SOCIAL ENTREPRENEURSHIP: CHALLENGES IN THE IMPLEMENTATION OF EDUCATIONAL TECHNOLOGY INNOVATION TO ADDRESS LITERACY

Comparative study among social entrepreneurs in prize-based competitions

Student Name	: Sulyana Andikko
Student Number	: 445985
Supervisor	: Dr. Payal Arora
Second Reader	: Janelle Ward, PhD

Media and Business | Erasmus School of History, Culture and Communication
ERASMUS UNIVERSITY OF ROTTERDAM

Master Thesis
22 June 2017

SOCIAL ENTREPRENEURSHIP: CHALLENGES IN THE IMPLEMENTATION OF EDUCATIONAL TECHNOLOGY INNOVATION TO ADDRESS LITERACY

ABSTRACT

Purpose – One of the leading causes of educational inequality persists because the lack of support from national governments has resulted in a disproportionate opportunity to learn and gain benefit from education. Thus, many children still lack basic skills, such as literacy. There is a growing hype in the discussion of information and communication technology-based literacy applications as a solution to chronic problems in the world of education. Technology innovations – as created by social entrepreneurs - have provided new opportunities to overcome educational inequality, while simultaneously improving teaching methods within underprivileged communities by providing an affordable, and engaging learning experience. However, challenges to incorporating technology within education are impeding these innovations. To date, substantive technology-based learning has emerged to the forefront of the debate on the matter of building conducive infrastructures to enrich learning environments. Unfortunately, there is a lack of empirical studies in providing a deeper understanding of the prospective role of technology-based learning platforms. Therefore, this thesis investigates challenges in implementing the educational technology innovations generated by 12 social entrepreneurs and takes into account social entrepreneurship's intermediary in the form of prize-based competitions. Additionally, this thesis also sheds some light on target audiences, types of digital innovation produced, and the motivations of social entrepreneurs to enter a prize-based competition.

Design/Methods – Through qualitative methods, namely content analysis and in-depth interviews, this thesis provides insight into the key challenges encountered by social enterprises that have emerged in the execution of technology to create social value on an educational scope.

Findings – The incorporation of technology in improving education can serve as a tutor, a teaching aid, or even as a learning tool. The target audience of education technology innovations can be classified into two categories: business-to-business and business-to-customers. Meanwhile, challenges involved in the process of implementation and production are: location and cultural sensitivity (i.e. lack of qualified teachers, lack of supporting infrastructures, market characteristics) practical usability (i.e. software and device compatibility, data analytics, and feedback mechanisms), theoretical practicability (personalized and generic content), economic scalability (i.e. monetization, credibility of innovation), viable scalability, and strategic alliance establishment. The motivations for entering a prize-based competition included: social motives, recognition of innovation, interconnected network, and guidance for improvement. Furthermore, the study makes new recommendations for the organizers of prize-based competitions in order to be even more valuable for social entrepreneurs.

Keywords: *technology, educational inequalities, innovation, social entrepreneurs, prize-based competition, qualitative methods, content analysis, in-depth interviews.*

ACKNOWLEDGEMENTS

That which does not kill us, can only makes us stronger – Friedrich Nietzsche

TABLE OF CONTENTS

LIST OF TABLES & FIGURES

Literacy is about empowerment. It increases awareness and influences the behavior of individuals, families and communities. It improves communication skills, gives access to knowledge and builds the self-confidence and self-esteem needed to make decisions.

Koïchiro Matsuura | Director-General of UNESCO

1. INTRODUCTION

In today's world in which technology is continually advancing, educational inequality continues to be a major global issue. Educational inequality is defined as the variations in the degree to which educational attainment is possible within a population (Lin & Yang, 2009). Educational inequality persists because different social backgrounds result in disproportionate opportunities to learn and to benefit from education (Kim, Miranda, Olaciregui, 2008). Education is a fundamental element in achieving social equality and reducing income inequality; it is one of the determinants that results in economic growth (Lin & Yang, 2008), a reduction in crime, and increased political awareness (Miyagishima, 2016). According to UNESCO (2015), globally 58 million children receive no schooling and around 100 million children do not complete primary education. One of the leading causes of this is that governments rarely designate improving education as a priority via their national budgets which results in children living without basic skills, such as literacy. The latest data from World Bank shown that in 2013, the government in average only allocates 4.68 percent in education expenditure from national's budget ("Government Expenditure on Education", n.d).

In absolute numbers, in 2015 there were still 781 million illiterate adults worldwide (UNESCO, 2015). UNESCO defines literacy (2015, p. 137) as the ability to '*identify, understand, interpret, create, communicate and compute using printed and written materials associated with the varied context*.' Literacy has been studied in several approaches, including mastery of certain skills, functional or applied, text-related, and the learning process (UNESCO, 2006). There are four non-governmental causes of poor learning performance, including: (1) parents' inexperience of the schooling environment; (2) low-quality materials and infrastructure; (3) linguistic diversity (McEwan & Trowbridge, 2007), and (4) it seems that many pedagogical inventions and educators' competencies have failed to transform the formal education organization into an effective medium for learners (Reardon, 2011).

These causes will only increase the gap further and decrease one's well-being, thus, represents a threat to nations' future (Darling-Hammond, 2010; Kim, Miranda, Olaciregui, 2008; Robinson-Pant, 2004). If the achievement gap were to be handled properly, the resulting educational equality would result in higher opportunities being realized, hence, the betterment of a nation's society (Zhao, 2016). Despite all the aforementioned complexities surrounding the issue of education, as a social problem, there may still be hope for education when it is in the hands of social entrepreneurs who have a vision of creating social value through innovation (Austin, Stevenson, & Wei-Skillern, 2006; Damani & Sardeshpande, 2015). Social

entrepreneurs can exploit the current era by developing open-access educational methodology or social software for improving the learning experience (Goldin & Katz, 2008; Ross, Morrison, & Lowther, 2010). The development of ICT-based learning systems has attracted both educators and learners as a way of empowering quality education to achieve literacy (Wu & Liu, 2015). This thesis explores the challenges that exist in the production and implementation of ICT-based education innovation by analyzing the forms of technology created by social entrepreneurs in improving learning outcome.

1.1 Educational Innovation: Adaptation with Information and Communication Technologies

The involvement of technology in educational innovation is not new. The spread of information and communication technology has resulted in substantial possibilities for accelerating human growth, and thereby significantly transforming education (Arora, 2016), either in the form of a tutor, a teaching aid, or a learning tool (Ross, Morrison, & Lowther, 2010). The first and second forms enhance how an educator manages and adjusts instructions to cater to individual needs. The latter form aims to enable learners – irrespective of their sociodemographic background – to utilize technology effectively in comprehending relevant skills.

An example of previous research on a scientific comprehension topic (i.e. a circuit board) is a multi-platform open source software named "Osqoop", which proved capable of resulting in a better understanding and improved memory among students, as well as increasing positive feelings and motivation (i.e. enjoyment) due to students' sense of achievement upon completion of the assignment (Bertacchini et al., 2012; Palmer, 2005). To date, substantive information communication and technology (henceforth, ICT)-based learning has emerged to the forefront of the debate on the matter of building well-developed infrastructures to enrich learning environments. There is a growing hype in the discussion of ICT-based literacy applications as a solution to chronic problems in the educational world in developing countries. However, a deeper understanding of the prospective role of ICT-based learning platforms is needed in the form of empirical studies (Kim, Miranda, Olaciregui, 2008). For instance, an analysis of a study conducted by Nolen (2009) found that, between year 2003-2007, only 8.1 percent (n = 62) of 758 educational psychology articles addressed issues surrounding educational technology. Therefore, the exploration of how technology is being used to improve the learning process that has been created by social entrepreneurs in educational sphere is also perceived as an interesting aspect for study in this thesis.

