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# Covid-19 and entrepreneurship education: Implications for advancing research and practice

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## ABSTRACT

This article aims at critically examining the linkage between entrepreneurship education and COVID-19 in order to help understand future research and practice paths. Due to the large global impact COVID-19 has had on society, new entrepreneurial education management practices are required to deal with the change. To do this, this article discusses why COVID-19 can be a transformational opportunity for entrepreneurship education research due to the new thought processes raised by the pandemic. The article suggests several assumptions that have changed as a result of COVID-19 and how entrepreneurship education is required in order to help solve the pandemic. By doing this, the article suggests that more entrepreneurship education research embedding a COVID-19 context is required to breakthrough new frontiers and reset the research agenda. By taking an entrepreneurial stakeholder perspective that looks at entrepreneurship education as a holistic process, an enhanced analysis of how response mechanisms including recovery and change are conducted can be made. This enables a way to view the COVID-19 crisis as an opportunity for more attention placed on the importance of entrepreneurship education for society.

## 1. Introduction

COVID-19 is posing a significant challenge to management education especially for international students and courses that have an experiential nature (Brammer & Clark, 2020; Marshall & Wolanskyj-Spinner, 2020). Restrictions on mass gatherings and social distancing requirements have limited in class teaching, which has resulted in a massive quick shift to online teaching methods as a result of the COVID-19 pandemic (Ratten, 2020). This has meant an increase in courses taught through digital communication methods (Krishnamurthy, 2020). Border closures and cuts to international travel have further restricted international student mobility and business activities (Donthu & Gustafsson, 2020). To respond to these changes there has been a rapid uptake in remote and digital learning entrepreneurship education methods (Bacq, Geoghegan, Josefy, Stevenson, & Williams, 2020).

Entrepreneurship education is considered as an important way to influence the competitiveness of any country or industry, so it provides opportunities in the COVID-19 pandemic to progress to a more competitive educational environment (Liguori & Winkler, 2020). Whilst there are many debates about whether entrepreneurship can be taught, the general consensus is that any form of education regardless of an individual's personality can have beneficial outcomes (Glaveli, 2008). This means that the design and structure of an entrepreneurship course can be moulded to suit an individual's learning preference (Suseno & Ratten, 2007). These

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preferences are embedded in more tailored courses that incorporate cultural dimensions to entrepreneurship education. The goal of these courses is to inculcate a specific orientation whether it be an industry or experience within the teaching philosophy (Miragaia, da Costa, & Ratten, 2018).

Entrepreneurship education generally tends to be defined as study that teaches skills to start and manage a business for growth (Mentoor & Friedrich, 2007). However, more recently this has changed due to more students interested in acquiring knowledge about entrepreneurial behaviour that does not necessarily equate to starting a business (Ratten & Jones, 2018). For this reason, studying entrepreneurship is encouraged as a way of getting students to think about future career directions. This means that students learn about different possible careers that range from a start-up, to include small business management and corporate venturing (Peterman & Kennedy, 2003). Thus, entrepreneurship education is recognised not just for its ability to teach practical skills but to also obtain knowledge about how to help communities and promote a improved quality of life (Ratten, 2017).

An entrepreneurial attitude includes an emphasis on a personal control over a situation that incorporates some degree of innovation, which is important during the COVID-19 crisis (Brown & Rocha, 2020). This means emphasizing an individual's ability to change a course of action because of their self-esteem and need for achievement (Rauch & Hulsink, 2015). The growth of entrepreneurship education during the past decade has been phenomenal and is now a common course in most business schools (Santos, Neumeyer, & Morris, 2019). This importance of entrepreneurship education in changing student's perceptions is reflected in numerous studies (Souitaris, Zerbinati, & Al-Laham, 2007). For example, Zhang and Cain (2017) found that more than 50% of entrepreneurship education students intended to become entrepreneurs after finishing their courses. This is supported by Kubberød and Pettersen (2017) who found that students who took entrepreneurship training were more positive towards entrepreneurship.

Entrepreneurship education has become more complex due to the need to teach a range of topics related to innovation and futuristic thinking (Oosterbeek, Van Praag, & Ijsselstein, 2010). Consequently, pedagogical approaches now focus on managing expectations by teaching students how to be resilient (Ahmed, Chandran, Klobas, Linan and Kokkalis, 2020). This means embedding a real world context that exposes students to service learning (Santos et al., 2019). Addressing world problems is part of entrepreneurship curricula as it provides a way for students to help solve societal issues through focusing on their intention to become entrepreneurial (Beynon, Jones, & Pickernell, 2016). An entrepreneurial intent is defined as "a clear and conscious decision to start a new v'senture" (Elliott, Mavriplis, & Anis, 2020). This means students can apply entrepreneurship principles that empower them to take strategic action. A recent review article on entrepreneurship research by (Ferreira, Fernandes and Kraus (2019)) found that entrepreneurial principles can be analysed in many different ways depending on the environmental context including health, technology and social-related concerns. In this commentary, we explore the way to encourage entrepreneurial intention in students by focusing on the effects of COVID-19 on entrepreneurship education. To do this we draw on existing and emerging management education practices surrounding COVID-19 (Beech & Anseel, 2020). These reflections will enable a better understanding about the current state of play in management education regarding entrepreneurship (Duval-Couetil, Ladisch, & Yi, 2020).

