

**Investigating how Biology Teachers enhance Entrepreneurship Skills among students
in Secondary Schools: A Case of Selected Secondary schools in Northern Education
Division.**

By

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degree of Master of Education in Teacher Education

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DECLARATION

I declare the research work, “Investigating how Biology Teachers Enhance Entrepreneurship skills among students: A case of selected schools in Northern Education Division Mzuzu”, is my work and that all the quotes or sources used have been properly acknowledged and cited. It is being submitted in fulfilment of the requirements for the degree of Masters of Education in Teacher Education by Research Report at Mzuzu University. It has never before been included in a thesis or dissertation submitted to this or any other institution for a degree, diploma, or other qualification.

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DEDICATON

This work is dedicated to my daughter Tiffany for accepting to be left with grandparents till I finish my work,
I salute you my dear.

ABSTRACT

The study aimed at investigating how biology teachers enhance entrepreneurship skills among students in selected schools in Mzuzu. Due to lack of employment opportunities which has become a very serious issue in Malawi today, the need for entrepreneurship skills to be inculcated (instilled) in the students is very important especially at secondary level where some of the students may not have the opportunity to further their education such students can use the skills which was inculcated into them to become an independent person who can now establish either a bee farm, or can go into planting flowers which in turn can be sold to provide money for him/her. Specifically, the study was guided by three objectives, namely: (i) Determine the selected teachers understanding of entrepreneurship skills, (ii) assess how teachers enhance entrepreneurship in biology classroom and (iii) establish challenges faced when enhancing entrepreneurship in biology classrooms. The study adopted a qualitative approach with a case study design. The study targeted biology teachers in selected schools in Mzuzu, and the sample size was five which depended on saturation point. Purposive sampling and convenient sampling was used to identify participants for the study. The researcher got permission from Mzuzu University Research Ethics Committee (MZUNIREC), EDM, and Head teachers to conduct the research and besides, informed consent was sought from teachers before starting interviews. Data were collected using interviews and lesson observation. After data transcription, it was kept in files created on the laptop, flash disks, and hard copies to avoid losing information. Thematic analysis was used to analyse data. The study found that all five teachers demonstrated inadequate knowledge in the area of entrepreneurship skills and the predominant use of teacher centred methods accompanied by insufficient resources, hinder enhancing of entrepreneurship skills during the instruction of biology.

GLOSSARY OF ACRONYMS/ABBREVIATIONS

ESE: Entrepreneurial Self-Efficacy

MIE: Malawi Institute of Education

MoE: Ministry of Education

MZUNIREC: Mzuzu University Research Ethics Committee

MW2063: Malawi Vision 2063

NED: Northern Education Division

NPC: National Planning Commission

PCK: Pedagogical Content Knowledge

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CHAPTER ONE: INTRODUCTION TO THE STUDY

1.0 Introduction

This chapter aims at providing the background to the study, stating the problem, purpose of the study, objectives, justification of the study, and theoretical framework.

1.1 Background to the study

Entrepreneurship is a dynamic and multifaceted field involving the creation and pursuit of business opportunities with the aim of generating profit and innovation (Shane 2017). At its core, entrepreneurship include the ability to take risks and create value through the introduction of new products, services, or processes. Entrepreneurs are often characterized by their ability to identify market needs and their capacity to mobilize resources, manage risks, and overcome challenges (Gaddis, et.al, 2016). Entrepreneurship can take various forms, including small business ventures, scalable start-ups, and social enterprises. In modern economies, entrepreneurship plays a vital role in economic development by fostering innovation, creating jobs, and contributing to competition (Audretsch, 2018)

Entrepreneurship and local private enterprise are critical components of African economic development (Brixiova, et. al, 2015) As a result, entrepreneurship agenda has been enhanced by governments, universities and international agencies as one solution to reducing the high rate of unemployment (UN 2017). UN, (2017) states that the story of Africa's worrisome youth unemployment is often told alongside the story of the continents fast and steady economic growth. But the problem is that in most African countries, youth unemployment occurs at a rate more than twice that for adults. Arguably, sustainable development at all levels and in all social contexts is required to transform society by reorienting education and help people develop knowledge, skills, values and behaviours (UNESCO, 2018).

Entrepreneurship is the activity of an individual who uses abilities, skills, creativity and innovation in taking chances of existing opportunities and risks to produce something new and different from already existing,

Paramita, 2017; Wulandari et.al., 2014. Entrepreneurship skills integrated into learning can also build the students characters and behaviours so that they can be independent in work or entrepreneurship later. Entrepreneurship skills are skills and competencies that will enable one to seek and run an enterprise successfully, acquired through training that emphasizes the acquisition and development of appropriate knowledge and skill that will enable an individual to maximize the resources around him/her (Paramita, 2017).

Entrepreneurship in biology education is education that provides training experiences and skills that are suitable for entrepreneurship endeavours (Ovie,2011) It prepares graduates with entrepreneurship knowledge and indicates in them skills that are socially useable. It produces self-reliant graduates who can utilize the skills they have acquired to establish personal businesses, which is in line with the 2063 Malawi Agenda which focuses much on skill needs for manufacturing industry and sectors that support it (Malawi, 2063).

Biology is a branch of natural science that examines living things and their interactions with one another, (Akinsowon & Salau 2023). It examines the structure, functional growth, origin, evolution, genetic, and distribution of living things among others. Biology is taught as an important part of basic science as a subject in secondary schools and Universities around the world.

The teaching of biology has been believed to be difficult due to its abstract nature. The highly conceptual nature of biology makes it particularly difficult for students to understand (Udoh, 2014). Abidoye (2019) therefore, stated that in order for the objectives of teaching and learning of biology to be achievable, more emphasis should be placed on field studies, guided discovery, laboratory techniques, and skills. The teaching and learning of biology motivate students to; develop practical techniques and process skills, acquire knowledge and develop understanding of fundamental biological principles, concepts, terms and facts, show understanding of the applications and uses of biological knowledge in daily life, develop an understanding of current issues and developments in biology. The influence of biology on the life of every individual globally cannot be over emphasized. As a field of science, biology helps us understand the living world and the way its many species (including human) functions, evolve and interact. Advances in medicine, agriculture, biotechnology and many other areas of biology have brought improvements in the quality of life. Biology gives knowledge to the effect of substances that may induce changes in the body. It allows for the

understanding of growth factors and the prevention of diseases. Biology can provide answer to large-scale environmental problems.

Adebisi & Ajayi (2015) Says that if science is to be learned effectively, it must be experienced and close to the students through practical activities. Etiubon & Udoh (2011) posited that practical activities develop students' manipulative skills, attitudes, and interests that simplify science concepts. It makes difficult and abstract concepts real, removes misconceptions, and ignites, increases, and sustain students' interest in science through various activities using sourced science materials to enrich science learning experiences. This is aimed at preparing students to become productive individuals at the workplace and has opened access to creativity and knowledge.

Biology is an applied field of study built upon many disciplines for the purpose of achieving and maintaining the well-being of individuals in an ever-changing society and is very suitable to be applied in the field of entrepreneurship because the scope of biology is very broad, covering all aspects of organisms that can be utilized to improve meeting the needs of human life both products and bioprocesses (Okori et al. 2021).The biology curriculum by the nature of its content is expected to be well placed in developing entrepreneurship skills among secondary school learners. It broadly aims at developing life coping skills such as recording, measuring, communicating, observing, predicting, hypothesizing, and inferring among others (MIE,2013). However, Malawi as a country is facing a lot of contemporary issues such as unavailability of USD, political instability, social inequality, technological advancement and climate change just to mention a few. If we look deep into these we see that they are partly linked to a lack of entrepreneurship skills. There is lack of comprehensive training and mentorship programs for aspiring entrepreneurs which contributes to a low level of innovation and business sustainability Zgambo(2019).

Many potential entrepreneurs may have ideas but lack the know-how to develop them into profitable businesses, a lack of access to capital, coupled with poor financial literacy, further prevents individuals from starting or scaling businesses. Inadequate knowledge of business management, marketing, and finance leaves many businesses vulnerable to failure, especially in a high –risk environment where external factors (like currency fluctuations) play a significant role. Additionally, there is a gap in fostering entrepreneurial mindsets

that are critical for problem solving and adapting to challenges, such as navigating the unavailability of foreign currency. Young people, who often represent a large portion of the labour force, may not see entrepreneurship as a viable career option due to these challenges (Mazzucato, 2013).

The unavailability of USD interlinked with lack of entrepreneurship skills. For instance, the foreign currency shortage could be partly due to insufficient local innovation in export sectors, indicating that entrepreneurship education is not achieving its intended impact. If Malawi had more locally developed businesses that produced goods or services for export, the country could earn more USD and stabilize its currency reserves. Furthermore, a lack of entrepreneurial skills means that many potential businesses miss opportunities to solve local problems with locally sourced solutions, which could help reduce dependence of foreign imports and ease the pressure on the foreign currency reserves. A stronger entrepreneurial culture could mitigate some of the negative effects of the foreign exchange crisis, Ngwira(2016). Development of these skills are in line with the secondary education outcome which focuses on development of occupational and entrepreneurship skills (MIE, 2013) These skills when acquired are useful for success in business and for problem-solving and adaptation for national and individual development (MIE,2013). For instance, venturing into the following areas could mitigate the challenge:

- *Apiculture: (Bee keeping) Harvesting honey for both local consumption and export

- *Aquaculture: Fish, prawn, and crab farming to reduce reliance on imported seafood

- *Floriculture: Cultivation of flowers for local and international markets

- *Horticulture: Fruit and vegetable farming with potential for export

- *Ecotourism: Utilizing biodiversity to attract tourists

- *Mushroom Cultivation: A protein-rich food source with commercial potential

- *Biogas and Biofuels production: Sustainable energy solutions

- *Pest Control and Poultry Production: Enhancing food security and business opportunities.

Malawi has a vision for the next 40 years, laid out in its 2063 Agenda. Among others, the country wishes to have the majority of her citizens be highly knowledgeable with relevant quality education that incorporates a strong element of academic excellence and technical and vocational skills fit for the labour market, entrepreneurship and implementation of the vision so that they have a wider opportunity to adapt with dynamics of life and be able to increase development of the nation by creating wealth for sustainable living and self-reliance (NPC, 2020). So the citizens are expected to be innovative and strive for socio-economic freedom by 2063 by taking part in income generating activities; observing healthy values; promoting agriculture; fighting against corruption and many more developmental agenda. This implies that if the country is to achieve this vision by 2063, biology in schools has to be taught in a way that enhances entrepreneurship skills; but is it being taught in a way that enhances these skills? What challenges exist in Malawian biology classroom? Little is understood if biology teachers enhance these skills in their teaching.

1.2 Statement of the problem

Like other countries which are struggling with unemployment, self-reliance and employment creation are highly desired in Malawi. Malawi Agenda 2063 education sector advocates for redesigning the education system to respond to the current and future skill needs of the manufacturing industry and sectors that would support the country in enhancing entrepreneurship skills among students.

The 2013 secondary school curriculum has development of entrepreneurship skills, among other seven essential skills, as secondary school education outcomes that every subject at this level has to achieve. The other six skills outlined in the curriculum are citizen skills, ethical and socio-cultural skills, economic development & environmental skills, practical skills, creativity & resourcefulness, and scientific technological skills. Biology as an applied science provides a lot of opportunities for entrepreneurship. The curriculum has been running for a decade now but are the biology teachers teaching the subject for development of entrepreneurship skills? This study was conceptualised to investigate answers to this question.

1.3 Aim of the study

The study aimed to investigate how biology teachers enhances development of entrepreneurship skills among students in some secondary schools within the Northern Education Division in Malawi.

1.4 Objectives of the study

The study set out to:

1. Determine selected biology teachers understanding of entrepreneurship skills
2. Assess strategies that the selected biology teachers use to enhance entrepreneurship skills in biology classrooms
3. Establish challenges the selected teachers face in teaching biology for development of entrepreneurship skills.

1.5 Significance of the study

The findings of this study are going to help the Ministry of Education to assess if secondary school outcomes are being achieved. Furthermore, findings allow the teachers themselves to reflect of their classroom practices in line with expectations from the curriculum so that their teaching can achieve the intended outcomes.

1.6 Theoretical framework

The study was built on the Entrepreneurial Self-Efficacy (ESE) theory derived from Social Cognitive theory by Albert Bandura which emerged in 1977.

