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Framework for Undergraduate Entrepreneurship Education in Australia: Preliminary Exploration

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Abstract: This study investigates engagement activities higher education institutions have been providing to develop a learning culture as well as entrepreneurship skills for undergraduate entrepreneurship education learners in Australia. This research is intended to explore changes and adjustments made in the curriculum of undergraduate entrepreneurship education programmes in selected higher education institutions in Australia due to uncertainties caused by COVID-19. We focused on six Australian universities offering undergraduate entrepreneurship programmes, which were purposefully chosen. Data and information were gathered from the universities' websites, documents available from the same source, the universities' structure of engagement activities, and their curriculum. Previous literature was referred to for models already proposed and executed. By considering the COVID-19 crisis as well as similar types of future uncertainties, the study has identified the necessity of implementing open innovation and experiential learning models in a blended environment and having strong IT infrastructure for sustainable industry-university collaboration to facilitate a learning culture and develop entrepreneurship skills in undergraduate entrepreneurship education learners in Australia.

Keywords: entrepreneurship education; experiential learning; blended learning; university-industry collaboration

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1. Introduction

A well-managed university-industry collaboration could provide university students with opportunities to get connected with industry as well as to understand the industry's major goals and research interests (Guan and Zhao 2013). The importance of close engagement between university and industry, including SMEs, through entrepreneurship education has been emphasised for the development of students' entrepreneurship skills (Gordon et al. 2012), boost their business understanding and skills or competencies (Kirby 2003), and demonstrate network competencies, i.e., the ability to develop teams and manage relationships with external stakeholders (Walter et al. 2002).

Collaboration is a continual and integrative process where two or more entities mutually and actively participate in joint activities towards achieving common goals (Bedwell et al. 2012). Current developments in higher education highlight the increasing need for collaboration for both the universities and industry's interests and benefits (Guan and Zhao 2013; Awasthy et al. 2020; Jirapong et al. 2021; Un and Rodríguez 2018), which cannot be achieved by working alone (Jirapong et al. 2021; Un and Rodríguez 2018). Successfully agreed-upon university-industry partnerships could help to set up a long-term commitment as well as result in a win-win situation for both parties, for example, in problem solving, resource sharing, and skills access (Awasthy et al. 2020). In fact, collaboration is considered imperative to overcome the challenges of competitive edge, which is one of the organisational struggles. The benefits of collaborating between universities and companies include industries receiving talented and competent undergraduates, both having access

to knowledge and technology, providing opportunities to both academics and students to learn the necessary skills and knowledge from industries, such as product development, commercialisation, finding financial resources, and providing opportunities to university undergraduates to gain relevant knowledge of delivering cutting-edge discoveries (Tapia et al. 2019). Collaborations may also fulfil the function of promoting people's development between organisations (Reficco et al. 2018).

Entrepreneurial projects could be considered a part of learning to become an entrepreneur (Fayolle and Gailly 2008), as education through enterprises is considered an effective way of "learning by doing", i.e., experiential learning (Gibb 1993). Under this backdrop, this research intends to identify a preliminary best practise framework for undergraduate entrepreneurship education that could provide a sound guideline for higher education institutions to engage and maintain good relationships with industry (including SMEs), with the aim of facilitating a learning culture for students in undergraduate entrepreneurship programmes that will enable them to engage with industry and develop their entrepreneurial skills.

To develop this framework, we first explored the structure of the engagement activities, or practical activities, conducted in selected higher education institutions. We then identified changes and adjustments made in the curriculum as a result of the COVID-19 crisis. Based on the practises observed in the institutions and relevant literature, as well as considering the COVID-19 crisis and similar types of future uncertainties, we offer a preliminary best practise framework for undergraduate entrepreneurship education providers that may serve as a contingency should similar kinds of crises in the future occur.

The study intends to identify the preliminary undergraduate entrepreneurship education framework with a combined model of Open Innovation and Experiential Learning in a technology-based infrastructure for undergraduate entrepreneurship education in Australian Higher Education Institutions. This is the first detailed study, and thus it provides additional knowledge to the existing literature.

2. Literature Review

We first discussed entrepreneurship education in general to provide an overall backdrop to this study, including matters pertaining to curriculum content and structure post-pandemic. We then looked at strategies that have been used for developing a learning culture for undergraduate entrepreneurship education, followed by a brief discussion on the implementation of an engagement framework and resilience development, by way of illustrating possible guiding principles of implementation for higher education entrepreneurship education.

2.1. Entrepreneurship Education

Entrepreneurship education entails the adoption of pedagogical approaches that will help develop learners' entrepreneurial attitudes, skills, and behaviours (Fayolle et al. 2006). Students studying entrepreneurship education should have the opportunity for real-world experience as well as reflection on their actions (Kassean et al. 2015). The growing research on entrepreneurship education (Dhliwayo 2008; Norris 2014) has emphasised the adoption of an experiential learning approach (learning by doing) for developing entrepreneurs, with two broad benefits standing out. First, it helps students develop knowledge through experiencing, thinking, reflecting, and acting (Rasmussen and Sorheim 2006), and secondly, the approach creates the right atmosphere for learning by adding value to students' knowledge, skills, and experiences as well as providing them with the opportunity to facilitate synergistic learning (Scott et al. 2016) through the sharing of ideas. In fact, close attachment with industry affords higher education institutions with prospect of implementing an experiential learning approach (Tapia et al. 2019; Guan and Zhao 2013; Gordon et al. 2012), where students of entrepreneurship programmes could hone their confidence as well as enhance their entrepreneurial ability (Bell and Bell 2016).

Despite its benefits, documented challenges to successful collaboration include cultural differences, conflicting targets (Hemmert et al. 2014), distinct perspectives on managing technology (Roud and Vlasova 2018), a lack of communication, a poor knowledge transfer process (Ranga et al. 2013), and a lack of trust between universities and industry (Huang and Wilkinson 2014; Awasthy et al. 2020). These challenges have negatively impacted university-industry collaboration as well as presented barriers to implementing an experiential learning approach in entrepreneurship education (Awasthy et al. 2020; Hemmert et al. 2014; Roud and Vlasova 2018).