## 2. The COVID-19 crisis

Crisis are complex and their effects are felt immediately but also over a long period of time (Ansell & Boin, 2019). The COVID-19 crisis was a low-probability event that was unpredictable. Doern et al. (2019:401) state that crises can be classified as "extreme unexpected unpredictable events or as more mundane everyday disturbances, sudden or gradual, crisis have also been categorizes as 'major' or 'minor', 'internal' or 'external' and as 'technical/economic' in nature or 'people/social/organizational centric'". This dichotomy in approaches reflects the varying nature of crisis from natural ecological events to economic disasters (Buchanan & Denyer, 2013). Whilst the nature of a crisis can be ranked on a scale of severe to inconsequential, all crisis influence human life in some way or another (Eggers, 2020). This results in some businesses perform better than others due to their level of resilience, which means they can cope due to creating solutions based on available resources (Faulkner, 2001).

The COVID-19 pandemic was unpredictable and a surprise (World Health Organisation, 2020). As Clark, Davila, Regis, and Kraus (2020) state, there are many different ways countries have responded to the COVID-19 crisis depending on their regulatory policies. As a result, the COVID-19 pandemic has resulted in significant societal upheaval and it has been a career shock for many students and educators (Akkermans, Richardson, & Kraimer, 2020). Most management educators had not considered a need to move rapidly to working and studying from home and in a digital environment. The good news is that for most students and educators the change meant they could continue their studies albeit in a different environment. This continuity in education was needed particularly in terms of ensuring students course progression (Jones, 2019). Unlike other industries, the education industry could move online in a short time period, which enabled students to continue their studies but also enabled others to learn through online courses. This has been helpful in ensuring society continuity and also providing a way for individuals to learn during times of crisis (Doern, 2016).

Since the World Health Organization on March 11, 2020 declared the COVID-19 crisis a pandemic, there has been an enormous impact on management education. This impact can be analysed through a geography approach using the space dimensions of territory, place, scale and network (Brinks & Ibert, 2020). As different countries and regions have varying policies regarding in-class versus digital class participation there are conflicting views about the best way to change educational practices as a result of the crisis (Donthu & Gustafsson, 2020). This means the scale of the impact can be high or low depending on the amount of educational courses that are moved to a fully online environment. As a result, education and learning networks make a difference in finding the right approach to take. Thus, as its effects continue to be felt in the education sector, policy makers have issued and implemented improvements.

Crisis are not new to the education sector but the impact of COVID-19 has had the biggest impact on education practices compared to other crisis. As a result, the crisis has brought forth new questions about the role of education in society and how the education industry can respond to the crisis. Over the past decade, management education as a scientific area of inquiry has blossomed with the

continued growth in enrolments (Ferreira, Fayolle, Ratten and Raposo, 2018). This means there is an already existing substantial body of knowledge that can help decipher ways to deal with crises (Williams, Gruber, Sutcliffe, Shepherd, & Zhao, 2017). However, due to the impact of COVID-19 being high, a complex solution that takes into account multiple stakeholders is required (Bailey & Breslin, 2020).

There is some confusion about pandemics due to pre-pandemic stages being communicated that might not lead into a serious situation (Alon, Farrell, & Li, 2020). This means the public health response to a pandemic can change depending on the severity of a disease and how it progresses (Watson, 2011). There was a delay in declaring the COVID-19 a pandemic despite the seriousness of the situation, which meant there has been some controversy over whether it was managed by global health authorities (Cortez & Johnston, 2020). In addition, as there are political repercussions from having a pandemic declared, this created accusations of politicization (Hall, Scott, & Gossling, 2020). Whilst a coordinated international approach to dealing with a pandemic is required, the current closure of country borders means this is hard to do (Hall et al., 2020). In addition, each country is competing for medical personnel and other health experts (He & Harris, 2020). This has created a talent war but also increased competition for required medical devices.