1.2 Social Entrepreneurs and Social Innovation in an Educational Setting

Formal educators find it difficult to overcome the literacy challenges they face in order to provide opportunities for non-educators to contribute in this aspect. Hence, this section discusses the role of social entrepreneurs. In recent decades, the topic of entrepreneurship has received considerable academic attention from both scholars and policymakers (Dees, 1998; Peredo & McLean, 2006; Van Praag & Versloot, 2007). An entrepreneur is defined by Hébert and Link (1989, p. 3) as an individual who specializes "*in taking responsibility for and making judgmental decisions that affect the location, form, and use of goods, resources, or institutions.*"

However, what if the motives of self-actualization, employment independence, and opportunities for implementing design-thinking among entrepreneurs (Sharir & Lerner, 2006) are combined with a social mission to aid particular communities? Dees (1998) called this type of entrepreneur 'social entrepreneurs.' Why is it so important to study social entrepreneurs? Zahra, Gedajlovic, Neubaum, & Shulman (2008, p.1) proposed that social entrepreneurship "*encompasses the activities and processes undertaken to discover, define, and exploit opportunities in order to enhance social wealth by creating new ventures or managing existing organizations in an innovative manner.*" In other words, social entrepreneurs pursue the social purpose of establishing value through innovation (Austin, Stevenson, & Wei-Skillern, 2006; Choi & Majumdar, 2013) in which is further discussed in the theoretical framework.

An example of an educational technology social entrepreneur is ruangguru.com, an Indonesian web-based and application-based learning platform that was founded in 2014 (Tegos, 2015). Ruang Guru (which means "teacher's room" in Bahasa), one of Indonesia's largest online learning management platforms, enable learners to access preparation materials for national examinations. Ruang Guru also provides tutoring (offline and online) lessons on a vast range of subjects, whereby English and Math reportedly make up about 60 percent of all lessons offered through the platform (Cosseboom, 2015; Maulani, 2016). Ruang Guru optimizes the student learning process by utilizing the analytical tools provided, thus reducing costs on printed material (e.g. rehearsal books). Moreover, as a social business, Ruang Guru also provides an additional source of income for the 27,000 tutors currently registered by allocating them 80 percent of the transaction fee, meaning they only accept a 20 percent reduction (Cosseboom, 2015). As formal institutions are failing to provide the educational equality that is necessary, the increased participation of social entrepreneurs as part of the solution to this issue is studied in more detail in this thesis. Simultaneously, considerations in designing and implementing ICT-based innovation also discussed in the theoretical framework.

1.3 Prize-Based Competitions for ICT-Based Educational Innovation

The introduction of innovations in the form of new ventures needs credible external support as they require resources, e.g. financial capital, infrastructure, human capital and relevant expertise (Foo, Wong, & Ong, 2005). Within the education sector, an acceleration can be seen in the implementation of prizes as a facilitator of technology innovation, given the potential of technology itself to provide greater access, and thus, high-quality education (Arora, 2016). Corporations can also aid entrepreneurs by launching competition projects or social movements that target the general public, learners, professionals, and even funders. For instance, Dollar General Literacy Foundation collaborated with the Barbara Bush Foundation in initiating the ICT-based literacy empowerment competition named Adult Literacy XPRIZE (henceforth, ALEXP).

As a non-profit organization, the core business of XPRIZE is to design and manage large-scale competitions in order to encourage innovation aimed at realizing benefits to humanity that were lacking due to market failure (Harman, 2016). The ALEXP is a two-year long (2016-2018) global competition worth US$ 7,000,000. It aims to realize the most transforming innovation in the lives of low-literacy adults, and targets teams of application developers, educators, engineers and innovators by getting them to develop mobile applications for existing smart devices (e.g. smartphones and tablets). This competition is expected to realize a significant increase in literacy skills among adult learners in the United States in just 12 months ("Overview of Adult Literacy XPRIZE," n.d). The Global Learning XPRIZE (henceforth, GLEXP), another global competition, is worth US$ 15,000,000. It wants to develop – within 18 months – open-source and scalable software that targets children in developing countries ("Overview of Global Learning XPRIZE," n.d). The focus is on teaching children the basics: reading, writing and arithmetic. Both of these competitions are based on the notion of Lee, Battilana, and Wang (2014), who suggested that social enterprise intermediaries who fund and incubate social enterprise can be used for the population of high-potential entrepreneurs.

Prizes are naturally competitive, market-oriented, and results-driven which is the reason why they are viewed as an alternative to funding innovation and scaling solutions in various global contexts (Arora, 2016). However, is the monetary prize the only element that incentivizes social entrepreneurs to enter a competition? This thesis addresses the question by studying social entrepreneurs' motivation to enter, followed by actual recommendations to improve the impact of prizes. Participants from the ALEXP and GLEXP competitions were used as a population to address these topics. In total, 12 social entrepreneurs participated in the research described in this thesis; they are discussed in more detail in the Methodology chapter.

1.4 Social and Scientific Relevance

1.4.1 Social Relevance

Previous research suggests that the potential of adapting technologies for literacy development remains largely untapped in an educational setting (Flewitt, Messer, & Kucirkova, 2015). As discussed by Burnett (2009), there is an extensive need to incorporate ICTs into literacy programs by reflecting on learners' interests, as this will contribute to a profound transformation in contemporary practices (Underatuin, 2011). As literacy is also about critically facing an unknown text, being able to search for clues and generating new meaning, this means that new educational responses are needed (Kalantzis, Cope, & Harvey, 2003; Elmborg, 2006).

However, previous scholars have proven that the last two approaches mentioned are not particularly distinctive when it comes to comparing learning outcomes (Chambers, Slavin, Madden, & Gifford, 2008; Ross, Morrison, & Lowther, 2010). Contrary to the research of previous scholars, this thesis argues that ICT-based educational technology can be a potential key to developing learning outcome by providing an interactive learning experience and enriched content (Kim, Miranda, Olaciregui, 2008; Owston, et al., 2009; Paraskeva, Mysirlaki, & Papagianni, 2010). The objective of this Master's thesis is, therefore, to contribute to increasing our knowledge of how social entrepreneurs are dealing with the challenge of literacy through ICT-based innovation. Overall, this can lead to insights into the educational and entrepreneurship-related aspects that can be anticipated for aspiring, emerging or established entrepreneurs.

Moreover, the findings of this research can lead to the improvement of government policies regarding both education and entrepreneurs. Previous literature found that governmental support contributes to fostering the formation and sustainability of social entrepreneurs, which could lead to an increased capacity to stimulate them as problem-solvers (Short, Moss, & Lumpkin, 2009). However, Yitshaki and Kropp (2016) suggested that the government gave only a minimum of attention to social welfare, and subsequently created a gap between the fulfillment of social needs and providing social services. One of the fundamental aspects relating to social entrepreneurs that is studied in more detail is the opportunity of accessing assistance (e.g. funding, exposure, network) through a third-party mechanism, specifically prize-based competitions. The lack of access to investment markets often appears to be a significant barrier for social businesses to accomplishing impact on a large scale (Martin & Osberg, 2015). Therefore, by analyzing the motivation of social entrepreneurs enrolled in prize-based competitions, this Master's thesis will benefit potential investors (e.g. incubators,

accelerators), prize-based competition initiators, or even other aspiring entrepreneurs who are interested in entering a similar competition.

