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Research into Early Stage Identification of Entrepreneurs: Educational Tools Using Virtual and Augmented Reality

Stephen Robert PEARSON and Mahmoud SHAFIK
University of Derby, Kedleston Rd, Derby, DE22 1GB, UK.
College of Science & Engineering

Abstract: One of the big challenges facing youth over all the world is unemployment. There are many reasons that unemployment exists specially within this community. It is mainly due to lack of jobs, knowledge, professional skills, and inability of the youth to recognise their potential as entrepreneurs. This is off course impact on national economy and there is a need to help this community to identify their individual potential at early stage and develop the necessary educational and training tools that can help them to overcome such unemployment challenge. This ongoing research programme is mainly focused on researching into early-stage identification of young entrepreneurs and aiming to develop the tools that can support them in short and long development. This paper presents the initial outcomes of whether virtual reality and augmented reality tools can offer advanced educational and training tools, better suited to entrepreneurs than conventional classroom-based training. It is important to mention that key part of this research programme is also focused on integrating Artificial Intelligences tools. This is to enhance the tools learning experience and meet individual needs. The outcomes of this studies are reported in the other paper published in this conference.

Keywords. Young Entrepreneurs, Youth Entrepreneurs, Entrepreneur Traits, Trait analysis, Virtual Reality, Augmented Reality.

1. Introduction

There is a limited amount of literature relating to studies and research undertaken on young entrepreneurs, and at the time of writing this paper there was little or no literature that could be found covering the identification of young people as entrepreneurs. The most significant of the studies appears to have been carried out from a policy perspective (e.g., Greene, 2002; Blanchflower and Oswald, 2009) or identity perspective (e.g., Rouse, 2004). The limited amount of research that appears to have been undertaken, primarily focuses on young entrepreneurs and their venture creation activities. The focus of said research is on those whose ventures have achieved poor performances with significant rates of business failure. There are few theoretical studies in relation to young entrepreneurs and young entrepreneurship, with research mainly focused on empirical findings and results (Lewis and Massey, 2003). The previous paper published at previous ICMR2021 focused on the study of young entrepreneurship, to understand how potential entrepreneurs can be positively identified, in an effort to train, nurture, mentor and assist them in creating their own businesses. This paper follows on from that study to further look at the use of VR and AR in the training of young entrepreneurs.

This paper is to investigate the potential use for Virtual Reality and Augmented Reality tools as training aids to develop the skillsets required of young entrepreneurs to facilitate the successful formation and development of their business and business acumen.

Investigation into the potential use of VR and AR identified several research questions, which this paper seeks to answer.

- Does VR and AR training offer a better learning environment than normal classroom studies for young entrepreneurs?
- Will the use of VR and AR offer better opportunities for entrepreneurs to be able to communicate their entrepreneurial undertakings to others?
- Can the use of VR remove geographical barriers to training and collaboration with other like-minded entrepreneurs?
- What are the risks regarding Cybersecurity and Information integrity for VR?

2. VR and AR as Training Tools

The development of modern society leads to rapid changes in the conditions of its existence, contributing to the processes of evolution and transformation, which, in turn, becomes a source of creation and implementation of innovations in education and training. The growing digitalisation cannot bypass the education sector; the study of the impact and prospects of using digital technologies both in higher and secondary schools is actualising. The didactic capabilities of modern technologies and their application in education is one of the topical areas of pedagogy. Today, the use of augmented and virtual reality technologies in educational practices seems promising. The introduction of new technologies into the pedagogical process is an integral part of improving the quality of education. The issues of forming the educational environment of a general secondary education institution using virtual and augmented reality have just begun by scientists and have not been fully investigated. One of the promising areas is the use of virtual and mixed reality environments based on educational platforms and specialised equipment. Augmented reality technologies in education are at the stage of their formation. Today, there is a need to build new strategies for the training of teachers, whose activities in the future will certainly be implemented in completely different conditions, but the lack of a unified methodology is also a significant problem. Augmented reality technologies are developing so rapidly that research in the field of education and pedagogy simply does not have time to provide theoretical understanding or develop a systemic methodology [11]. Further research is required on the methodology for the optimal combination of classical forms of teaching and learning using virtual systems.

