozic, C. L. (2014a). Case-Based Instruction for Innovation Education in Engineering and Tech-nology. *age*, *24*, 1.

Bozic, C. L. (2014b). The effects of the case study and lecture instructional methods on teaching and learning innovation theory.

Bunterm, T., Lee, K., Ng Lan Kong, J., Srikoon, S., Vangpoomyai, P., Rattanavongsa, J., & Rachahoon, G. (2014). Do different levels of inquiry lead to different learning outcomes? A comparison between guided and structured inquiry. *International Journal of Science Education*, *36*(12), 1937-1959.

Carland, M. (2015). Engineering innovativeness. In American Society for Engineering Education. American Society for Engineering Education.

Carrasco, G., Molina, J.-L., Patino-Alonso, M.-C., Castillo, M. D. C., Vicente-Galindo, M.-P., & Galindo-Villardón, M.-P. (2019). Water quality evaluation through a multivariate statistical HJ-Biplot approach. *Journal of Hydrology*, *577*, 123993.

Chandrasekar, K. (2011). Workplace environment and its impact on organisational performance in public sector organisations. *International journal of enterprise computing and business systems*, *1*(1), 1-19.

Chen, C., Seff, A., Kornhauser, A., & Xiao, J. (2015). Deepdriving: Learning affordance for direct perception in autonomous driving. Proceedings of the IEEE international conference on computer vision,

Cheung, C. K., Rudowicz, E., Yue, X., & Kwan, A. S. (2003). Creativity of university students: What is the impact of field and year of study? *The Journal of Creative Behavior*, *37*(1), 42-63.

Chinonye, L., Oludayo, O., Akinbode, M., Agboola, M., Oluyomi, O., Oluwatobi, S., & Uzoma, U. (2015). Entrepreneurship Education and Poverty Alleviation: Impact Analysis of Covenant University Graduate between 2006-2013. Proceedings of the International conference on African Development Issues (ICADI) May,

Chirchietti, N. (2017). The role of Innovation Hubs taking start-ups from idea to business. IZNE Working Paper Series.

Choo, S., & Wong, M. (2006). Entrepreneurial intention: triggers and barriers to new venture creations in Singapore. *Singapore management review*, *28*(2), 47-64.

Chowning, J. T., Griswold, J. C., Kovarik, D. N., & Collins, L. J. (2012). Fostering critical thinking, reasoning, and argumentation skills through bioethics education. *PloS one*, *7*(5), e36791.

Christensen, C. M. (2013). *The innovator's dilemma: when new technologies cause great firms to fail*. Harvard Business Review Press.

Clark, I. (2012). Formative assessment: Assessment is for self-regulated learning. *Educational Psychology Review*, *24*(2), 205-249.

Cochran, W. G. (1963). The Behrens-Fisher test when the range of the unknown variance ratio is restricted. *Sankhyā: The Indian Journal of Statistics, Series A*, 353-362.

Coffman, B. A., Clark, V. P., & Parasuraman, R. (2014). Battery powered thought: enhancement of attention, learning, and memory in healthy adults using transcranial direct current stimulation. *Neuroimage*, *85*, 895-908.

Connelly, L. M. (2008). Research considerations: power analysis and effect size. *MedSurg Nursing*, *17*(1), 41-43.

Cooper, D. R., & Schindler, P. S. (2006). Business research methods: Empirical investigation. *Journal of service research*, *1*(2), 108-128.

Covin, J. G., & Miles, M. P. (1999). Corporate entrepreneurship and the pursuit of competitive advantage. *Entrepreneurship Theory and Practice*, *23*(3), 47-63.

Cowart, K. O., Fox, G. L., & Wilson, A. E. (2008). A structural look at consumer innovativeness and self-congruence in new product purchases. *Psychology & Marketing*, *25*(12), 1111-1130.

Cox, B. F. (2002). The relationship between creativity and self-directed learning among adult community college students.

Creswell, J. W., & Zhang, W. (2009). The application of mixed methods designs to trauma research. *Journal of Traumatic Stress: Official publication of the international society for traumatic stress studies*, *22*(6), 612-621.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *psychometrika*, *16*(3), 297-334.

Cronbach, L. J., & Bierstedt, R. (1955). *Text materials in modern education: a comprehensive theory and platform for research*. University of Illinois Press.

Crosling, G., Nair, M., & Vaithilingam, S. (2015). A creative learning ecosystem, quality of education and innovative capacity: a perspective from higher education. *Studies in Higher Education*, *40*(7), 1147-1163.

Culkin, N. (2013). Beyond being a student: An exploration of student and graduate start-ups (SGSUs) operating from university incubators. *Journal of Small Business and Enterprise Development*.

Davis, B. C., Hmieleski, K. M., Webb, J. W., & Coombs, J. E. (2017). Funders' positive affective reactions to entrepreneurs' crowdfunding pitches: The influence of perceived product creativity and entrepreneurial passion. *Journal of business venturing*, *32*(1), 90-106.

Deci, E. L., & Ryan, R. M. (2004). *Handbook of self-determination research*. University Rochester Press.

Din, N., Haron, S., & Rashid, R. M. (2016). Can Self-directed Learning Environment Improve Quality of Life? *Procedia-Social and Behavioral Sciences*, *222*, 219-227.

Dochy, F., Segers, M., Van den Bossche, P., & Gijbels, D. (2003). Effects of problem-based learning: A meta-analysis. *Learning and instruction*, *13*(5), 533-568.

Doğan, E. (2015). The effect of entrepreneurship education on entrepreneurial intentions of university students in Turkey. *Ekonometri ve istatistik e-Dergisi*(23), 79-93.

Dooley, D., & Prause, J. (2003). *The social costs of underemployment: Inadequate employment as disguised unemployment*. Cambridge University Press.

Drazin, R., & Schoonhoven, C. B. (1996). Community, population, and organization effects on innovation: A multilevel perspective. *Academy of management journal*, *39*(5), 1065-1083.

Drucker, P. F. (1985). Entrepreneurial strategies. *California Management Review (pre-1986)*, *27*(000002), 9.

Duke, B., Harper, G., & Johnston, M. (2013). Connectivism as a digital age learning theory. *The International HETL Review*, *2013*(Special Issue), 4-13.

Earl-Babbie, M. (2013). The Practice of Social Research. *Wadsworth, Thomson Learning Inc*.

Fayolle, A., & Gailly, B. (2015). The impact of entrepreneurship education on entrepreneurial attitudes and intention: Hysteresis and persistence. *Journal of small business management*, *53*(1), 75-93.

Fincham, J. E. (2008). Response rates and responsiveness for surveys, standards, and the Journal. *American journal of pharmaceutical education*, *72*(2).

Fisk, R. P., Grove, S. J., & John, J. (2008). *Interactive services marketing*. Houghton Mifflin Boston.

Florida, R. L. (2005). *Cities and the creative class*. Psychology Press.

Ford, R., & Meyer, R. (2015). Competency-based education 101. *Procedia Manufacturing*, *3*, 1473-1480.

Frambach, J. M., Driessen, E. W., Chan, L. C., & van der Vleuten, C. P. (2012). Rethinking the globalisation of problem based learning: how culture challenges self directed learning. *Medical education*, *46*(8), 738-747.

Frank, J. R., Snell, L. S., Cate, O. T., Holmboe, E. S., Carraccio, C., Swing, S. R., Harris, P., Glasgow, N. J., Campbell, C., & Dath, D. (2010). Competency-based medical education: theory to practice. *Medical teacher*, *32*(8), 638-645.

Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of counseling psychology*, *51*(1), 115.

Gaglio, C. M. (2004). The role of mental simulations and counterfactual thinking in the opportunity identification process. *Entrepreneurship Theory and Practice*, *28*(6), 533-552.