1.4.2 Scientific Relevance

This thesis aims to contribute to existing literature and the scientific lacuna not only by focusing on how social entrepreneurs are facing challenges but also by identifying where ICT-based educational technology was used to implement their innovation for improving literacy by assessing best practice examples. The identification of digital educational innovation will contribute to the current discourse surrounding the transformation of literacy and provide a perspective for addressing educational inequality. Simultaneously, this Master's thesis also takes into account the role of prize-based competitions in the enhancement of social businesses. In the past, scholars have argued that, despite increased awareness, there is still too little academic discussion on the impact of social entrepreneurship competitions on social business (Kwong, Thompson, & Mei Cheung, 2012; Ross & Byrd, 2011). This has resulted in a lacuna in the literature.

1.5 Research Questions

As Shane and Venkatamaran (2000) explained, entrepreneurs are change agents in the sense that they ensure that society transforms technical information into relevant products and services. In other words, social entrepreneurs take into account the information they have collected from the society and articulate it into a means for discovering opportunities. As explained by Zahra and colleagues (2008), it is only natural that social opportunities are considered global, and entrepreneurs have become adept at formulating innovation to address global needs such as education. In creating opportunities for improving education, technology affects the learning process in such forms as distance learning, educational games, and simulations (Ross, Morrison, & Lowther, 2010). Based on the aforementioned statements, the main research question has been formulated as:

RQ: *How do social entrepreneurs address literacy challenges through their digital innovations?*

In order to support the main research question, several sub-questions have been formulated. According to Ross, Morrison, and Lowther (2010), educational technology is capable of delivering characteristics that are distinctive from conventional (e.g. teacher-led) methods. Not only could an ICT-based education delivery strategy save time and costs, it will also enable the producer to reach a much wider target audience by making the instruction

accessible at various locations. Furthermore, an ICT-based learning platform also facilitates customization in terms of content variation, sequence, and feedback loops (Morrison, Ross, Kemp, & Kalman, 2010). By utilizing various multimedia tools such as visuals, sound effect, and music, the learning process will trigger learners on an emotional-cognitive level, thus resulting in a higher comprehension level (Bertacchini, et al., 2012), as well as improving students' interest in the subject matter being communicated (Klopfer, Osterweil, Groff, & Haas, 2009). Therefore, based on the aforementioned statements, the first sub-question is formulated as:

SQ1: *What forms of ICT-based literacy innovations are being created and who are their target audiences?*

Social innovation opportunities have always been established through a mixture of cultures: practical, scientific, technological, economic, business-related, etc. (Szell, 2012). Therefore, they cannot be established without the collaboration of others, thereby combining old and new innovative ways for a better innovative environment and for developing joint discourses (Mulgan, 2012; Szell, 2012). Consequently, social innovation also creates major challenges within the organization (Gustavsen, 2012), due to the need to take the surrounding circumstances into account. Therefore, a successful collaborative process works based on two principles: a sense of responsibility and hope, which is then further translated into different forms such as production, diffusion, and services. Therefore, the second sub-question is formulated as:

SQ2: *What challenges do these social entrepreneurs face in the collaboration process of production and dissemination of ICT-based literacy applications?*

An innovation that has been formulated from an idea needs not only an individual to orchestrate the daily operational activities, but also an extensive array of skillful marketing and promotion strategies that will attract the audience before it eventually transforms people's perspective and leads to consumption (Sen, 2006). The commercialization of ideas is difficult without external support as abundant ideas are already available in the market. Convincing external parties is not an easy task, especially for a new social venture, so even compelling ideas or innovations have to be tested in order to convince external stakeholders of their feasibility. One of the strategies for checking the marketability of ideas is by entering prize-based competitions. As explained by Arora (2016), the nature of prizes means they are viewed as an alternative source of funding for innovation in order to support business sustainability. However, it is also interesting to study the motive behind social entrepreneurs who enter prize-

based competitions, as they need a significant amount of capital to build such an innovation before it can actually be launched onto the designated market. Additionally, by acquiring information concerning social entrepreneurs' motivation, further recommendations for prize-based competition organizer (i.e. XPRIZE) is also provided. Therefore, the third sub-question is formulated as:

SQ3: *What motivates social entrepreneurs to enter a prize-based competition?*

As the concept of social entrepreneurship is understood and defined differently by various stakeholders (Mair & Marti, 2006; Weerawardena & Mort, 2006), the above questions are answered by using qualitative methods, specifically, content analysis and in-depth interviews. Saunders, Lewis, and Thornhill (2009) explained that qualitative methods are useful in an exploratory research in order to acquire a deeper understanding and new insights based on prior studies and capture the meaning from participants' perspectives and beliefs (Matthews & Ross, 2010; Passer, 2014). Additionally, qualitative methods are commonly used in the field of educational technology research (Ross, Morrison, & Lowther, 2010; Luo, 2011). Therefore, this thesis made use of the qualitative approach, specifically in-depth interviews and content analysis in order to explain the topics more meaningfully.

1.6 Thesis Layout

This thesis is organized as follows: first, the theoretical framework defines essential concepts in relation to the research questions, including literacy, the role of – and reasons for considering – the implementation of an ICT-based educational innovation, social entrepreneurship, discovering opportunities, and prize-based competitions. This is followed by the Methodology chapter that elaborates further on the research design and provides justification for the chosen qualitative methods and thematic analysis as the most suitable method for addressing the designated topics. Subsequently, in the results section I present the underlying patterns or themes and key findings that were derived from the interviews, and the content analysis is explained in relation to the theoretical framework. Finally, the discussion section delivers new insights on converting the research findings into valuable strategic solutions on how social entrepreneurs can implement digital-based educational technology in addressing literacy. Additionally, conclusion, limitations, and practical suggestions for future research are provided.

2. THEORETICAL FRAMEWORK

As already noted in the introduction, the aim of this thesis is to investigate how social entrepreneurs address literacy challenges through the implementation of ICT-based educational innovation by also taking into account prize-based competitions. The following paragraphs broadly introduce the underlying assumptions concerning the importance of addressing literacy, the framework concerning roles of ICT-based educational innovations, as well as considerations in implementing them. This is followed by a discussion of entrepreneurship and social entrepreneurs, elements that are related to the discovering opportunity presented in this Master's thesis. The justification for the focus is provided by highlighting the gap in research, thereby rationalizing the choices and approaches to the topic. Finally, to provide an overview of this thesis, a summary and a conceptual framework are provided at the end of this section.

2.1 Literacy

This section discusses literacy further as there are diverse interpretations that assisted the researcher in analyzing the type of application being produced by social entrepreneurs as well as the content being incorporated for the designated audience. In general, it is important to understand perceptions of literacy as viewed by social entrepreneurs because these influence how they produce, disseminate, and choose the target audience for their ICT-based educational innovation (which is explained comprehensively in the analysis chapter).

2.1.1 Definition and Advantages of Literacy

According to Fryer and Levitt (2004), a country with a highly illiterate population is characterized by having a high rate of drop-outs and failure at mathematics and reading tests. Literacy is viewed as a major contributor to capacity building (Kim, 2009). Literacy is defined by UNESCO (2005, p. 21) as the ability to 'identify, understand, interpret, create, communicate and compute using printed and written materials associated with various contexts. Literacy involves a continuum of learning that enables individuals to achieve their goals, develop their knowledge and potential, and participate fully in the community and wider society.' Alternatively, the Survey of Adult Skills of the Organization for Economic Cooperation and Development (OECD, 2014) defined literacy as "understanding, evaluating, using, and engaging with written text to participate in society, to achieve one's goals, and to develop one's knowledge and potential." The definition of literacy provided by UNESCO (2017) involves three critical components. Firstly, literacy in relation to means of communication and expression through various media. Secondly,

literacy is a plural and a concrete phenomenon. Therefore, literacy is practiced by incorporating specific languages in chosen contexts to attain particular goals. Thirdly, literacy involves the measurement of learning in a diverse spectrum or a continuum of proficiency levels that provides several benefits. By utilizing various media in a preferred context to achieve mastery, according to UNESCO (2006), the advantages of literacy are as follows: personal (i.e. self-esteem, self-confidence, and personal empowerment); cultural (i.e. questioning norms, cultural engagement); social (e.g. promoting health, family-related planning, life expectancy); economic (e.g. increasing income, employment opportunity). In general, literacy enables an individual to collaborate in both local and global society to realize developmental changes (Corus & Ozanne, 2011; Kim, 2009).