The COVID-19 pandemic is global whereas previous pandemics have been largely focused on specific areas (He & Harris, 2020). This has meant it is difficult or almost impossible for health professionals to travel to other geographic regions. This has resulted in a sense of national interest instead of international solidarity (Hall et al., 2020). In addition, many developed countries have had significant outbreaks of the disease and required help from developing countries. This reversal in health policy has been unprecedented and is surprising given the increased levels of internationalisation we have seen in the past. Therefore, the COVID-19 pandemic represents a unique opportunity for entrepreneurs to transform existing practices (Kirk & Rifkin, 2020).

Linnenluecke (2017) suggests three main ways to build resilience: develop adaptable business models, alter global supply chains and strengthen employees. By adapting business models, organisations can move their production facilities to focusing on relevant market needs. This enables rapid innovation by shifting the market focus into new business practices. In the current COVID-19 crisis contactless and online services have been emphasised so organisations have had to change their business models to reflect this (Kirk & Rifkin, 2020). As supply chains have become more global, it is useful to have alternative countries for sources of production. This helps to decrease the reliance on one country and means that in times of a crisis there are multiple source of supply. As a result, employees in the education sector need to be strengthened in terms of the autonomy and independence they have in making decisions (Hahn, Minola, Bosio, & Cassia, 2020). This enables teaching and mentoring employees about business ideas. In addition, businesses that have a higher level of reliance are better able to cope with change, which can enable them to act swiftly by preparing new business ideas (Hills, 1998). This means that in times of a crisis some degree of improvisation with educational methods that incorporate entrepreneurial thinking is needed (Krishnamurthy, 2020).

### 3. Entrepreneurship education as a field of study

Entrepreneurship education is defined as “any pedagogical program or process of education for entrepreneurial attitudes and skills” (Fayolle, Gailly, & Lassas-Clerc, 2006, p. 702). This definition reflects the notion that the field of entrepreneurship education involves the application, design and implementation of innovative, futuristic and proactive strategies to an educational environment. This involves analysing new market potential and technological solutions. Fayolle and Klandt (2006, p. 1) also took a pedagogical approach in defining entrepreneurship education as “any pedagogical programme or process of education for entrepreneurial attitudes and skills, which involves developing certain personal qualities”. Therefore, most definitions of entrepreneurship recognise the need for concurrent study of multiple topics that lead to change.

Part of entrepreneurship education involves taking an inter-disciplinary perspective that incorporates different study areas for a practical solution. Jones (2019:243) more recently describes entrepreneurship education as a “collective of initiatives operating in universities, community colleges, vocational (or trade) schools, high schools and elementary (or primary) schools, that are held together by a common desire to develop in students a greater capacity for entrepreneurial agency”. This reflects the emphasis on entrepreneurship education on its real life suitability that reflects changing societal conditions. Therefore, entrepreneurship education unlike other scientific areas that are more theory based offers a promising way to teach others how to deal with the COVID-19 crisis.

In higher education there is a tendency to evaluate employability in the form of hard skills rather than soft skills (Clinkard, 2018). Entrepreneurship education tries to include both hard and soft skills in order to contribute to lifelong learning. This means hard skills that are technical or role-specific are combined with soft skills such as personality. Employability is a key issue facing graduates as they embark on their career. Increasingly students after they finish their courses will have multiple jobs due to a reliance on project-based work (Marginson, 2011). This means students will need to continually upgrade their skill repertoire depending on market conditions. In addition, the increased casualisation of the workforce means some individuals will need to have a number of jobs. Helyer and Lee (2014) discuss how work experience is crucial to the future employability of higher education graduates. Therefore, internships have been advocated as a way to mix workplace learning with study needs (Guile & Lahiff, 2013). Internships enable a more economically efficient way of learning on the job whilst acquiring knowledge.

There are different streams within entrepreneurship education that reflects its intricate nature (Ferreira, Fayolle, Ratten and Raposo, 2018). Entrepreneurs are change agents that pursue opportunities in the marketplace so entrepreneurship education has a positive impact on student’s capabilities and ability to adjust to emerging technologies (Beynon et al., 2016) There is a multitude of existing studies on entrepreneurship education at the undergraduate (eg Von Graevenitz, Harhoff, & Weber, 2010), masters (eg Rauch & Hulsink, 2015) and doctoral level (eg Muñoz, Guerra, & Mosey, 2020). These different levels reflect how entrepreneurship is taught from a number of different perspectives including at the micro, macro and meso level. At the micro level, the emphasis is on small businesses and teaching individuals to become entrepreneurs whilst at the macro level it focuses more on global entrepreneurship

issues evident in large scale companies. At the meso level social entrepreneurship and community-based entrepreneurship topics are at the heart of entrepreneurship courses (Ferreira, Fernandes, & Ratten, 2017). Thus, most research on entrepreneurship education tends to associate positively the impact of entrepreneurship education on entrepreneurial intention and attitude (Ahmed, Chandran, Klobas, Liñán, & Kokkalis, 2020). For example, Kolvereid and Moen (1997) found that participants in entrepreneurship education classes were more likely to start their own businesses than non-participants. Peterman and Kennedy (2003) found that participation in entrepreneurship education classes increases the desirability of pursuing an entrepreneurial career. Whilst most research on the link between entrepreneurship education and behaviour is positive, some studies find no positive effect. For example, in a study on undergraduate students, Oosterbeek, Van Praag and Ijsselstenn (2010) found that intentions to start a business decreased after finishing an entrepreneurship class. Similarly, Mentoor and Friedrich (2007) found that participation in entrepreneurship education did not affect intention to be an entrepreneur.