Galama, T., & Hosek, J. (2008). *US competitiveness in science and technology*. Rand Corporation.

Gervais, A., Karame, G. O., Wüst, K., Glykantzis, V., Ritzdorf, H., & Capkun, S. (2016). On the security and performance of proof of work blockchains. Proceedings of the 2016 ACM SIGSAC conference on computer and communications security,

Ghauri, P., & Grønhaug, K. (2010). Research methods in business studies (4. utg.). *Harlow: Financial Times Prentice Hall*.

Ghavifekr, S., & Rosdy, W. A. W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science*, *1*(2), 175-191.

Giacalone, D. (2016). Enhancing student learning with case-based teaching and audience response systems in an interdisciplinary Food Science course.

Gibb, A., & Price, A. (2014). A compendium of pedagogies for teaching entrepreneurship. *International entrepreneurship educators program*.

Goldsmith, R. E., Kim, D., Flynn, L. R., & Kim, W.-M. (2005). Price sensitivity and innovativeness for fashion among Korean consumers. *The Journal of social psychology*, *145*(5), 501-508.

Gower, J. C., Lubbe, S. G., & Le Roux, N. J. (2011). *Understanding biplots*. John Wiley & Sons.

Gozukara, I., & Colakoglu, N. (2016). Enhancing entrepreneurial intention and innovativeness of university students: the mediating role of entrepreneurial alertness. *International Business Research*, *9*(2), 34-45.

Grace, K., Maher, M. L., Fisher, D., & Brady, K. (2015). Data-intensive evaluation of design creativity using novelty, value, and surprise. *International Journal of Design Creativity and Innovation*, *3*(3-4), 125-147.

Gratton, C., & Jones, I. (2014). Research methods for sports studies.

Guglielmino, L. M. (2013). The case for promoting self-directed learning in formal educational institutions. *SA-eDUC*, *10*(2).

Gujarati, D. N., & Porter, D. C. (2003). Basic econometrics (ed.). *Singapore: McGrew Hill Book Co*.

Gurol, Y., & Atsan, N. (2006). Entrepreneurial Characteristics Amongst University Student: Some Insights For Entrepreneurship Education And Training In Turkey.

Hair, J. F. (2009). Multivariate data analysis.

Hair, J. F., Celsi, M., Ortinau, D. J., & Bush, R. P. (2010). *Essentials of marketing research* (Vol. 2). McGraw-Hill/Irwin New York, NY.

Hair Jr, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. *European business review*.

Hampton, G., Rhodes, C., & Stokes, M. (2004). *A practical guide to mentoring, coaching and peer-networking: Teacher professional development in schools and colleges*. Routledge.

Hardwick, R. M., & Celnik, P. A. (2014). Cerebellar direct current stimulation enhances motor learning in older adults. *Neurobiology of aging*, *35*(10), 2217-2221.

Hattab, H. W. (2014). Impact of entrepreneurship education on entrepreneurial intentions of university students in Egypt. *The Journal of Entrepreneurship*, *23*(1), 1-18.

Hayes, A. F., & Scharkow, M. (2013). The relative trustworthiness of inferential tests of the indirect effect in statistical mediation analysis: Does method really matter? *Psychological science, 24*(10), 1918-1927.

Herreid, C. F. (2007). *Start with a story: The case study method of teaching college science*. NSTA press.

Hesse-Biber, S. N., & Leavy, P. (2010). *The practice of qualitative research*. Sage.

Hian, C. K. (1996). Testing hypotheses of entrepreneurial characteristics. A study of Hong Kong MBA students. *Journal of Managerial Psychology, 11*(3), 12-25.

Hills, G., Lumpkin, G., & Singh, R. (1997). Opportunity recognition: Perceptions and behaviors of entrepreneurs. Frontiers of entrepreneurship. In: Babson College Press, Wellesley, MA.

Himwich, E. (2016). Yale's new "Design Factory. *The CEID. Yale Scientific.*

Hitt, M., & Duane Ireland, R. (2017). The intersection of entrepreneurship and strategic management research. *The Blackwell handbook of entrepreneurship*, 45-63.

Hmelo-Silver, C. E. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review*, *16*(3), 235-266.

Hodgetts, R. M., & Kuratko, D. F. (2004). Entrepreneurship; Theory, Process and Practice.

Hoffman, A., & Holzhuter, J. (2012). The evolution of higher education: innovation as natural selection. *Innovation in Higher Education: Igniting the Spark for Success, American Council on Education, Rowman & Litttlefield Publishers Inc., Lanham, MD*, 3-15.

Hofmann, W., Baumeister, R. F., Förster, G., & Vohs, K. D. (2012). Everyday temptations: an experience sampling study of desire, conflict, and self-control. *Journal of Personality and Social Psychology*, *102*(6), 1318.

Hoidn, S., & Kärkkäinen, K. (2014). Promoting skills for innovation in higher education: A literature review on the effectiveness of problem-based learning and of teaching behaviours.

Hooshyar, D., Kori, K., Pedaste, M., & Bardone, E. (2019). The potential of open learner models to promote active thinking by enhancing self-regulated learning in online higher education learning environments. *British Journal of Educational Technology*, *50*(5), 2365-2386.

Hopwood, C. J., Wright, A. G., Ansell, E. B., & Pincus, A. L. (2013). The interpersonal core of personality pathology. *Journal of personality disorders*, *27*(3), 270-295.

Horohov, J. E. (2017). Measuring Learning, Not Time: Competency-Based Education and Visions of a More Efficient Credentialing Model.

Hu, L.-t., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological methods*, *3*(4), 424.

Hurt, H. T., Joseph, K., & Cook, C. D. (1977). Scales for the measurement of innovativeness. *Human Communication Research*, *4*(1), 58-65.

Hutcheson, G. D., & Sofroniou, N. (1999). *The multivariate social scientist: Introductory statistics using generalized linear models*. Sage.

Inoue, K., Ribeiro, T., & Sakama, C. (2014). Learning from interpretation transition. *Machine Learning*, *94*(1), 51-79.

Iversen, A.-M., Pedersen, A. S., Krogh, L., & Jensen, A. A. (2015). Learning, leading, and letting go of control: Learner-led approaches in education. *Sage Open*, *5*(4), 2158244015608423.

Jamil, F., Ismail, K., & Mahmood, N. (2015). A review of commercialization tools: University incubators and technology parks. *International Journal of Economics and Financial Issues*, *5*(1S).

Janssen, M., Konopnicki, D., Snowdon, J. L., & Ojo, A. (2017). Driving public sector innovation using big and open linked data (BOLD). *Information systems frontiers*, *19*(2), 189-195.

Jekel, T., Ferber, N., & Stuppacher, K. (2015). Innovation vs. Innovativeness: Do We Support Our Students in (Re-) Inventing the World? *GI_Forum*, *2015*, 373-382.

Johansson, S. (2016). Case studies and their impact on teaching. In.

Johnston, M. P. (2017). Secondary data analysis: A method of which the time has come. *Qualitative and quantitative methods in libraries*, *3*(3), 619-626.

Jolliffe, I. T., & Cadima, J. (2016). Principal component analysis: a review and recent developments. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, *374*(2065), 20150202.

Jonassen, D. H. (2007). Engaging and supporting problem solving in online learning. *Online learning communities*, 109-127.

Jonassen, D. H., & Hernandez-Serrano, J. (2002). Case-based reasoning and instructional design: Using stories to support problem solving. *Educational Technology Research and Development*, *50*(2), 65-77.

Jones, C. L. D. (2015). *The full range advising experience: An assessment of college academic advisors' self-perceived leadership styles*. University of North Texas.