2.1.2 Approaches to Literacy

In an attempt to conceptualize literacy, UNESCO (2013) generated four approaches to grasp a proper understanding of literacy in relation to education and knowledge by considering wide-ranging disciplines.

Literacy as an autonomous set of skills. In this approach, literacy is viewed as a set of tangible fundamental skills, namely the distinct cognitive skills of reading and writing, numeracy, and access to knowledge and information. Access to knowledge and information skills are included as these refer to how the basic skills are applied in critical ways (e.g. questions, communication, exploration, expression) that can be of assistance in an individual's surroundings.

Literacy as applied, practiced and situated. This approach, which is widely-known as functional literacy, emphasizes the application of basic skills (i.e. reading, writing, and numeracy) in relevant contexts that affect an individual's overall socio-economic development.

Literacy as text. This approach to understanding literacy is based on viewing it by considering the 'subject matter' and the nature of production and consumption of texts by literate individuals. The core of this approach is to identify passages of text, also known as 'discourse.'

Literacy as a learning process. At its core, this final approach believes in the notion that literacy is an active learning process, instead of merely a product of intervention in educational settings. This type of approach to literacy is translated into forms of (1) 'task-conscious' learning, which is commonly used in literacy programs and typically measured by the execution of test-based tasks; and (2) 'learning-conscious' learning, which is measured from the learner's point of view. The end results of the learning process anticipate that the individual will progress

to a more profound level, e.g. interpreting, investigating, probing, theorizing, and thus acquire the ability to transform certain aspects dialogically.

Based on the abovementioned statements, this thesis argues that nowadays, literacy is not a simple dichotomous category consisting of literate/illiterate. To date, there has been little agreement on what literacy does concern. As explained by Kalantzis, Cope, and Harvey (2003), the rise of technologies and shifts in society have caused dramatic changes in the core concept of learners' literacy needs, thus resulting in the term 'Multiliteracies' being coined. From the perspective of Multiliteracies, scrutinizing the social and structural functions of emerging technologies is important because learners constantly need to cope with alteration and diversity by examining socio-cultural aspects, while remaining both autonomous and collaborative. Because literacy is also about critically facing an unknown text (being able to search for clues and generate new meaning), consequently, novel educational responses are also needed (Kalantzis, Cope, & Harvey, 2003; Elmborg, 2006).

The debate over literacy was also discussed by Gee (2010) and Gee (2000) who mentioned the context of New Literacy Studies (henceforth, NLS) as an emerging field of study. NLS view literacy as not only the cognitive activities of a person but also how he/she functions within society (Gee, 1999; Gee, 2000). In other words, NLS argue that literacy is more than just an intellectual activity: it is about sociocultural practices that are integrated into different meanings (e.g. interaction, technology, beliefs), and numerous contexts (e.g. schools, communities, workplaces). For example, people read and interpret a comic book differently depending on whether they are a fan, a cultural critique, or a fiction mythology writer. Thus, literacy becomes 'multiple' (Gee, 1999). Literacy has transformed from instrumental, skill-based classifications and become further oriented toward a comprehension of critical literacy as a culturally positioned occurrence that interrelates with the way societies construct meaning and belonging (Elmborg, 2006).

Therefore, this thesis attempt to investigate how this shift in literacy has affected digital novelty in education. What kind of literacy content is being produced by the innovator? What are the considerations and challenges when using technology to address literacy? One could assume that, with the freedom to adjust, and the large capacity of new technological devices, Multiliteracies can be dealt with in various ways in a sociocultural context. This thesis believes that, in today's world, literacy should also prepare an individual to face the future in a more comprehensive context, beyond the capability of reading, writing, and numeracy. As content is still debatable, the incorporation of technology might not be that simple, as it requires the prior analysis of many factors. In order to acquire a better understanding of the challenges faced

when addressing literacy by implementing technology, the next part focuses on roles and factors that influence the implementation of ICT-based educational technology and builds a constructive basis for the conceptual framework of this research.

2.2 Educational Technology Innovation for Literacy Development

2.2.1 Definition of Educational Technology Innovation

Before discussing educational technology innovation further, several related terminologies need to be explained. Daniel, West, and Mackintosh (2006, p. 5) defined technology as "the application of scientific and other organized knowledge to practical tasks by organizations consisting of people and machines." Innovation is interpreted as an action that potentially leads to "new products and processes" (Daneels, 2002, p.1096). The Organization for Economic Cooperation and Development (OECD, 2014, p .22) provides a further explanation of innovation in education by involving new products and practices "within classrooms and educational organizations, how teachers develop and use their pedagogical resources, and to what extent change can be linked to improvements that provide a substantial increase in the international education knowledge base."

Moreover, educational technology is defined by Januszewski and Molenda (2008, p. 1) as "facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources." Within this definition, 'facilitating' signifies that neither messages nor methods determine the learning results, because learning is internally controlled by the learner, and external parties can only influence the process. 'Processes' refers to sets of activities that lead to a designated outcome and 'resources' relates to high-tech equipment or aided tools, for instance, digital media, software, or learning management. In a broader sense, 'resources' may also involve people, communities, and even policymakers. Consequently, the abovementioned definitions are utilized in this thesis to guide the researcher in building a fundamental basic knowledge of how social entrepreneurs discover social business opportunities within the field of education. The functional perspectives in implementing an ICT-based education innovation are explained later in more detail.

2.2.2 Roles of Technology in the Learning Process: A Conceptual Framework

The literacy practices of younger generations are currently characterized by the utilization of technology (e.g. distance education, games), which over the past decade have become increasingly efficient (i.e. memory space), portable, and affordable (Flewitt, Messer, & Kucirkova, 2015; Ross, Morrison, & Lowther, 2010) in providing high-quality learning

experiences to an ever-widening market (Daniel, West, and Mackintosh, 2006). Moreover, ICT in educational innovation enables content to be delivered in a more engaging and interactive way (Kim, Miranda, Olaciregui, 2008; Owston, et al., 2009; Paraskeva, Mysirlaki, & Papagianni, 2010). Although access to technology is highly unevenly distributed in many contexts, ICT and distance learning are considered capable of providing immediate potential in improving literacy, thus leading to learning equivalency (UNESCO, 2006; UNESCO, 2015). Therefore, the demand for businesses to support literacy programs through digital media is critical because such support can contribute significantly to reducing poverty and encouraging the formation of an ecosystem that nurtures equality (Corus & Ozanne, 2011). From a more comprehensive perspective, the many roles of educational technology can be described as that of a tutor, teaching aid, and learning tool (Ross, Morrison, & Lowther, 2010), as explained below.

   Technology as a tutor. In the early years (1970s-1980s), research in educational technology applications emphasized computer-assisted instruction (henceforth, CAI) in relation to improving learning outcomes (Ross, Morrison, & Lowther, 2010). Nowadays, advanced CAI programs can supply lecture-type lessons and drill-and-practice exercises tailored to a learner's learning path or his/her personal needs (Naccarato, Pantano, & Tavernis, 2011). CAI is also being made in combination with engaging animation and graphics, making it much more interesting than textbooks as it facilitates interactivity (Ross, Morrison, & Lowther, 2010). Unlike teacher-led learning methods, technology is not prone to psychological factors such as boredom or stress that might influence the learning process (Morrison et al., 2010). Smeets (2005), who categorized this type of technology as skill-based transmission, revealed that an ICT-based learning environment helps to simplify a multifaceted process by acting as a facilitator in encouraging active learning and higher-order thinking. Several advantages have been identified by using technology as a tutor (Ross, Morrison, & Lowther, 2010): (1) enabling learners to practice on core content and skills while providing educators with independence to perform other tasks; (2) providing remedial instruction opportunities for low-achieving students; (3) assigning supplementary instruction for learners who cannot access teachers; and (4) assisting the standardized assessment of students by constructing lessons to increase familiarity.