Entrepreneurship education involves a variety of activities that include both in-class and out-of-class learning (Jones, Penaluna, & Pittaway, 2014). This means a holistic and more long-term approach to evaluating the effect of entrepreneurship education on behaviour is needed. Increasingly entrepreneurial education is viewed as a programme consisting of a number of components that can alter based on contextual situations. Ahmed et al. (2020:4) describe an entrepreneurship education programme as consisting of “several components including course content (eg lecture material, guest speakers, online resources, modes of delivery etc) and course goals (eg learning introductory concepts and theory) compared to learning specific skills”. This means in the COVID-19 environment course content can change to reflect new environmental contexts whilst the course goals can remain the same depending on the entrepreneurial intent (Iivari, Sharma and Venta-Olkkonen, 2020).

To understand the link between entrepreneurship education and intentions different theories can be applied (Secundo, Mele, Sansone, & Paolucci, 2020). Human capital theory proposes that individuals study entrepreneurship as a way to build their business skills (Ahmed et al., 2020). This means individuals acquire certain skills and knowledge by studying certain subjects. Unger, Rauch, Frese, and Rosenbusch (2011) suggest that human capital is linked to entrepreneurial success as individuals acquire more practical training. Entrepreneurial self-efficacy theory has also been used as a way of understanding how individuals develop skills through entrepreneurship training. This is evident in Chen, Greene, and Crick (1998) finding that entrepreneurial self-efficacy distinguishes entrepreneurs from managers. This means entrepreneurship education can embed a more independent and risk-taking spirit in students. This helps them build confidence about their ability to start a new business.

Jena (2020) suggests that the main components of individual attitude towards entrepreneurship education are cognitive, affective and behavioural. The cognitive component includes a student’s beliefs, knowledge and thought processes. Individuals have different beliefs about entrepreneurship education due to their thoughts about its impact on performance (Jones, Ratten, Klapper, & Fayolle, 2019). This means beliefs in the form of perceptions can alter the way an individual learns. Detailed thoughts can be true or untrue depending on the context and attitude towards education (Sommarstrom, Oikkonen and Pihkala, 2020). Therefore, individual feelings about education should be assessed in light of the situation. Each individual has different beliefs depending on their position within society. This results in some inequity in terms of attitudes towards entrepreneurship education. The social environment in terms of family, school and work interaction will also play a part in influencing feelings towards education (Jones, Klapper, Ratten, & Fayolle, 2018).

The affective component concerns feelings and emotions an individual has towards education. This means some individuals will react differently to learning stimuli. In order to increase the perceived desirability of entrepreneurship education it is important that consideration regarding intuition is acknowledged. Some individuals will express themselves in different ways that impact on the entrepreneurship experience (Jones, Jones, Williams-Burnett, & Ratten, 2017). In addition, courses will be evaluated differently depending on the perception of value co-creation. This is due to students having different motivations and reasons for studying entrepreneurship.

The behavioural component involves the responses an individual has towards education, which means that individuals will act differently depending on how they learn (Ratten & Jones, 2018). For some students, the desire to study entrepreneurship is motivated by a financial incentive whilst for others non-financial reasons such as contributing to society are paramount. Therefore, the expected responses to entrepreneurship education are based on the aspirations of students (Ratten, 2017). Students will have different attitudes towards entrepreneurship education depending on whether they are taking the subject as an elective or compulsory part of their course. This means there will tend to be more positive feelings towards the experience if the student chooses to study the topic.

## 4. Impact on entrepreneurship education

### 4.1. Student impact

The COVID-19 pandemic emerged at the start of the academic year for students in Australia and Asia that begin studies early in the year. For most European and North American universities, the crisis happened in the middle of the teaching year. In Australia, the crisis initially meant many international students predominately from China could not enter the country so the focus was moving to online teaching to accommodate these students. This necessitated a change to online courses that then altered when in early March universities closed around the world when the pandemic was declared and all classes moved to an online format. Although within Australia there has also been a difference in responses to the COVID-19 pandemic due to individual states in Australia having different COVID-19 transmission rates. Thus, in states of Australia such as Victoria where there is currently a high level of positive COVID-19 cases that has resulted in continued online classes but in Western Australia where there are few COVID-19 cases the universities have re-opened for in person classes. In addition, second waves of COVID-19 in the United Kingdom and Spain have again shut borders and



impacted management education. This fluctuating and evolving environment makes it hard for management educators to plan and teach classes.