Jones, R., Pykett, J., & Whitehead, M. (2013). *Changing behaviours: on the rise of the psychological state*. Edward Elgar Publishing.

Jöreskog, K. G., & Sörbom, D. (1993). *LISREL 8: Structural equation modeling with the SIMPLIS command language*. Scientific Software International.

Judd, C. M., & Kenny, D. A. (2010). Data analysis in social psychology: Recent and recurring issues. *Handbook of social psychology, 1*, 115-139.

Kaiser, H. F. (1974). An index of factorial simplicity. *psychometrika, 39*(1), 31-36.

Kalton, G. (2020). *Introduction to survey sampling* (Vol. 35). Sage Publications.

Kang, J.-S., Chiang, C.-F., Huangthanapan, K., & Downing, S. (2015). Corporate social responsibility and sustainability balanced scorecard: The case study of family-owned hotels. *International Journal of Hospitality Management, 48*, 124-134.

Kaur, M., Gifford, T., Marsh, K. L., & Bhat, A. (2013). Effect of robot–child interactions on bilateral coordination skills of typically developing children and a child with autism spectrum disorder: A preliminary study. *Journal of Motor Learning and Development, 1*(2), 31-37.

Koe, W., Krishnan, R., & Utami, S. (2018). The influence of entrepreneurial skills on business start-up intention among Bumiputra students. *Journal of Advanced Manufacturing Technology (JAMT), 12*(2), 53-64.

Koehler, M., & Mishra, P. (2009). What is technological pedagogical content knowledge (TPACK)? *Contemporary issues in technology and teacher education*, *9*(1), 60-70.

Kolympiris, C., & Klein, P. G. (2017). The effects of academic incubators on university innovation. *Strategic Entrepreneurship Journal*, *11*(2), 145-170.

Kombo, D., & Tromp, D. (2006). Project and thesis writing: An introduction. *Pauline" s Publications Africa*.

Koppensteiner, N. (2018). Transrational Methods of Peace Research: The Researcher as (Re) source. In *Transrational Resonances* (pp. 59-81). Springer.

Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.

Kouwenhoven, W. (2010). Competence-based curriculum development in higher education: some African experiences. *Access & expansion: Challenges or higher education improvement in developing countries*, 125-146.

Krain, M. (2016). Putting the learning in case learning? The effects of casebased approaches on student knowledge, attitudes, and engagement. *Journal on Excellence in College Teaching*, *27*(2), 131-153.

Kuh, G. D., Kinzie, J., Schuh, J. H., & Whitt, E. J. (2011). *Student success in college: Creating conditions that matter*. John Wiley & Sons.

Lai, K. T. P., & Tang, K. C. C. (2000). Obstacles to the implementation of problem-based learning (PBL) in local universities of Hong Kong.

Lao, R. C. (1970). Internal-external control and competent and innovative behavior among Negro college students. *Journal of Personality and Social Psychology, 14*(3), 263.

Lasrado, V., Sivo, S., Ford, C., O'Neal, T., & Garibay, I. (2016). Do graduated university incubator firms benefit from their relationship with university incubators? *The Journal of Technology Transfer, 41*(2), 205-219.

Lassnigg, L. (2015). Competence-based education and educational effectiveness. A critical review of the research literature on outcome-oriented policy making in education.

Lassnigg, L., Hartl, J., Unger, M., & Schwarzenbacher, I. (2017). Higher Education Institutions and Knowledge Triangle: Improving the interaction between education, research and innovation.

Law, K. M., & Breznik, K. (2017). Impacts of innovativeness and attitude on entrepreneurial intention: Among engineering and non-engineering students. *International Journal of Technology and Design Education*, *27*(4), 683-700.

Law, N., Yuen, A., & Fox, R. (2011). *Educational innovations beyond technology: Nurturing leadership and establishing learning organizations*. Springer Science & Business Media.

Leary, H. M. (2012). Self-directed learning in problem-based learning versus traditional lecture-based learning: A meta-analysis.

Lee, J., Kim, D., & Sung, S. (2019). The effect of entrepreneurship on start-up open innovation: Innovative behavior of university students. *Journal of Open Innovation: Technology, Market, and Complexity*, *5*(4), 103.

Lee, V. S. (2012). What is inquiry-guided learning? *New directions for teaching and learning*, *2012*(129), 5-14.

Lin, C.-Y., Marshall, D., & Dawson, J. (2013). How does perceived convenience retailer innovativeness create value for the customer? *International Journal of Business and Economics*, *12*(2), 171-179.

Lindholm Dahlstrand, Å., & Politis, D. (2013). Women business ventures in Swedish business incubators. *International Journal of Gender and Entrepreneurship*, *5*(1), 78-96.

Lindholm, D., Å , && Politis, D. (2013). Women business ventures in Swedish business incubators. *International Journal of Gender and Entrepreneurship*, *5*(1), 78-96.

Liu, S., Quinn, J. A., Gutmann, M. U., Suzuki, T., & Sugiyama, M. (2014). Direct learning of sparse changes in Markov networks by density ratio estimation. *Neural computation*, *26*(6), 1169-1197.

Lorz, M., Mueller, S., & Volery, T. (2013). Entrepreneurship education: a systematic review of the methods in impact studies. *Journal of enterprising culture*, *21*(02), 123-151.

Lund, C. (2011). Property and citizenship: conceptually connecting land rights and belonging in Africa. *Africa Spectrum*, *46*(3), 71-75.

Macdonald, L. (2016). *Supporting civil society: The political role of non-governmental organizations in Central America*. Springer.

Mahat, J., Ayub, A. F. M., & Luan, S. (2012). An assessment of students' mobile self-efficacy, readiness and personal innovativeness towards mobile learning in higher education in Malaysia. *Procedia-Social and Behavioral Sciences*, *64*, 284-290.

Maital, S., & Seshadri, D. (2012). *Innovation management: strategies, concepts and tools for growth and profit*. SAGE Publications India.

Martínez León, I. M., & Martínez García, J. A. (2011). The influence of organizational structure on organizational learning. *International Journal of Manpower*.

Mason, C., & Brown, R. (2014). Entrepreneurial ecosystems and growth oriented entrepreneurship. *Final report to OECD, Paris*, *30*(1), 77-102.

Matlay, H., Dinis, A., do Paço, A., Ferreira, J., Raposo, M., & Rodrigues, R. G. (2013). Psychological characteristics and entrepreneurial intentions among secondary students. *Education+ Training*.

Matsunaga, M. (2010). How to Factor-Analyze Your Data Right: Do's, Don'ts, and How-To's. *International journal of psychological research*, *3*(1), 97-110.

McDermott, R. (2011). Internal and external validity. *Cambridge handbook of experimental political science*, 27-40.

McGregor, S. L., & Murnane, J. A. (2010). Paradigm, methodology and method: Intellectual integrity in consumer scholarship. *International journal of consumer studies*, *34*(4), 419-427.

Mertler, C. A., & Reinhart, R. V. (2016). *Advanced and multivariate statistical methods: Practical application and interpretation*. Taylor & Francis.

Mishra, S. P., Sarkar, U., Taraphder, S., Datta, S., Swain, D. P., Saikhom, R., Panda, S., & Laishram, M. (2017). Multivariate statistical data analysis-principal component analysis (PCA). *International Journal of Livestock Research*, *7*(5), 60-78.

Morris, M. H., & Kaplan, J. B. (2014). Entrepreneurial (versus managerial) competencies as drivers of entrepreneurship education. In *Annals of Entrepreneurship Education and Pedagogy–2014*. Edward Elgar Publishing.