The ESE theory looks at empowering teachers as Role Models: by cultivating their own entrepreneurial self-efficacy, teachers can serve as role models to students. If teachers believe in their ability to think creatively and manage entrepreneurial projects, they are more likely to encourage students to adopt a similar mindset. Teachers can then apply these skills to integrate entrepreneurial concepts into the teaching of the biology curricula. Building confidence in students; by incorporating the principles of ESE. Principles of ESE include mastery experience (both positive & negative) vicarious experience (observing others who are successful in entrepreneurship, social persuasion (positive encouragement from others) physiological and emotional state (entrepreneurs emotional and physical states can impact their self-efficacy) goal setting and planning (entrepreneurs with clear well defined goals are more likely to feel a sense of accomplishment when they achieve these goals). Biology teachers can help students build confidence in their ability to develop entrepreneurial skills. For example, teachers can encourage students to innovate in biotechnology or environmental entrepreneurship, fostering a mindset where students feel empowered to transform scientific knowledge into real world ventures (Donald, et.al,2021).

Larsen et.al, (2023) argue that just by integrating entrepreneurship into biology education, biology teachers can enhance student's entrepreneurial skills by developing activities or projects that require creative thinking and problem solving in biological context. This could include challenges such as designing sustainable business in bioengineering, agriculture, or healthcare. The theory of ESE suggests that students who are guided to believe and be more motivated in their capacity to succeed in entrepreneurial endeavors within biology, they will be more motivated to engage in such activities.

According to Baruah and Ward (2014), encouraging resilience and risk taking entrepreneurship often involves risk and failure hence students need to be taught how to navigate through these challenges. Through fostering

an environment where students can experiment, fail and learn from those failures, teachers can build resilience among students. The theory of ESE, suggest that student's belief in their own abilities can help them take on challenges in biological fields, from research to commercializing innovations.

The theory emphasizes the importance of mentorship, feedback, and experience in developing self-efficacy. Biology teachers can create projects, internships or mentorship programs that give students hands-on experience in biology related entrepreneurial ventures, thus reinforcing their belief in their abilities to succeed in real-world applications (Bandula, 1997). The theory of Entrepreneurial Self-efficacy is highly relevant for biology teachers aiming at enhancing development of entrepreneurship skills in students. By adopting ESE, teachers can help students develop not just biological knowledge but also the entrepreneurial mindset necessary to turn that knowledge into impactful ventures. This is not only preparing students for a wide range of carriers but also encourages innovations within the field of biology.

This theory has helped the researcher in exploring how biology teachers build self- confidence through specific teaching methods, which help students to develop self-confidence in entrepreneurial tasks related to the field of biology. For instance, some teachers were encouraging students to take on projects like creating innovative solutions for environmental problems. By providing students with the tools and resources to succeed, teachers also build their ESE. In addition, providing opportunities for autonomy. ESE is also linked to an individual's sense of control over their entrepreneurial activities. Biology teachers were able to provide students with opportunities to work independently or in small groups on projects that require decision making and resource management. These activities allow students to feel more capable of initiating and managing entrepreneurial ventures. The last way on how the theory helped the researcher was that it led to mentorship and role modeling. The biology teachers who demonstrate entrepreneurial behavior themselves, serves as role models. Their guidance helped students internalize the belief that they, too can succeed in entrepreneurial endeavors, reinforcing their own entrepreneurial self-efficacy.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

Literature review is a discussion of the current published materials available for a certain research topic. It summaries, synthesises and evaluates the materials and information according to research objectives, thesis and central themes (Ramdhani et al,2014). This chapter presents related literature review to the study and addresses the objectives of the study. The literature is reviewed under the following headings: definition of entrepreneurship skills, importance of entrepreneurship, strategies for enhancing entrepreneurship, challenges faced by teachers when enhancing entrepreneurship skills and summary of literature review.

2.1 Literature Review

2.1.1 Definition of Entrepreneurship

Entrepreneurship undergoes constant evolution, with diverse definitions reflecting changes in the entrepreneurship field over time. The literature review reveals that entrepreneurship is multifaceted with definitions ranging from risk taking creativity and innovation to the creation of new business ventures and the ability to capitalize on opportunities (Paramita, 2017; Wulandari et, al., 2014; Godin, 2012, Isenber, 2010, Zuckerberg, 2011). Notably, these definitions emphasise the practical use of entrepreneurship from innovations and risk taking to the process of creating value in explaining the natural phenomena and finding solutions.

In this study, the literature has provided valuable insights into how entrepreneurship skills can be integrated into science and biology education. This body of research typically focuses on developing entrepreneurial mindsets and skills in students, which can be applied to real-world biological innovations and ventures. For example:

*Integrate entrepreneurial skills with biological concepts

*Use innovative teaching methods like project-based learning and creativity

*Encourage real-world applications of biology through entrepreneurial thinking

*Equip students with the skills necessary to innovate within the biological science

In this study entrepreneurship skills in biology classroom is primary concerned with the functional application of biological concepts and entrepreneurship skills in real life situations, rather than playing around with scientific jargons and complex scientific systems. The focus is on cultivating basic scientific common sense and utilising it in everyday activities for successful and sustainable living. So biology teaching whilst enhancing entrepreneurship in current study is viewed as having the basic knowledge to apply scientific processes in everyday life. This perspective partially aligns with many studies including (Kolb, 2018), who support that the development of skills such as decision making, risk-taking, and innovation by encouraging students to engage in authentic, experience based learning, where they analyse, test, and refine their entrepreneurial ideas in biological fields. Similarly, Amabile (2014) argues that entrepreneurship skill development is not about mastering specialised jargon for expert careers, but fostering creativity in biology education which helps students develop ability to think outside the box, challenge conventional thinking, and find innovative biological solutions that could lead to entrepreneurial ventures.

Entrepreneurship skills encompass a blend of hard and soft skills, including creativity, problem-solving, strategic planning, communication, leadership, resilience, time management, communication, networking, sales & marketing, financial literacy, critical thinking, decision-making, work ethics, passion & energy, and adaptability. Entrepreneurship skills can be itemized and categorised similarly to pedagogical content knowledge, allowing for structured and focused approach to learning and development in both areas. PCK is an understanding of how to teach a specific subject and it is also structured into categories and sub-categories. Entrepreneurship skills when categorized and itemized facilitate learning and development, which allows for a more structured and targeted approach to teaching and learning.

Table 2.1 Examples of itemized entrepreneurship skills:

Category	Skill	Description
Technical	Financial and modelling	The ability to create and analyse financial projections
	Marketing strategy	Developing and implementing effective marketing plans
Strategic	Market research	Understanding customer needs and market trends
	Competitive analysis	Identifying and analysing competitors
Mindset	Resilience	Ability to bounce back from setbacks
	Adaptability	The ability to adjust to changing circumstances
Soft	Negotiation	The ability to reach mutually beneficial agreements
	Public speaking	Effectively communicating ideas to an audience

Source: “Grit The Power of Passion and Perseverance” Duckworth,et.al. (.2020)

2.1.2 Importance of entrepreneurship

Entrepreneurship has a critical role in tackling challenges of poverty, migration, and unemployment, according to a recent study (Rachana & Vineel, 2019). According to (Daniel, et.al., 2015) entrepreneurship skills are important in a number of ways including:

Employment creation: is a result of entrepreneurship. It offers unskilled people an entry-level position that is necessary for them to obtain experience and training. Entrepreneurship is a primary driver of job creation. Entrepreneurs identify opportunities and create new businesses, which generate employment for individuals in various sectors. Start-ups and small business are often the first to hire new workers, contributing to a reduction in unemployment and a boost in economic activity (Shaper & Voley, 2014).

Skill acquisition: Gaddis et.al. (2016) opined that entrepreneurship fosters an environment for continuous learning and skills development. Entrepreneurs acquire a wide range of skills such as leadership, problem-solving, financial management, and marketing, that are valuable not only to them but also to their employees. These skills contribute to the development of a more skilled and adaptable workforce.

Complementary role in developing the occupational knowledge: Entrepreneurship supports the development of specialized knowledge and expertise in different industries. Entrepreneurs often engage in innovation and create new methodologies or systems that advance their industries. This, in turn enhances the occupational knowledge of employees and overall sector (Daniel & Kecskes, 2015).

Reduction in high rate of unemployment: According to Sharper and Voley, (2014), Entrepreneurship can help reduce high unemployment by providing opportunities for individuals to work for themselves or coming up with new businesses. Entrepreneurs can stimulate local economies and develop businesses in underdeveloped regions, offering people the chance to generate income and reduce the dependency on government support.

Great increase in self-employment: Bosma & Sternberg (2014), opined that enhancing entrepreneurship skills enables individuals to pursue self-employment, thereby reducing reliance on traditional employment. By equipping individuals with the skills needed to start and manage their own businesses, entrepreneurship increases the opportunities for self-employment, leading to greater economic independence and financial security for individuals.

Effective utilisation of local resources: Entrepreneurs can make use of local resources such as raw materials, human capital, and knowledge, to create sustainable business. By focussing on local opportunities entrepreneurs can contribute to the efficient use of available resources, reducing waste and encouraging local economic growth (Herrington, et.al., 2017)

Decentralization and diversification of business: Entrepreneurship usually lead to decentralisation, where businesses are spread out across regions, ensuring that economic power is not concentrated in just one era. By establishing businesses in different locations, entrepreneurship also fosters diversification, reducing dependency on a single industry and creating a more resilient economy (Gaddis et.al.,2016).

Promotion of science and technology: According to Shaper & Voley (2014) entrepreneurship in science and technology accelerates the development and adoption of new technologies. Entrepreneurs often invest in research and development, turning scientific discoveries into practical applications that improve industries like healthcare, energy, and communications. By promoting entrepreneurship, societies can foster technological advancements that lead to greater efficiency and competitive advantages globally.

Innovation: Entrepreneurship is a key driver of innovations. It is the centre of innovation that offers new product ventures, market, technology, and product quality, among other things, and raises people's standards of life. Entrepreneurs are often at the forefront of developing new products, services, or technologies. By fostering a culture of entrepreneurship, individuals are encouraged to think creatively and solve problems in new ways, which leads to breakthroughs that can transform industries and improve lives (Galloway, et.al.,2019).

Impact on Society and Community Development: A wide and diverse job base contributes to the growth of a society. It alters society and encourages things like greater investment in education, improved sanitation, a decline in slums, and a larger percentage of homeownership. Thus, entrepreneurship helps the organization achieve a higher standard of communal life that is more stable (Galloway et.al., 2019).

Boost Standard of life: By raising income, entrepreneurship contributes to raising a person's standard of life. A household's increased consumption of different products and services over a specific time period is what is referred to as their level of living (Galloway et.al., 2019).

Promotion of entrepreneurship culture: Gaddis, et.al (2016) suggested that, enhancing entrepreneurship skills encourages an entrepreneurial mind set, where individuals are more likely to pursue business opportunities, take calculated risks, and create value. A culture of entrepreneurship fosters a sense of empowerment, resilience, and self-reliance, ultimately contributing to dynamic economy. This mind set also encourages innovation and a spirit of competition, which is essential for long-term economic prosperity

2.1.3 Teachers understanding of entrepreneurship Skills

The demand is growing for science teachers who can effectively guide them toward understanding entrepreneurship and serve as role models for them so that they become the future self-employed workers and sources of economic dynamism. However, literature on teachers understanding of entrepreneurship brings to light some issues on their competences on the same such as:

Varied Level of Knowledge; Research indicate that there is a broad range of understanding regarding entrepreneurship skills among educators. While some teachers possess strong knowledge and practical experience in entrepreneurship, others may lack exposure to entrepreneurial concepts or teaching methodologies. This variation is often linked to the teacher's academic backgrounds, professional development in their work (Steiner, 2022).

Inadequate training: According to Tidd & Bessant (2014) in their research results showed that many teachers, especially in primary and secondary education, they have not received formal training in entrepreneurship education. As a result, their understanding of the subject may be theoretical rather than practical, leading to challenges in effectively teaching entrepreneurial skills to students. Training programs for educators focused on entrepreneurship are often limited, and those that do exist may not be accessible to all teachers.

