Research Article

e-ISSN: 2710-2122, p-ISSN: 2710-2114
2025: Vol 7(s1), pp 1-12. https://doi.org/10.38140/ijer-2025.vol7.s1.05
Interdisciplinary Journal of Education Research

Fostering Entrepreneurial Mindset: Insights from Chemistry Students at a South African University

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EDITORIAL DATES
Received: 15 September 2024
Revised: 24 February 2025
Accepted: 04 March 2025
Published: 24 April 2025

DOI: 10.38140/ijer-2025.vol7.s1.05

Abstract: The evolving labour market contributes to high graduate unemployment, requiring skills and competencies that may not be taught at university. Entrepreneurship education teaches soft skills and attributes that produce multi-skilled graduates who do not solely depend on formal employment after graduation. An entrepreneurial mindset, as a learning outcome of entrepreneurship education, allows a person to create value by identifying and seizing opportunities, making decisions with limited information, and remaining flexible and resilient in frequently complex and uncertain situations. Hence, this study aims to evaluate how entrepreneurship education influences the entrepreneurial mindset of chemistry students at a university in the Eastern Cape, South Africa. The paper employed a qualitative research methodology in the form of open-ended questionnaires, adopted Bandura's social cognitive theory, and utilised thematic data analysis to achieve the set aim. The sample size consists of 10 purposively selected participants who attended the course. The key findings indicate that chemistry students understand how the chemistry course teaches them skills in producing everyday products and appreciate the exposure to business venturing through entrepreneurship education. The students identified profitable solutions to societal problems; however, they are unclear about where and how to obtain assistance in turning their ideas into real-life businesses. This study concludes that the course has a positive influence on the entrepreneurial mindset. It recommends that the institution redesign the curriculum to incorporate science-based entrepreneurship education by integrating chemistry and a practical participatory approach that demonstrates entrepreneurship through various production and business development stages.

Keywords: Entrepreneurship education, chemistry students, entrepreneurial mindset, science education, graduate unemployment.

1. Introduction

The advances brought by globalisation and digitalisation in the workplace are diminishing the competencies acquired through traditional academic training in Higher Education Institutions (HEIs). As such, HEIs need to be innovative in developing the skills, attributes, and competencies of the graduates they produce. In order for HEIs to contribute to human capital and economic development, they must facilitate knowledge generation that addresses societal issues, either by producing adaptable and versatile graduates or by creating personalised solutions that are accessible to communities (Tsephe, 2024). The graduate attributes that foster versatility include emotional intelligence, multidisciplinary knowledge, critical thinking, service orientation, and negotiation skills (Wong et al., 2022; Shivoro et al., 2024). Additionally, Wong et al. (2022) highlight the importance of the ability to explain the role and relevance of science in society, awareness of the business industry, adaptability and flexibility, and ICT skills as essential for employability. Consequently, HEIs should strive to create a conducive environment that nurtures these attributes.

How to cite this article:
Dyantyi-Gwanya, N., Faleni, N., & Ncanywa, T. (2025). Fostering Entrepreneurial Mindset: Insights from Chemistry Students at a South African University. *Interdisciplinary Journal of Education Research, 7*(s1), a05. https://doi.org/10.38140/ijer-2025.vol7.s1.05

One initiative by HEIs is the incorporation of entrepreneurship education (EE) into all programmes, due to the wide range of attributes stimulated by this training (Miranda, Goñi, Berhane & Carberry, 2020; Salih et al., 2024). The skills, attributes, and competencies fostered by EE include self-efficacy, self-awareness, creativity, leadership, resilience, planning, financial management, technological savviness, teamwork, and critical problem-solving (Ezechinyere, 2019; Rankhumise & Letsoalo, 2023; Rodrigues, 2023). EE is regarded as a stimulating mindset that actively promotes entrepreneurial intentions, enhances competence, and develops entrepreneurial ability (Jena, 2020; Vinogradova et al., 2023; Rodriguez, 2023). The entrepreneurial mindset is a non-binary term, implying that not starting a business does not necessarily indicate a failure to achieve the intended learning outcomes (Saptono et al., 2020). Several studies have observed a positive impact of entrepreneurship education on the development of entrepreneurial competencies, as well as on students' entrepreneurial intentions (Jennifer et al., 2022; Vinogradova et al., 2023; Crişan et al., 2024). The influence of entrepreneurial studies on students extends beyond merely motivating them to start a new business; it also enhances their career journeys and equips them to navigate various social and political situations.