   Technology as a teaching aid. In this role, technology is used to enable educators to increase engagement and effectiveness by generating, organizing and also delivering content or exercises and by incorporating multimedia elements. For instance, a program called 'Reading Reels' embeds several video segments and has built-in interactivity with an instructional type of exercise in designated lessons (Chambers, Slavin, Madden, & Gifford, 2008). In a recent British study, an interactive whiteboard with a preloaded instructional content was shown to have the

potential to facilitate the learning practice more efficient and engaging (Ross, Morrison, & Lowther, 2010). Moreover, a device called Interactive Classroom Communication Systems (widely known as "clickers") enables students to respond immediately to the teacher's exercise, and all answers are compiled instantly and displayed graphically. The advantages compared to non-technology aided teaching methods include: (1) providing immediate review or evaluation of a learner's performance; (2) organizing track records regarding a learner's progress so the teacher can evaluate and adjust the curriculum accordingly; and (3) increasing engagement so learners absorb teacher-led instruction.

Technology as a learning tool. Smeets (2005) called this an *open-ended constructivist* type of technology that functions as an instrument for assisting learners in shaping their knowledge. An example is a program called AVOIR, a collaborative project initiated by the University of the Western Cape that builds connections with other universities across Africa to bring together a course created by Free Open Source Software developers (Daniel, West, & Mackintosh, 2006). Throughout the entire program, learners are expected to produce scholastic and commercial results that will contribute to Africa's progress. The notion of AVOIR aligns with two main advantages cited by Ross, Morrison, and Lowther (2010) in their previous studies, namely: (1) the focus of the learning process is student-oriented, resulting in a more cooperative atmosphere; and (2) increasing learners' problem-solving skills.

Although this early research revolves around the computer as a medium, intermediate educational technology has developed various hardware, personalized software, and mobile applications that prioritize interactivity in order to enhance the learning process, hence resulting in emerging literacy skills (Gee, 2003; Nawaz & Kundi, 2010). Therefore, these basic principles of technology implementation in an educational setting are still relevant today. Scholars have long debated whether a technology-based instructional system is likely to generate better learning results than conventional methods. Previous scholars have proven that the two approaches are not that distinctive when it comes to comparing learning outcomes (Chambers, Slavin, Madden, & Gifford, 2008; Ross, Morrison, & Lowther, 2010). Moreover, both poorly designed ICT programs and predictable, disorganized lessons result in low test scores and decrease students' eagerness to learn. Previous studies have also shown not only that application in formal institutions is still limited to skill-based ICT use, but also that the percentage of courses containing ICT is minimal (Smeets & Mooij, 2001; Smeets, 2005).

More importantly, Smeets & Mooij, (2001) pointed out that a struggle frequently takes place between approving fixed principles relating to the learning design/development by educators (e.g. curriculum), and the actual activation of those principles in the classroom.

Smeets (2005) further explained that the educator should act more as a collaborative partner in delivering the most suitable student-centered learning experience. By acquiring insights from social entrepreneurs, this thesis explored the abovementioned issues in greater depth by serving as a guideline in analyzing their types of ICT-based educational innovations. The research picks up on the current discussion about the implementation of technology in an educational setting by exploring considerations in the design process, as discussed in the next section. This helped the researcher to analyze factors that might influence the type of educational technology being produced by social entrepreneurs.

2.2.3 Considerations in Designing Technology Innovation in Education

For a technology innovation to be successfully implemented, it needs to be translated and applied based on the challenges and opportunities within the environment in which it will operate. Several factors found to influence the production and implementation of ICT-based education are explained below by embedding within a case study of "Pocket School" devices that took place in Latin America (Kim, Miranda, & Olaciregui, 2008).

Location and cultural sensitivity. ICT-based learning innovation needs to be constructed by unfolding the practical problems that emerge in a particular place and due to pupils' specific circumstances. For example, children who live in isolated regions may have limited access to appropriate infrastructure and other resources (e.g. electricity, competent teachers, formal institutions) to support them during the course of their learning. Therefore, mobile learning could be an ultimate or single preference. Moreover, family culture must also be taken into consideration when developing appropriate learning content and devices. A study conducted by Kim, Miranda, & Olaciregui (2008) revealed that in almost all cases the parents of underprivileged children are unable to read or even speak the main local language. However, the universal beliefs applied to all situations and cultures are based on the notion that learning should be entertaining, self-accomplishing, and gratifying. Pocket School has been designed to be small and portable, and it is appropriate for an isolated area where there is a greater chance that formal institutions are nonexistent.

Practical usage. Regarding the isolation of an area, because of the absence of a service center and other support, the device provided should be able to endure high-risk conditions (e.g. scratch-resistant, water-resistant, and shock-resistant). Also, the user-interface and user-experience should organize learning materials, so they are handy and easy to operate and involve no unnecessary difficulties (Gee, 2003; Sharples, Corlett, & Westmancott, 2002). Furthermore, the content design for both software and hardware makes repetitive testing and

prototyping obligatory to assess which program would best guarantee mastering the designated material (Kim, Miranda, & Olaciregui, 2008). Pocket School devices are loaded with a literacy driver that requires a large memory capacity to optimize the contents visually and thus guide learners through the lessons easily.

Theoretical practicability. Although the sophistication of the ICT-based education program may seem attractive, learners will only become engaged in the learning process if it fulfills their personal needs and excites their intellectual inquisitiveness. Therefore, learners' prior knowledge and literacy skills need to be observed to improve an effective content that is capable of delivering them a meaningful and fruitful learning experience. For example, in rural areas, where text-reading ability may be limited, software that demonstrates and recites words out loud would provide learners a greater chance of grasping the knowledge.

This practicability includes three main elements. First, phonemic awareness, which is understanding that pronounced words are built up sequentially from detachable sounds (e.g. a combined series of sounds, identifying first sounds, recognizing rhyme). Pocket School is capable of creating a database for hundreds of multimedia-based words, lyrics, poems, and rhymes, which can be replayed incessantly. Second, alphabetic fluency, which aims at synchronization between audio (phonemes) and letters for the identification of words the learner will read. For instance, as mobile learning devices have a higher potential for enabling learners to create comprehensive artwork involving multimedia, this dramatically increases the possibility of developing a coherent, multiple-page e-book containing sentences and a visual template for each page. Lastly, reading fluency, which is the competency to read through text rapidly and efficiently without mindful effort by reciting and by frequent practice. In the case of Pocket School in Latin America, children who live in remote areas and do not communicate in Spanish as their mother tongue need a substantial introduction to new words. Hence, multimedia phrasebooks and short stories tailor-made to shape vocabularies would be an exceptional strength for this type of audience (Kim, Miranda, & Olaciregui, 2008).

Economic Scalability. Building schools and infrastructures, and providing competent teachers is much more time-consuming and expensive in remote areas, while technology devices can be produced much more cheaply. "Pocket School" simply requires mass production and this expense that can be reduced if the producers collaborate with governmental or other related international organizations to subsidize the manufacturing process and its dissemination.