Students particularly those in management courses requiring experiential learning have been highly affected. Whilst classes have altered new pedagogy and assessment to suit the new conditions, students have had to quickly adapt to new learning methods. In addition, students have been physically and socially isolated from their peers that has caused mental hardship. This has been mitigated in some way through online social activities that try to recreate physical environments. For many students the campus environment plays a big role in their intellectual development. With many campuses closed this has affected the way students learn and their ability to learn through peer networks. Extra-curricula activities including sport and drama societies have closed impacting the social life that students experience in conjunction with their academic activities. In addition, internships, international study tours and site visits have stopped. This has limited the interaction students have with communities. However, there has been a positive increase in online activities that re-create normal environments. This has had a favourable impact in terms of students thinking and acting in creative way and helped to build resilience and entrepreneurial thinking in students that is needed in the competitive global marketplace.

Entrepreneurship students can be considered as nascent entrepreneurs as they are involved in business activities whilst studying (Souitaris et al., 2007). This means sometimes entrepreneurship students are already entrepreneurs and are taking the class as a way to learn more about entrepreneurship. University students near the end of their courses are more likely to want to start a business (Ahmed et al., 2020). Thus, in times of crisis entrepreneurship plays a key role in retraining individuals for new industries that are emerging in society. Traditional employment channels are changing as there is more reliance on the gig economy. This means students are likely to have a portfolio career in which different employment paths become available. This has meant that there is less emphasis by students on finding employment in large firms and the government sector. As a result, more students have become interested in startups and starting their own business. Young people are being encouraged to apply for jobs in new industries some of which were not in existence in the previous year. This means the emphasis in young people is to think creativity and a way to learn this is through entrepreneurship education.

There has been much uncertainty associated with COVID-19 that has resulted in misinformation (Krauss, Clauss, Breier, Gast, Zardini and Tiberius, 2020). In addition, rumours about its origin continue to cause political effects which has had an impact on students. As there is scarce work integrating a medical and entrepreneurship approach more collaboration is needed in terms of student learning. The link between medical science and entrepreneurship is intuitive and natural due to both being about innovation. This means taking a big-picture perspective to COVID-19 makes sense due to the complementary strengths of both science and entrepreneurship (Kuckertz, Brandle, Gaudig, Hinderer, Reyes, Prochotta and Berger, 2020). This will help to unveil digestible knowledge that can be used in different segments of society.

Another way to look at the interdisciplinary nature is to focus on the hard or soft sciences. Typically the hard sciences such as medicine and engineering are rule and results orientated whilst the soft sciences such as entrepreneurship focus more on creativity. This means it is worth noting that due to the current COVID-19 crisis causing much panic in society interdisciplinary research using hard science but with a soft science mentality can help. This will enable strategies to be developed to protect public health whilst reducing negative effects on students. By leveraging the abilities of both the hard and soft sciences it can showcase innovative developments for societal good. Therefore, raising awareness of an interdisciplinary approach for enabling medical and social scientists to work together.

#### 4.2. Teaching and learning methods

Entrepreneurship education normally involves some form of interactivity in which students are immersed in an environment that involves them learning about how to perform a task. The environment whilst normally physical can be virtual in terms of augmenting reality to enable students to learn about a behaviour. Examples of learning platforms include writing a business plan, pitching an idea or conducting a market analysis (Ahmed et al., 2020). Within an entrepreneurship course there are normally some tasks involving how to develop creativity that can lead to a business venture. Another key learning benefit of entrepreneurship education is the exposure students have to real entrepreneurs. This can involve role models or mentors that inspire students to be entrepreneurs.

Management education at all levels from undergraduate to graduate has been dramatically affected by the COVID-19 pandemic. Practical placements in most entrepreneurship courses have been removed or significantly reduced. This means that developing innovative methods of entrepreneurship education is challenging without traditional classroom environments. Therefore, it is essential that entrepreneurship educators sustain high-quality teaching methods as the success of future entrepreneurs depends on it. An entrepreneur's role in society can be culturally acquired due to society's expectations about individual behaviour based on economic conditions. This means in times of crisis, an entrepreneur will experientially acquire certain skills. Guest speakers are often used in classes as a way of describing their experiences. Although online guest speakers can also be done when social distancing limits physical contact. In addition, it can be beneficial to have guest speakers from international locations via online platforms that overcome geographical distance limitations. In addition, incubators and accelerator programs are increasingly being used in entrepreneurship programs. This is due to initial ideas needing help in terms of making them commercially viable. Most universities have programs designed to nurture an idea and enable participants to access required resources. This can include competitions and internships designed to expose students to outside ideas that provide helpful feedback. In addition, science and technology parks are often located on university grounds enabling students to have more interaction with business.