Lack of integration in curriculum: Entrepreneurship is not always integrated into the standard curriculum, particularly in traditional education systems. this lack of integration limits teacher's ability to develop a comprehensive understanding of entrepreneurship skills and, consequently, hinders their ability to teach these skills effectively to students. However, some schools have introduced interdisciplinary approaches, where teachers incorporate entrepreneurship concepts into subjects like economics, business studies, or even arts (Christensen et.al., 2015).

Positive Attitude Toward Entrepreneurship: Despite the challenges, many teachers express a positive attitude toward teaching entrepreneurship. They recognize its importance in fostering innovation, problem-solving, and creativity (Steiner, 2018). However, this enthusiasm may not always translate into action due to the lack

of resources, training, or curricula support. Teachers who have experience in business or entrepreneurial ventures themselves are often more confident in imparting these skills to their students.

Challenges in Assessing Entrepreneurship Skills: Vohra (2022), in his study said that teachers often face difficulties in assessing entrepreneurship skills, as these skills are typically more complex and subjective compared to traditional academic skills. Teachers may lack standardized methods or tools for evaluating skills like creativity, risk-taking, or leadership in an entrepreneurial context. This results in inconsistency in how entrepreneurship education is delivered and assessed.

Samanci et. al. (2020) opined that when conducting the applications to build entrepreneurship, the student contributes to the process of investigating, questioning, explaining, and turning the source of information into a product, while the teacher plays the role of leader and enhancer. It is the responsibility of teachers to help students attain the highest standards of creativity, invention, and innovation in this particular setting. A teacher undertakes the role of a leader by imparting to his students the value and significance of science as well as the thrill and responsibility that come with learning scientific facts. The teacher helps the students to embrace national and cultural values, ethical principles within the applications, and global moral ideals by encouraging them to become better researchers, thinkers, and people.

With the inclusion of creative talents in the scientific curriculum, teachers must receive training on how to help students acquire these abilities. From early childhood, the spirit of business is born. Accordingly, teachers who can effectively mentor this ability and enhance creative thinking can substantially inspire students (Mbanefo & Eboka, 2017). Making sure that aspiring biology teachers understand entrepreneurship is very important.

Furthermore, it is imperative that teachers have access to social media platforms, which provide a plethora of successful off-campus entrepreneurship case studies. With the use of these different platforms or to say being resourceful and knowledgeable on entrepreneurship, the teacher cultivates her spirit of entrepreneurship in addition to conceiving and supervising the development of entrepreneurship abilities. In entrepreneurship education, it is advised that learning be accomplished through entrepreneurship processes. Another reason, it

is imperative that aspiring scientific teachers receive theoretical assistance in the form of entrepreneurship skills, (Samanci et. al., 2020).

2.1.4 Teaching strategies enhancing entrepreneurship

There are possibilities to learn entrepreneurship skills and become self-sufficient in many fields including biological field. Several new entrepreneurship initiatives are being developed to keep biology students interested throughout their studies. These programs may help with unemployment issues if they were taught to students effectively and were part of the course curriculum (Mbanefo & Eboka, 2017).

It is necessary for biology teachers at all educational levels to embrace effective teaching practices in order to investigate these business potentials in the field. As a result, students will be able to get the knowledge and abilities necessary to start their own businesses in the field of biology. However, it is imperative that teachers of biology adopt strategies such as:

Teaching methods: biology teachers should use appropriate teaching methods such as students-centred approach, field trip, demonstration and inquiry: In order to develop students' entrepreneurship skills, biology teachers should make their classes more student-centred by implementing instructional tactics including field visits, demonstrations, inquiry, problem-solving, and guided discovery.

Entrepreneurship club & exhibition entrepreneurship club should be established to promote and teach those topics in biology that create self-employment.

Seminars and workshops: seminars and workshops on entrepreneurship in biology are needed by the entrepreneur to succeed in business. So seminars and workshops should be organised for students at least once each academic session. The successful entrepreneurs and experts in biology to be invited to deliver lectures on entrepreneurship to broaden the students mind so as to learn more about the entrepreneurship.

The government's capacity to put one's ideas into action is expressed via the curriculum as entrepreneurship competence [Ministry of Education (MoE), (2015)]. Furthermore, in order to accomplish goals, this competency involves not just creativity, invention, and taking calculated risks, but also planning and project

management skills. Additionally, this competency serves as the foundation for the more distinctive knowledge and abilities that individuals who participate in or contribute to commercial activities have. It also helps everyone at home, in society, and in business by enabling them to grasp the context and conditions of their work and seize career opportunities.

2.1.5 Challenges when enhancing entrepreneurship in classrooms

In his study, Ementa (2013), concluded that there are challenges to entrepreneurship teaching which include:

The lack of proper facilities at the entrepreneurship centres: In his conclusion he further talked about how entrepreneurship education is flawed and lacks a practical focus claiming that as a result, when offered opportunities in the sector, the students of entrepreneurship training perform below expectations. Further emphasized that the current entrepreneurship centres lack proper infrastructure and equipment, he also affirmed this insufficiency.

Lack of funding: Well-crafted government financing and policies are responsible for both the establishment and encouragement of entrepreneurship education. Additionally, a few of the previously mentioned findings are revealed:

There is no standard curriculum: Teachers lack the necessary skills to present a fresh perspective on the value of entrepreneurship; entrepreneurship centre's in higher education institutions are not functioning well; formal education does not collaborate with business owners and the community; and collaboration with financial and non-financial institutions is still scarce (Ementa, 2013).

Lack of awareness: One of the significant challenges to enhancing entrepreneurship in classrooms is lack of awareness among both teachers and students more especially its importance and relevance. Many students may not see entrepreneurship as a viable career option or understand its potential to drive economic growth and innovation. Teachers may also lack proper training or resources to teach entrepreneurial concepts effectively. This eventually results in students not receiving the necessary guidance and skills to succeed in entrepreneurial ventures (Galloway & Brown, 2017).

Large classes: Large class sizes pose as another big challenge in fostering an interactive and personalized learning environment that entrepreneurship education demands. Entrepreneurship, by nature, thrives in settings where collaboration, mentoring, and individualized feedback are emphasized. In large classes, it becomes difficult for instructors to engage with students meaningfully, assess their progress individually, or address specific entrepreneurial challenges. This situation may result in less hands-on experience and fewer opportunities for students to develop practical skills related to entrepreneurship (Galloway & Brown,2017).

Assessment procedures: In most schools there are traditional assessment methods, which are often focused on exams and written reports, may not align with the skill set required for entrepreneurship. Entrepreneurship involves creativity, critical thinking, adaptability, and the ability to take calculated risks-qualities that are challenging to assess through standard evaluation methods. Educators may struggle to design assessments that adequately measure student's entrepreneurial competencies such as innovation, leadership, and practical problem-solving. This misalignment between teaching methods and assessment procedures may hinder student's ability to fully engage in the entrepreneurial learning process (Haneberg,2022).

2.1.6 Summary of literature review

The literature review delves into the multifaceted concept of entrepreneurship in biology classroom, tracing its meaning, emphasizing its application in real life situations, teachers understanding of entrepreneurship skills, strategies used when enhancing entrepreneurship skills and challenges faced when teaching. Entrepreneurship is portrayed as an essential tool in job creation in the modern world, contributing to societal progress and fostering economic growth. Its importance is underscored by scholars who argue that it goes beyond a mere acquisition of knowledge, serving as a means for making informed decisions on health, environmental concerns and technological advancement. By incorporating entrepreneurial concepts such as identifying market opportunities, resource management, and innovation, biology teachers can prepare students for future careers that require both scientific knowledge and business acumen. Entrepreneurship within biology classrooms encourages a holistic understanding of how biological solutions can be monetized and applied.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

This chapter provides an overview of the methodology which brings about the understanding of the whole research process (Creswell, 2018). It encompasses the research paradigm, approach, design, site, population, sample size, sampling techniques, data collection methods and instrument, data analysis, trustworthiness and ethical considerations.

3.1. Research Paradigm

A research paradigm serves as a foundational set of beliefs and assumptions guiding the research approach. It influences how scholars perceive and study the world, determining how they formulate research questions, methods of data collection, and interpretation of findings. There are several types of research paradigms, with the two main categories being positivist and interpretivist paradigms. Positivism focuses on objective reality that can be measured and observed, emphasising quantitative methods and statistical analysis. It seeks universal laws and generalisations, prioritising objectivity and replicability (Cohen, et. al., 2018; Creswell, 2018). In contrast, Interpretivism recognises the subjective nature of reality in, focusing on the point that different people in society experience and understand reality in different ways. It allows exploration and interpretation of meanings, emphasising deep understanding of social phenomena (Cohen, et. al., 2018). In this research, the psychological assumption of interpretivist is adopted.

ESE is a psychological construct that reflects an entrepreneur's confidence in their ability to complete entrepreneurial activities. It is a key quality for entrepreneurial success and is influenced by a range of factors. Including risk-taking, uncertainty, creativity, leadership, proactivity, persistence, and passion. Allows in-depth exploration of participants' perspectives and understanding of the social reality (Creswell, 2018).

The adoption of psychologists in this research aligns with its interpretive nature, allowing for an in-depth exploration of participants' subjective experiences and perspectives in the context of enhancing entrepreneurship skills. Psychologist provides a framework to delve into the socially constructed nature of

and the intricate ways individuals perceive and navigate educational experiences (Chen, et. al., 2018).

3.2 Research Approach

Research Approach are plans and the procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation. This plan involves several decisions and they need not to be taken in the order in which they make sense to me and the order of their presentation here. The overall decision involves which approach should be used to study a topic informing this decision be the philosophical assumptions the researcher brings to the study (Creswell, 2018).

There are so many types of approaches namely quantitative, qualitative, mixed approach, descriptive, experimental, correlational and action but this study employed qualitative approach. According to Cohen, et.al. (2020) a Qualitative approach refers to research that elicits participants accounts of meanings, experiences or perceptions about the nature of a phenomenon understudy. Its central aim is to understand social life and meanings that people attach to everyday life. Qualitative research is therefore concerned with understanding, rather than explanations, and subjective explorations of reality from the perspective of the insider (Creswell, 2018).

3.3 Research design

A research design is the overall plan or structure that guides the process of collecting analysing, and interpreting data in a research study (Creswell, 2018). There are several types of research designs, each serving specific purpose. One common type is the exploratory design, which is used to study a topic in-depth and generate understandings. Another type explanatory design, which aims to understand the relationships between variables. The descriptive design is aimed at providing a detailed account of a phenomenon, while the experimental design involves manipulating variables to establish the cause-and-effect relationships. The choice of research design is crucial as it influences the study's validity and reliability. In this research, descriptive design was employed with a case study. A case study allows an in-depth investigation of a particular instance or small number of instances within their real-life context. The case study approach involves studying approach involves studying a case to provide a broader

perspective and enhance the generalisability of findings (Creswell,2018). It is suitable for answering questions that start with how, who and why. Its further strength is that it is particularly well suited for investigating events that occurring in a contemporary context.

3.4 Research site

The study site was located in the northern region, especially in the four selected secondary schools of the Northern Education Division, Malawi.

3.4.1 Study Participants

The study considered the biology teachers in the four selected secondary schools. However, the target population of biology teachers in those secondary schools are two from each school.

3.4.1.1 Sample Size

Creswell, (2014) defined a sample as a finite set of respondents selected from a population to provide the information required to answer research questions. For this study, the sample size was guided by data saturation, a common approach in qualitative research: a point where data could not generate new themes (Creswell, 2018). Therefore, it involved four schools with 2 biology teachers from all four selected schools in NED. The study contained only teachers from form 1, 3 and 4 because the time data was collected, form twos were doing their revision. This could not affect the results because requirements of teaching biology follow the same procedure. Further details about the participants are found in Table 3.1.