Moses, C., Akinbode, M., Olokundun, A. M., & Agboola, M. G. (2015). Entrepreneurship education and action-oriented pedagogical approaches. *International Journal of Educational Science and Research*, *5*(5), 53-60.

Mudhovozi, P., & Nyanga, T. (2015). Smoking and self-justification among university students. *Studies on Ethno-Medicine*, *9*(1), 117-125.

Mueller, S. L., & Thomas, A. S. (2001). Culture and entrepreneurial potential: A nine country study of locus of control and innovativeness. *Journal of business venturing*, *16*(1), 51-75.

Mugenda, O. M., & Mugenda, A. G. (2003). Quantitative and qualitative approaches. In: Nairobi: Acts Press.

Muigai, S. W. (2012). *Factors that influence student participation in entrepreneurship among university students; the case of Strathmore university undergraduates students* University of Nairobi, Kenya].

Muijs, D., & Lindsay, G. (2008). Where are we at? An empirical study of levels and methods of evaluating continuing professional development. *British educational research journal*, *34*(2), 195-211.

Mutai, R. (2011). Micro and small enterprise sector and existing support system with emphasis on high-tech oriented entrepreneurship in Kenya. *Journal of Language, Technology & Entrepreneurship in Africa*, *3*(1), 99-108.

Nählinder, J., Tillmar, M., & Wigren, C. (2015). Towards a gender-aware understanding of innovation: a three-dimensional route. *International Journal of Gender and Entrepreneurship*.

Naik, G. R. (2017). *Advances in Principal Component Analysis: Research and Development*. Springer.

Ndemo, B., & Aiko, D. (2016). Nurturing Creativity and Innovation in African Enterprises: A Case Study on Kenya. *Entrepreneurship-Practice-Oriented Perspectives*, *21*.

Ndofirepi, T. M. (2020). Relationship between entrepreneurship education and entrepreneurial goal intentions: psychological traits as mediators. *Journal of Innovation and Entrepreneurship*, *9*(1), 2.

Ndururi, J. G. (2020). Entrepreneurship skills and Growth of Women-Owned MSEs in Central Kenya Counties. *Journal of Entrepreneurship & Project management*, *4*(6), 58-67.

Nkhoma, M., Sriratanaviriyakul, N., & Quang, H. L. (2017). Using case method to enrich students' learning outcomes. *Active Learning in Higher Education*, *18*(1), 37-50.

Nulty, D. D. (2008). The adequacy of response rates to online and paper surveys: what can be done? *Assessment & evaluation in higher education*, *33*(3), 301-314.

Omweri, K. F. (2016). *The role of business incubation centres in promoting youth entrepreneurship in Kenya: a case of youth entrepreneurial program at Nailab center* University of Nairobi].

Ooge, J., De Croon, R., Verbert, K., & Vanden Abeele, V. (2020). Tailoring Gamification for Adolescents: a Validation Study of Big Five and Hexad in Dutch. Proceedings of the Annual Symposium on Computer-Human Interaction in Play,

Osborne, J. W., & Waters, E. (2002). Four assumptions of multiple regression that researchers should always test. *Practical assessment, research, and evaluation*, *8*(1), 2.

Osler, J. E. (2012). TrichotomySquared A Novel Mixed Methods Test and Research Procedure Designed to Analyze, Transform, and Compare Qualitative and Quantitative Data for Education Scientists who are Administrators, Practitioners, Teachers, and Technologists. *i-manager's Journal on Mathematics*, *1*(3), 23.

Overmyer, G. R. (2014). *The flipped classroom model for college algebra: Effects on student achievement* Colorado State University].

Ozkazanc-Pan, B. (2018). Bowen and Hisrich (1986) on the female entrepreneur: 30 years of research and new directions for gender and entrepreneurship scholarship. *Foundational Research in Entrepreneurship Studies*, 103-126.

Palaniappan, G. (2017). Determinants of corporate financial performance relating to board characteristics of corporate governance in Indian manufacturing industry. *European Journal of Management and Business Economics*.

Pandiangan, P., Sanjaya, G., & Jatmiko, B. (2017). The validity and effectiveness of physics independent learning model to improve physics problem solving and self-directed learning skills of students in open and distance education systems. *Journal of Baltic Science Education*, *16*(5), 651.

Papis, K. G. (2015). Emotional intelligence and sociotropy-autonomy in young women with DSM-IV-TR hypochondriasis: a mixed-method study.

Park, H. M. (2017). Factor Analysis for Questionnaire Survey Data.

Patrick, D. L., Burke, L. B., Gwaltney, C. J., Leidy, N. K., Martin, M. L., Molsen, E., & Ring, L. (2011). Content validity—establishing and reporting the evidence in newly developed patient-reported outcomes (PRO) instruments for medical product evaluation: ISPOR PRO good research practices task force report: part 1—eliciting concepts for a new PRO instrument. *Value in Health*, *14*(8), 967-977.

Peppler, K., & Bender, S. (2013). Maker movement spreads innovation one project at a time. *Phi Delta Kappan*, *95*(3), 22-27.

Polgar, S., & Thomas, S. A. (2011). *Introduction to Research in the Health Sciences E-Book*. Elsevier Health Sciences.

Preacher, K. J., Zhang, Z., & Zyphur, M. J. (2016). Multilevel structural equation models for assessing moderation within and across levels of analysis. *Psychological methods*, *21*(2), 189.

Qureshi, S., Cheema, F., & Sana, F. (2016). An exploratory study of entrepreneurial centers in Pakistan: an untapped market opportunity. *IBT J Bus Stud*, *11*(2), 16-28.

Rae, D. (2012). Action learning in new creative ventures. *International journal of entrepreneurial behavior & Research*.

Rahman, S. K., Sathik, M. M., & Kannan, K. S. (2012). Multiple linear regression models in outlier detection. *International Journal of Research in Computer Science*, *2*(2), 23.

Rajapathirana, R. J., & Hui, Y. (2018). Relationship between innovation capability, innovation type, and firm performance. *Journal of Innovation & Knowledge*, *3*(1), 44-55.

Rauch, A., & Hulsink, W. (2015). Putting entrepreneurship education where the intention to act lies: An investigation into the impact of entrepreneurship education on entrepreneurial behavior. *Academy of management learning & education*, *14*(2), 187-204.

Rauch, A., van Doorn, R., & Hulsink, W. (2014). A qualitative approach to evidence–based entrepreneurship: Theoretical considerations and an example involving business clusters. *Entrepreneurship Theory and Practice*, *38*(2), 333-368.

Razali, N. M., & Wah, Y. B. (2011). Power comparisons of shapiro-wilk, kolmogorov-smirnov, lilliefors and anderson-darling tests. *Journal of statistical modeling and analytics*, *2*(1), 21-33.

Rideout, E. C., & Gray, D. O. (2013). Does entrepreneurship education really work? A review and methodological critique of the empirical literature on the effects of university-based entrepreneurship education. *Journal of small business management*, *51*(3), 329-351.

Robinson, C. D., Tomek, S., & Schumacker, R. (2013). Tests of moderation effects: Difference in simple slopes versus the interaction term. *Multiple Linear Regression Viewpoints*, *39*(1), 16-24.

Robinson, J. (2015). Consumer innovativeness and shopping styles. *Journal of Consumer Marketing*, *27*(5), 437-446.

Robb, A., Valerio, A., & Parton, B. (Eds.). (2014). *Entrepreneurship education and training: insights from Ghana, Kenya, and Mozambique*. The World Bank.

Rogers, E. M. (2010). *Diffusion of innovations*. Simon and Schuster.

Rovai, A. P., Baker, J. D., & Ponton, M. K. (2013). *Social science research design and statistics: A practitioner's guide to research methods and IBM SPSS*. Watertree Press LLC.