Entrepreneurship significantly contributes to the socioeconomic development of a nation by fostering economic expansion through innovative productivity and creating employment opportunities (Frederick et al., 2018). The development in China is credited to entrepreneurship, which is derived from institutions of learning and cultural backgrounds that consistently provide an entrepreneurial context (Zhang, 2019). This is supported by an entrepreneurial mindset characterised by unique ideas and distinctive approaches to pursuing opportunities and tackling challenges, where education plays an effective role in preparing students (Nowinski et al., 2019; Bazkiaei et al., 2020). This initiative prepares students to become entrepreneurs and creates job opportunities (Tung et al., 2020). The entrepreneurial mindset analyses opportunities, manages businesses, and assesses community challenges (Bosman, 2019). Entrepreneurship education (EE) is one of the skills that students need to acquire, as highlighted in teaching curricula, and it has a significant impact on the eradication of unemployment and crime (Ncanywa & Dyantyi, 2022). Entrepreneurship is associated with individuals' abilities to transform and implement ideas, thereby enhancing students' characteristics and self-efficacy (Saptono et al., 2020). EE links chemistry innovations, technical expertise, and creativity to produce innovative science-based products, highlighting the ability to introduce new products to the market (Entrialgo & Iglesias, 2020).

Ezechinyere (2019) reported that chemistry undergraduates displayed a moderately positive attitude towards applying their technical knowledge to explore entrepreneurial activities with minimal capital, citing their capability to produce soap (Ezechinyere, 2019). The chemistry students involved in this research are enrolled in a semester-long EE course that primarily consists of theoretical content, with little to no practical experience. These students possess a technical background in chemical processes used to produce everyday products such as fuel, cleaning agents, cosmetics, and pharmaceuticals. This leads to the concept of science-based entrepreneurship education (SBEE), wherein scientific concepts are integrated into the curriculum to stimulate innovation and foster 'knowledge to business' intentions (Blankesteijn et al., 2021). Similar to entrepreneurship education, the learning outcomes of SBEE aim to cultivate an entrepreneurial mindset. The graduate attributes fostered by SBEE contribute to the development of this entrepreneurial mindset.

1.1 Problem statement and question

EE for chemistry students is commonly offered theoretically as a parallel module to the chemistry syllabus by an incumbent with only an entrepreneurship background (Dyantyi & Faleni, 2023). This approach limits the incorporation of science, technology, and research components into the curriculum (Blankesteijn et al., 2021). The lack of consensus on the contents of the curriculum, teaching methods, and assessment methods perpetuates the gap (Linton & Xu, 2020; Miranda et al.,

2020). On the other hand, the pedagogy applied in EE depends on the nature of the students and the length of the course. Anwar and Abdullah (2021) reported that students prefer a participatory approach, while experiential learning exposes students to real-world business. However, the latter is limited by a lack of opportunities for work-integrated learning. This study evaluates whether entrepreneurship education offered to chemistry students stimulates an entrepreneurial mindset. Hence, the key research question is:

- How does the entrepreneurship education offered to chemistry students influence their entrepreneurial mindset at a university in the Eastern Cape, South Africa?