Table 3.1 Demographic status of teachers

Participants	pA	pB	pC	pD	pE
Form	3	1	3	4	1
School	X1	X2	X3	X4	X4

KEY:

*** P for participant**

*** X for school** thus having school 1, school 2, school 3, and school 4

3.4.2 Sampling methods

Sampling techniques are methods used to select a subset of individuals or elements from a larger population for research purposes (Creswell, 2018). There are various types of sampling methods. Random sampling involves selecting elements from a population at random, giving each element an equal chance of being selected. This ensures that the sample is a representative of the entire population, reducing bias and promoting the generalisability of findings. Purposive sampling includes selecting specific individuals or elements basing on predetermined criteria that align with the research objectives. It allows researchers to focus on participants who possess the information or experiences relevant to the research questions, providing depth and specificity. Convenience sampling involves selecting participants based on their easy accessibility or availability. Convenience sampling is practical when time and resources are limited and allows for the inclusion of participants who are readily accessible (Creswell,2018). In this study Purposive and convenience sampling techniques was employed. The sampling techniques deemed necessary because it enabled the researcher to select participants who are actually teaching biology in the study area. Cohen et. al. (2018), state that purposeful sampling is used in order to access knowledge of people

who have in-depth knowledge about particular issues. They concur with Creswell (2018) who says in purposeful sampling the researcher intentionally selects individuals to learn or understand the central phenomenon. Convenient sampling was utilised based on availability and subject allocation on the school timetable.

3. 5 Data collection Methods and Instruments

3.5.1 Data collection methods

Data collection is the process of gathering and obtaining information systematically for research purposes (Creswell, 2018). In both quantitative and qualitative research, various methods are employed to collect data. In qualitative research employs methods such as interviews, focus groups documents analysis and observations. Interviews, especially semi-structured interviews, involve open- ended questions that allow probing participants to express their perspectives in-depth. Focus group gather information from group discussions. Document analysis involves examining existing records, documents, or artefacts. Observations provide a first-hand information of certain behaviour natural settings. Qualitative methods offer rich context-specific data which facilitates a deep understanding of complex phenomena (Cohen et al., 2018; Creswell, 2018). This study utilised semi-structured interviews where an interview guide (Appendix D) was used, and lesson observation form (Appendix E) as its open – end discussions, allowing the research to pose follow-up questions, exploring responses more deeply and extracting information pertinent to the research objectives (Creswell, 2018). This helped to collect data on all the three research objectives: teachers understanding of entrepreneurship skills, how teachers enhance entrepreneurship and challenges faced when enhancing entrepreneurship skills.

3.5.2 Data analysis

Data analysis is the process of inspecting, cleaning, transforming, and modelling data to discover useful information, draw conclusions, and support decision making. Qualitative research uses methods like thematic analysis, content analysis, and narrative analysis. Thematic analysis involves identifying, analyzing, and reporting patterns or themes within the data. Content analysis is often used to quantify and analyze the presence of specific words, themes, or concepts within a set of texts. Narrative analysis involves examining the structure, content, and context of narratives (Cohen, et.al.,2018; Creswell, 2018).

All data analysis methods provide an in-depth exploration of participant's perspectives and experiences, but they may be influenced by the researcher's interpretation and subjectivity. Despite this inherent limitation, the present study chose to employ thematic analysis to unveil patterns and meanings within teacher's responses. Thematic analysis was selected for its capacity to facilitate deep understanding of the data, making it suitable for exploring how biology teachers enhance entrepreneurship skills among students. The study adopted the combination of inductive and deductive coding methods. In deductive coding themes were predefined based on theory or research objectives.

The data collection instruments were aligned to the constructs of the theory required for the study, and research objectives. So, the researcher had already predetermined themes during data collection. The predetermined themes include Inductive coding, on the other hand, deductive was used in the analysis to allow themes to emerge organically from the raw data that was collected (Linnerberg & Korsgaard, 2019).

To analyze the qualitative data collected, a thematic coding approach was employed. A coding scheme was developed based on the three research objectives:

- *Determine selected biology teachers understanding of entrepreneurship skills
- *Assess the strategies teachers used to enhance entrepreneurship skills
- *Establish challenges faced in teaching biology for development of entrepreneurship skills

Two interview were audio-recorded with participant's consent together with the other data all were transcribed verbatim. The transcripts were read and read to ensure familiarity with the content, and initial notes were made

in the margins to highlight potential codes or significant statements relevant to research objectives. A hybrid coding approach was used, combining both deductive (theory driven) and inductive (data driven) coding. The initial framework was derived from study's objectives (deductive) and then refined through a careful reading of the data (inductive). The coding scheme evolved through multiple iterations during the analysis. The final coding scheme was organized into three major categories aligned with the research objectives. Each category included a set of codes and sub-codes that captured specific ideas expressed by participants. These themes were used to answer the research questions and are presented in the findings chapter.

Table 3.2 Coding Scheme

Category	Code	Description
Teachers understanding of entrepreneurship	1. Definition of entrepreneurship skills 2. Purpose and relevance	1. How teachers define or describe entrepreneurship skills (ability to start a business, use of skills obtained to start a business) 2. –teachers views on the importance and relevance of entrepreneurship skills
Strategies used to enhance entrepreneurship skills	1. Group work 2. Presentations 3. Pair work 4. Discussion 5. Use of teaching materials	1. How students learn in groups 2. How students learn through presentations of their findings after completing a task 3. Learning where two individuals collaborate 4. A conversation or debate about a specific topic 5. How teachers incorporate teaching materials in their lessons
Challenges in teaching for development of entrepreneurship	1.Lack of enough funds in science department 2.Lack of relevant resources 3.teachers not familiar with entrepreneurship skills 4. concept of entrepreneurship not included in the syllabus	1. unavailability of funds 2.unavailability of relevant resources 3. teachers not being very conversant with entrepreneurship skills 4.concepts not clearly indicated in the syllabus

3.6 Trustworthiness

The study employed various measures to enhance trustworthiness such as credibility, transferability, dependability and confirmability (Cohen, et.al., 2018; Creswell, 2018; Lincoln & Guba, 1985). Credibility or internal validity refers to the extent to which the findings, interpretations, - and conclusions of a study are trustworthy and believable. It measures whether the findings of the study are correct and accurate. This was achieved through triangulation of data from multiple sources, for instance, on how teachers enhance entrepreneurship, the findings were similar from all sources of data collection. Transferability, or external validity, in qualitative research refers to the extent to which the research results can be applied to different contexts or settings. In this study, transferability was enhanced by providing a detailed description of the research context, participants, and data collection methods.

This through documentation enables readers to evaluate the relevance and applicability of the findings to various situations. Dependability, on the other hand, assesses the extent to which the study's results could be replicated by other scholars with consistent outcomes. To ensure dependability, a clear audit trail of the entire research process was maintained, documenting every decision and modification made during the study. This transparency allows for an examination of the study's dependability and its potential replication by other researchers.

Confirmability refers to the degree of neutrality in the findings of a study, ensuring that interpretations are grounded in participant's responses rather than influenced by potential bias or personal motivations of the researcher. To address confirmability, the researcher engaged in reflexive practices, acknowledging and documenting their biases and assumptions. An external auditor, unfamiliar with the study, reviewed both the research process and findings to minimize researcher bias. Additionally, an audit trail documenting every step of the data analysis was provided, serving as transparent record to establish that the data faithfully represents participant's responses. This comprehensive approach contributed to the confirmability of the research outcomes (Creswell, 2018)

To achieve trustworthiness, the study incorporated other measures like member checking, triangulation of data a pilot study. Member checking is a process in which participants were given the opportunity to review and

validate the findings to ensure the accuracy of the data. Triangulation of data from multiple sources was employed to cross-verify information, recognizing that discrepancies may exist between what is reported and the actual occurrences on the ground (Cohen, et. al.,2018; Creswell, 2018).

3.7 Ethical issues

The researcher followed ethical guidelines to ensure that all the participants of the study are treated with respect and consideration. The responses were kept strictly confidential. Ethical approval (Appendix F) was obtained from Mzuzu University Research Ethics Committee (MZUNIREC) to ensure that the involvement of participants in data collection agrees with local and international ethical guidelines. Permission to collect data in schools was obtained from the Ministry of Education through the Education Division Manager in Mzuzu, but letter not attached as it mentions school names so ethically not ideal to be part of thesis document, head teachers of the selected schools and all participants before the onset of the study. Furthermore, the participants were informed of the nature and purpose of the study and signed consent forms (Appendix A). The signed forms are not attached for confidentiality purposes as stipulated by Creswell (2018).

CHAPTER FOUR: FINDINGS AND DISCUSSION

4:0 Introduction

This study aimed at investigating how biology teachers enhance entrepreneurship skills among student. The study pursued three main objectives: determine selected biology teachers understanding of entrepreneurship skills, assess how biology teachers enhance entrepreneurship in biology classrooms, and establish challenges in enhancing entrepreneurship in biology classrooms.

Cohen et.al. (2018) propose five methods for presenting qualitative data. The first approach involves presenting data through groups, which is effective for summarizing responses from participant groups. This automatically organizes data, making themes and patterns more apparent. However, this method is more suitable when single data collection instrument is used, and it becomes challenging with multiple instruments. The second method is individual presentation, where responses from one participant are presented first before moving on to the next. This preserves the coherence and integrity of the responses from an individual and allows presentation of the whole picture of an individual. However, it is not possible to summarize data or issues arising across the individuals. The third method is by presenting all the data that are relevant to a particular issue. This is where the data that is relevant for a particular issue is collected and summarized together. However, individual's response loses wholeness, coherence and integrity because comparison across all responses from individuals is difficult. The fourth method involves organizing data according to research questions or objectives. This method brings together all the relevant data from multiple sources to collectively address the research question. The fifth method of organizing and presenting data is by instrument, where research findings of each instrument are organized and presented separately. The method is often supported by other methods such as by issue or by people. This study organized and presented its findings through research objectives. This decision aims to consolidate relevant data from various sources, directly addressing

the study's objectives. The study does not intend to compare cases or isolate each issue; instead, issues are presented as they relate to each objective. The main focus is on determining selected biology teachers understanding of entrepreneurship skills, assess how biology teachers enhance entrepreneurship in biology classrooms and establish challenges in enhancing entrepreneurship in biology classrooms.

4:1 FINDINGS AND DISCUSSION

4.1.1 Objective1: Selected biology teachers understanding of entrepreneurship skills

This objective was mainly focusing on two key areas: teachers defining or describing entrepreneurship skills; and the importance of enhancing entrepreneurship in biology classroom. Data was collected through participant interviews using set of questions from the interview guide (see Appendix D) and classroom observation check list that targeted specific areas outlined in the lesson checklist (Appendix E).

4.1.1.1 Definition of entrepreneurship skills

This aspect of the study aimed at gauging the knowledge of biology teachers on what entrepreneurship skills mean. The anticipated meaning of entrepreneurship skills was categorized into two: ability to impart knowledge and skills, use of skills possessed for self-employment and job creation.

Table4. 1: Definition of entrepreneurship skills

Responses	Participants	Frequency (n=5)
Ability to impart knowledge and skills	pA, pB	2
Use of skills possessed for self-employment and job creation	pD, pC	2
Mentioned both	pA, pB	none
Mentioned neither of them	pE	1

Two participants mentioned “ability to impart knowledge and skill” two mentioned the use of skills possessed for self-employment and job creation and the last one mentioned the ability of encouraging students to involve themselves to be proactive in business. The varied responses show a range of understanding among biology

teachers regarding the meaning of entrepreneurship skills, some focused on ability to impart knowledge and skills while others looked at it as practical application of skills possessed for self-employment and job creation. This indicates partial understanding of the concept of entrepreneurship skills to those correctly mentioned one or two attributes. This partial understanding may affect deliverance of biology lessons to bring meaning understanding and skills in students for daily consumption. According to Chikasanda, et. al. (2014), lack of teacher's knowledge makes teachers feel insecure to enhance interactive learning in biology classroom, as a result, teachers tend to teach just for the sake of passing examinations which is not supposed to be like that according to what it means on entrepreneurship. Enhancing entrepreneurship skills requires teachers to integrate interactive methods and resources for learners to socially interact with the environment and construct new knowledge based on their pre-requisite knowledge.

Therefore, for teachers to effectively enhance entrepreneurship skills, there is need to bring awareness to teachers in all schools, that entrepreneurship skills go beyond theoretical knowledge and includes the practical part of that knowledge in everyday life as indicated in the study that entrepreneurship skills are skills that one possesses and is able to apply in everyday life. Comparatively the results showed that some teachers are aware that entrepreneurship skills involve acquiring knowledge and skills but also applying them in real life situations.