Rwigema, H. (2004). *Advanced entrepreneurship*. Oxford University Press.

Saeid, N., & Eslaminejad, T. (2017). Relationship between Student's Self-Directed-Learning Readiness and Academic Self-Efficacy and Achievement Motivation in Students. *International Education Studies*, *10*(1), 225-232.

Salem, M. I. (2014). The role of business incubators in the economic development of Saudi Arabia. *International Business & Economics Research Journal (IBER)*, *13*(4), 853-860.

Sarazin, M. (2017). Can student interdependence be experienced negatively in collective music education programmes? A contextual approach. *London Review of Education*, *15*(3), 488-504.

Saunila, M., Ukko, J., & Rantanen, H. (2012). Innovation capability and its measurement in Finnish SMEs. In *Practice-Based Innovation: Insights, Applications and Policy Implications* (pp. 417-435). Springer.

Schein, E. H. (2019). A new era for culture, change, and leadership. *MIT Sloan Management Review*, *60*(4), 52-58.

Schmidt, A. F., & Finan, C. (2018). Linear regression and the normality assumption. *Journal of clinical epidemiology*, *98*, 146-151.

Schumpeter, J. A., & Nichol, A. (1934). Robinson's economics of imperfect competition. *Journal of political economy*, *42*(2), 249-259.

Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons.

Siew, N. M., Chin, M. K., & Sombuling, A. (2017). The effects of problem based learning with cooperative learning on preschoolers' scientific creativity. *Journal of Baltic Science Education*, *16*(1), 100.

Somsuk, N., & Laosirihongthong, T. (2014). A fuzzy AHP to prioritize enabling factors for strategic management of university business incubators: Resource-based view. *Technological forecasting and social change*, *85*, 198-210.

Stal, E., Andreassi, T., & Fujino, A. (2016). The role of university incubators in stimulating academic entrepreneurship. *RAI Revista de administração e inovação*, *13*(2), 89-98.

Sullivan, S. C., & Downey, J. A. (2015). Shifting educational paradigms: From traditional to competency-based education for diverse learners. *American Secondary Education*, 4-19.

Tabachnick, B. G., & Fidell, L. S. (2007). *Experimental designs using ANOVA*. Thomson/Brooks/Cole Belmont, CA.

Taghinezhad, A., Azizi, M., Shahmohammadi, S., Kashanifar, F. S., & Azadikhah, M. (2016). Comparing the effects of direct and indirect learning strategies on Iranian EFL learners' vocabulary learning. *Journal of applied linguistics and language Research*, *3*(1), 133-143.

Tan, O.-S. (2021). *Problem-based learning innovation: Using problems to power learning in the 21st century*. Gale Cengage Learning.

Tharayil, S., Borrego, M., Prince, M., Nguyen, K. A., Shekhar, P., Finelli, C. J., & Waters, C. (2018). Strategies to mitigate student resistance to active learning. *International Journal of STEM Education*, *5*(1), 1-16.

Thébaud, S. (2015). Business as plan B: Institutional foundations of gender inequality in entrepreneurship across 24 industrialized countries. *Administrative science quarterly*, *60*(4), 671-711.

Thistlethwaite, J. E., Davies, D., Ekeocha, S., Kidd, J. M., MacDougall, C., Matthews, P., Purkis, J., & Clay, D. (2012). The effectiveness of case-based learning in health professional education. A BEME systematic review: BEME Guide No. 23. *Medical teacher*, *34*(6), e421-e444.

Tiwari, A., Chan, S., Wong, E., Wong, D., Chui, C., Wong, A., & Patil, N. (2006). The effect of problem-based learning on students' approaches to learning in the context of clinical nursing education. *Nurse education today*, *26*(5), 430-438.

Tuckman, B. W. (1965). Developmental sequence in small groups. *Psychological bulletin*, *63*(6), 384.

Ülgen, F. (2014). Schumpeterian economic development and financial innovations: a conflicting evolution. *Journal of Institutional Economics*, *10*(2), 257-277.

Wai, K., Dastane, O., Johari, Z., & Ismail, N. B. (2019). Perceived risk factors affecting consumers' online shopping behaviour. *The Journal of Asian Finance, Economics and Business*, *6*(4), 246-260.

Walder, A. M. (2017). Pedagogical Innovation in Canadian higher education: Professors' perspectives on its effects on teaching and learning. *Studies in Educational Evaluation*, *54*, 71-82.

Wang, W.-B., Hung, Y.-C., & Wang, C.-C. (2013). University-industry business incubators in Taiwan.

Wenglinsky, H. (2001). Teacher classroom practices and student performance: How schools can make a difference. *ETS Research Report Series*, *2001*(2), i-37.

Winterton, J., & Winterton, J. (2009). Competence across Europe: highest common factor or lowest common denominator? *Journal of European industrial training*.

Wu, H.-C., & Mohi, Z. (2015). Assessment of service quality in the fast-food restaurant. *Journal of Foodservice Business Research*, *18*(4), 358-388.

Yang, J.-H. (2017). The effect of role model and entrepreneurship education on entrepreneurial intention of Korean juvenile. *Asia-Pacific Journal of Business Venturing and Entrepreneurship, 12*(2), 1-11.

Yeager, D. S., & Dweck, C. S. (2012). Mindsets that promote resilience: When students believe that personal characteristics can be developed. *Educational psychologist, 47*(4), 302-314.

Yıldız, İ. G., & Çolakoğlu, N. (2015). A comparative study on entrepreneurial intentions of vocational school and undergraduate students with entrepreneurship education. *Economy & Business Journal, 9*(1), 203-209.

Yonezawa, A., & Shimmi, Y. (2016). Transformation of university governance through internationalization: Challenges for top universities and government policies in Japan. In *Matching Visibility and Performance* (pp. 101-118). Brill Sense.

Yong, A. G., & Pearce, S. (2013). A beginner's guide to factor analysis: Focusing on exploratory factor analysis. *Tutorials in quantitative methods for psychology, 9*(2), 79-94.

Yusoff, W. F. W., Rajah, S., Ahmad, K., & Ismail, K. (2017). University-based entrepreneurial ecosystem: How graduates perceive and react.

Zaremba, W., & Sutskever, I. (2015). Reinforcement learning neural turing machines-revised. *arXiv preprint arXiv:1505.00521*.

Zhang, Y., Duysters, G., & Cloodt, M. (2014). The role of entrepreneurship education as a predictor of university students' entrepreneurial intention. *International Entrepreneurship and Management Journal, 10*(3), 623-641.

Zhou, C., Friedrichs, Y. v., & Sundin, E. (2014). *Social entrepreneurship: Leveraging economic, political, and cultural dimensions*. Springer.

Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2003). Business research methods (ed.). *Thomson/South-Western, Cincinnati, OH*.

# APPENDICES

## Appendix I: Introduction Letter

Murrey Mercy
P.O. BOX 49,
ELDORET
TEL NO.0720 669246
Email address murreymercy@yahoo.com

Dear Sir/Madam,

**RE: REQUEST FOR RESPONDENTS**

I am a postgraduate student of Moi University pursuing a Doctorate degree in Entrepreneurship. I am carrying out a research on **"Entrepreneurial pedagogy, Incubator use and Student innovative capability in Institutions of higher education in Kenya".** The study is purely academic and it is for this reason therefore, that the information provided will be treated with uttermost confidence. I thus request for your co-operation in filling the questionnaire honestly and to the best of your knowledge.