2. Methodology

The relevant paradigm for this study is the constructivist paradigm, also known as interpretivism, symbolic interactionism, or hermeneutics (Adom et al., 2016). To understand social reality, insiders' viewpoints are crucial. This paradigm is pertinent to the study as it seeks to determine whether the entrepreneurship education module offered to chemistry students stimulates an entrepreneurial mindset. The study adopts qualitative research, which is an interpretative, naturalistic, and multimethod approach to the subject matter (Aspers & Corte, 2019). Qualitative responses are examined to interpret phenomena through the meanings derived from the students' responses, which are neither numerical nor statistical. Consequently, this approach facilitates an understanding of the various methods employed by the selected university to promote entrepreneurship education and foster an entrepreneurial mindset. The participants are selected using purposive sampling, given that they meet the criterion of being exit-level students who have completed the entrepreneurship education module. These students are sufficiently aware of the deficits in chemistry skills in the market, job scarcity, and the necessity to develop their own products. This awareness will assist in addressing unemployment and the lack of job opportunities in the job market. Purposive sampling, also known as subjective sampling, involves the researcher selecting variables based on the study's relevance. The sample size consists of 10 participants, of which 8 are students, and 2 are in-service or work-integrated learners.

2.1 Data Analysis and ethical considerations

The study explores whether the entrepreneurship education offered to chemistry students influences their entrepreneurial mindset. This is achieved through the use of open-ended questionnaires as a qualitative data collection method. The students' responses in the generated questionnaire were analysed to contemplate the importance of entrepreneurship in learning Chemistry. The case study was designed to enable students to highlight the influence of entrepreneurship education as part of the curriculum. A qualitative approach was used to understand students' experiences based on active study in constructing their own knowledge or soft skills related to market opportunities in science. The gathered data were analysed using thematic analysis to focus on the content and give attention to what was said (Meraz et al., 2019). Thematic analysis probes "What was the point of the story?", "What were the events told?", and "What main idea or theme is directly or indirectly stated?". The questionnaire was based on their knowledge of chemistry, serving as their learning foundation and what can be constructed from their experiences in learning. Different responses and explanations towards the subjects were highlighted to illustrate students' interests in the subject and the skills and abilities acquired to tackle various societal economic challenges. This was achieved through their learning experiences and the identification and participation of communities in their field of study. Finally, the integration of learning experiences from knowledge, skills, abilities, and approaches to proposed tasks is projected. This would lead to proficiency assessment, which is performance-based evidence.

An ethical clearance certificate with the protocol number WSU/NDED/10-2022 was obtained from the Authority of the University Research Ethics Committee to ensure compliance with research ethics

and integrity. All participants signed a consent form, and it was explained that they could retract their consent at any stage of the research to ensure understanding and voluntary participation. The study will adhere to relevant laws and guidelines concerning privacy and confidentiality.

3. Presentation and Discussions of Findings

The thematic analysis of the results yielded the following themes: motivation for studying Chemistry, creating an entrepreneurial mindset for Chemistry students, an entrepreneurship course as a subject of choice for Chemistry students, and entrepreneurship education for an entrepreneurial mindset.

3.1 Motivation for studying Chemistry

An entrepreneurial course should develop a curriculum that is creative and innovative (Crișan et al., 2024). The course aims to enhance students' competencies in entrepreneurial activities, create an entrepreneurial environment through competitions and promotions, and expose students to various entrepreneurship activities. Students in the chemistry stream should cultivate an entrepreneurial mindset to explore the opportunities presented by the technical content. This entrepreneurial behaviour was unconsciously observed by some students who responded to the question:

"Please tell us what has motivated you to study Analytical Chemistry?"

> S1: "*What really motivated me is that my neighbour was a doctor in Chemistry; she was very smart in our community, doing things differently. Also, my interest is to discover my own things like other analytical scientists*."