The response for the four participants who partially defined entrepreneurship skills:

“it is about imparting knowledge and skills to learners which could be providing solutions to problems encountered in everyday life” (participant A)

“The ability of encouraging students to involve themselves to be proactive I business whether big or small e.g. farming and selling of the farm products” (participant B)

“These are skills which one acquire after learning something and they become very useful afterwards”
(Participant C)

“Skills that one possesses which helps in future that encourages self-sustenance and self-employment”
(Participant D)

The finding also indicates one response which was considered incorrect that the study got from one participants who failed to clearly explain what entrepreneurship skills are. His response was:

“entrepreneurship is very critical thing in education and is supposed to be a course on its own because it empowers students as well as teachers on how to survive in a society”.

This response indicates a lack of alignment with the expected meaning of entrepreneurship skills, revealing a potential misunderstanding among this group of teachers or lack of clarity regarding the meaning of entrepreneurship skills. This teacher cannot articulate entrepreneurship concepts to students in line with enhancing entrepreneurship skills among students (Chikasanda, et.al,2014). This was evident during lesson observation where he failed to demonstrate an accurate knowledge of the subject taught. The teacher failed to demonstrate ability to link present content with past and future learning experiences, other subject area and real world experiences and application.

This reveals a gap in teacher’s knowledge of entrepreneurship skills that needs a proper awareness so that teachers stay informed. This can enhance a more unified and effective enhancing entrepreneurship skills among students in schools. For teachers to effectively teach biology they must demonstrate knowledge and understanding of curriculum and subject content and having ability to impart this knowledge into their students as suggested by (Killen, 2013) for teaching to take place in classroom, the teacher is expected to act as a facilitator in the teaching process, while the learners interact in groups solving problems by undertaking practical work in order to consolidate what they have learned in real life situations. Teachers need to focus on the range of knowledge, concepts and skills that learners are not yet ready to acquire on their own but can acquire with the help from their teachers. Teachers need to contextualize their lesson always having an entrepreneurship activity where the knowledge constructed can be used. This emphasizes the importance of ensuring that biology teachers are well-versed with entrepreneurship skills which is in line with the broader goals of academic excellence and technical and vocational skills fit for the labor market entrepreneurships and implementation of the vision (NCP, 2020)

4.1.1.2 Importance of enhancing entrepreneurship in biology classroom

The study aimed to investigate the importance of enhancing entrepreneurship in biology classroom, here the study came up with the following components, an understanding which helps them in solving problems, ways of getting income, job creation and enhancing critical thinking. The data collected from interview and lesson observation was crosschecked and compared. A noteworthy observation emerged regarding the prevalence of responses related to the importance of enhancing entrepreneurship. During interviews, a majority of the participants, emphasized that it gives an understanding which helps them in solving problems, most of them emphasized their consistent a way of getting income and job creation and one of these participants mentioned that it enhances critical thinking participant E.

However, none discussed around other key components of enhancing entrepreneurship in biology classroom, such as innovation, entrepreneurship culture and impacts on society and community development. The absence of not talking of these components, raises questions about teachers understanding on entrepreneurship skill. This could be an indication of a potential gap in teachers as if this is a very new aspect in education setting, which would hinder enhancing of entrepreneurship skills among students. It is important to know that most teacher find it difficult to enhance entrepreneurship amongst students for they are not very much familiar with it they have just seen it written in the syllabus, as such they end up teaching for the sake of passing exams. As Amama, (2017) assert, that enhancing teacher's knowledge, skills and values is crucial for enhancing entrepreneurship. Here are the summarized perceptions of teachers on importance of enhancing entrepreneurship in biology classroom.

Table 4.2 Importance of enhancing entrepreneurship in biology classroom

Participants	Responses provided	Frequency (n=5)
pA, pB, pC, pD,	Expressed consistence on the fact that it gives an understanding which helps them in solving problems, getting income & job creation	4
pE	Expressed consistence on enhancing critical thinking	1

Participant who emphasized on the aspect that it enhances critical thinking shared this insight.

pE: *“in most cases it enhances critical thinking among students and it also enhance hands on skills.”*

The responses provided by some participants highlight a prevailing tension within the education system regarding how biology teachers enhance entrepreneurship skills. Many teachers find it hard to balance covering syllabus, focusing on examination, making sure that students pass their exams. This tension is evident in statements emphasizing on prioritizing exam success, and perceiving other activities as a potential waste of time. Additionally, it is noteworthy that some teachers acknowledged the importance of enhancing entrepreneurship as it is hands on activity but cited limited of resources and the fact that it is a new thing to some of the teachers. This suggests a need to emphasize the availability of resources in schools for practical lessons. In addition to the perception that imparting knowledge and skills is waste of time instead of fighting for finishing syllabus indicates a potential gap in the understanding of broader goals of education which is in line with the 2063 education agenda.

Furthermore, through lesson observation (classroom observation), the study also checked on mastery of subject content matter by teachers, ability to link present content with past and future learning experiences, other subject areas and real world experiences and application. The results of the study revealed significant insights on the challenges of enhancing entrepreneurship in biology classrooms.

Firstly, the assessment of mastery of subject identified inaccurate knowledge of the subject taught, not prepared instructional materials that were appropriate for the lesson and failing to demonstrate ability to link present content with past and future learning experiences especially participant E. This highlight the need for targeting professional development to enhance teacher’s subject knowledge and ensure accurate dissemination of scientific concepts as claimed by Sultan, et. al. (2018), that teaching for enhancing entrepreneurship skills requires teachers who have sufficient knowledge about the scientific concepts and processes; and be aware of the naïve ideas about science.

Secondly, the findings from observation of classroom activities diverged from the responses obtained during interviews. There was misalignment of information for some teachers between the reality observed in classrooms and what was proclaimed by teachers. Some lessons, did not align lesson objectives to the curriculum and students learning needs this misalignment signifies little knowledge on entrepreneurship and this stems from teachers lack of understanding. One of the lessons observed did not facilitate social interaction among students or encourage them to construct their own knowledge actively. Instead, students were depicted as passive recipients of information delivered by the teacher through lecturing method.

Consequently, lack of interactive classroom practices would impede enhancing entrepreneurship skills necessary for effectively facilitating students use of higher level thinking, contradicting goals of science education and our national aspirations of raising scientifically and innovative citizens to support developmental agenda of the country as stipulated in MW2063. In observed lessons, four out of five incorporated the element of social interaction through group work, pair work and practical activity, even though it was like that some lessons left a lot to be desired due to inadequate involvement of group members lack of supervision by teachers. Following this groups lost focus diverting their discussions away from the lessons content. Some groups were reported to be discussing un related topics instead of engaging with the topic being taught. Similarly, in some groups, members were not actively participating allowing others to complete the work on their behalf.

On the contrary this is against the principle required for enhancing entrepreneurship skills, which require learners to be fully engaged in the lesson and close monitoring of groups by facilitator to make sure right information is generated during teaching and learning (Margolis,2020; Barnett,2019). Therefore, teachers need to prepare enough activities for the lesson to engage learners fully, and supervising the groups as they perform the activities. Clever students should assist in taking supervisory roles. Moreover, the predominant teaching method observed was lecture method, where teachers delivered information to students in one-way communication, two other lessons mixed with question and answer approach, however the questions posed were of low order which only requires recall of information rather than encouraging deeper understanding or critical thinking.

As Margolis (2020) argues, classroom practices should aim at developing learners critical thinking, curiosity, and inquisitive minds about their environment, rather than simply encouraging memorization of information. So, it is better for teachers to ask proactive questions to nurture critical thinking skills rather than encouraging rote memory which hampers enhancing entrepreneurship skills. Basically, the interpretations indicated a misalignment between teacher's self-confessions regarding their teaching methods, especially in enhancing active learning and social interaction, and the observed classroom practices. What was seen in most classes were teacher centered classes, which opposes the development of entrepreneurship skills. (Muliadi,2020).

On the other hand, partially it might be because of resources, as it was witnessed in some of the lessons, teachers had no teaching and learning resources, but in some cases where there was potential for active learner's engagement, it might be because teachers were not interested in taking long, they claimed learner-centered approaches are time consuming. They just wanted to tell the students and go as indicated in the responses of some participants. However, this difference highlights the need to bridge the gap and ensure that teachers are effectively implementing strategies that enhance student engagement, interaction, and construction of their own knowledge (Margolis, 2020; Burnett, 2019).

In addition, it was observed that most teachers demonstrated limited creativity in improvisation, only 3 out of 5 participants incorporated teaching and learning resources into their lessons. Some teachers failed to produce visual aids like chart thus failing to prepare instructional materials that are appropriate for the lesson. Furthermore, one of the teachers in one of his lessons was supposed to use instructional technology to enhance students learning, and gives clear & specific instructions and explanations.

Certainly this lack of creativity hinders the effectiveness of teaching methods and diminishes the potential for engaging students in a meaningful way, opposing ways of enhancing entrepreneurship skills which requires active participatory methods (Amama, 2017). The study provided valuable insights into the understanding and enhancing entrepreneurship skills. Sound education is needed for reveal biology skills which are necessary for providing entrepreneurship skills which is aimed at making individual being gainfully self-employed (Aniama Salome,2017). While there is a commendable emphasis on the use of active methods availability of resources, the study highlighted significant challenges in enhancing entrepreneurship skills. Therefore, it is

crucial to prioritize the effective development of entrepreneurship skills to align with the goals of science education and the MW2063 Agenda, ensuring that the transformation of the country from poverty alleviation to wealthy creation is inclusive and comprehensive (NPC, 2020).

4.1.2 Objective 2: strategies that selected teachers use to enhance entrepreneurship skills in biology classrooms

The objective focused on analyzing how selected biology teachers enhance entrepreneurship, specifically focusing on the strategies which they use when enhancing entrepreneurship. In order to address this objective, the study examined how teachers teach, what materials do they use, and the types of lesson activities engaged. The primary aim was to assess whether students could socially interact, construct new knowledge and effectively internalize and practice newly acquired skills and knowledge.

To gather information on this objective, the study employed the two methods, lesson observation and interviews. Interview was guided by interview guide in Appendix D, lesson observation was guided by lesson observation guide in Appendix E, provided a real-time evaluation of how teachers taught, used the resources and integrated the lesson activities. Through the use of various data collection methods, researcher was privileged to cross-validate information and obtain a more comprehensive understanding of the research topic. For example, findings from interviews with teachers about how biology teachers enhance entrepreneurship in biology classroom were compared with observations of classroom practices to ensure consistency and reliability.

The study aligned with literature recommending the enhancing entrepreneurship skills through investigative questioning innovation, explaining and turning the source of information into a product, group work, pair work, creative talent, project work and critical thinking (Samanci et.al., 2020). These methods under proper guidance, allow students to socially interact, construct new knowledge, internalize and use the new knew

knowledge and skills. After organizing the data and coding, two themes came up: Teaching strategies and learning materials.

4.1.2.1 Teaching strategies

The study scrutinized the employed teaching methods, using various methods of data collection: lesson observation and interviews to ensure accuracy of data. However, the findings from the two sources showed inconsistency. In interviews, some participants openly asserted the use of active participatory methods such as group work, case study, brainstorming, pair work, presentations after practical work, innovations. Contrary to the claim made in interviews the divergence became more apparent during lesson observations (classroom observation). It was found that only few participants incorporated these participatory methods in their lessons such as group work, presentation and pair work. However, these observed methods did not fully integrate social interaction, and active engagement of learners within groups. If social interactive strategies are used strategically alongside other approaches to cater diverse learning styles and needs can help in enhancing entrepreneurship skills. Entrepreneurship skills which are expected to be enhanced through interactive teaching include: increased engagement, creative and innovative thinking problem solving decision making, critical thinking and collaboration. Knowledge construction during group presentation appeared insufficient, as teachers mostly dominated the information delivery during group presentations, and groups struggled to provide accurate information which was required for them. In some groups students exhibited noise and lacked control, signaling reduced students engagement, if more of the strategies were used to specifically address entrepreneurship e.g. role play on entrepreneurship, case studies, analogies these strategies could help enhance entrepreneurship development. A summary of what was observed is outlined as follows:

- *Inconsistency between proclaimed methods in an interview
- *Minimal incorporation of social interaction and active engagement
- *Dominance of teachers during group presentations
- *Students minimal contribution during group discussions and presentations
- *Noisy groups lacking control during lesson activities

*Less activities for active student's engagement

*Three lessons observed using learner-centered methods.