Thanks in advance,

Yours faithfully,

MURREY MERCY

## Appendix II: Results For Kmo Sampling Adequacy For Each Item

| Problem Based Learning | KMO |
|---|---|
| We have responsibility for our learning | 0.8560 |
| Actively involved in the process of learning | 0.9047 |
| Problem tasks stimulate thinking, analysis and reasoning | 0.8976 |
| We have autonomy in the process of learning | 0.8813 |
| We have an opportunity to interact with the faculty | 0.9000 |
| Problems match with students' level of knowledge | 0.8894 |
| Emphasize is placed on self-directed learning | 0.9113 |
| Problem based design assures self-being in directed learning | 0.9257 |
| Being present in tutorial groups is necessary to master the learning goal | 0.9314 |
| We take initiative in diagnosing our learning needs | 0.8991 |
| I fulfil the task given to me during group work | 0.8459 |
| I participate in group work as much as possible | 0.8838 |
| Problems are easily solved without much difficulty | 0.8965 |
| We choose appropriate learning strategies | 0.9316 |
| Multiple trials are encouraged in developing solutions for classroom problems | 0.9330 |
| We are expected to conduct field research on a given topical issues | 0.9040 |
| We can self-monitor the learning process | 0.8934 |
| We decided on the resources for leaning | 0.8993 |
| We have encouraged to work in peer groups where we can conduct peer assessments | 0.8754 |
| **Overall** | **0.8994** |
| **Competence Based Learning** | **KMO** |
| Teaching is geared towards enhancing students' capabilities | 0.8918 |
| Exams conducted is key to determining the competence of the learner | 0.8798 |
| Skills matching is conducted to determine courses students should undertake | 0.8573 |
| All entrepreneurship students take up skills matching classes to determine businesses they can run/manage | 0.9195 |
| Various talent development programs/ projects are conducted at the university relating to entrepreneurship | 0.8833 |
| Talent development as an activity is part of the university calendar | 0.8911 |
| The assessment given enhance our entrepreneurial skills | 0.8977 |
| The teaching is based on class experiments so as to enhance our abilities | 0.9112 |
| We take initiative to start tasks | 0.9046 |
| We take responsibility for the choices we make | 0.8394 |
| During group experiments I make valuable contributions | 0.8303 |
| I contribute to shared group results by performing class duties | 0.9207 |
| With my expertise I help others perform their tasks | 0.8708 |
| We are encouraged as a group to do our best to achieve the best results possible | 0.8712 |
| **Overall** | **0.8836** |

| Direct Learning | KMO |
|---|---|
| Teachers employ question and answer session when teaching | 0.8679 |
| We are encouraged to ask questions when learning to ensure they grasp concepts | 0.8784 |
| Presentations are compulsory when studying various units | 0.8859 |
| Presentations are pre-defined in terms of number of presentations and mode of presentations | 0.9008 |
| Teachers must appear in class for every lesson | 0.8613 |
| We are required to attend all classes | 0.8389 |
| Class discussions are encouraged in class to enhance our understanding | 0.9106 |
| We are allowed to create own questions to test their ability | 0.9298 |
| Discussions take up most of the course time | 0.8659 |
| Class presentations have a positive impact on us | 0.9172 |
| We are given an open arena of the questions and answers to enhance our ability | 0.9039 |
| Discussions broaden our skills during class work | 0.8727 |
| We are encouraged to brainstorm on questions and answers to enhance our skills | 0.8765 |
| We are motivated to work based on the class assessment deadlines | 0.8949 |
| We take responsibility for the class presentation given | 0.8828 |
| **Overall** | **0.8870** |
| **Case Study Learning** | **KMO** |
| I can clearly understand and articulate the main concepts | 0.8990 |
| Write-up of well-known local entrepreneurs' experiences are available for review to students | 0.8955 |
| I have the ability to think through a problem and argue it out and give possible solutions | 0.9331 |
| Review of literature as a skill is taught to students during entrepreneurship | 0.9151 |
| It gives an overview understanding of what happens in real life situations | 0.9076 |
| I have the ability to understand the relationship between the concepts | 0.9109 |
| Case study has improved my learning efficiency | 0.9297 |
| I have the ability to apply knowledge gained from cases to solve other problems | 0.9129 |
| Case study has helped me learn the entrepreneurship content in a more comprehensive way | 0.9022 |
| I have the ability to articulate real life issues based on the cases done in a classroom setting | 0.9090 |
| Gives more opportunities for participation | 0.8900 |
| We are given more opportunities to apply learning to different cases | 0.9387 |
| More structured environments enhance learning | 0.9198 |
| Encourages application of analytical skills | 0.8875 |
| More opportunities for reviews of literature | 0.9189 |
| **Overall** | **0.9114** |

| Incubator Use | KMO |
|---|---|
| The business incubator has enhanced my networking abilities | 0.8788 |
| I'm able to network with entrepreneurs from diverse fields | 0.9139 |
| I am able to meet and work with other entrepreneurs | 0.8409 |
| I have acquired sufficient business training through the incubator | 0.9069 |
| The incubator has opened me up to better ideas | 0.8620 |
| Entrepreneurial lab focuses on key business aspects of training | 0.8927 |
| I have acquired practical skills through the training given through the incubator | 0.8959 |
| The incubator has enabled me have access to peer mentoring | 0.8062 |
| I am able to build my entrepreneurial capabilities and skills | 0.8394 |
| I have the ability to enhance my etiquette and presentation skills | 0.8199 |
| The entrepreneurial lab has enhanced my communication skills | 0.9129 |
| Entrepreneurship training policies gained through the incubator has enhanced my understanding | 0.8551 |
| The lab has provided me with a combination of many skills including, ability to plan, organize and manage resources | 0.8888 |
| **Overall** | **0.8706** |
| **Student Innovative Capability** | **KMO** |
| I have the capacity to produce unique ideas | 0.8682 |
| I am constantly seeking for unusual novel solutions to solve problems | 0.8978 |
| Actively searching for better products and services | 0.9248 |
| I have come up with new products that has benefited my business | 0.8799 |
| Developed new ideas and concepts overtime | 0.9135 |
| I have actively identified new services and products that has enhanced my capability | 0.9200 |
| I have come up with new products that has benefited the business | 0.8862 |
| Constantly seeking for new ways to do things | 0.9249 |
| I prefer work that requires originality in thought | 0.9215 |
| I can generate new ideas and be able to translate them into viable and profitable businesses | 0.8801 |
| Ability to present new methods and ideas | 0.9038 |
| I have the capacity to modify the features of an existing product or service | 0.8764 |
| I have the capability to come up or discover original ideas | 0.8882 |
| I have the ability to discover new products and services | 0.8844 |
| **Overall** | **0.8983** |

**Appendix III: Questionnaire for fourth Year Entrepreneurship Finalists**

**Directions:** For each statement below, please mark appropriately against each statement. There is no right or wrong answers, so please respond as honestly as possible.

**General information**

1. Gender ( ) Male ( ) Female
2. What is your age group? 18-25 ( ) 26-30 ( )

**PART A**

**Objective I: Problem Based Learning**

To what extent do you agree with the following statements on problem based learning factors affecting student innovativeness these institutions of higher education? Key: SA- Strongly Agree, A- Agree, D- Disagree, SD- Strongly Disagree, ND- Not Decided

| Statement | SA | A | ND | D | SD |
|---|---|---|---|---|---|
| participation is encouraged in solving problems | | | | | |
| Emphasis is placed on self-directed learning | | | | | |
| We have the opportunity to interact with the faculty | | | | | |
| We have labs for experimental learning | | | | | |
| Problem tasks stimulate discussions and critical reflection in tutorial groups | | | | | |
| Problem based design of the course requires active and critical reflection by students | | | | | |
| Being present in tutorial groups is necessary to master the learning goals | | | | | |
| I share my individual assessment results with my peers | | | | | |
| I fulfill the tasks given to me during group work | | | | | |
| I participate in group work as much as possible | | | | | |
| Problems are easily solved without much difficulty | | | | | |
| All teachers offer experiments to enhance the learning activity | | | | | |
| Multiple trials are encouraged in developing solutions for classroom problems | | | | | |
| We are expected to conduct field research on given topical issues | | | | | |
| Field research is taught in class in detail to ensure students have problem-solving skills | | | | | |
| We have peer assessment to help assist each other solve entrepreneurial quizzes | | | | | |
| We are encouraged to work in peer groups where we can conduct peer assessments | | | | | |

**Objective II: Competence Learning**

To what extent do you agree with the following statements on competence based factors affecting student innovativeness in institutions of higher education?