In the recent past, the use of digital platforms has gained traction for learning purposes. During the COVID-19 period of profound uncertainty, trends reveal an abrupt shift to the digital platform by education practitioners as well as adjustments made in curriculum delivery (Maritz et al. 2020; Ratten 2020). In certain contexts, both the students and the teachers were not afforded sufficient time to gradually transition to the digital environment (Ratten 2020). Programmes that embed experiential learning, such as entrepreneurship education, which requires educators to take the approach, were at risk, as the latter faced challenges to implement it in the online environment (He and Harris 2020) and to ensure learner engagement due to a lack of face-to-face interaction (Bartusevičienė et al. 2021).

Overall, the COVID-19 crisis presented a new perspective for entrepreneurship education, making it necessary to update course content to reflect the demands of the new environmental context, albeit keeping to the same goal (Iivari et al. 2020; Ratten and Jones 2021). In fact, the contents of the entrepreneurship education programme include a number of components that could be changed depending on the contextual situation (Ahmed et al. 2020). The growing literature on entrepreneurship education (see Fiet 2000; Etzkowitz et al. 2000; Koch 2003; Béchard and Toulouse 1998) suggests that the content should be adjusted according to the purpose and the target group. One of the important skills that need to be nurtured via entrepreneurship education is entrepreneurship's resilience, which is now all-important due to the impact of COVID-19 (Portuguez Castro and Zermeño 2021; Zutshi et al. 2021; Schepers et al. 2021), leading to a call to educators and training providers to strengthen the course content by including the skill (Portuguez Castro and Zermeño 2021). In addition to resilience, entrepreneurs now need to possess dynamic and technological capabilities as well as agile leadership skills (Aldianto et al. 2021). Dynamic capabilities refer to the rearrangement of a company's competence in an unpredictable environment (Teece et al. 1997), technological capabilities indicate the limit of extending a company's capabilities to manage information technology resources for supporting and improving business strategies and processes (Lu and Ram 2011), and agile leadership is about a leader's ability to be quick, adaptive, and flexible in responding to unforeseen events in an unfamiliar circumstance (Attar and Abdul-Kareem 2020). Due to the continuous diversification of work structure in the COVID-19 context as well as similar types of future uncertainties, students of entrepreneurship education have been forced to acquire the skills of surviving to thrive (Maritz et al. 2020), which in turn has forced entrepreneurship education providers to focus on these in their curriculum and approach.

Adjustments have been seen in course delivery worldwide, including in Australia, where the digital platform has been utilised and experiential learning adopted (Maritz et al. 2020; Ratten 2020). In Australia, the Tertiary Education Quality Agency (TEQSA) expects universities to be accredited with industry or an industry body for this type of education to meet the regulatory requirements (Henderson and Trede 2017). While this move obviously helps bridge the gap between theoretical and practical knowledge, there is a deeper socioeconomic concern in Australia that needs the attention of providers of entrepreneurship education.

COVID-19 has had a substantial economic impact on young Australians in the form of, for example, unemployment and education disruption, which have been considered complex long-term effects (AIHW 2021). In addition, only a very small percentage of start-ups (3.2%) exhibit serious employment growth, although there is a relatively high rate of small business formation in Australia (Hendrickson et al. 2016). The GII (Global Innovation

Index) 2021 data shows Australia's innovation output, which is related to innovative entrepreneurial activity, having been ranked 33rd globally, lower than innovation input, which was ranked 15th worldwide out of 132 economies (WIPO 2021). Innovative input, in this context, refers to institutions, human resources, and related research. The statistics raise concerns since entrepreneurship was a vital engine of economic growth during the COVID-19 crisis (Maritz et al. 2020). Students are becoming interested in starting their own ventures due to the employment crisis caused by COVID-19 impact (Ratten and Jones 2021), leading to a call for more emphasis on entrepreneurship education to make people think creatively (Ahmed et al. 2020). These driving forces have provided motivation for this study to explore how current undergraduate entrepreneurship education practises could provide a sound guideline for higher education institutions to engage and maintain good relationships with industry.

2.2. Strategies for Developing a Learning Culture for Undergraduate Entrepreneurship Education

The world economy has been significantly impacted due to COVID-19, and growing research suggests that entrepreneurship is considered a transition tool from surviving to thriving in an uncertain future (Obschonka et al. 2016; Devece et al. 2016; Bullough and Renko 2013). Based on the literature review as well as general practises observed in Australian higher education institutions, we delved into the following areas to explore the possibility of their relevance to undergraduate entrepreneurship education in Australia.

2.2.1. Experiential Learning Theory

According to the experiential learning theory, effective learning occurs when learners are actively involved in an experience and reflect upon it (Peltier and Scovotti 2010, p. 515). Literature on experiential learning emphasises interaction between entrepreneurs and students, where the former share their real-world experience with the latter (Bliemel 2014). The traditional approach to learning is useful only from the theoretical perspective of entrepreneurship education (Gedeon 2014). The experiential learning approach, on the other hand, affords greater student engagement, as the learners might engage in working with a real business case or involve themselves in a real start-up (Erikson and Gjellan 2003). This learner-centred approach allows the learners to be in charge of constructing their own learning by actively engaging in the learning activities that result in deep learning, learner engagement, and developing their skills (Gibb 2002; Rae 2010; Rushworth 2013).

2.2.2. Experiential Learning Project and Industry-Oriented Research Work

Experiential learning projects provide an opportunity for a collaborative learning environment, helping learners develop valuable business skills such as critical thinking, problem-solving skills (J. J. Ferreira et al. 2017), and interpersonal communication skills, which are increasingly desired in society (Ratten and Jones 2018). Universities are encouraged to initiate problem-based research to create a positive impact on industry as well as encourage university-industry collaboration (Awasthy et al. 2020), which could involve university research students (Australian Industry Group and Australian Council of Graduate Research 2018). In this way, students in entrepreneurship will be able to engage with SMEs to develop their entrepreneurial skills.