Students are motivated to study Chemistry due to its contribution to human security through the provision of food, improving our health, and solving social problems (Matlin, Krief, Hopf & Mehta, 2021). The desire to discover demonstrates that Chemistry and innovation always coexist (Jennifer et al., 2022). One student mentioned this:

> *S2: "What motivated me to study Analytical Chemistry is that we deal with Chemistry in our daily lives, the food we eat, the products we use. You have to have solutions in your own way, be creative, and be able to think outside the box."*

This statement reveals that both Chemistry and entrepreneurship education can motivate students to become independent problem solvers and risk-takers in life. Chemistry students can apply their technical knowledge to start businesses while still in university, allowing them to graduate with established enterprises (Dyantyi & Ncanywa, 2022; Jennifer et al., 2022). The students demonstrated the ability to contextualise what they learned in Chemistry class with the real-world products they use daily. This is essential for project conceptualisation, as it involves identifying societal problems that have potential solutions which can be monetised into business ventures. The responses regarding motivation to study Chemistry revealed how chemistry professionals can be adaptable. This observation highlights the importance of versatility, including emotional intelligence, multidisciplinary knowledge, critical thinking, service orientation, and negotiation skills, which align with entrepreneurial education (Wong et al., 2022; Shivoro et al., 2024). Without exposure to entrepreneurship education, chemistry students may struggle to monetise their skills into profitable services and products.

3.2 Creating an entrepreneurial mindset for Chemistry students

One of the functions of universities is to produce students who are economically active. Therefore, the vision of universities must encompass their entrepreneurship development. For instance, the mission statement of the chosen university states: "Through its core business, … responds to societal needs in ethical, scholarly, sustainable, and entrepreneurial ways, and delivers future-ready graduates." This mission statement highlights the university's commitment to transformation, including fostering an entrepreneurial mindset among its graduates. When students were asked how

the Chemistry course assisted them in developing an entrepreneurial mindset, the following responses emerged:

"Does the entrepreneurship course assist you to be creative, maybe thinking about starting your own business using knowledge from the Analytical Chemistry program?"

> *S2: "Basic chemistry skills will assist me to create new processes, introduce new techniques and come up with new ideas through research and lead to the product that will solve the needs of the community".*
>
> *S7: "I am aware of the lab precautions; I cannot spill the products. I have been in the lab for so long, I follow the procedures. Therefore, I cannot come up with unfulfilled products. In the lab, I have done saponification, which is the soap production, and others. I am used to doing those things practically and something you do practically is hardly forgettable. How can it be"?*

These statements confirm that Chemistry students possess a mindset focused on producing market-ready products, such as soaps, purified items, and goods demanded by their communities. As noted in Sigmon (2021), the skills acquired in Chemistry can be combined with entrepreneurship skills to prepare students for commercialisation. To foster an entrepreneurial mindset, it is essential to integrate an entrepreneurship course into the Chemistry programme. This integration equips students with entrepreneurial skills, as it helps develop a creative mindset (Nowinski et al., 2019; Matlin et al., 2021). A university that cultivates an entrepreneurial environment for its students enables them to become proficient and engaged citizens. For instance, when students were asked the following questions:

"During your studies, have you identified any needs in your community where your chemistry skills could assist in job creation? How can you use or apply your chemistry skills in your everyday life?"

> *S1: "Venturing into cosmetics, we can manufacture beauty products and start selling them. We can tutor high school learners in Mathematics and Physical Science".*
>
> *S3: "A lot of people in my community are facing difficulties in treating watts, making a product that minimizes the growth of watts through chemistry skills could create job opportunities as I will need people to assist with the production, packaging and the distribution of the watts treatment product. Water purification can be quite a suitable example of using chemistry in our everyday life mainly because we use water every day".*
>
> *S6: "I can buy detergents and machines that can help me purify the water and sell purified water to the people. I encourage everyone to stop burning plastic, instead teach them recycling".*
>
> *S7: "We can use or apply chemistry skills in our daily life by manufacturing products that are in need and used by the community every day, e.g., Cleaning Material, Food we eat, Lotions, Pharmaceuticals, and also things like toothpaste. Entrepreneurship is the process of creating an opportunity where others don't see it and pursue it regardless of the lack of resources. That needs perseverance and commitment".*
>
> *S9: "Yes, especially in terms of polymer (recycling), use of machinery, inorganic Chemistry in terms of Health. Food, facewash, fuels, cars, phones, laptops, batteries and Pharmaceuticals".*

The responses now demonstrate students' ability to link chemistry with entrepreneurship. The purpose of the course is partially achieved in terms of students not only focusing on technical competence but also exploring other avenues to apply their technical skills during or after their studies. This approach allows students time for trial and error and enables them to share experiences with peers while at university. Embedding entrepreneurship education in non-business courses enhances proficiency by demystifying business concepts through familiar field-specific terminology (Crişan et al., 2024).