2.1. VR for Entrepreneurial Training Tools

Contemporary entrepreneurship draws individuals to engage their capacity, efforts and abilities in the creation of new services and products that compete with market demand (Bellotti et al., 2012). Starting a new business venture is an uncertain undertaking and unstable process that necessitates a developed mental model, allowing the entrepreneur to go through a sensemaking and decision-making processes. Entrepreneurship education provides individuals with the required skills and knowledge and gives them the ability

to recognise relevant opportunities and potential pitfalls (Jones & English, 2004), but it frequently struggles with finding effective learning tools. Taking a look at virtual reality as a technological and complementary tool that enables the user to learn and evolve their skills by immersing themselves into virtual environments is a necessary step in inspecting functional teaching approaches. *(Research Question 1 answered)*

Contemporary entrepreneurship draws individuals to engage their capacity, efforts, and abilities in the creation of new services and products that compete for market demand and attention (Bellotti et al., 2012). Klein & Bullock (2006) found that there is little connection between the leading approaches to entrepreneurship education and economists' understanding of the entrepreneurial function. As starting a new business is commonly an uncertain undertaking and precarious process, the entrepreneur must develop a mental model through the sensemaking procedure on how the environment where the newly developed business will operate. Moreover, it is a demanding and challenging obstacle on how to prepare entrepreneurs to be able to communicate their entrepreneurial undertakings to others and gain their support through sense giving process (Hill & Levenhagen, 1995). Entrepreneurship education is the process of providing individuals not only with the required skills and knowledge, but also the ability to recognise commercial opportunities (Jones & English, 2004). According to Raposo & Do Paço (2011), entrepreneurship education seeks to link knowledge with the abilities to recognise and pursue opportunities by generating new ideas and allocating needed resources, and the abilities to create and operate a business venture through creative and critical manner. The ultimate goal of processing entrepreneurial knowledge onto individuals is for them to master aspects that are derived from open and constant communication with the environment, sharing, and evaluating the challenging goals, and finally form the ability to adapt to unforeseen conditions (Neck & Greene, 2010). However, the transfer of increased responsibility that comes along with managing businesses is considered a challenging process (Jones & English, 2004). Karlsson & Moberg (2013) relatedly estimate that trait-based view of entrepreneurship, where only some individuals are born with the necessary competencies to become entrepreneurs, is still prevalent in modern societies. It does not come without surprise that the debate wherever entrepreneurship can be taught with enabling supportive and stimulating learning processes is now ongoing for several decades (Ronstadt, 1985; Kantor, 1988; Hynes, 1996; Jack & Anderson, 1999; Kirby, 2004; Henry et al., 2005; Taatila, 2010). Yet, at both the theoretical and ontological levels, no firm consensus regarding entrepreneurship education has been achieved due to the ever-changing landscape of contemporary entrepreneurship as a concept (Huq & Gilbert, 2017). Similarly, Nabi & Holden (2008) conclude that there is no universal approach to entrepreneurship that works for all contexts – different contexts require tailored and customised approaches to best suit individual needs. There is a substantial diversity of target groups included in the educational process. Learning entrepreneurial methods and approaches facilitates the formation of a way of thinking and acting, built on assumptions using a portfolio of techniques to motivate individuals towards creating (Neck & Greene, 2010). While these methods and approaches can be taught within the selected entrepreneurial teaching course on a primary and secondary education or graduate and postgraduate levels, individuals can gain the relevant knowledge by involving themselves into self-taught processes (Katz, 2014). The shaping of individuals' entrepreneurial intentions does not solely depend on their personalities, and personal aims, goals and tendencies, but rather are directly linked to the level of engagement and priority entrepreneurial objectives they hold (Top et al., 2012). The potential uses of virtual reality as an educational tool have

been the subject of several discussions and studies in the past (e.g. Wickens, 1992; Hedberg & Alexander, 1994; Psotka, 1995; Winn & Jackson, 1999; Kaufmann et al., 2000; Virvou & Katsionis, 2008; Merchant et al., 2014; Martín-Gutiérrez et al., 2017). Yet, the potential of virtual reality that would allow future entrepreneurs to gain necessary skills helping them tackle everyday obstacles on their entrepreneurial pathways appear as a virtually unresearched subject. Recent research suggests that individuals can retain more information, and can effectively use learned skills and obtained knowledge after participating in virtual reality simulation (Krokos et al., 2019), making virtual reality a vital learning tool. (*Research question 2 answered).* There are a handful of existing and freely accessible virtual reality environments that deal with the STEM domain, and generic courses on entrepreneurship. These environments are designed to boost the individuals' active learning as well as the teachers' lecture conduct by interacting with various virtual objects and other peers. Perikos et al. (2018) explored a particular virtual reality world, the 3D Virtual World, and investigated the potential for entrepreneurship education. The 3D Virtual World is a cloud-based software component that is implemented in OpenSim, an open-source multi-user virtual environment where individuals can interact with a various object, devices and other users, represented by avatars that are delegated into the roles of students or tutors. Students take an active role in virtual classes that involve interactive quizzes and exercises, while tutors provide them with simultaneous feedback on their performance. Additionally, individuals can actively participate in different activities in order to visualise procedures that are relevant for obtaining entrepreneurial knowledge of specific work field according to Marko Orel (2019). There also exists the potential for collaboration in a wider field with students geographically widespread attending virtual classes and forming new, albeit, virtual relationships. (*Research question 3 answered*)