2.2.3. Establishing a Trustworthy Relationship between the University and Industry

The primary challenges of university-industry collaboration are a lack of trust and poor operational understanding from both parties (Roud and Vlasova 2018). University and industry representatives should be able to trust each other in order to develop mutual strategies for solving each other's problems, achieving their objectives, sharing information, and creating values for both parties (de Klerk 2012). Trusting refers to travelling with the risks of a journey towards an uncertain future (Nguyen and Liem 2013). To lead effective collaboration from both sides, there is an urgency in identifying and appointing suitable

people, such as key university staff and capable managers from industry, who are expected to have entrepreneurial behaviour to influence effective collaboration (Awasthy et al. 2020).

2.2.4. IT communication Hub and Resolving IP Concerns

Digitalisation has made it easier to access social networks, online entrepreneurship programmes, relevant information, improve one's ability to identify and evaluate worthwhile business opportunities (Smith et al. 2017), obtain finance (Haddad and Hornuf 2018), and discover new innovative business models (Richter et al. 2017). Entrepreneurship education in higher education institutions, which have been significantly affected by COVID-19 due to their provision of practical and immersive training, has now resorted to using artificial intelligence, which allows learners geographical flexibility, online interaction, real-time feedback, online breakout groups, live discussion, as well as online delivery and presentation (Ratten 2020). Despite its benefits, using an IT platform between different parties may result in potential conflicts related to intellectual property rights and values, which ultimately may negatively impact communication between universities and organisations (Hewitt-Dundas et al. 2019). It is thus crucial to identify each party's motivation for the collaboration (Edmondson et al. 2012), establish mutually agreeable and enforceable guidelines on intellectual property concerns, and create a shared policy on conflicts of interest (Awasthy et al. 2020) for successful collaboration.

2.2.5. Open Innovation (OI, Triple, and Quadruple Helix) Model and Developing a Culture of Experiential Learning

Growing research suggests that collaboration between universities and industry can help facilitate a culture of student engagement with the latter (Henderson and Trede 2017; Awasthy et al. 2020). The OI model has been attracting increasing attention since the concept was first presented by Chesbrough in 2003 (Chesbrough 2003). The greater openness to external sources of knowledge contributes to innovative output in an organisation (Chesbrough 2003; Tani et al. 2018). This openness encourages the flow of ideas, knowledge, and information between businesses (Yun JinHyo. et al. 2020), with the model outlining the opportunity for learning by doing (Chesbrough 2003). The experiential learning approach places emphasis on making sense of the learner's experiences in the activities in which they actively engage (Peltier and Scovotti 2010, p. 515). The OI model creates the opportunity for a collaborative work environment where the different stakeholders, such as learners, lecturers, and industry players, can share their views and work collaboratively, which ultimately motivates the learners to work towards and achieve their professional outcomes (Chesbrough 2003; Iglesias-Sánchez et al. 2015). In fact, all types of innovative ideas may not be available in the closed innovation paradigm of a firm, and some ideas could lie outside the walls of the firm (Chesbrough 2003). Here, this innovation ecosystem allows companies to create value that cannot be created by a single company alone (Su et al. 2018). The entrepreneurship education courses are expected to design activities that make the learners feel personally engaged with the industry. For example, in the case of a Spanish university, collaborative opportunities between the university and industry provide the learners with opportunities to experience practical activities such as solving a real case, conducting team activities, and performing role plays. In fact, those activities are considered effective ways to teach entrepreneurship (Iglesias-Sánchez et al. 2019). Thus, the OI model provides an opportunity for developing a creative foundation for undergraduate entrepreneurship education.

This review has identified various activities between universities and industry worldwide, including in Australia, that could help to develop a collaborative culture between both parties as well as a learning culture for the learners by implementing the OI model and experiential learning approach. For this instance, a relevant example would be Iran, where a university develops a knowledge-based company. Through the emerging company, universities motivate their academic stakeholders to get engaged with the SMEs/industry as well as to support them (Moradi and Noori 2020). Another activity concerns the academic

business incubator, which could be considered an innovative knowledge network. An academic business incubator in Poland is a relevant example where it has been performing as an "innovative network" (Richert-Kaźmierska 2010, p. 12). This academic entrepreneurship creates a start-up and develops a system where the universities are required to cooperate with the business community for the long term. Overall, the academic entrepreneurship system includes institutions, organisations, and relevant entities and activities such as technology parks, technology transfer, etc. that can be applied to support research and education for students to obtain practical skills (Siemieniuk 2016). The qualitative data collected from the selected universities also shows the institution's intention to implement the OI model and experiential learning approach in their undergraduate entrepreneurship courses through collaborative work with industry. Details of this will be discussed in the data analysis section.

OI has advanced to the macro level of a more open approach, such as described by the Triple Helix model, which showcases collaborative engagement between universities, industry, and government (De Las Heras-Rosas and Herrera 2021). The Triple Helix model is rooted in Open Innovation. There is a considerable theoretical overlap in the literature between the Triple Helix model and open innovation (Kerry and Danson 2016). The three players—industry, university, and government—work together in partnership to implement policies as well as resolve social problems (N. Ferreira 1999). The state provides the support mechanism for the desired university-industry collaboration and acts as a hierarchy-structured component by holding the monopoly power to enforce new laws or decisions (Ortiz 2013). For instance, in Australia, the Tertiary Education Quality and Standards Agency (TEQSA) acts as an independent national quality assurance and regulatory agency for higher education institutions. The Tertiary Education Quality and Standards Agency Act 2011 was established to enforce the quality standards of higher education institutions in Australia through TEQSA's quality assurance approach as well as to protect students' interests (TEQSA Act 2012).