Viable Scalability. In developing a mobile learning technology, various costs are usually involved in the repetitive cycles of iteration, production, modification, distribution, and field testing. Therefore, "Pocket School" needs strategic alliances with areas of expertise such as

those of developers, educators, and other social entrepreneurs who share the same vision of increased sustainability.

Innovators must also bear in mind how they want to address people's educational needs. According to Daniel, West, and Mackintosh (2006), three aspects of education are considered essential. First, as education for all is an immensely important goal for personal and national development, it needs to be *widely accessible*. Second and third, learners *require a high quality of education,* and *at minimal costs.* The study conducted by Daniel, West, and Mackintosh (2006) showed that as more countries start to achieve the objective of enrolling children into primary school, questions start to be raised about the quality of the education. The abovementioned three criteria for education are interconnected, which is why achieving education for all seems such a challenge (Daniel, West, and Mackintosh, 2006). For instance, if access to school is increased by making education free, this will cause an imbalance in the quantity and type of training required in producing competent educators. On the other hand, if the quality of education is increased by providing more books and lessons, the costs of studying will automatically increase, which immediately results in fewer people being able to access it. Therefore, the advanced feature provided by educational technology has the potential to balance these obstacles (Daniel, West, and Mackintosh, 2006; Semali & Asino, 2012).

Technology is not only capable of increasing access, but it can also provide an opportunity for improving quality through collaboration with fewer educators, while simultaneously reducing costs. An example is 'Pratham', a non-profit organization based in Mumbai. Its founder Madhav Chavan identified that the problem of illiteracy might be driven by the poor teaching methods of unsupervised and unskilled teachers, and also by the absolute deficiency of government responsibility for learning outcomes (Martin & Osberg, 2015). As education is mainly a political activity, educators must either agree to the terms that exist in the dominant ideology within a particular society as set by the government or intentionally resist and offer an entirely new alternative (Elmborg, 2006). These types of roles regarding digital innovation are identified in greater depth when coding the interview transcripts which acted as guidance when drawing up the analysis section regarding the themes that have emerged. In addition, the transcripts also assisted the researcher in observing the applications. Considering the implementation of an ICT-based educational innovation acts as guidance in dealing with the challenges faced by social entrepreneurs (SEs). Hence, this thesis sought to examine the gap that has arisen in educational issues and how it can be overcome by digital innovation created by entrepreneurs. The next section discusses the innovator, starting with a discussion of entrepreneurship and continuing with an explanation regarding social entrepreneurs.

2.3 Entrepreneurship and Entrepreneurs

The terms 'entrepreneur' and 'entrepreneurship', which derive from the original French word '*entreprendre',* meaning 'to take into one's hands' (Roberts & Woods, 2005), have received considerable attention from scholars over the course of the years. In the early 18th century, Richard Cantillon recognized the entrepreneur as a person who engaged in market exchanges at his/her own risk for the purpose of making a profit (Hébert & Link, 1989). Since then, three major entrepreneurial traditions have been built: the German tradition, which emphasizes the importance of innovation (Schumpeter, 1934); the Chicago tradition, which focuses on risk in relation to uncertainties (Knight, 1921); and the Austrian tradition, which emphasizes the need to perceive opportunities as this assumes that markets consist of individuals who possess distinctive knowledge, hence resulting in a disequilibrium (Kirzner, 1997).

Shane and Venkatamaran (2000) define entrepreneurship as "the scholarly examination of how, by whom, and with what effects opportunities to create future goods and services are discovered, evaluated, and exploited." Robert & Woods (2005) on the other hand, define an entrepreneur as someone who discovers, evaluates and exploits profitable opportunities by taking into account consequences, awareness of opportunity and needs for innovation. Hence, an entrepreneur believes in the notion of creating newness (i.e. innovation) as a primary driver that will disrupt and decompose the traditional system (Schumpeter, 1942; Schumpeter, 1934). The idea of pioneering future solutions, which is considered as a fundamental approach to entrepreneurial accomplishment, is followed by a challenging process when innovation is assembled (Brush, 2008; Martin & Osberg, 2015). According to Ireland and colleagues (2013), entrepreneurship accentuates the need to determine and align available resources (i.e. human, social/network, financial and technological) to tackle problems by exploring opportunities, obtaining competitive advantages, realizing personal growth, and establishing value.

Entrepreneurs have possibilities for establishing new mixtures of existing resources and integrating related individuals into the construction of public spheres (Steyaert & Katz, 2004). Entrepreneurship provides several benefits on an individual and a national level. A study by Van Praag and Versloot (2007) on the contribution of entrepreneurs to society, showed that entrepreneurs could create new opportunities through innovation and hence generate employment. Moreover, entrepreneurs are considered to have higher utility levels than employees, because they are associated with developmental effects involving productivity and competition, and with economic elements (Bornstein, 2004; Diochon, 2004; Van Praag & Versloot, 2007). Furthermore, entrepreneurs are defined by three key contributions to the development of an organization: (1) envisioning uncertainty within an environment; (2) enacting

the vision by providing clarity of direction and purpose from necessary resources; (3) enabling innovation by mobilizing the support of other pivotal persons (Thompson, Alvy, and Lees, 2000). Therefore, entrepreneurial activity can be viewed as an extension of the ideological approach, by becoming problem-solvers in dealing with the limitations of prevailing structures and thus assist society as a whole (Corus & Ozanne, 2011; Martin & Osberg, 2015).

Before the next section, the researcher would like to discuss several distinctive perspectives of innovators (i.e. entrepreneurs) in relation to educational technology, regarding the impact they wish to establish through their innovation (Petrie & Avery, 2011). Based on the Warschauer (1998) framework, the first approach, *Determinist*, associates technology with a guarantee of successful outcome regardless of the many multifaceted and dominant factors surrounding the implementation. The *Instrumentalist* approach states that technology is only a tool that does not directly impact a positive learning outcome. Furthermore, it implies that the results still depend on how thorough the technology is integrated into the lesson, favoring learning objectives, and managed by teachers. Lastly, the *Critical* position states that technology and the learning process has its own ecosystem and that any changes within it will slightly or radically affect the learning environment. These changes usually involve sociocultural aspects (e.g. power, communication patterns, infrastructures), that are identified as environmental dynamics which influence an organization's reason for existence (Weerawardena & Mort, 2006). In general, Warschauer (1998) dismisses the Determinist style, acknowledges the value of the Instrumental perspective, and encourages innovators to implement the Critical view of technology.

By examining how social entrepreneurs' digital innovations are being implemented, we will arrive at an understanding of how their views drove the establishment of the business and transformed it. As elaborated upon by Weerawardena and Mort (2006), the primary objective of building a social business influences how entrepreneurs act on risks, identify environmental obstacles, find a revenue model, and manage resources to guarantee its sustainability. The phenomenon of entrepreneurship has aroused the curiosity of many other scholarly disciplines to explore it further, as the themes surrounding the creation of opportunities (e.g. why, when, how, means of exploitation) are a profoundly interesting study topic (Shane & Venkatamaran, 2000). The objective of this thesis is to contribute to the notion of discovering opportunities in social entrepreneurship, as explained further in the next section.

2.4 Social Entrepreneurship

2.4.1 Definition of Social Entrepreneurship

Social entrepreneurship is regarded as a species in the genus of entrepreneur (Dees, 1998). Although social entrepreneurs (henceforth, SEs) have presumably existed for a considerable amount of time, it was not until three decades ago that academic literature started considering them as a distinct group of entrepreneurs (Short, Moss & Lumpkin, 2009, Choi & Majumdar, 2013). A social entrepreneur plays the role of a change agent in the social sector by adopting a mission to establish and maintain social value by identifying and pursuing new opportunities, engaging in a mechanism of continuous innovation, adaptation, and learning (Dees, 1998; Martin & Osberg, 2015; Wilson & Post, 2013), thus satisfying a gap involving social needs that the nation's system is incapable of fulfilling (Thompson, Alvy & Lees, 2000). Moreover, social entrepreneurship is known for having business models that place people first, overcome limitations in creative ways – which leads to entirely new directions – and foster collaboration (Szell 2012). Therefore, mission-related impact become the important criterion, and resources need to be shifted to be more economically productive businesses (Weerawardena & Mort, 2006; Dees, 1998).