The results revealed that there is misalignment between what teacher claimed in the interview, and the actual teaching practices observed in the classroom implying limited knowledge on how they can enhance entrepreneurship in biology classrooms. Most of the lessons observed utilized teacher-centered approaches, despite most of them claiming in an interview of using participatory methods in their lesson delivery such as group work, role plays, pair work and presentations. This inconsistency observed, implies a possible mismatch between teacher's intentions and the practical implementation of classroom practices. The misalignment may affect the effective use of active participatory methods, hence hindering the enhancing active engagement, social interaction, and knowledge construction among students these components are crucial for fostering entrepreneurship, as highlighted in literature (Amama,2017).

This underscores the importance of aligning effective and active pedagogical strategies across teacher claims, some teachers were not effectively engaging students they failed using a variety of instructional strategies in order to meet individual learning goals. This could be because of insufficient preparation for enhancing entrepreneurship skills since enhancing entrepreneurship skills require teachers to be creative and thorough prepared having knowledge and understanding of the subject content (Paramita, 2017) which can support students in constructing their own knowledge and experience in real life situation.

The revealed deficiency in the number of activities designed indicated a compromise in student's engagement in the lesson. The lesson observed had less activities to fully engage students, as a result, noisy classroom groups were observed. Enhancing entrepreneurship skills requires a variety of hands-on activities, experiences and interactive task as pointed out in literature. So absence of these activities may limit student's opportunities to explore and acquire and apply these concepts actively.

4.1.2.2 Teaching materials

This is another way of analyzing how some teachers enhance entrepreneurship skills among students, the study aimed at scrutinizing the nature and use of teaching and learning materials. From literature, enhancing entrepreneurship requires a number of resources for students to interact with and these resources among other things should help these students to socially interact; construct new knowledge; bring the lesson to real life situation; internalize and practice the skills and knowledge (Barnett,2019; Amineh& Asl,2015).

During lesson observation some participants conducted their lessons without employing any teaching and learning materials apart from teacher's guide book. In comparison some teachers incorporated the specified resources in their lesson deliveries. However, the effectiveness of using teaching and learning resources varied among these participants.

While three of these participants successfully utilized materials for the intended purpose initially planned, one participant faced challenges. For instance, one participant intended to use projector for practical activity to show students some process in the topic of biotechnology, but only showed the students in classroom without involving them in real life application, however, its impact on facilitating social interaction, knowledge construction, and real-life contextualization was limited. The summary of findings is presented in the Table 4.3.

Table 4.3 Incorporation of teaching materials

Participants	Materials available	effective use of materials
pA	Yes	Yes
pB	Yes	Partially
pC	No	No
pD	Yes	Yes
pE	No	No

Key:

*“yes” in material column indicates material available

*“no” indicate materials not available

*“yes” in used materials effectively indicate effectively used

*“partially” indicate partially used with limitations

*“no” in used materials effectively indicate not used.

The observed pattern, where a significant number of participants did not utilize teaching materials in their lessons, may have a negative bearing on the enhancing entrepreneurship skills in science education, since it requires a variety of resources for students to interact with in the process of teaching and learning. While developing entrepreneurship learning activities, emphasizing practice is highly recommended. Activities for entrepreneurship should be designed with a variety of features, such as enhancing creativity skills that are essential for entrepreneurship behaviors thinking and advocating a “learning by doing” (Suacamram,2019). Asking them why they do not use materials in their lesson delivery, some had the following to say:

p C *“Lack of relevant resources in teaching biology we sometimes have materials which are not relevant for a particular topic and difficult to find them and its time consuming as such I fail to teach such topic properly; these other resources I have never seen them so it might be difficult for me to use them when teaching so I just teach theoretically.”*

p E *“well in most case we teach for formalities, we teach for learners to pass examinations and put the school on map when many learners pass biology will distinctions. It is very difficult for most of us teachers to prepare teaching resources for each and every lesson and the fact that some resources are scarce and expensive if the school don't have I as a teacher I cannot manage to use my own money to look for these resources.”*

These comments from some teachers revealed several challenges that teachers face to resources available. For example,

(participant C) *“mentioned the irrelevant of materials and difficulty in finding science resources and highlighting that they are time consuming to make”*

and for (participant E) *“emphasized teaching for formalities without regarding the use of teaching resources, focusing on examination rather than comprehensive teaching practices which can enhance entrepreneurship skills”*.

Overall, these comments pointed to some of the factors that make teachers fail to plan and utilize resources in their lesson delivery, which opposes the guide lines for enhancing entrepreneurship skills as outlined in literature. This highlighted the need to emphasize more on comprehensive and effective teaching approaches to biology teaching in secondary schools with integration of enough resources.

The use of resources is crucial in the enhancing entrepreneurship skills for students to engage in social interactions, construct new knew knowledge, and apply lessons to real-life situations enhancing the practice of skills and knowledge, the resources facilitate biology students to have entrepreneurship knowledge, skills, attitudes and interests (Supeni, et. al, 2017; Setyawan,2016). When teachers do not effectively utilize teaching and learning materials, it limits student’s opportunities to participate actively in the lesson, construct meaningful understanding and connect theoretical knowledge to practical applications of the lesson. As already alluded to by Margolis (2020), this passive approach may impede the development of comprehensive enhancing entrepreneurship skills which requires students to actively engage with subject matter using diverse resources. To enhance the enhancing entrepreneurship skills, it is essential for teachers to incorporate a variety of teaching and learning materials in their lessons and these resources should be used effectively. This can create a conducive environment for students to actively participate, ask questions collaborate with peers, and apply their knowledge to real-life situations as indicated in the study by Wardhani, et. al. (2018).

Thus the challenges highlight challenges relating to planning, execution, and overall impact on student’s engagement and learning outcomes. Addressing these issues is crucial for enhancing the enhancing entrepreneurship skills among students.

4.1.3 Objective 3: challenges in enhancing entrepreneurship skills in biology classrooms

This component aimed at examining the challenges in enhancing entrepreneurship in biology classroom. The investigation involved interviews and lesson observations. After comparing and crosschecking the data with participants, the analysis and discussion were structured around two main codes: challenges in enhancing entrepreneurship and possible solutions to these challenges.

4.1.3.1. Challenges that affect the enhancing of entrepreneurship in biology classroom

After data analysis, the identified challenges affecting the enhancing of entrepreneurship are presented in the Table 4.4.

Table 4.4 Challenges affecting enhancing entrepreneurship skills.

Challenges	Number of participants	Frequency (N=5)
Lack of relevant resources when teaching biology	pA, pC, pD	3
Noise within the classes when working	pA	1
Lack of enough fund for biology practical's	pA, pC, pE	3
Concept of entrepreneurship not included in the syllabus	pE, pD, pC, pA	4
Lack of interest by students in the subject	pC	1
Teachers not familiar with entrepreneurship	pB, pC, pD, pE	4
Government policies which are not flexible	pE	1
Difficult to come up with real examples in some topics in biology	pB	1
Lack of creativity for teachers to improvise	pE, pA	2
Lack of knowledge or knowing little by teachers in some topics	pB	1
Unpreparedness of teachers	pA, pC	2

Participants identified several challenges that affect the enhancing entrepreneurship, and these challenges are interrelated somehow. Among the challenges, the most frequently mentioned by participants was lack of most

relevant resources for teaching and learning biology; concept of entrepreneurship not included in the syllabus: lack of funds for biology practical's and teachers not familiar with entrepreneurship. According to the findings, lack of resources was a predominant challenge that most teacher face when it comes to the enhancing entrepreneurship skills.

These challenges revealed problems that are faced in the context of enhancing entrepreneurship skills among students in biology classrooms. The deficiency of these resources in schools not only impedes the enhancing of entrepreneurship but also interactive teaching approaches, it also restricts students understanding of scientific concepts, active exploration and application of these concepts and skills. A critical aspect enhancing entrepreneurship involves hands-on experiences and practical applications which are affected by the absence of teaching and learning resources (Barnett,2019; Amineh&Asl,2015) Concept of entrepreneurship not included in the syllabus limits student's exposure to entrepreneurship, hindering their skills and interest development, as some participants had to say:

pC: "concepts of entrepreneurship not clearly indicated in the syllabus like any other topic as such we just teach for the sake of teaching."

pD: "this entrepreneurship thing is very new to most of us I have some little knowledge of it thus why am able to answer these questions of which am not sure if am right or wrong whatever the case I have very little knowledge about entrepreneurship so it's a big challenge to most of us teachers."

pE;" most of administrators in schools as well as teachers we don't know about entrepreneurship we just know that there are essential skills indicated in the syllabus so to impart these skills in students is very difficult".

pA: "...lack of relevant resources in teaching biology, the other materials available sometimes may not be for a particular topic you are teaching which requires up to date resources and sometimes it could be that the resources cannot be used by special needs students."

Having little knowledge or not knowing something about entrepreneurship underscores the negative effects on enhancing entrepreneurship skills in biology classroom. This becomes a challenge among teacher since they fail to effectively teach and cannot say much or anything of entrepreneurship. It is important to know that enhancing entrepreneurship amongst student is very important. These skills and competencies will enable an individual seek and run an enterprise successfully acquired through training that emphasizes the acquisition and development of appropriate knowledge and skills that will enable an individual to maximize the resources around him/her within the limit of his/her capability (Alam et. al., 2018; Yilmiaz &Yilmiaz, 2019).

To overcome this challenge, in the first place there has to be some sensitization campaign teachers should be aware of this thing, they should undergo some trainings for lack of this knowledge in a teacher affect the enhancing of entrepreneurship skills among students hence failure of students acquiring these skills thus opposing the national goals of MW2063 (NPC, 2020).

Concept of entrepreneurship not included in syllabus as a must teach topic which makes most teachers not to teach specifically on entrepreneurship skills. It is a big challenge to most of these teachers to effectively teach of entrepreneurship hence limiting opportunities for personalized instruction and feedback which could lead to lack of hands-on activities which is essential components of active learning. According to Ezeudu (2018) entrepreneurship in biology classroom has a lot of advantages which includes skills acquisition, plays a complementary role in developing occupational knowledge, job skills and work experience among teachers and students as well as enhancing science and technology among other things.

All in all, absence of entrepreneurship concepts in syllabus as a basic topic undermines the enhancing entrepreneurship skills and inhibits student's opportunities to develop and acquire these skills, which is in line with the MW2063 agenda of producing educated nation which is scientifically and technologically sound. Despite the fact that teacher's opinions are saying entrepreneurship is not included in the syllabus this does not indicate that the teachers are misinterpreting the curriculum. However, MIE through MoE developed a secondary school curriculum that emphasizes practical skills aimed at self-employment. This curriculum focus on equipping students with knowledge and skills applicable to real-world scenarios, though it does not specifically mention entrepreneurship within biology syllabus.

To address this, issue the curriculum developers should look into this as they are redesigning the curriculum. They should make sure to put this as the most basic topic, so that it is a must for teachers to teach as any other topic. By enhancing entrepreneurship in biology classroom, teachers can create inclusive and dynamic teaching and learning environments conducive to imparting knowledge and skills in students effectively as outlined by Alam, et. al., (2018) and Yilmaz& Yilmaz, (2019).

Lack of resources in most schools, schools do not provide the required resources for specific topics in biology, as such teachers get demotivated and do not perform accordingly. Killen (2013) cited that for teaching to take place in class a teacher is expected to act as a facilitator in the teaching process, while the learners interact in groups solving problems, doing practical work which is only possible if there is availability of resources this lead to increase in lecturing method which impede student's ability to conduct independent research, critically analyze information and being able to develop skills. Lack of required resources in schools hinder the enhancing of entrepreneurship skills in biology classroom thus limiting students access to essential learning materials and resources.

Enhancing entrepreneurship requires enough resources for students to interact with as they are learning as well as constructing knowledge. Addressing this challenge is paramount, to create a conducive environment for students that fosters active engagement, comprehensive understanding, and the practical application of scientific knowledge in everyday context. Schools must have enough resources whenever one need for practical's they must be readily available. Teachers may also create their own teaching materials which they can manage, teachers can also encourage students to engage in independent research and exploration to supplement their learning. By being resourceful and creative, teachers can be able to enhance entrepreneurship skills despite the challenges posed by lack of materials (Chikasanda, et. al.,2014).

Noise within the classroom emerged as one of the challenges. Some students when conducting work makes a lot of noise this usually affects other students. Managing behavior and maintaining discipline becomes more challenging in such classrooms, potentially leading to disruptions that distract from learning. It compromises the ability of teachers to adopt learner centered classroom practices which necessitate the enhancing entrepreneurship as it requires conducive environment.