In recent years, there has been a growing number of studies that have developed applications of the Quadruple Helix model in different contexts (Galvao et al. 2019), incorporating civil society into the model in various forms of collaboration such as sustainable green resources, eco-innovation, or smart cities (Galvao et al. 2019). In this case, the Triple Helix paradigm is extended by assuming that society also acts as a key actor with academia, industry, and government in innovation processes (Carayannis and Grigoroudis 2016). In fact, the transfer of knowledge and technology from the university to the outside is a critical factor for economic (Etzkowitz and Leydesdorff 2000) and social (Lewis et al. 2016) development. The Quadruple Helix innovation theory postulates that the economic development of a country depends on four pillars: universities, industry, the government, and public/civil society (Parveen et al. 2015). Thus, the model provides opportunities for interaction among these four players, contributing to external development as well as providing the benefits of incorporating new information into an institution's teaching, research, and dissemination processes (Natário et al. 2017). The collaborative work of multiple stakeholders is expected now to manage complex problems caused by COVID-19 (Bailey and Breslin 2020), underscoring the wisdom of keeping collaborative actions by academia, companies, the public sector, and civil society (Oana Bărbulescu et al. 2021).

2.3. Implementation of the Undergraduate Entrepreneurship Education Framework and Resilience Development

The significant impact of COVID-19 on the global economy has re-emphasised the importance of business resilience in that it has now become a vital element in the business economy (Aldianto et al. 2021). Originating from the Latin word 'resiliens' to refer to the pliant or elastic quality of a substance (Greene et al. 2002; Ledesma 2014), resilience in the context of entrepreneurship refers to entrepreneurs' preparedness or persistence compared to other non-resilient entrepreneurs (Korber and McNaughton 2018). This preparedness or persistence is a capability that can be developed (Werner 2004), which can be performed

through a collaborative learning approach in interactive spaces as well as optimising individual learners' learning outcomes (Lengnick-Hall et al. 2011). Mainly considered a result of an interactive process between individuals and their environment (Mason 2020), including having to adjust to new contextual conditions, resilience can be developed by getting access to an abundance of resources, such as human, social, and emotional capital (Zehir and Narcıkara 2016). An individual must exhibit positive growth after a stressful event to demonstrate resilience (Britt et al. 2016). It is this learning experience that the student is expected to gain from the experiential learning approach (Jardim 2021; Mason 2020).

Bandaranaike et al. (2020) presented a case study of a Mexican university where an entrepreneurial mindset reflection model has been used to guide its response towards the COVID-19 pandemic and similar future uncertainties in regard to the university's entrepreneurship education. The entrepreneurial mindset refers to the way of thinking that offsets challenges and encourages individuals to reflect upon their mistakes and continuously improve their skill sets to turn ideas into action competently and confidently (de Villiers Scheepers et al. 2018). The curriculum centres on basic business set-up knowledge, experiential project-based learning, business ideation and business plan development, as well as business pitching (Bandaranaike et al. 2020). With the introduction of a new teaching-learning approach where experienced entrepreneurs teach and mentor students via the online platform, the model considers the functioning of mindset through an experiential method of learning in a non-physical workplace using an online modality outside a physical workplace where the students get the opportunity to engage with professional entrepreneurs (Bandaranaike et al. 2020). Thus, the loss of physical contact has been managed as well, while this approach maximises contact with workplace mentors. In addition, components such as business ideation and pitching help develop resilience, giving it relevance and credence in an undergraduate entrepreneurship education framework.

3. Research Methodology

The study pivots around the question of what preliminary best practice undergraduate entrepreneurship education framework has been adopted by undergraduate entrepreneurship education providers considering the COVID crisis and similar types of future uncertainties. Based on the practises observed in higher education institutions in undergraduate entrepreneurship programmes in Australia, the study intends to propose a framework with the aim of facilitating a learning culture for students in undergraduate entrepreneurship programmes that enables them to engage with industry and develop their entrepreneurial skills. To answer this question, we adopted a qualitative research methodology.

Overall, Australian universities offer 584 subjects related to entrepreneurship. The focus seems to be at the undergraduate level, with 24 minors or majors and a specialisation in areas of entrepreneurship (Maritz et al. 2015). Historically, the first prominent entrepreneurship programme was offered by Swinburne University of Technology in 1989 (Maritz et al. 2019; Nabi et al. 2017). Although the growth of Australian entrepreneurship education has seen a moderate boom, trends reveal a marginal decline in programmes offered by the country's higher education institutions (Maritz et al. 2019; Maritz et al. 2021). Against this backdrop, using purposive sampling, we selected six Australian higher education institutions to identify the framework used for their undergraduate entrepreneurship education, referred to in this paper as University 01, University 02, University 03, University 04, University 05, and University 06. The criteria set for the sampling were that the universities have business faculties and offer undergraduate entrepreneurship programmes. In the sample universities, leading old (established) universities with multiple campuses have been chosen. Furthermore, the comparatively new universities were chosen based on their capabilities to offer flexible blended learning opportunities with modern online infrastructure. Information identified on the websites of the sample universities reveals that they provide learners with the opportunity of flexible blended study as well as the opportunity to develop their technological skills through the utilisation of

technology-based online platforms, a tool that could help them survive in the current and future uncertainties. Recent studies have emphasised the importance of digital literacy in individuals, particularly entrepreneurs, to improve entrepreneurial performance in the digital era (Firmansyah et al. 2023). Additionally, the selection of the sample universities, both old and new, has considered that the universities must be those that have grown, are reputable, and have established networks with internationally reputable companies for their learners' engagement and/or placement (paid or otherwise) during the study period, for the purpose of the latter's entrepreneurship skills development. Overall, the choice of the sample universities was based on their exposure or reputation as well as key capabilities, including IT infrastructure, placement facilities, and mentorship support by industry experts.

Relevant information for the study was collected from content directly available on the universities' web sites, including documents such as course handouts and videos of course leaders. We also checked the universities' structure of engagement activities and their curriculum to identify if the skills focused included those that will help sustain students in crisis situations, such as COVID-19 and other similar types of future uncertainties. The criteria for document selection at the sample universities were based on the expected information that is required to design an undergraduate entrepreneurship programme. Particularly, contents that include detailed explanations regarding the curriculum and engagement structure were collected from the websites and analysed. In addition to this process, the study also conducted a survey with academics from the universities to collect additional information as well as verify the information collected from the web sites. The literature reviewed also adds further understanding of the activities and what universities generally do. Inductive content analysis was adopted, where the data underwent three main phases of preparation, organisation, and reporting (Elo and Kynas 2008).