Several researchers also underline the role of innovation in social entrepreneurship enterprises (Borins, 2000, Dees, 1998, Sahut & Peris-Ortiz, 2014; Weerawardena & Mort, 2006). As identified by Weerawardena and Mort (2006) in their study, innovativeness, risk management, and pro-activeness are central to social entrepreneurship practice. Additionally, based on the Schumpeterian perspective, innovation in social entrepreneurship focuses on the importance of technology and considers novel combinations of available resources as the primary foundation for a new product, production method, the creation of a new market, and for detecting supply sources and developing dissemination methods (Amit & Zott, 2001). Hence, the findings indicate that social entrepreneurship can be seen as a multidimensional model that is closely related with a behavioral manifestation. In summary, social entrepreneurs are individuals who thrive on innovation and learn to discover opportunities while also managing potential risks effectively to ensure sustainability. The distinctive element of commercial entrepreneurs and social entrepreneurs is located in the social impact that is generated by the innovation. This definition will be used as guidance in learning how social entrepreneurs run their businesses.

2.4.2 Distinctive Features and Characteristics of Social Entrepreneurship

According to Martin & Osberg (2015), social entrepreneurship has two important distinctive features. First, *actions*: direct and indirect. Direct action is where an individual becomes personally involved with the purpose of realizing a specific desired outcome. Indirect action is where an individual convinces another person or entity to take a particular action that will bring about the desired result. Second, *outcome*: maintenance improvement of an existing system; or transformation of the current system into an optimized system. Innovation is regarded as a continual process because it can be derived from an entirely new invention or a unique adaptation of an existing one (Noruzi et al., 2010). Furthermore, Martin and Osberg (2015) elaborated on the fact that social entrepreneurship has specific characteristics: (1) Identification of a stable but disruptive equilibrium as a result of marginalization; (2) Prototype, refining, and scaling the equilibrium-shift to provide a social value proposition that challenges policy-makers; (3) Forging a new stable equilibrium that disseminates new social values by creating a well-maintained ecosystem around it. Additionally, social entrepreneurship provides positive signals about caring for others and examples of goodwill and cooperation (Mair, Marti, & Ventresca, 2012). The following section elucidates how the characteristics and behavioral manifestation of a social entrepreneur can relate to opportunity discovery.

2.4.3 Discovering Opportunities for Social Entrepreneurs

"All acts of entrepreneurship start with the vision of an attractive opportunity" (Guclu, Dees & Anderson, 2002, p.1). Opportunity is defined by Austin et al. (2006) as the desired future condition which is distinguishable from the present one, and whereby the designated state is achievable. Entrepreneurial opportunities are the possibilities of involving new goods, services and raw materials, and organizing methods that open prospects for acquiring calculated amounts of profit in the long haul (Shane, 2000). Perseverance in the discovery process, aided by prior knowledge, results in the early detection of specific customers' problems, thus defining the target audience, and the purpose of the innovation (Shane & Venkataraman, 2000).

Previous scholars argued that the focus on the dynamics of the discovery, evaluation, and exploitation of opportunities should also be taken into account while developing an entrepreneurial idea (Guclu, Dees, & Anderson, 2002; Shane & Venkataraman, 2000). Thompson, Alvy, and Lees (2000), further argue that to foster social entrepreneurship, one should bring together people and ideas to identify opportunities and transform the ideas into a sustainable yet meaningful creation for society at large, since different persons within society have different beliefs and resources. For example, the advancement of technology stimulated

social entrepreneurs at 'Grameen' to produce a mobile phone that offers isolated villages better access to outside information, along with new business opportunities (Guclu, Dees, & Anderson, 2002). Hence, changes can ignite entrepreneurs to make a community feel empowered. According to Austin et al. (2006) – as well as Noruzi, Westover, and Rahimi (2010) – four elements need thoughtful contemplation on the part of social entrepreneurs to achieve greater comprehension regarding the process of discovering opportunities.

Market Failure. Social entrepreneurs step up in the event of social-market non-fulfillment. That is when commercial entrepreneurs fail to fill the gap in particular social needs because the consumers have limited buying powers. In addressing market failures, according to Noruzi, Westover, and Rahimi (2010), a social entrepreneur might encounter that there is no market (i.e. beneficiaries are unable to pay anything), a limited market (i.e. beneficiaries have a limited ability to pay), or a low-profit market (i.e. beneficiaries have the capacity to pay all the costs but the market is still underdeveloped, or investment in this market is subject to a higher risk). Subsequently, whenever commercial entrepreneurs leave a gap, this can represent a potential opportunity for social entrepreneurs.

Mission. The underlying purpose of social entrepreneurship is the establishment of social values for the public good. The creation of this social value is expressed by delivering solutions to immediate social problems (Austin et al., 2006; Dacin, Dacin & Tracey, 2011; Douglas, 2010), catalyzing social transformation (Alvord, Brown & Letts, 2004; Bornstein, 2004), while uncovering opportunities for joining forces with profit-oriented entrepreneurs in the future (Estrin, Mickiewicz & Stephan, 2013; Mair & Martí, 2006). The mission and vision of a social entrepreneur are always concerned with providing added value for underprivileged sections of a community (Thompshon, Alvy, & Lees, 2000). In Schumpeter's (1934) central concept, innovation is not only a primary driver in urging the revamping process, but also acts as a primary source of value creation.

Moreover, according to Sahlman (1996), through the mission statement, social values (i.e. deals) can be created in forms of a kind, consumers, timing, flexibility, and measurability. *Kind*: the SE needs to balance between financial rewards and non-financial rewards given to team members. *Consumers:* the SE considers his/her funders as primary clients since social consumers have less economic or market power to be involved in the transactional relationship with social enterprises. *Timing* and *Flexibility:* investors in social enterprises typically contribute fairly small, short-term amounts to capital needs, which explains why social entrepreneurs have to spend a significant amount of time allocating the grants to cover daily operational costs. *Measurability:* since the social impact is difficult to quantify, this can form a risk for investors.

Resources Mobilization. An organization built by an SE is designed to overcome social exclusion and enhance underprivileged market participation. Therefore, by addressing multifaceted social problems, an SE builds collaborative relationships with various stakeholders, thereby bridging diverse groups (Di Domenico, Haugh, & Tracey, 2010; Peredo & Chrisman, 2006), often at the cost of breaking down existing social barriers (Mair & Marti, 2009). Given the embedded social purpose, social entrepreneurs are faced with challenges in acquiring and maintaining human and financial resources to achieve sustainability.

Social entrepreneurship relies on a robust network (i.e. people, investors, and non-profit organizations) to circulate resources for funding and staffing, and also to maintain its sustainability (Sahlman, 1996). According to Noruzi et al. (2010), sustainability can be achieved through a combination of employing temporary skilled volunteers, obtaining donations and recognizing predictable long-term revenue sources (e.g. government, corporate, source-foundation, individuals). Thus, social entrepreneurs need to be able to clarify and communicate an inspiring mission as an appealing way of attracting, recruiting and retaining potential employees, partners, as well as a group of volunteers (Thompson, Alvis, & Lees, 2000). Moreover, they need to maintain their credibility and high reputation to foster people's confidence in collaborating with them, and finally succeed in delivering social values to their beneficiaries (Sahlman, 1996). In addition to this notion, social innovation opportunities are always established through a mixture of cultures: practical, scientific, technological, economic, and commercial (Szell, 2012). Thus, social innovations cannot be established without collaborating with others, and involve combining old and new innovative ways and developing joint discourses (Mulgan, 2012; Szell, 2012).