To overcome this challenge, teachers can implement strategies such as grouping them for collaborative activities, utilizing flexible and leverage peer teaching and cooperative learning techniques to foster student's engagement and participation. Teachers can create inclusive and dynamic learning environments conducive to enhancing entrepreneurship (Alam, et. al., 2018; Yilmaz& Yilmaz, 2019).

Lack of funds in science department also emerged as another challenge. Funding for biology practical's is very small much that some other topics which were meant to be taught practically end up taught theoretically teachers have no choice they cannot use their own money. This limits students from exploring knowledge and experiencing real life situation. Forcing teachers to resort to passive approaches of communicating information to students. This contradicts with the development of skills entrepreneurship which is associated with active engagement of learners through-hands on, mouths-on activities.

To overcome this challenge, schools must make sure that there is enough fund for science department and more especially biology. Teachers can start clubs with an aim of generating money which will be used during their practical's lessons.

Lack of creativity for teachers to improvise underscored a barrier to enhancing entrepreneurship which is very crucial in biology classroom. This aligns with findings in the study of Ristanto, et. al., (2017), emphasizing the need for teachers to exhibit creativity in embracing learner-centered methods that cultivate an environment conducive for enhancing entrepreneurship. The less mentioned but critical issue was lack of knowledge by teachers on some topics. This highlights the importance of teacher's proficiency in scientific content. This proficiency is crucial for delivering accurate information and addressing misconceptions among students as already alluded to by Ristanto et al. (2017), highlighting the need for teachers to better understand scientific concepts especially biology.

The challenges highlighted by teachers, are very big issues to enhancing entrepreneurship in biology classroom. These challenges make it difficult for students to better understand scientific ideas and limit the use of these concepts in daily life. Fixing these problems is crucial to create a better teaching environment where students can fully grasp science concepts and apply them in real life situations.

4.1.3.2 Possible solutions to the challenges when enhancing entrepreneurship

Despite the challenges highlighted by participants in enhancing entrepreneurship, after further investigation, there was a positive aspect as they possess knowledge of how they can deal with some of the hindrances to bring about effective classroom practices that can enhance enhancing entrepreneurship in biology classroom. Although some responses diverged from the intended focus such as use of lecture method, participants offered various solutions to enhance entrepreneurship as indicated in the Table 4.5.

Table 4. 5: Solutions to the challenges in enhancing entrepreneurship

Challenges	Solutions	Participants who mentioned	Frequency
Lack of relevant resources when teaching biology	Administrators in schools should make the resources available, make them from locally available resources, needs teachers creativity, improvisation, enough preparations ask students to make some	A,C, and D	3
Noise within the classroom when working	Use more of collaborative methods of teaching peer teaching for more students participation and involvement	A	1
Lack of enough funds for biology practical's	Government should provide funds in all schools, school administrators should make sure they allocate enough funds for biology practical's	A,C and E	3
Concept of entrepreneurship not included in the syllabus	Curriculum developers should include this concept in the syllabus	A,B,C,D and E	4
Lack of interest by students in the subject	Relating biology lessons with real life examples, less use of abstractness	C	1
Teachers not familiar with entrepreneurship	Teachers should undergo trainings and there has to be sensitization meetings and awareness campaign	B,C,D and E	4
Government policies which are not flexible	Government should make policies which could be flexible that teachers can be able to do somethings which are not possible due to not being flexible	E	1
Difficult to come up with real life examples in some topics in biology	Ask friends for help how they teach such topics	B	1
Lack of creativity for teachers to improvise	Teachers should be creative and resourceful	A and E	2
Lack of knowledge by teachers in some biology topics	Enough preparations , ask friends for help	B	1
Unpreparedness of teachers	Teachers should make sure they are well prepared	A and C	2

Addressing the challenges, participants through interview offered insightful solutions. For instance, to address lack of resources, participants mentioned the need for government provision, use of locally available

resources, teacher's creativity, improvisation, through preparations, asking learners to bring some from home and school administrators to make sure they provide these resources. This will help learners to interact with a variety of resources and bring forth the development entrepreneurship skills as they are using the resources. Noise can be tackled by giving them group work which will make everyone to participate, peer teaching and presentations this ensures full participation and involvement of students. The government should also make sure that they allocate enough funds in schools so that the administrators be able to allocate enough funds for sciences including biology.

Participants on concept not available in the syllabus, suggested that the government through curriculum developers should make sure they include it so as to make it like any other basic topic so that it become a must teach topic, and that there has to be a sensitization meeting with teachers make them aware and of course they have to go for training so that they know what they are teaching and how best they can deliver that to students. On lack of knowledge teachers should be well prepared and be flexible to ask friends for help on how to teach a particular topic which might be difficult for one this help in enhancing teachers knowledge, there by being able to make biology classroom a conducive environment for students to be able to develop and acquire entrepreneurship skills.

The participant's suggestions underscored a collective commitment to overcome challenges in enhancing entrepreneurship. These practical solutions, tailored to the specific challenges identified, demonstrate a comprehensive approach that involves not only teacher's efforts but also calls for systematic support from educational authorities to make sure that teachers perception and classroom practices agree with the aspects required for enhancing entrepreneurship among students a goal in science education and a stepping stone in achieving MW2063 goals.

4.2 Summary of the chapter

The study aimed at investigating how biology teachers enhance entrepreneurship skills, covering effectiveness of biology teaching at the school, understanding of entrepreneurship and how to enhance entrepreneurship. Findings revealed diverse understanding, with some teachers encountering this for the first time. While some demonstrated partial understanding others struggled to articulate some key aspect of

entrepreneurship. The recognition of attributes highlighted the significance of both theoretical and practical application for entrepreneurship skills. Regarding understanding of entrepreneurship, a tension among teachers emerged. Inconsistencies between stated practices and observed actions underscore challenges in subject mastery, classroom activities, and resource availability, highlighting the need for improvement in biology classroom to foster development of entrepreneurship skills.

Examining challenges affecting the enhancing of entrepreneurship skills, the identified challenges like lack of relevant resources, not familiar with entrepreneurship, lack of funds and lack of creativity, hinders the interactive teaching methods, limiting students in acquiring and developing entrepreneurship skills. The suggested solutions encompassed cooperative endeavors, highlighting involvement of both teachers and systematic measures from government.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

The chapter consolidates the primary outcomes of the study, investigating how biology teachers enhance entrepreneurship skills among students. It offers a comprehensive understanding of the entire research process, summarizing the main findings, discussing their implications, presenting recommendations and area of further study. The aim is to enhance the enhancing entrepreneurship skills, fostering the development of entrepreneurship attitude among students producing a generation capable of navigating the challenges of the contemporary era marked by rapid advancements in science and technology, and bringing forth socio-economic development.

5.1 Summary of findings

Under the study's objectives, determine selected biology teachers understanding of entrepreneurship skills in biology education is increasingly recognized as a vital component of modern pedagogy. This study aimed at investigating teachers understanding of entrepreneurship skills, their strategies for enhancing these skills in classroom, and the challenges they face in this endeavor. The finding indicates a multifaceted approach to fostering entrepreneurship skills, highlighting the essential role that biology educators play in bridging theoretical knowledge with practical applications. This discussion explores these findings in detail, aligning them with current literature to provide a comprehensive understanding of the topic. Furthermore, the teaching experience distribution suggests that while many teachers are equipped to foster an entrepreneurship mind set in their students, ongoing support and training are necessary to enhance their pedagogical approaches. As education systems increasingly recognize the importance of entrepreneurship in preparing students for the future, efforts must be made to ensure that biology educators are fully supported in integrating these competencies into their teaching practices.

The study reveals that biology teachers perceive entrepreneurship skills as competencies acquired through learning, which can be invaluable later in life. Teachers emphasized that certain biological concepts, particularly those related microorganisms, biotechnology, are essential not only for scientific understanding

but also for practical applications in fields. This perspective aligns with the 2063 goals which includes the ability to turn ideas into action through creativity, innovation and collaboration.

The connection between theoretical knowledge and real-world applications is crucial, as it allows students to see the relevance of their studies in addressing global challenges. This understanding according to literature advocates for the embedding of entrepreneurship education within existing curricula to enhance student's capacity to identify opportunities and develop practical solutions. When teachers integrate entrepreneurship thinking into biology lessons, they not only impact scientific knowledge but also prepare students for future challenges by fostering a mindset geared towards innovation and problem-solving.

The findings indicate that biology teachers not all effectively enhance entrepreneurship. Most of these teachers failed to use real-world examples, they failed to help students connect biological processes to pressing issues in real life situations. Which is not in line with interpretivist teaching theories, which suggest that students learn best when they can relate new information to their own experiences. Experiential learning in particular, has been shown to enhance knowledge retention and application, essential for cultivating an entrepreneurship mindset. The findings suggest that group activities foster collaboration, encouraging students to actively participate in practical tasks and share ideas hence need to be fully utilized. This collaborative environment not only enhances learning outcomes but also reflects the real-world dynamics of entrepreneurship, where teamwork and collective problem-solving are critical, hence enhance not only academic achievement but also the development of essential social and entrepreneurship skills.

In addition, the implementation of ongoing project work such as those done in science clubs where students engage in practical experiments, further illustrates how teachers can foster an entrepreneurship spirit. These projects allow students to apply theoretical knowledge to tangible outcomes, reinforcing the connection between biology and entrepreneurship. Such hands-on experiences are vital for nurturing innovative thinking and equipping students with the skills needed to navigate complex scientific and business landscapes.

Despite the positive approaches employed by biology teachers, significant challenges hinder the effective enhancing entrepreneurship in biology classroom. One of the primary challenge identified in the study is the lack of relevant teaching resources. This finding aligns with literature which emphasized that effective

teaching in science education requires access to appropriate and context-specific materials. The absence of such resources can limit teacher's ability to provide engaging and practical learning experiences, thereby reducing students understanding and interest in entrepreneurship. Inadequate resources for special needs students present another challenge. As highlighted earlier on, inclusive education often falters when the available resources do not cater to diverse learning needs. This lack of support can hinder participation and entrepreneurship thinking among all students, underscoring the importance of developing inclusive teaching strategies that accommodate varying abilities. The findings also revealed that insufficient funding for biology practical's often leads to a reliance of theoretical teaching, depriving students of essential hands-on experience. The financial constraints faced by many schools are echoed already by other researchers, which indicates that a lack of resources can significantly limit the implementation of practical experiments and projects in science education. As a result, teachers feel demotivated, leading to a diminished capacity to inspire entrepreneurship skills in their students. Moreover, the study identified gaps in the curriculum concerning entrepreneurship, with some teachers noting that the concepts of entrepreneurship are not clearly articulated in the syllabus. This observation is consistent with the findings of other scholars who argued that without explicit inclusion of entrepreneurship education in school curricula, students may miss opportunities to develop essential entrepreneurship skills.

Lastly, the challenge of limited teacher knowledge regarding entrepreneurship emerged as a significant challenge. As one participant noted, lacking the necessary understanding of entrepreneurship hinders a teacher's ability to effectively impart these skills to students. This concern is supported the work of other scholars which emphasizes the need for professional development for educators to enhance the understanding and teaching of entrepreneurship.

Through the integration of real-life application and collaborative teaching and learning, educators can effectively bridge the gap between theoretical knowledge and practical application. However, significant challenges remain, including a lack of resources, insufficient funding and gaps in the curriculum, which hinder the full realization of entrepreneurship education in biology classrooms. Addressing these challenges requires a concerted effort from educational stake holders, including policy makers and school administrators, to

provide the necessary resources and training for teachers. By fostering an environment that supports entrepreneurship in education, we can better prepare students to become innovative thinkers and problem solvers in an increasingly complex world.

5.3 Conclusion

The study found out that teachers have partial knowledge on entrepreneurship skills, much of their effort is teaching biology for exams. Some strategies used in teaching biology are not effective for development of entrepreneurship skills, there is need for more active participatory methods. Inadequate funding, lack of relevant resources is some of the challenges that hinder development of entrepreneurship skills in biology classrooms.

Enhancing entrepreneurship in biology classroom has the potential of equipping individuals with acceptable entrepreneurship skills and reliance as a pathway for creating and generating gainful employment. Students well trained in biology should be creative in thinking and be able to observe job opportunities where others have overlooked and invest on such. Such a person should acquire the attitudes and skills to be self-employed and productive. There is a need for the biology teachers to teach students for the acquisition of the entrepreneurship skills necessary for employment and productivity.