In the preparation phase of data analysis, the units of analysis were decided. In order to make sense of the collected data, the data were divided into three categories: Entrepreneurship Curriculum (Code-01), Engagement Structure (Code-02), and Programme Information (Code-03). The data were reviewed multiple times to ensure accurate placement in the three categories. Similar sub-categories were put in the same categories. Due to the lack of all the required information (as mentioned before) and to ensure the validity of the universities' website data, we ran a qualitative survey that was sent to academics who were sourced from a research portal. The survey also aimed to obtain the respondents' views on the proposed framework. The study received feedback from a total of 17 academics.

The qualitative survey questions required the respondents' comments on the following areas:

- undergraduate entrepreneurship education curriculum, which includes the development of learners' relevant skills;
- engagement structure that could develop a culture of learner engagement with SMEs or industry;
- IT-based infrastructure where different stakeholders (university learners and industry stakeholders) collaboratively work and share ideas;
- resolving intellectual conflict between universities and industry partners;
- how lessons learned from the COVID-19 crisis could be utilised as a contingency for future curriculum towards an entrepreneurship education framework; and
- the offer of the blended learning mode for undergraduate entrepreneurship education in order to sustain and manage future uncertainties.

University 01 is located in Australia and offers undergraduate and postgraduate programmes as well as research degrees via its different locations. University 01's Bachelor of Entrepreneurship (Honours) is offered by its Business Department.

University 02 has campuses located across Australia and other countries. In addition to the conventional mode, the university also runs its programmes online. University 02 offers undergraduate and postgraduate qualifications in a range of areas, including design,

creative technology, and business. The Bachelor of Entrepreneurship programme at this university is offered under the Business Faculty.

University 03 delivers its programmes through its multiple locations in Australia. It offers a range of programmes at the undergraduate, postgraduate, and research levels. The university's Bachelor of Entrepreneurship is offered by its Business Faculty.

University 04 is located in Australia and offers a range of disciplines, including law, education, architecture, information technology, engineering, and business. The sample university works with different companies worldwide to provide students with invaluable networking and work opportunities such as placements, internships, and real-world projects. The university offers a Bachelor of Business (Innovation and Entrepreneurship) programme.

University 05 offers a 4-year Bachelor of Innovation and Entrepreneurship programme. The sample University 05 is one of the oldest universities in Australia. It is a multi-campus institution and offers the programme in different locations.

Sample University 06 is a multi-campus university in Australia that offers a range of qualifications, including accounting and finance, architecture, law, and business. The university offers a 3-year Bachelor of Innovation and Entrepreneurship qualification under the business faculty.

4. Data Analysis

Based on the data gathered from the resources mentioned above, the universities' curriculum, engagement structure, and relevant information pertaining to the programmes investigated are now described and discussed.

4.1. Entrepreneurship Curricula

University 01 offers a one-year full-time Bachelor of Entrepreneurship (Honours) programme. The curriculum does not appear to have been changed or updated due to COVID-19. The university's start-up programme provides students with opportunities to build their entrepreneurial skills, including the skills to sustain themselves in uncertain situations like COVID-19, by organising different entrepreneurial events. Students have the opportunity to hear the success stories of the university's start-up founders and discover business start-up ideas based on design thinking through the digital experience. The start-up centres run workshops and talks featuring technology-enabled entrepreneurs and their success stories. Support for students includes collaboration spaces, opportunities to connect with experienced mentors, and start-up awards.

University 02 offers the Bachelor of Business (Entrepreneurship), where a full-time study runs for three years. The programme runs in a combination of modes: online, face-to-face, and blended sessions. Self-study and industry placement are included in the curriculum. The programme comprises 24 subjects, of which 16 are compulsory core subjects, including 300 h of industry placement, and 8 are elective subjects. It is designed with a mix of both theory and practise elements. The curriculum is designed such that it allows students to explore the principles and dynamics of entrepreneurship, gain knowledge on the principles of business, leadership, marketing, and finance, and raise funds for future ventures. The course structure does not reveal any updated content to build students' resilience skills to face uncertain situations. However, it does include industry placement, where students have the opportunity to join a team and solve diverse entrepreneurial challenges. In addition, a unit in the study programme called "industry consulting project" requires students to obtain industry-related experience by applying their learning to practical work situations. By getting engaged with industry clients through their live briefings, students would be able to explore how to achieve business outcomes from an undefined business challenge.

University 03 offers a three-year, full-time Bachelor of Entrepreneurship qualification designed to be taken in conjunction with any bachelor's degree offered by the university rather than as a stand-alone programme. Combining both theory-based contents and

practical projects, it is developed to help students form a team, pitch their ideas to potential investors, and ultimately develop strategies to obtain funds. The programme is designed for students to gain knowledge and skills in product development, ethics, operations, financing, funding, start-ups, growth, and exit strategy. There is an explicit statement in the curriculum that it is designed to develop the learner's resilience to sustain themselves when facing real-world challenges. In fact, the curriculum places emphasis on the learner's understanding and development of their resilience, risk tolerance, creativity, and the right mindset, as well as their ability to think big and lead their teams towards success. The curriculum appears to have been adjusted to address the COVID-19 context, affording students the opportunity to explore topics on risk tolerance and resilience.

University 04 Bachelor of Business (Innovation and Entrepreneurship) is offered for a duration of three years full time. Students will study creativity and innovation, computer modelling for project design, entrepreneurship for social impact, enterprise design, and value creation. They will get an opportunity to learn how to set up and market a successful business venture with knowledge of economics, marketing, and entrepreneurship. The programme is designed with a mix of online and campus study, and students gain practical skills through an industry internship and mentoring programme.