3. Cybersecurity and Information integrity of VR Tools

Since the first head-mounted AR display in the 1960s, Virtual Reality (VR) and Augmented Reality (AR) have become increasingly more prominent and given way to the metaverse, a massive virtual shared world created by the convergence of the internet, VR, and AR. While this has become most noticeable in the video gaming industry, the metaverse is set to revolutionize eCommerce, healthcare, entertainment, and the automotive industries as well. Soon these immersive technologies will become indispensable.[8] Now is the time both organizations and individuals start looking at cybersecurity in the VR-AR world from a different perspective to avert any potential cybersecurity breaches. However, as these technologies continue to improve, so do the cybersecurity risks involved. Cyber threat actors evolve their modus operandi to infiltrate the end-users privacy for their nefarious purposes.

3.1. A Minefield of Information — Readily Available

When you use a VR headset, you share crucial information about your facial features, eyes, speech data, and even your retina patterns. These biometric identification characteristics are critical as any malicious actor can replicate them and cause use for illegitimate purposes such as identity theft and other cybersecurity breaches.[8]

3.2. Data Security Issues — Lack of Encryption

There is currently data encryption in online communication tools such as instant messaging apps, readily available for end-users. However, several VR/AR systems have not yet implemented encryption for network connections. Besides, these systems rely on third-party apps for collaborations, which often do not adopt sufficient protective measures [8].

3.3. Rise in DDoS Attack — Can Affect Business Continuity

Generally, business organizations include a well-compiled incident response strategy in their cybersecurity policy for the traditional environment. As VR/AR technology is still in its nascent stages and not appropriately monitored, these environments are at risk from several cyberattacks, such as DDoS attacks. [8]

3.4. Mitigating Cybersecurity Risks In VR/AR Environments

As AR and VR technologies mature into mainstream technologies, users must be ready to tackle the cybersecurity threats that may arise due to any reasons whatsoever. Securing device-to-device communication between such devices and the centralized servers that manage communications in the VR/AR environment is essential. It is better to encrypt outbound and inbound connections from and to VR/AR devices for maintaining data privacy. One should ensure force authentication of all communication between VR/AR devices. Using proper identity and authentication mechanisms between VR/AR applications and the centralized ecosystem help secure communications with the primary server. It is advisable to use data masking for securing data. All VR/AR applications and firmware residing on such devices must be additionally protected using robust anti-virus and anti-malware tools. Users must look out for any abnormal behaviour of the VR/AR devices, applications, and the ecosystem. Validating the integrity and relevance of VR/AR content is also crucial. There should be continuous assessment of VR/AR devices, applications, and the overall ecosystem. [8] (*Research question 4 answered*). The platform that is based upon VR and AR is part of a future development and will be the subject of Future Work.

4. Conclusions

The big question that this paper was keen to address and answer is, why we should use VR and AR to train future Entrepreneurs. This created a set of four research questions that have been answered within this paper. Furthermore it has been shown from the above research and studies that the use of VR and AR training has significant benefits in terms of engagement, assimilation and understanding of the training provided. It would therefore make sense to utilise the most up-to-date training methods to facilitate the entrepreneurs of the future. VR has significant potential and is ready for both classroom and personal use. There is a required seismically shift in education that will push the use of VR tools forward in teaching curriculums of entrepreneurship education. Besides, new, more profiled and fully supported platforms and the content will need to be developed in order to expand learners' engagement into virtual environments. Finally, an undergoing research effort will need to be expanded with empirical studies in order to support the

effectiveness of incorporating Virtual Reality in the classroom. Learning possibilities in virtual reality environments are practically endless, and certainly, entrepreneurship education could stand to benefit. The development of tools to facilitate this are outside the scope of this research. It is this Authors belief that Entrepreneur development should consist of a mixture of Andragogy using VR and AR as outlined above, but also Heutagogy. Heutagogy is an important part of Entrepreneurial development and ongoing life and can be used as a method for effective problem solving and knowledge banking. A big part of the entrepreneurial development should be learning to be an entrepreneur rather than being taught how to be one. At the risk of causing controversy, this isn't something that the majority of academics can do effectively, as some of them do not have the experience of being entrepreneurs themselves, some have the experience of being able to teach from a syllabus but not from the perspective of an entrepreneurial journey to success which is not often a smooth transition but one fraught with highs and lows with failures and successes.

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