3.3 An Entrepreneurship course as a subject of choice for Chemistry students

Offering entrepreneurship education to Chemistry students has many economic benefits, such as excellence in manufacturing products like soap, the production of renewable energy, job creation, and addressing Sustainable Development Goals, among others (Ezechinyere, 2019; Jennifer et al., 2022). These students can be referred to as Chemistry Entrepreneurs as they learn to develop entrepreneurial skills relevant to their studies. For instance, Chemistry Entrepreneurs learn from the entrepreneurship course how to identify opportunities within their field, devise production strategies, and create investment plans. These skills can be applied to various social activities, such as water purification, the food and drink economy (including additives, flavours, and the extraction of natural food components), farming (insecticides, herbicides, and food chains), textiles, and electronics (Miranda et al., 2020; Linton & Xu, 2021). Students studying Chemistry find it beneficial to choose courses that provide them with entrepreneurial skills. Consequently, most students interviewed mentioned the Entrepreneurial Skills course as one they particularly appreciated. The following questions were asked of the participants:

"From the courses you've studied during this semester, which ones are you likely to understand more? Why is that?"

Most respondents confirmed that an entrepreneurship course enhances their problem-solving skills and creates a positive mindset about starting a business. The following are some of the responses:

> S3: "*Indeed, each of these courses can open doors for business and can be used as combined to produce a successful and productive enterprise*".
>
> S4: "*Entrepreneurial skills focus on the concept of being an entrepreneur and because I want to establish my own business in the near future I find pleasure in studying* it".
>
> S5: "*Entrepreneurship skills- because it teaches about business management, of which I want to start my business one day, so I can take care of my own things and not depend on anyone. In the lab, we are manufacturing products, and if I can get the opportunity to start my business one day, everything will go smoothly*".

These students confirm that choosing an entrepreneurship course is more beneficial for their future endeavours. Moreover, the Chemistry programme that infuses entrepreneurship skills can create a positive entrepreneurial mindset. This is in line with the studies of Dyantyi and Ncanywa (2022), which advocate for universities to create an entrepreneurship ecosystem that allows their students to develop an entrepreneurial mindset. This can ultimately lead to an entrepreneurial intention to start businesses and foster economic growth. Students also agree that theories in an entrepreneurship course assist creativity and the intention to use their Chemistry knowledge to start businesses. Two students confirmed that:

> S1: "*Yes, even in daily life, Chemistry helps generate a range of business ideas".*
>
> S4: "*Yes- I can start thinking about my business using the Chemistry knowledge that I already studied by making my own hypothesis if I create or produce products".*

These responses indicate that Chemistry entrepreneurs value the curriculum that enables them to be economically active. Consequently, the theories, principles, and calculations in Chemistry foster creativity and promote a positive entrepreneurial mindset (Ezechinyere, 2019). The Chemistry entrepreneurs further indicated that they possess a mindset geared towards translating their knowledge into products or businesses. When asked the question, "From the course mentioned in (3), have you ever thought of translating your interests into a product or business using that knowledge?" the participants:

> S4: "*Yes- I can be an entrepreneur by producing my products while helping my society and creating jobs by producing cosmetics products, for example".*

S8: "*In the form of polymer, Yes, I do because the metals or elements plastic I can do business with them*".

S9: "*Yes, it is an ongoing thought which would obviously be implemented in the future*".