The qualification for University 05 has been updated at the beginning of 2023 by including work-integrated units. Students are required to study, among others, finance, microeconomics, law, business decision making, entrepreneurship and innovation, business venturing and managing innovation, ideation in enterprise, advanced innovation management, business development and growth, innovation, and entrepreneurial strategy, as well as other units as work-integrated units, including industry placement and international work placement in business. Although a specific topic on resilience is not evident, the social entrepreneurship unit includes the study of different practises, actions, and situations as exemplifications of the maintenance of sustainable social benefits, in addition to the industry placement component, which clearly throws the learner into situations requiring the practise of resilience. The programme's leadership and ethics unit will help the learners learn to manage complex business problems ethically in challenging situations. The course is run face-to-face via online activities incorporating guided online activities such as self-directed learning, interactive workshops, tutorials, group discussion, and the like.

The Bachelor of Innovation and Entrepreneurship programme at University 06 offers subjects on finance, marketing, and managing new ventures. The student learns business modelling and works with experienced mentors. The student has the opportunity to study, amongst others, subjects related to the management of opportunity assessment, entrepreneurship foundation and mindset, design thinking, decision making, business incubator immersion, innovation and creativity, start-up methodologies, entrepreneurial leadership, and entrepreneurship research. In relation to change and uncertainties, the unit on opportunity assessment provides the learner with the avenue to assess risks and the utilisation of new technologies to benefit a particular venture, looking at changes in the external environment with the aim of aligning the venture's direction and providing it with continuous improvement. The learning objectives clearly indicate that the unit helps learners develop resilience skills. The university has an online learning platform (MyUni), which is used to support traditional face-to-face learning. There is a clear indication that the unit is delivered in a blended mode. Learners are required to conduct a range of assessment tasks, such as a reflective journal, role play, presentation, essay on creative practise, case study, business proposal, quiz, and research proposal. The unit "Tech E-challenge" focuses on technological innovation. The unit "Digital Technology Entrepreneurship" provides the opportunity for the learner to learn about online business and emerging software, while other units such as "Social Enterprise", "Corporate Entrepreneurship in Organisations", and "Entrepreneurship Research Project" assist in developing learners' practical skills.

4.2. Engagement Structure

Entrepreneurship and industry engagement were found to be present in all the programme structures of the universities sampled. However, they take on different forms across the universities, with differences in the types and levels of engagement.

University 01 students get to interact with entrepreneurs through various activities embedded with the learning units in the programme. For example, in the unit "Start-up Bootcamp", they are exposed to the challenges faced by entrepreneurs; in start-up weekends, 'hackathons', and bootcamps, they are able to connect with founders of highly innovative ventures. In the unit "Navigating Entrepreneurial Ecosystems", the students interact with diverse stakeholders. Additionally, the students get the opportunity to work with academics and professionals across a wide range of disciplines while studying the unit "Innovation Funding Platforms". The unit-led engagement slots provide the space and platform for the students to operate in a collaborative, immersive, experiential, studio-based environment.

University 02 partners with some of the most prestigious enterprises in Australia as well as around the world to provide work experiences to students. Students need to fulfil a minimum of 300 h of industry placement during the second year of the programme. The placement enables students to face real industry challenges, as well as solve genuine industry problems. Academics and industry partners help the students gain new perspectives and reach a wide business network. Additionally, students are required to complete industry projects as a part of practical-oriented assessment activities, which necessitates their engagement with industry clients and helps them develop skills to face diverse entrepreneurial challenges.

The Bachelor of Entrepreneurship offered at University 03 provides students with an opportunity to gain access to real-world placement through incubators, technology parks, and innovation centres. Students are expected to work at and get engaged with the "start-up co-working space" on a regular basis as an integral part of the learning units Incubator-1, Incubator-2, Incubator-3, and Incubator-4. In the unit Incubator-7, students get the opportunity to conduct market research and develop strategies for managing risks, business growth, and possible exit strategies. The programme also provides students with the opportunity to complete practical projects that help them convert their innovative ideas into a business product or service, thus sharpening their skills in developing ideas and starting a start-up.

The engagement strategy in the Bachelor of Business (Innovation and Entrepreneurship) programme at University 04 is evident in the inclusion of a start-up elective. It offers a start-up incubator, innovation, and collaboration centre. Here, the students get access to experiential elective and participative business simulation projects, internships, and student exchange or mentorship opportunities. The business career mentoring programme with a mentor company allows students to understand current reality and uncertainty as well as build skills to sustain themselves in current and future uncertainties. In addition, the programme allows students to meet with senior executives, receive expert advice, and gain knowledge of workplace insights. The programme has been developed in partnership with a range of industries so that students can gain access to those industries.

In University 05, students have the opportunity for industry placement, where they will experience supervised work placement with a host organisation. The students will also be given access to an international work-integrated placement.

In University 06, students are involved in an internship that provides them with real-world exposure, multiple networking opportunities, and real professional training. In the unit "Entrepreneurial Foundations and Mindset", they are afforded the opportunity to participate in an online community and write a reflective journal based on the experience. The assessment task also requires students to engage with others through an online portal in order to complete the tasks.

4.3. Programme Information on Websites

The visibility of programme information on the websites is important. They are the first line of enquiry, so to speak, when students search for suitable programmes to enroll in. When students browse the internet for university choices, they do so judiciously, "looking for details and key information that would serve their purposes against the backdrop of their own preferences, characteristics, and background" (Haroon 2022, p. 4). In light of the pandemic, we wanted to explore the inclusion of COVID-19-related information linked to the programme being offered by the university, as this will suggest the sensitivity of the programme providers to the issue and its relevance to the study of entrepreneurship.

In the case of University 01, it is stated on the website that detailed information about the units can be obtained after enrolling. Thus, while some information on the units is displayed, it is limited in nature. Nonetheless, the website does inform visitors of some extent of exposure to industry mentors, although clarity is required with regard to detailed interaction or collaboration activities to be implemented.

Plenty of key information is available on the website of University 02, particularly on the structure of the programme. An overview of the units to be taken is provided, including industry placement, core units, elective units, and the like. However, the website does not include the detailed session contents as well as full information about the assessment tasks and the relevant activities for every unit. It is mentioned that more detailed information could be obtained from unit outlines as well as discussions with academic staff.