Krishnamurthy (2020) suggest that there are five main trends impacting business education as a result of COVID-19: algorithms, service, assessment, personalization and problem solving. Algorithms mean that students can learn via artificial intelligence rather than through direct human interaction. This means that increasing amounts of theory will be taught via online activities rather than

through human contact. Service means that relevant and contextual information will be taught. This means instead of students studying a set number of subjects, there will be more timely courses taught that depend on current events. Thus, the emphasis will be on continuing learning rather than a discrete number of subjects. Assessment means that objective learning outcomes will be emphasised so that learning is the result of a multitude of factors that are interwoven to create a specialised learning experience. Personalization refers to making changes to an educational offering to suit a specific individual. This helps to cater for specific learning needs that can enable better performance. Problem solving means finding answers to issues facing society. Increasingly this skill is viewed in a positive way in light of increased inequalities amongst members of society.

Given that the global management education environment has significantly changed as a result of the COVID-19 pandemic the content of entrepreneurship education programs varies with some valuing a practical and immersive experience more than others. This means there is a debate about the right approach to take in entrepreneurship education from a practical approach to more of a hybrid model including both practice and theory. This is due to the importance played on learning concepts and theory related to entrepreneurship whilst engaging in the act of being an entrepreneur. Therefore, the emphasis is placed on learning about business planning and how to take calculated risks. More recently skills such as creativity and decision making have been emphasised. The most commonly referred to objectives of entrepreneurship education programs is to acquire knowledge about action plans related to business and to stimulate an entrepreneurial mindset towards change (Glaveli, 2008). This means skills related to management including accounting and marketing are embedded in the teaching of attitudes towards entrepreneurship. Due to the wide ranging number of objectives in entrepreneurship courses it can be hard to align the design of the course with the outcomes. Hence, the content of entrepreneurship education courses needs to be treated in an analytical manner.

As the COVID-19 crisis has deepened around the world, so does the need to practice and think in an entrepreneurial manner (Parnell, Widdop, Bond, & Wilson, 2020). The effects of the COVID-19 crisis are felt in diverse parts of society and has resulted in increased inequality gaps between rich and poor (Pantano, Pizzi, Scarpi, & Dennis, 2020). The interest in entrepreneurship education has grown due to changing economic conditions emphasizing ecological sustainability and social equity. This has resulted in more entrepreneurship education courses that incorporate both economic activities and social objectives.

#### 4.3. Technology revolution

The COVID-19 crisis has the potential to transform management education but to realize this potential management education needs to critically evaluate its epistemological foundation in order to challenge existing paradigms (Nicola et al., 2020). Finding solutions to how education can evolve as a socio-economic activity is crucial. Technology plays a key role in this due to the need for digital learning environments. Since the introduction of the internet and online forums for education, information technology has been an important enabler and disruptor for management education. This is especially true in today's education environment in which most aspects of teaching have a technology component. Technology is now interwoven into education and has become even more important during the covid crisis. Technology has been adapted and developed to solve some of the issues faced by changing environmental conditions. To build resilience in education, technology is used as an effective way to manage change (Liu, Shankar, & Yun, 2017). Whilst there are many benefits of technology it cannot fully replace physical contact in which non-verbal communication is important.

The arrival of COVID-19 has been a watershed moment as it totally changed how life is conducted (Higgins-Desbiolles, 2020). Previously there was a large trend towards international entrepreneurship and transnational entrepreneurship so the introduction of border closures as a result of COVID-19 has significantly altered existing business models. Social activities have been reduced and people told to communicate via digital technology. These changes have been made due to an effort by governments to control the pandemic. This has meant trying to strike a balance between public health requirements and economic needs (Perrow, 1984). As a result, difficult circumstances have emerged in which governments have kept essential services whilst trying to reduce the impact on public health (Milliken, 1987). The unprecedented size of government interventions have helped reduce the impact of COVID-19 on society so the COVID-19 crisis offers a way to grow better and prioritize entrepreneurship education.

There is little clarity in the entrepreneurship education literature about the inputs and intended outputs (Pittaway & Cope, 2007). This means there is significant diversity about what the right teaching and learning methods are in entrepreneurship education. This is due to a variety of attitudes and skills needed for entrepreneurship. Entrepreneurship education research has experienced an extraordinary increase recently due to its practical nature. This means it is challenging to find a specific answer to deal with the problems.