3.4 Entrepreneurial education for entrepreneurial mindset

The entrepreneurial mindset is a collection of motivations, abilities, and mental processes that set entrepreneurs apart from non-entrepreneurs (Davis et al., 2016). It is a complex, non-binary concept characterised by determination, management of uncertainty, and flexibility (Miranda et al., 2020; Tittel & Terzidis, 2020). Colombelli and others describe the entrepreneurial mindset as the ability of an individual to create value by seizing opportunities while remaining adaptable and resilient in challenging conditions (Colombelli et al., 2022). These diverse definitions indicate that the entrepreneurial mindset cannot be measured in a one-dimensional way, such as simply starting a business or not. The results from this study's responses revealed various attributes and qualities that fall under the entrepreneurial mindset. For instance, the S1 response below mentions a profitable solution for a societal problem regarding the need for extra-curricular services while demonstrating innovative skills in manufacturing beauty products. S8's critical thinking further explored the causes of poor performance in Physical Sciences by offering experimental resources.

S1: "Venturing into cosmetics, we can manufacture beauty products and start selling them. We can tutor high school learners in Mathematics and Physical Science".

S8: "The High school in my community is struggling in terms of conducting Physical Science experiments due to a lack of equipment and resources. With raising funds, I could use my Chemistry skills to help them with the equipment and resources necessary for these experiments".

The question about starting a business illustrates the influence of entrepreneurship education on entrepreneurial mindset.

"Have you ever thought of translating your interests into a product or business using that knowledge?"

This question promotes ideation and opportunism, which are crucial for ensuring that students see the bigger picture of the course content learned in class. Institutions are responsible for creating an entrepreneurial ecosystem that allows students to explore their passions in business. The responses demonstrate the readiness of students.

S4: "Yes- I can be an entrepreneur by producing my products while helping my society and creating jobs by producing cosmetics products, for example."

S8: "In the form of polymer, Yes, I do because the metals or elements plastic I can do business with them."

S9: "Yes, it is an ongoing thought which would obviously be implemented in the future."

The respondents in this study enjoy entrepreneurship education and have identified potential business ventures. However, none of them has started exploring these opportunities, implying that having an entrepreneurial mindset is not sufficient without enabling resources. To delve further into the matter, the following question was posed to better understand the strengths and weaknesses of the existing support systems.

"With your experience in laboratory skills and all relevant instrumentation and analysis, have you ever considered finding something truly unique to sell?"

S2: "Yes, a cleaning detergent, but unfortunately, due to a lot of stress academically and lack of time for research purposes, I could not continue with it."

S5: "Yes, I have thought of it but lack the resources to make it a reality."

> *S7: "Yes. I am currently selling Tupperware, high-quality clothes, weaves, and makeup. The makeup industry is so complex and full of everyone who sells it, but few understand much more deeply about it and the skin and the fabric of clothes, hair products, and weaves. Knowing each product, what it will be composed of, and how it will assist, avoiding too much error and knowing how the product behaves at room temperature."*

The responses highlight the imbalance between the theory and practice of learning in entrepreneurship education, as well as the lack of resources. The learn-by-doing practical approach is ideal but limited by the availability of opportunities and resources. Researchers advocate for universities to adopt a practical participatory approach when teaching and learning entrepreneurship education to actively instil skills in effective communication, teamwork, and leadership in complex situations (Ncanywa & Dyantyi, 2022). Students also prefer active teaching methods, as they allow for the development of problem-solving and creativity skills (Rahman, Fayolle, Dana & Rahman, 2024). All the students identified business opportunities but cited a lack of resources, time to practise theory, and an enabling ecosystem to bring their ideas to life. One solution proposed in the literature is to teach entrepreneurship education through a practical participatory approach, as it creates a "learn by doing" environment (Jennifer et al., 2022; Rankhumise & Letsoalo, 2023; Rodrigues, 2023). In the case of chemistry students, the course is termed science-based entrepreneurship education (SBEE) (Blankesteijn et al., 2021; Linton & Xu, 2021). SBEE acts as a catalyst for chemistry entrepreneurs and academic entrepreneurship, increasing the possibilities of new venture creation from exploiting university research. Several responses in the findings mentioned applying chemistry knowledge to research products to improve their quality. The findings show that the entrepreneurial mindset of chemistry students is positively influenced by entrepreneurial education. The study further revealed the shortcomings of universities in the Eastern Cape, South Africa, in supporting students in exploring their business ideas.