The website for the undergraduate entrepreneurship programme of University 03 contains information updated with COVID-19 context to achieve the objectives of developing resilience, risk tolerance, creativity, and the right mindset in students. The student will be exposed to new and emerging entrepreneurship issues, and the course provides access to real-world placement through innovation centres, technology parks, and incubators. Although the website provides relevant information regarding the course, it does not provide detailed information regarding assessment activities that could be found in the unit outlines.

The website of University 04 does not show any updates to the course content as related to the COVID-19 context. However, the industry attachment opportunity, which emphasises the importance of developing resilience skills in order to survive in the face of real-world uncertainties, is mentioned on the website. Information is also available on the types of assessments. However, there is no mention of the nature and requirements of the assessment, i.e., if they would require student engagement with industry, if there are industry-oriented projects, and so on.

The University 05's website presents sufficient information in an organised way. Nonetheless, more information is required to contribute to the intended framework, as supplied by the qualitative survey of scholars we conducted. The latter also validated the data we obtained from the websites.

Although not all the expected information regarding its undergraduate entrepreneurship education is available on the University 06's website, it is sufficiently presented in an organised manner, making it easy to understand. Future students are able to make informed decisions based on the website's information.

5. Findings and Discussion

This section presents findings of this study and detailed discussion on the findings. Table 1 presents a summary of data collected for this study.

5.1. The Summary of the Collected Data Is Presented in the Table 1 below:

The feedback received from the respondents was classified and coded together with the previous set of data. The responses received from the academics were checked against the information retrieved from the universities' websites. Moreover, they helped to piece together a complete scenario of the preliminary Undergraduate Entrepreneurship Education Framework, as shown in Figure 1.

Table 1. Summary of data collected.

	University 01—Bachelor of Entrepreneurship (Honours)	University 02—Bachelor of Business (Entrepreneurship)	University 03—Bachelor of Entrepreneurship	University 04—Bachelor of Business (Innovation and Entrepreneurship)	University 05—Bachelor of Innovation and Entrepreneurship	University 06—Bachelor of Innovation and Entrepreneurship
Entrepreneurship curriculum	Duration: one year. The curriculum does appear to include an updated topic on resilience due to the COVID-19 crisis. Mode of delivery is not visible on the website.	Duration: three years. The curriculum does not reveal any updates on resilience due to the COVID crisis. Blended delivery.	Duration: three years. Not a stand-alone programme, but to be taken in conjunction with any bachelor's degree offered. The curriculum appears to have been updated to include resilience and risk tolerance.	Duration: three years. There is no indication of the curriculum update due to the COVID crisis. Blended delivery: online and campus study.	Duration: four years Clear statement that the student will be able to develop skills to maintain sustainable social benefits in different situations. Blended delivery: face-to-face and online.	Duration: three years The learning objectives clearly indicate that the learner will get the opportunity to develop resilience skills through the course. Blended learning option is available.
Engagement Structure	Start-up bootcamp. Hackathons. Collaborative, experiential, and studio-based engagement slots.	Industry placement. Industry projects.	Real-world placement through incubators, technology parks, and innovation centres. Learners work in start-up co-working spaces on a regular basis.	Start-up incubator. Innovation and collaboration centre. Students get access to a business simulation project, an internship, and a mentorship opportunity.	Supervised work placement with the host organisation/industry. Access to international work-integrated placement.	Engagement through an online platform with the online community. Internship provides real world exposure, multiple networking opportunities, and real professional training.
Programme information on websites	Limited information is visible regarding the engagement structure and the indication of getting detailed information after enrolment.	Plenty of information is available regarding the engagement structure of the programme.	Access to real world placement through innovation centres, technology parks, and incubators.	Industry attachment Opportunities.	Website presents comparatively sufficient information in an organised way.	Website presents organised and sufficient information.
Similarities among the undergraduate entreprenuerial qualifications and the providers	Curriculum: Overall, the majority of the universities have given an indication of course curriculum updates. Technological infrastructure to deliver blended learning: • Although all the sample universities have not mentioned details about the delivery mode on their websites, available information indicates the universities having the infrastructural capacity to deliver blended learning. • Most of the universities clearly state that they possess the current technology to offer blended learning.					
Disimilarities among the undergraduate entreprenuerial qualifications and the providers	Engagement duration and structure: • The undergraduate entrepreneurship education programmes offered across the six universities follow different types of engagement strategies. • The course durations for the programmes vary across the sampled universities. Visibility of information on the web sites: • Most of the information on the websites of the sample universities is fairly well organised, except for a few of them.					

All the universities have a strong IT platform to develop online engagement facilities. University 02 mentioned that the course is delivered using a blended model. University 02 is a relatively new university, and the course handouts reveal its technological strength and strong online IT infrastructure. The university has commented on its website about its capacity to offer flexible learning in a blended environment. The relevant literature suggests

that a provider's technological strength is one of the important factors in its ability to offer blended learning (Brew et al. 2020). University 06 also clearly indicates that its online IT portal provides opportunities for learners to interact with others, to get experience by sharing ideas and working collaboratively, and thus help them in their skill development. Learners are also given to avenue to familiarise themselves with the use of technology, particularly software, and to develop their skills to survive future challenges. Students are required to reflect on their experiences through the use of reflective journals. This practise aligns with literature positing that the IT portal integrates university-industry collaboration (Bandaranaike et al. 2020) and that both parties experience benefits, i.e., university learners interact and learn from their industry partners while the latter obtain support from the university resources and experts with the relevant knowledge and skills (Awasthy et al. 2020).