5.3 Recommendations

Based on the findings and conclusions of this study, several recommendations can be made to enhance the enhancing of entrepreneurship skills in biology classroom:

1. MoE through DQAS should support biology teachers with professional development opportunities to be empowered with knowledge and skills needed to teach entrepreneurship to ensure that biology curriculum is being implemented as designed. Trainings should focus on entrepreneurship pedagogy, innovative teaching methods and ways to integrate real-life applications into biology lessons. Such professional development not only enhance teachers content knowledge but also boosts their confidence in delivering entrepreneurship education.
2. Addressing funding limitation is vital for success of practical in biology classroom. Educational institutions should seek diversified funding sources, including grants, partnerships with local industries

and community sponsorships, to support hands-on projects and activities. By securing adequate funding for biology practical's, schools can ensure that students have the opportunity to engage in experiential learning which is crucial for developing entrepreneurship skills.

5.7 Contributions of the study to knowledge of entrepreneurship education

The study has brought insight to discussion of entrepreneurship skills education among biology teachers by highlighting effective strategies that can enhance development of these skills and potential challenges that teachers should be aware of.

5.8 Area of Further Study

Building on the findings and discussion from this study several areas for further research can be proposed.

1. Replicating the same study with bigger sample size so that findings can inform relevant policies on entrepreneurship education
2. Exploring the perspectives of students regarding entrepreneurship skills development in biology education.

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APPENDICES

APPENDIX A: CONCENT FORM FOR RESEARCH



Mzuzu University Research Ethics Committee (MZUNIREC)

Informed Consent Form for Research in Master of Education (Teacher Education)

Introduction

I am Thoko Grace Lozani from **Mzuzu University**. I am doing research on “How biology teachers enhance entrepreneurship skills among secondary school students in Mzuzu”. This consent form may contain words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask them of me or of another researcher.

Purpose of the research

This research aims to investigate how biology teachers enhance entrepreneurship skills among secondary school students.

Type of Research Intervention

This research will involve your participation in a group discussion and/or individual interview.

Participant Selection

You are being invited to take part in this research because you are directly involved as you are one of those people who teaches biology.

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. If you choose not to participate nothing will change. You may skip any question and move on to the next question.

Duration

The research takes place for a period of ten (10) months.

Risks

You do not have to answer any question or take part in the discussion/interview/survey if you feel the question(s) are too personal or if talking about them makes you uncomfortable.)

Reimbursements

You will not be provided any incentive to take part in the research.

Sharing the Results

The knowledge that we get from this research will be shared with you and your community before it is made widely available to the public. Following, we will publish the results so other interested people may learn from the research.

Who to Contact

If you have any questions, you can ask them now or later. If you wish to ask questions later, you may contact: Prof/Dr/Miss Thoko G. Lozani, Chipasula secondary school, private Bag 71, Lilongwe. (Phone number 0999348376/0888108637).

This proposal has been reviewed and approved by Mzuzu University Research Ethics Committee (MZUNIREC) which is a committee whose task it is to make sure that research participants are protected from harm. If you wish to find out more about the Committee, contact Mr. Gift Mbwele, Mzuzu University Research Ethics Committee (MZUNIREC) Administrator, Mzuzu University, P/Bag 201, Luwinga, Mzuzu 2, Phone: 0999404008/0888641486

Do you have any questions?

Part II: Certificate of Consent

I have been invited to participate in research about “Investigating how biology teachers enhance entrepreneurship skills among secondary students in selected schools in Mzuzu”.

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study

Print Name of Participant _____

Signature of Participant _____

Date _____

Day/month/year

If illiterate ¹

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Print name of witness _____

Thumb print of participant

Signature of witness _____

Date _____

Day/month/year

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands the research project. I confirm the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been

¹ A literate witness must sign (if possible, this person should be selected by the participant and should have no connection to the research team). Participants who are illiterate should include their thumb print as well.

answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher /person taking the consent_____

Date _____ **Day/month/year**

APPENDIX B

CONSENT FORM FOR AUDIO-RECORDING INTERVIEWS



I invite you to participate in an interview in my study on the topic “**Investigating how biology teachers enhance entrepreneurship skills among students**”. I would like to audio record what transpires in this interviews. I therefore, request for your permission for me to audio record our discussions in the interviews. Please sign below if you have accepted to be audio-recorded. I give consent to the following:

- a) Being interviewed in the study.
- b) Being audio-recorded during the interview.

Name of the teacher: _____

Signature of the teacher _____ Date: _____

Name of the Researcher: _____

Signature of the Researcher _____ Date: _____

APPENDIX C

Mzuzu University,
Private Bag 201,
Luwinga,
MZUZU 2.
Email: gracelozani@gmail.com

The Division Manager,
Northern Education Division,
Post Office Box 133,
MZUZU.

Dear Sir,

REQUEST TO CARRY OUT A RESEARCH IN YOUR SCHOOLS

I am a post graduate student at Mzuzu University pursuing a **Master of Education in Teacher Education**. I am carrying out a study titled *“Investigating how Biology teachers enhance entrepreneurship skills among students: A case of selected schools in Northern Education Division”* as a partial fulfillment of the requirements for the award of a Degree of Master of Education. I am therefore writing to request your good office for permission to carry out this study in the four secondary schools in your division.

My study will involve classroom lesson observation and a follow up interview with the teachers. I will request them to sign a consent form accepting involvement in the research. I also intend to protect the anonymity of the schools and teachers to be involved in the research by using pseudonyms.

Attached is an introduction letter from Mzuzu University.

Yours Sincerely,

THOKO GRACE LOZANI (0999348376)

APPENDIX D:

INTERVIEW GUIDE

Dear Respondent,

I am **THOKO GRACE LOZANI** a Masters student of Mzuzu University conducting an academic study on the topic “**Investigating how biology teachers enhance entrepreneurship skills among students in secondary schools. A case of selected secondary schools in Northern Education Division**”. It is a partial fulfilment **for the requirements of the award of master of education (teacher education)** of Mzuzu University. Responses will be treated with the utmost confidentiality and used only for academic purposes.

Therefore, I kindly request you to spare some time and answer.

Section A: Demographic information for respondents

1. Your Gender

Mark only one rectangle.

☐ Male ☐ Female

2. Age

Mark only one rectangle.

☐ Below 20 ☐ Years 21-30 ☐ Years 31-40 ☐ Years 41 Years or older.

3. Highest Qualification **Mark** only one rectangle.

☐ Diploma ☐ Degree ☐ Degree Master's

4. How long have you been teaching Biology?

☐

1 -3 yrs.

☐

4-6 yrs.

☐

7-10yrs.

☐

11 above

Section B: General questions

5. In your opinion, how can you describe biology teaching effectiveness at the school?

.....

.....

6. What is your understanding of entrepreneurship skills?

.....

.....

7. What is the importance of enhancing entrepreneurship in Biology classrooms? -----

8. How do you (biology teachers) enhance entrepreneurship in biology classrooms? -----

9. What are the strategies used when enhancing entrepreneurship skills? -----

10. What are the challenges in enhancing entrepreneurship in biology classrooms?

.....

.....

.....

11. What are the possible solutions to the challenges mentioned above?

.....

.....

Thank you for your participation

APPENDIX: E

LESSON OBSERVATION

OBSERVATION CHECKLIST AND COMMENT FORM

TEACHER ----- DATE ----- CLASS-----

PROFESSIONAL KNOWLEDGE: The teacher demonstrates thorough knowledge and understanding of the curriculum and subject content

Demonstrate an accurate knowledge of the subject taught	
Prepares instructional materials that are appropriate for the lesson	
Communicates clearly and checks for students understanding	
Demonstrate ability to link present content with past and future learning experiences, other subject areas and real world experiences and applications	
Effectively facilitates students use of higher level thinking skills in instruction.	

INSTRUCTIONAL PLANNING: The teacher plans effectively and sets clear objectives that are easily understood.

Aligns lesson objectives to the curriculum and student learning needs	
Ensures instructional materials are ready	
Plans for differentiated instruction	
Reviews the lesson at the end of the session	
Uses student learning data to guide planning	
Provide appropriate home work	

INSTRUCTIONAL DELIVERY: The teacher effectively engages students in learning by using variety of instructional strategies in order to meet individual learning needs

Communicates the lesson objectives clearly at the start of the lesson	
Engages and maintains students in active learning	
Differentiates instruction to meet students' needs	
Reinforces learning goals consistently throughout the lesson	
Uses instructional technology to enhance students learning, and gives clear & specific instructions and explanations	
Contextualizes lesson : having an entrepreneurship activity where the knowledge constructed can be used such as fermentation of cheese, animal production(poultry) and animal feed production	

LEARNING ASSESSMENT: The teacher systematically assesses students work and provides timely and relevant feedback

Assesses students understanding throughout the lesson by the use of effective questions	
Gives constructive and frequent feedback to students on their learning work outputs	
Involves students in setting learning goals and monitoring their own progress	
Uses constructively and recognizes mistakes and misconceptions to facilitate	

APPENDIX F



MZUZU UNIVERSITY

DIRECTORATE OF RESEARCH

Mzuzu University
Private Bag 201
Luwinga
Mzuzu 2
MALAWI
TEL: 01 320 722
FAX: 01 320 648

MZUZU UNIVERSITY RESEARCH ETHICS COMMITTEE

(MZUNIREC)

Ref No: MZUNIREC/DOR/24/28

13/04/2024.

Thoko Grace Lozani,
Mzuzu University,
P/Bag 201,
Luwinga,
Mzuzu 2.

Email: gracelozani@gmail.com

Dear Grace,

LETTER OF INTENT TO ISSUE A RESEARCH ETHICS AND REGULATORY PERMIT FOR PROTOCOL REF NO. MZUNIREC/DOR/24/28: HOW BIOLOGY TEACHERS PROMOTE ENTREPRENEURIAL SKILLS AMONG STUDENTS IN SECONDARY SCHOOLS. A CASE OF SELECTED SECONDARY SCHOOLS IN NORTHERN EDUCATION DIVISION .

The Mzuzu University Research Ethics Committee (MZUNIREC) reviewed your submission. The committee is now pleased to inform you that the protocol is at the stage at which the Principal Investigator is being required to pay the stipulated 10% regulatory fee of the actual budget as indicated in the research protocol being a regulatory **compliance and capacity building fee** before ethics approval and regulatory permit could be issued. This fee is required to be paid to the Committee. The mode of payment is either a cash or cheque deposit into the following bank account:

Description	Details
Beneficiary name and address	Mzuzu University, Private Bag 201, Luwinga, Mzuzu 2, Malawi
Beneficiary account name	MZUNIREC
Beneficiary account No.	1007578888
Bank name and address	National Bank of Malawi, Mzuzu Branch, PO Box 20, Mzuzu
Swift code or ABA number	N/A

Committee Address:

Secretariat, Mzuzu University Research Ethics Committee, P/Bag 201, Luwinga, Mzuzu 2; E-mail address: mzunirec@mzuni.ac.mw

Once payment is made, send a deposit slip/wire transfer slip for the verification of our Accounts Department.

Yours Sincerely,



Gift Mbwele

SENIOR RESEARCH ETHICS ADMINISTRATOR

For: CHAIRMAN OF MZUNIREC

Committee Address:

Secretariat, Mzuzu University Research Ethics Committee, P/Bag 201, Luwingu, Mzuzu 2; E-mail address: mzunirec@mzuni.ac.mw

APPENDIX G



MZUZU UNIVERSITY

**Department of Teaching, Learning and
Curriculum Studies**

Mzuzu University
Private Bag 201
Luwingu
Mzuzu 2
MALAWI

Tel: (265) 01 320 575/722
Fax: (265) 01 320 568
mdolo.mm@mzuni.ac.mw

16th April 2024

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

LETTER OF INTRODUCTION MS GRACE THOKO LOZANI

Ms Grace Thoko Lozani is a registered Master of Education (Teacher Education) Program student at Mzuzu University. She has been cleared by the Mzuzu University Research Ethics Committee (MZUNIREC) to collect data for the research study she is conducting as a requirement for the program.

Kindly assist her accordingly.

Yours faithfully,

Dr Margaret M. Mdolo
Program Coordinator