## 5. Conclusions

### 5.1. Contributions achieved

This article offers at least two contributions to the study of entrepreneurship education in light of the COVID-19 pandemic. First, a discussion about how the environmental conditions have changed was discussed as a way of analysing its effects on entrepreneurship education. This helps to develop methods of adapting existing content on crises to an entrepreneurship perspective. Second, this paper complements existing research on the COVID-19 pandemic by extending it to an entrepreneurship education perspective. This enables a starting point for more research to follow on how entrepreneurship education has evolved from the COVID-19 crisis. This includes focusing on the enablers or facilitators of entrepreneurship education during a crisis environment.

More work needs to be done on why and how entrepreneurship educators respond to crisis. This includes how entrepreneurship educators can facilitate the resilience of others by teaching them new skills. In this article, we assert that entrepreneurship education

makes an important contribution to crisis management. Certainly there is more research needed on the role entrepreneurship education plays in times of crisis. Future research may be directed towards examining the effects of COVID-19 at different points of time and in various geographical locations.

The COVID-19 crisis can be analysed in terms of entrepreneurship from before, during and after the event (Sharma, Leung, Kingshott, Davcik, & Cardinali, 2020). This enables different time frames to be compared in order to understand the changes occurring in the global business environment. By taking a multi-time period approach it will enable an overview of how the COVID-19 crisis has impacted stakeholders in terms of demand, supply and policy issues (Toresdahl & Asif, 2020). By doing so entrepreneurship education research can be transformative as it can embed a COVID-19 perspective into new research studies. This enables a significant unravelling of the way entrepreneurship educators have responded to the crisis and how relationships have changed.

## 5.2. Implications for policy and practice

Based on the discussion included in this article, there are a number of policy implications that have emerged. This involves the need for government investment on entrepreneurship education programs in times of crisis (Shrivastava, 1993). Due to the social distancing requirements and changing economic conditions more people have time to study online. This means education can transform people's lives by providing new opportunities. This includes information about how to start digital businesses and retrain for new opportunities. Government policy interventions can increase the number of entrepreneurs that in turn facilitate employment growth. The lessons from entrepreneurship education programs can strengthen the overall economy resulting in further economic gain.

The shutting down of many industries most notably the sport and tourism sectors provides an opportunity to rethink current strategies (Veil, 2011). To do this, entrepreneurship is required to reset business approaches that focus on a community-centred initiative. This will enable a reorganisation of entrepreneurial practices to build on local communities and people (Weick & Sutcliffe, 2011). This helps entrepreneurship to be used as a way to focus on social good. In addition, the spread of COVID-19 around the world indicates how global and networked our society has become. COVID-19 is more contagious than the seasonal flu and has a higher death rate so the impact of the virus will have lasting effects particularly in terms of human interaction (Wen, Wang, Kozak, Liy and Hou, 2020). Governments have responded to the virus by implementing more hygiene practices and social distancing procedures. This is in conjunction with restricting individual movement through border closures and city lockdowns. In addition, other activities such as sport and socialising have been restricted. The reduction in close contact activities is a radical change to previous behaviour that emphasises close interaction. COVID-19 likely came from an initial zoonotic (animal to human) transmission event. Entrepreneurship research needs to assess the impact of the COVID-19 using financial and non-financial metrics. Financial implications might be more readily available and easier to understand. Global economic data shows there has been a decrease in share markets resulting from the covid-19 crisis. Non-financial implications are harder to understand due to the perceived effects often being subjective. More research is needed on how economies can bounce back from the COVID-19 crisis and how policy makers can help. The answers to this is not simple and require care in terms of managing the associated costs. Resolving the COVID-19 crisis immediately is not possible as it will take time to handle. This means restoring social and economic stability is a priority. Policy makers need to balance short term health and social objectives with long term economic considerations. In the short term, governments need to support entrepreneurship that can bring increases in economic growth. To do this requires entities in the entrepreneurial ecosystem working together. This will enable more positive flow on effects in the economy to emerge. In the long term, entrepreneurship education can enable better societal conditions and help prevent or minimise future crisis. This means entrepreneurship educators need to work together with other stakeholders in the ecosystem in order to lessen the effect of the crisis. As there is no magic bullet to solve the COVID-19 crisis as it has been an unexpected and highly impactful event, complex trade-offs need to be considered that incorporate creative thinking endemic in entrepreneurship education.

Entrepreneurs have experienced the uncertainty caused by the COVID-19 crisis through personal or shared experiences of others. Increasingly user-generated content about the COVID-19 crisis has provided exposure to other's experiences that is magnified in social media settings. Moreover, the emotional contagion of the crisis has meant entrepreneurs intentions and behaviours have been affected. Business environments have become unstable as a result of the COVID-19 crisis and an entrepreneurial approach is the best way to go for the sustainability of the global economy. The past reliance of businesses on government subsidies does not guarantee survival as the government is having to spend money on health and social needs.