Key: SA- Strongly Agree, A- Agree, D- Disagree, SD- Strongly Disagree, ND- Not Decided.

| **STATEMENT** | **SA** | **A** | **ND** | **D** | **SD** |
|---|---|---|---|---|---|
| Teaching is geared towards enhancing students capabilities | | | | | |
| Exams conducted is key to determining the competence of the learner | | | | | |
| Skills matching is conducted to determine courses students should undertake | | | | | |
| All entrepreneurship students take up skills matching classes to determine businesses they can run/manage | | | | | |
| Various talent development programs/projects are conducted at the university relating to entrepreneurship | | | | | |
| Talent development as an activity is part of the university calendar | | | | | |
| The assessment given enhance our entrepreneurial skills | | | | | |
| The teaching is based on class experiments so as to enhance our abilities | | | | | |
| We take initiative to start tasks | | | | | |
| We take responsibility for the choices we make | | | | | |
| During group experiments I make valuable contributions | | | | | |
| I contribute to shared group results by performing class duties | | | | | |
| With my expertise I help others perform their tasks | | | | | |
| We are encouraged as a group to do our best to achieve the best results possible | | | | | |

**Objective III: Direct Learning**

To what extent do you agree with the following statements on direct learning influences on student innovativeness these institutions of higher education?

Key: SA- Strongly Agree, A- Agree, D- Disagree, SD- Strongly Disagree, ND- Not Decided.

| **Statement** | **SA** | **A** | **ND** | **D** | **SD** |
|---|---|---|---|---|---|
| Teachers employ question and answer sessions when teaching | | | | | |
| We are encouraged to ask questions when learning to ensure they grasp concepts | | | | | |
| Presentations are compulsory when studying various units | | | | | |
| Presentations are pre-defined in-terms of number of presentations and mode of presentations | | | | | |
| Teachers must appear in class for every lesson | | | | | |
| We are required to attend all classes | | | | | |
| Class discussions are encouraged in class to enhance our understanding | | | | | |
| Weare allowed to create own questions to test their ability | | | | | |
| Discussions take up most of the course time | | | | | |
| Class presentations have a positive impact on us | | | | | |
| We are given an open arena of questions and answers to enhance our ability | | | | | |
| Discussions broaden our skills during class work | | | | | |
| We are encouraged to brainstorm on questions and answers to enhance our skills | | | | | |
| We are motivated to work based on the class assessment deadlines | | | | | |
| We take responsibility for the class presentations given | | | | | |

**Objective IV: Case study learning.**

To what extent do you agree with the following statements on case study learning and students innovativeness in institutions of higher education?

Key: SA- Strongly Agree, A- Agree, D- Disagree, SD- Strongly Disagree, ND- Not Decided.

| **STATEMENT** | **SA** | **A** | **ND** | **D** | **SD** |
|---|---|---|---|---|---|
| I can clearly understand and articulate the main concepts | | | | | |
| Write-up of well known local entrepreneurs experiences are available for review to students | | | | | |
| I have the ability to think through a problem and argue | | | | | |
| Review of literature as a skill is taught to students during entrepreneurship | | | | | |
| I understand the relevance of this field to real world issues | | | | | |
| I have the ability to understand the relationship between the concepts | | | | | |
| Case study has improved my learning efficiency | | | | | |
| I have the ability to apply previous knowledge gained even more | | | | | |
| Case study has helped me learn the entrepreneurship content in a more comprehensive way | | | | | |
| I have the ability to articulate real life issues based on the cases done in a classroom setting | | | | | |
| We have more opportunities for participation | | | | | |
| We are given more opportunities to apply learning to different cases | | | | | |
| More structured environments enhances learning | | | | | |
| We have enhanced analytical skills through the case studies | | | | | |
| More opportunities for reviews of literature | | | | | |

**PART B: Moderating Variable: Incubator Use**

Do you use incubators Yes ( ) No ( )

**If Yes** to what extent do you agree with the following statements on business incubators used by entrepreneurship students in the school?

**Key:** SA- Strongly Agree, A- Agree, D- Disagree, SD- Strongly Disagree, ND- Not Decided.

| **STATEMENT** | **SA** | **A** | **ND** | **D** | **SD** |
|---|---|---|---|---|---|
| The business incubator has enhanced my networking abilities | | | | | |
| I'm able to network with entrepreneurs from diverse fields | | | | | |
| I am able to meet and work with other entrepreneurs | | | | | |
| I have acquired sufficient business training through the incubator | | | | | |
| The incubator has opened me up to better ideas | | | | | |
| Entrepreneurial lab focuses on key business aspects training | | | | | |
| I have acquired practical skills through the training given through the incubator | | | | | |
| The incubator has enabled me have access to peer mentoring | | | | | |
| I am able to build my entrepreneurial capabilities and skills | | | | | |
| I have the ability to enhance my etiquette and presentation skills | | | | | |
| The entrepreneurial lab has enhanced my communication skills | | | | | |
| Entrepreneurship training policies have enhanced my understanding | | | | | |
| The lab has provided me a combination of many skills including, ability to plan, organize and manage resources | | | | | |

**PART C: Dependent Variable: Student Innovative Capability**

To what extent do you agree with the following statements on student innovativeness by entrepreneurship students in the school?

Key: SA- Strongly Agree, A- Agree, D- Disagree, SD- Strongly Disagree, ND- Not Decided.

| **STATEMENT** | **SA** | **A** | **ND** | **D** | **SD** |
|---|---|---|---|---|---|
| I have the capacity to produce unique ideas | | | | | |
| I am constantly seeking for unusual novel solutions to solve problems | | | | | |
| Actively searching for better products and services | | | | | |
| I have come up with new products that has benefited my business | | | | | |
| Developed new ideas and concepts overtime | | | | | |
| I have actively identified new services and products that has enhanced my capability | | | | | |
| I have come up with new products that has benefited the business | | | | | |
| Constantly seeking for new ways to do things | | | | | |
| I prefer work that requires originality in thought | | | | | |
| I can generate new ideas and be able to translate them into viable and profitable businesses | | | | | |
| Ability to present new methods and ideas | | | | | |
| I have the capacity to modify the features of an existing product or service | | | | | |
| I have the capability to come up or discover original ideas | | | | | |
| I have the ability to discover new products and services | | | | | |
| I have enhanced my ability with respect to newness of ideas | | | | | |

**Appendix IV: University Research Authorization**

**MOI UNIVERSITY**
***POSTGRADUATE OFFICE***
**SCHOOL OF BUSINESS AND ECONOMICS**

**Tel: 0790940508**
**0771336914**
**0736138770**
**Fax No: (053) 43047**
**Telex No. MOIVARSITY 35047**

**P.O. Box 3900**
**Eldoret.**
**Kenya.**
**Eldoret**

**RE**: AHRD/PhDE/01/16 **DATE:** 19th September, 2019

**TO WHOM IT MAY CONCERN**

**RE: MURREY CHEBET MERCY**

The above named is a bonafide student of Moi University School of Business and Economics, undertaking a Doctor of Philosophy in Entrepreneurship Studies. She has completed coursework, defended her proposal, and is proceeding to the field to collect data for her research titled: **"Entrepreneurial Pedagogy, Incubator use and Student Innovativeness in Institutions of Higher Education, Kenya."**

Any assistance accorded to her will be highly appreciated.