4. Conclusions and Recommendations

This study seeks to explore how entrepreneurship education influences the entrepreneurial mindset of chemistry students at a university in the Eastern Cape, South Africa. As noted in the literature review, an entrepreneurial mindset is not solely a measure of whether one starts a business. It is a combination of attributes, skills, and behaviours acquired after exposure to entrepreneurial education. Hence, this study employed a qualitative approach using open-ended semi-structured questionnaires to evaluate whether the chemistry students can identify business opportunities, see themselves as future entrepreneurs, or recognise the value of studying entrepreneurship education. The primary objective of universities is to prepare students, including chemistry graduates, for employability in a highly competitive global job market. To enhance employability, graduates must possess multidisciplinary knowledge and skills, as well as demonstrate a range of soft skills and attributes. Accordingly, the undergraduate chemistry curriculum must adapt to include cross-disciplinary skills such as entrepreneurship education.

The findings of this study revealed that chemistry students appreciate their exposure to entrepreneurship education, as they recognise the vast business opportunities cultivated through the technical content of their chemistry subjects. All participants agreed that learning about entrepreneurship while being trained in skills for making daily products such as cleaning supplies, beauty products, and food enlightens them about business opportunities in their communities. The results show that the students understand the value of their technical knowledge in addressing societal issues such as health, energy poverty, and access to clean water, particularly when combined with entrepreneurship education. For instance, they suggested leveraging their technical competencies to offer extra lessons in physical sciences and mathematics to high school learners as a business venture. However, concerns were raised about the lack of financial support and access to resources such as the Rapid Incubator or Technology Transfer offices. This study confirms that an

entrepreneurial mindset is influenced by entrepreneurship education, which facilitates the connection between the technical expertise learned in the chemistry curriculum and societal problems, enabling the development of profitable solutions through business ventures. Nonetheless, most students expressed concerns about the absence of financial support and access to resources like the Rapid Incubator or Technology Transfer offices. Consequently, the study recommends that the institution redesign the curriculum to align with chemistry by exposing students to a practical participatory approach or the use of case studies that demonstrate entrepreneurship through various stages of production and business development. Essentially, the institution may adopt a science-based entrepreneurship model that integrates science, technology, and research and development aspects into the curriculum. In doing so, the imbalance between the theory and practice of entrepreneurship education will be minimised. This study recommends updating the curriculum to incorporate case studies illustrating entrepreneurship at different production and business development stages, as well as practical, interactive approaches. Including elements of science, technology, and research and development in the curriculum supports the idea of science-based entrepreneurship. Furthermore, students should be engaged practically by implementing extracurricular activities that enable them to launch legitimate enterprises on campus throughout the course term. This practical experience can narrow the gap between understanding what is taught in class and its real-world application.

5. Declarations

Author Contributions: Conceptualisation (N.D., N.F. & T.N.); Literature review (N.D., N.F. & T.N.); methodology (N.D.); software (N/A.); validation (T.N.); formal analysis (N.D. & N.F.); investigation (N.D., N.F. & T.N.); data curation (N.D. & N.F.) drafting and preparation (N.D., N.F. & T.N.); review and editing (N.D., N.F. & T.N.); supervision (T.N.); project administration (N.D.); funding acquisition (N/A). All authors have read and approved the published version of the article.

Funding: This research did not receive any external funding.

Acknowledgements: Authors declare no acknowledgement.

Conflict of Interest: The authors declare no conflict of interest.

Data availability: In adherence to approved ethics guidelines, the authors cannot publicly share the data due to ethical considerations. Interested parties may formally request access from the corresponding author. All authors have read and approved the published version of the article.

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