In the context of the COVID-19 crisis, entrepreneurship education remains very relevant. An ability to navigate the business environment in uncertain times is intrinsic to having a successful business. Inherent in conducting business in the crisis is the need to reconcile the urgency of delivering services with the need to move forward. The availability of government support is time limited so business need to be proactive about finding alternative support. In addition, countries (eg Australia) that have recently suffered devastating natural disasters (eg bushfires) have had to struggle on multiple fronts.

Educators and practitioners can derive valuable suggestions from this paper. Now more than ever entrepreneurship education is needed. This means making entrepreneurship education programs accessible to more people that can help alleviate some current societal problems. Due to there being many different ways to teach entrepreneurship, the role of crisis management needs to be embedded in all courses. This means being aware of the underlying reasons for the course and the resulting impact on entrepreneurial intention. The COVID-19 crisis will make firms rethink their current business models in order to make them more agile and flexible in the future. Due to the closing of state and country borders, locations will become more nationalistic. This is in contrast to the internationalisation trends of the past. Most businesses are struggling due to the impacts of COVID-19 although some businesses particularly online ones are flourishing so encouraging entrepreneurship training is needed.



**Table 1**  
Potential research issues.

Time periods	Potential research issues
Initial pandemic date	What was the initial reaction by entrepreneurship educators to the news? How quickly or slowly did educators move to a digital format?
During the crisis	What advantages/disadvantages were there to online teaching methods? How did psychological stress impact education? What other environmental factors influenced the rate of education?
During second and subsequent waves	How did entrepreneurship educators cope with the crisis? How disruptive were the second and subsequent waves of the crisis? How did entrepreneurship education change or stay the same compared to the first and second waves of the COVID-19 crisis?
Returning to the new normal	To what extent did entrepreneurship education move back to where it was prior to the pandemic? How different is existing entrepreneurship education compared to prior to the crisis?

### 5.3. Study limitations and further research opportunities

This conceptual article has discussed the impact of COVID-19 on entrepreneurship education. Due to the recent and ongoing nature of the COVID-19 crisis at the time of writing this article, longitudinal data could not be collected. Thus, more information about how entrepreneurship educators have adjusted to the new environmental conditions are required. This includes focusing more on how technological innovation has been utilised both by educators and students. To do this it would be useful to conduct international cross-country comparisons to see the differences and similarities with responses to COVID-19 related entrepreneurship education changes. The current thinking in the field of entrepreneurship education needs to include a COVID-19 lens in order to understand the change. This is due to context-wise, the COVID-19 pandemic has had a lot of influence on entrepreneurship education so this needs to be acknowledged. In addition, the role educators play in crisis settings needs to be stressed and this can be conducted in real time or via proxy in order to help uncover the contributions. Most existing studies are concerned with crisis planning and response without considering the intricacies of the experience (Runyan, 2006). Therefore, research is required on how entrepreneurship educators learn from crisis and their knowledge management techniques. Studies on COVID-19 and entrepreneurship need in turn to incorporate an education perspective in order to be more definitive about their contribution. In addition, more research on different time periods during the COVID-19 crisis from the initial World Health Organization declaring it a pandemic in March 2020 to the second wave of infections occurring in Melbourne, Australia in August 2020. Comparing how students and educators adjusted to these different time periods would be useful in terms of analysing the effect of the crisis on learning levels. It would be interesting to see if because of the stay at home restrictions students study more or alternatively if they are too stressed by the pandemic to learn in an efficient manner. Table 1 below states potential research issues in each of the time periods of the COVID-19 crisis.

## 6. Conclusions

In conclusion, this article has discussed the changing nature of entrepreneurship education as a result of the COVID-19 pandemic. The way crises affect business and the resulting affects on management education were discussed. This highlights the need to think more strategically given the continued nature of COVID-19 and its ongoing affects on entrepreneurs in society. As a result there is a greater need now more than ever to embed an entrepreneurial spirit in management education courses and standalone entrepreneurship subjects in order to help focus on the positive benefits of finding solutions for the crisis. The article has focused on the different affects of the crisis from a student learning, technological environment and course content perspective. This will help to build better learning and teaching methods in entrepreneurship education courses that can use crisis analogy as a way of finding productive solutions.

### CRedit authorship contribution statement

**Vanessa Ratten:** Conceptualization, Methodology, Data curation, Writing - original draft, preparation, Visualization, Investigation, Writing - review & editing. **Paul Jones:** Writing - review & editing.

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