Yours faithfully,

DEAN
School Of ...ss and Economics
MOI UNIVERSITY

**DR. RONALD BONUKE**
**ASSOCIATE DEAN, SB&E**

## Appendix V: Nacosti Research Authorization

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **141647**

Date of Issue: **24/September/2019**

**RESEARCH LICENSE**

**This is to Certify that Miss.. MERCY MURREY of Moi University, has been licensed to conduct research in Nairobi on the topic: ENTREPRENEURIAL PEDAGOGY, INCUBATOR USE AND STUDENT INNOVATIVENESS IN INSTITUTIONS OF HIGHER EDUCATION, KENYA for the period ending : 24/September/2020.**

License No: **NACOSTI/P/19/1758**

**141647**

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

**Appendix VI: Reliability Test**

| Test scale = mean(standardized items) | | | | | |
|---|---|---|---|---|---|
| Item | Obs Sign | item-test correlation | item-rest correlation | Average inter-item correlation | Alpha |
| var_1_1 | 60 - | 0.1533 | 0.0976 | 0.0734 | 0.8237 |
| var_1_2 | 60 - | 0.0782 | 0.0218 | 0.0741 | 0.8253 |
| var_2_1 | 60 + | 0.3210 | 0.2691 | 0.0716 | 0.8199 |
| var_2_2 | 60 - | 0.0124 | -0.0440 | 0.0748 | 0.8267 |
| var_2_3 | 60 + | 0.2350 | 0.1807 | 0.0725 | 0.8218 |
| var_2_4 | 60 + | 0.2590 | 0.2053 | 0.0723 | 0.8213 |
| var_2_5 | 60 + | 0.1877 | 0.1325 | 0.0730 | 0.8229 |
| var_2_6 | 60 + | 0.4025 | 0.3537 | 0.0708 | 0.8180 |
| var_2_7 | 60 + | 0.3747 | 0.3248 | 0.0711 | 0.8186 |
| var_2_8 | 60 + | 0.5122 | 0.4688 | 0.0696 | 0.8154 |
| var_2_9 | 60 + | 0.4441 | 0.3972 | 0.0704 | 0.8170 |
| var_2_10 | 60 + | 0.1679 | 0.1124 | 0.0732 | 0.8234 |
| var_2_11 | 60 - | 0.0603 | 0.0039 | 0.0743 | 0.8257 |
| var_3_1 | 60 + | 0.5996 | 0.5616 | 0.0687 | 0.8133 |
| var_3_2 | 60 + | 0.3114 | 0.2591 | 0.0717 | 0.8201 |
| var_3_3 | 60 + | 0.6107 | 0.5735 | 0.0686 | 0.8130 |
| var_3_4 | 60 + | 0.1340 | 0.0781 | 0.0736 | 0.8241 |
| var_3_5 | 60 + | 0.4491 | 0.4024 | 0.0703 | 0.8169 |
| var_3_6 | 60 + | 0.5159 | 0.4727 | 0.0696 | 0.8153 |
| var_3_7 | 60 + | 0.7755 | 0.7515 | 0.0669 | 0.8088 |
| var_4_1 | 60 + | 0.4530 | 0.4065 | 0.0703 | 0.8168 |
| var_4_2 | 60 + | 0.2208 | 0.1662 | 0.0727 | 0.8222 |
| var_4_3 | 60 + | 0.6463 | 0.6117 | 0.0683 | 0.8121 |
| var_4_4 | 60 + | 0.6853 | 0.6536 | 0.0679 | 0.8111 |
| var_4_5 | 60 + | 0.1808 | 0.1255 | 0.0731 | 0.8231 |
| var_4_6 | 60 + | 0.3019 | 0.2494 | 0.0718 | 0.8203 |
| var_4_7 | 60 + | 0.2069 | 0.1521 | 0.0728 | 0.8225 |
| var_4_8 | 60 - | -0.0011 | -0.0574 | 0.0750 | 0.8270 |
| var_4_9 | 60 + | 0.1745 | 0.1191 | 0.0731 | 0.8232 |
| var_5_1 | 60 + | 0.3807 | 0.3309 | 0.0710 | 0.8185 |
| var_5_2 | 60 + | 0.2628 | 0.2092 | 0.0722 | 0.8212 |
| var_5_3 | 60 + | 0.4538 | 0.4074 | 0.0703 | 0.8168 |
| var_5_4 | 60 - | 0.0697 | 0.0133 | 0.0742 | 0.8255 |
| var_5_5 | 60 + | 0.6893 | 0.6579 | 0.0678 | 0.8110 |
| var_5_6 | 60 + | 0.1892 | 0.1340 | 0.0730 | 0.8229 |
| var_5_7 | 60 + | 0.1428 | 0.0870 | 0.0735 | 0.8239 |
| var_5_8 | 60 + | 0.5049 | 0.4610 | 0.0697 | 0.8156 |
| var_5_9 | 60 + | 0.5271 | 0.4846 | 0.0695 | 0.8150 |
| var_5_10 | 60 + | 0.0668 | 0.0104 | 0.0743 | 0.8256 |
| var_5_11 | 60 + | 0.4486 | 0.4019 | 0.0703 | 0.8169 |
| var_6_1 | 60 + | 0.4358 | 0.3884 | 0.0704 | 0.8172 |
| var_6_2 | 60 + | 0.1840 | 0.1287 | 0.0730 | 0.8230 |
| var_6_3 | 60 + | 0.2781 | 0.2249 | 0.0721 | 0.8209 |

| | | | | | |
|---|---|---|---|---|---|
| var_6_4 | 60 + | 0.4499 | 0.4032 | 0.0703 | 0.8169 |
| var_6_5 | 60 + | 0.2062 | 0.1514 | 0.0728 | 0.8225 |
| var_6_6 | 60 + | 0.1883 | 0.1331 | 0.0730 | 0.8229 |
| var_6_7 | 60 - | 0.3867 | 0.3372 | 0.0709 | 0.8184 |
| var_6_8 | 60 + | 0.2299 | 0.1755 | 0.0726 | 0.8220 |
| var_6_9 | 60 - | 0.0332 | -0.0232 | 0.0746 | 0.8263 |
| var_6_10 | 60 + | 0.2984 | 0.2458 | 0.0719 | 0.8204 |
| var_7_1 | 60 + | 0.1308 | 0.0748 | 0.0736 | 0.8242 |
| var_7_2 | 60 + | 0.3313 | 0.2798 | 0.0715 | 0.8196 |
| var_7_3 | 60 - | 0.1445 | 0.0887 | 0.0735 | 0.8239 |
| var_7_4 | 60 - | 0.0379 | -0.0185 | 0.0746 | 0.8262 |
| var_7_5 | 60 + | 0.4438 | 0.3969 | 0.0704 | 0.8170 |
| var_7_6 | 60 + | 0.0385 | -0.0179 | 0.0746 | 0.8262 |
| var_7_7 | 60 - | 0.2561 | 0.2023 | 0.0723 | 0.8214 |
| var_7_8 | 60 - | 0.1719 | 0.1165 | 0.0732 | 0.8233 |
| var_7_9 | 60 - | 0.1080 | 0.0519 | 0.0738 | 0.8247 |
| var_7_10 | 60 - | 0.1718 | 0.1164 | 0.0732 | 0.8233 |
| **Test scale** | | | | **0.0719** | **0.8229** |

**Appendix VII: Counties of Kenya Map**