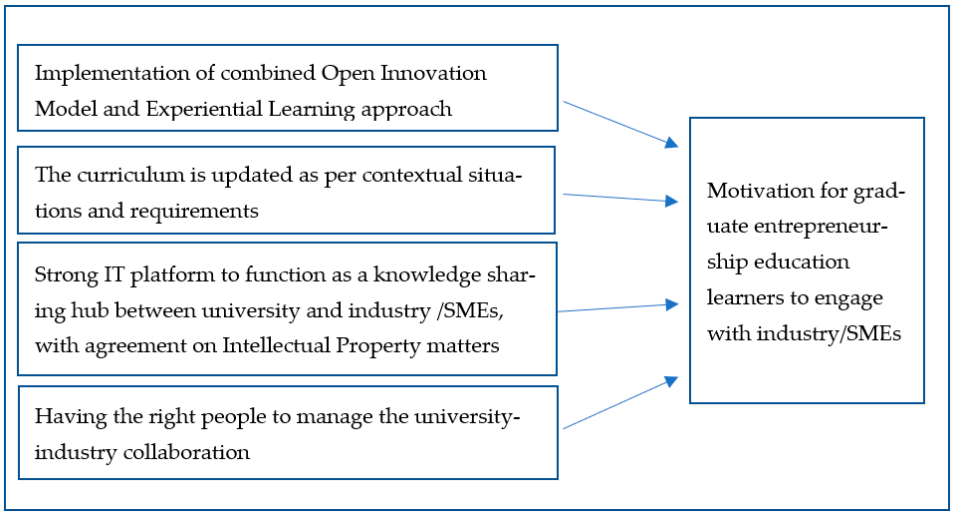

Figure 1. Preliminary Undergraduate Entrepreneurship Education Framework in Australia.

In fact, the course handbooks of all the universities place emphasis on learners getting used to the online environment as well as learning new technologies. The relevant literature also emphasises developing portals and delivering blended learning as contingency preparation for higher education institutes to survive in future disaster situations (Dabbous and Boustani 2023).

Preliminary Best Practise Engagement and Collaboration Strategy Observed

The data shows that universities require strong collaboration with industry. Importance has been placed on setting up relationships with industry so that students in the undergraduate entrepreneurship programmes could practically get engaged with industry and understand the current industry practises as well as develop their skills. This finding seems to be in keeping with many current practises and echoes the emphasis on effective collaboration between universities and industry so that industry-related education could be implemented (Ramadani et al. 2018).

The programmes offered across the selected universities have been designed to include relevant theory-oriented contents as well as practical activities via industry engagement, industry projects, and industry mentorships. The universities have organised real-world interaction or placement through incubators, technology parks, innovative centres, and start-up co-working spaces. In fact, they have adopted the open innovation model, implementing an experiential learning strategy. The OI model has been introduced in the educational setting to motivate students towards achieving professional outcomes through collaborative engagement between students, graduates, lecturers, and industry. The model identifies the stakeholders as a source of knowledge, a resource for innovation, and a competitive advantage (Iglesias-Sánchez et al. 2015). In terms of work culture, OI devel-

ops a culture of positive dynamics where individuals get self-empowered and allows the stakeholders (mainly students, entrepreneurs, lecturers, and decision-makers in universities) to generate confidence as well as build a modern and engaging higher education institution (Iglesias-Sánchez et al. 2019). Thus, the OI model could help higher education institutions develop the opportunity to implement the experiential learning approach for students to engage with industry as well as provide guidelines for developing a sustainable university-university collaboration.

In terms of course content updates, only University 01′s curriculum has been updated based on COVID-19 context to achieve the objectives of developing resilience, risk tolerance, creativity, and the right mindset in the students. It is not clear if other universities have performed so, as no indication is available to conclude this on their websites. However, the providers appear to have been giving the students access to real-world companies, hence providing the students with opportunities to engage with the industry for building entrepreneurship and relevant skills to help them sustain in the face of current and future uncertainties.

5.2. Blended Learning as a Contingency for Future Uncertainties

It has been observed that the majority of the sample universities have been following the blended learning strategy. The entrepreneurship education learning strategies, albeit via the blended mode, require the inclusion of active learning strategies in augmented reality in order to satisfy the experiential learning requirements (Anggadwita et al. 2017). We assumed that, based on this emphasis, the universities would have a strong IT infrastructure to facilitate an online platform and delivery. This is in line with relevant literature, which recommends that providers set up a platform where learners can connect, discuss, and share ideas and achievements with relevant people (Awasthy et al. 2020). It could also be considered a strategy to mutually share and work together as well as network with people (Bacq et al. 2020). Thus, the learners of undergraduate entrepreneurship education can have an opportunity to get engaged with the SMEs and develop entrepreneurial skills, even in situations where face-to-face engagement is not possible.

Technology, thus, has to play a key role in developing a digital learning environment (Ratten and Jones 2021). In light of future uncertainties, it needs to be used in an efficient way for managing change as well as building resilience in education (Liu et al. 2017). While it might not be possible to fully replace physical contact because of the importance of non-verbal communication, technology has many benefits (Ratten and Jones 2021). A technology-based teaching method in the form of a simulation game could be incorporated into the teaching for the purpose of developing an authentic learning environment (Ramadani et al. 2018) as well as to cater for future uncertainties with the aim of building a sustainable strategy for future battles (Mason 2020).

6. Conclusions

This paper has focused on looking at a preliminary undergraduate entrepreneurship education framework to aid Australian universities in engaging with industry, considering the recent COVID-19 crisis, as well as preparing for similar types of future uncertainties that could impact the provision of entrepreneurship education in Australia. Qualitative data has been collected from the selected university websites. The combined model of Open Innovation and Experiential Learning, as well as the other elements mentioned in the study, have contributed to the proposed preliminary best practise undergraduate entrepreneurship education framework for developing the right culture for undergraduate entrepreneurship education students in Australia. This framework could be used as a preliminary best practise guideline for undergraduate entrepreneurship education providers to collaborate with industry and facilitate the right learning environment for students in entrepreneurship education. One limitation of the study is that the data has not been derived from a longitudinal study, which may yield a different outcome, thus providing room for further study on the topic. In addition, limited information on the university

websites has also somewhat restricted our conclusion. In the future, other methods of obtaining data and information need to be considered, such as interviewing academic leaders, students, and other relevant personnel who would be able to provide the research team with more insightful and in-depth information. Nonetheless, we contend that our proposed preliminary undergraduate entrepreneurship education framework can provide a baseline for follow-up studies in the future.

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