Performance Measurement. Since a social entrepreneurship generates social value, it faces greater challenges in measuring performance than commercial entrepreneurs who can rely more on quantifiable measures such as market share, customer satisfaction, et cetera. By calculating the real costs of social problems, followed by measuring the costs of interventions, social enterprises can quantify their impact in financial terms (Martin & Osberg, 2015). A role is also played by external relevant contexts – for example, the macro-economy, tax structure, socio-political ecosystem, technological advances, labor – that can influence the success or failure of an enterprise, but over which entrepreneurs have no control (Sahlman, 1996). These factors may determine potential opportunities for a new social enterprise and predict the outcomes.

Overall, the theoretical framework of this Master's thesis, which concerns literacy, roles of technology, and considerations in designing an ICT-based educational innovation, assisted the researcher in analyzing the type of ICT-based educational application made by social entrepreneurs by observing the application and reviewing the interview transcripts. Hence, it also aided in determining their target audience and the challenges faced in production and dissemination. By also incorporating the process of discovering opportunities, considerations regarding the implementation process were investigated more comprehensively, which assisted the researcher in generating a preliminary coding that could be further developed and which finally contributed to more insights in the analysis section. However noble a social business may be, the creativity of a social entrepreneur in acquiring access to capital and a network is essential for establishing ideas and maintaining their sustainability. As investors usually command foreseeable quarterly revenues, functioning separately from conventional capital markets may provide social entrepreneurs with greater freedom in their activities (Martin & Osberg, 2015). The following section reviews an alternative to private sector funding in the form of prize-based competitions.

2.5 Social Entrepreneurs' Motivations in Prize-based Competitions

The Internet and developments in communication technologies have provided unprecedented opportunities for accessing and incorporating diverse forms of knowledge across the globe. Regarding social business, as suggested by Yitshaki and Kropp (2016), governments often give a minimum of attention to providing social welfare, thus creating a gap between the fulfillment of social needs and social services. The lack of access to investment markets often forms a major barrier to accomplishing impact on a large scale (Martin & Osberg, 2015). Consequently, an alternative source of funding is intensely desired. Along with the steady growth of the philanthropic market and difficulties in accessing government funding for various fields (such as art, culture, and higher education), the innovative design mechanism from private sources for social initiatives by entrepreneurs has grown substantially in importance (Damianov & Peeters, 2015).

As a result, it has created a larger role for the private sector and other third party intermediaries in coping with social problems (Yitshaki & Kropp, 2016). A prize-based contest is one of the channels for gathering together social scientific knowledge practitioners from across the world to resolve social problems. This type of competition has proven to have an enormous potential for solving challenging problems in diverse disciplines by encouraging innovation (Acar & Ende, 2015; Kwong, Thompson, & Mei Cheung, 2012) and has motivated entrepreneurs to

scale up their impact (Yitshaki & Kropp, 2016). Previous researchers suggested that competitions have the intangible benefits of inspiring participants (i.e. entrepreneurs) to launch a business and encouraging them to have the faith to pursue their mission (Huster et al., 2017; Kotha, George, & Srikanth, 2013). Unfortunately, several scholars argue that, despite growing awareness, there is still too little academic discussion about the impact of social entrepreneurship competitions on a social business (Kwong, Thompson, & Mei Cheung, 2012; Ross & Byrd, 2011), thus resulting in a gap in the literature.

A study conducted by Huster et al. (2017) found that social entrepreneurship competitions acted primarily as an educational and motivational medium in assisting the development of entrepreneurs' enterprises because they offer enriched entrepreneurial skills, and amplify self-confidence, a readiness to proceed with calculated risks, and a spirit of resilience. Moreover, Huster et al. (2017) elaborate that there are three main reasons for a social entrepreneur to decide to join a competition, namely: the prestige and credibility that competition brings to the business, expanding networking, and the opportunity of gaining proper coaching and mentoring. Therefore, by nature, being part of a prize-based competition facilitates opportunity recognition (i.e. promotional), which motivates aspiring or emerging entrepreneurs to transform intentions or purposes into real, measurable and systematic actions (Acar & Ende, 2015, Yitshaki & Kropp, 2016). Also, collaborating with relevant parties (e.g. venture capitalist, clients, professionals, and other entrepreneurs) as a result of the networking opportunity will enhance their social innovation (Huffman & Quigley, 2002; Kwong, Thompson, & Mei Cheung, 2012).

Entrepreneurs who can exploit these opportunities have a chance to contribute to various social and economic phenomena, to have an impact on society based on technological progress, while maintaining business cycle sustainability (Alvarez, Barney, & Anderson, 2012). The rapid development of social enterprises has created a new and interesting sample to be studied with regard to the way they fund one another and collaborate (Lee, Battilana & Wang, 2014). Compared to a more traditional funding mechanism, the use of prizes in the field of ICT education has grown immensely during the last decade (Arora, 2016). Prizes in the ICT-based education sector often include common eligibility criteria such as objective clarification for social impact, how to maintain sustainability, scalability, relevance to beneficiaries, cost-effectiveness, functionality, and innovativeness (Arora, 2016). Specifically, basic literacy continues to be the priority among current prizes.

Two examples of a prize-based social entrepreneurship competition in the field of education are the Adult Literacy XPRIZE (hereafter: ALEXP) and Global Learning XPRIZE (hereafter: GLEXP). Both competitions are managed by the XPRIZE Foundation which was founded in 1995 in California (USA). ALEXP is a two-year (2016-2018) global competition worth seven million US dollar, designed to transform the lives of low-literacy adults by developing mobile applications for existing smart devices. The GLEXP is a competition lasting eighteen months, worth fifteen million US dollars, designed to empower children by improving their learning (i.e. reading, writing, and arithmetic) through open source and scalable software ("Global Learning XPRIZE," n.d).

XPRIZE has established an incentivized prize competition aimed at realizing a positive change in the form of achievable timely technological breakthroughs ("What is an XPRIZE," n.d). XPRIZE targets market failure, meaning one of the following: (1) no financial costs are being incurred; (2) funds are being spent, but are not achieving the desired result; (3) no funds are being spent because no one recognizes that there is a problem that needs solving; (4) the problem is known, but no one realizes that it is not already being addressed; and (5) no one is addressing it, since finding a solution is thought to be impossible ("What is an XPRIZE," n.d). Passion is the driving force for participation in each competition as no strict educational background is required ("What is an XPRIZE," n.d). Thus, anybody can participate in these competitions. The winner will be able to provide leverage to attract further investment (e.g. capital, support, team members). At the end of the day, XPRIZE expects the innovations will be seen as the start of a new industry, or as a transformation from an existing one with sustainable benefits for the greater good in the future ("What is an XPRIZE," n.d). Based on the findings presented from previous research, this thesis has investigated what motivates SEs to enter a prize-based competition such as XPRIZE, while also providing further recommendations for the organizers so that SE prize-based competitions will be even more valuable in the future.

2.6 Summary and Conceptual Framework

The rich theoretical framework provided by past scholars has provided the scientific basis for this Master's thesis to approach and investigate the main research question **[RQ]**: *How do social entrepreneurs address literacy challenges through their digital innovations?*
The theoretical framework stated that one of the results of educational inequalities involves literacy. Literacy has been defined, and its advantages have been observed from four approaches, namely based on human, cultural, social and economic returns. An alteration has taken place in the meaning of basic literacy (i.e. reading, writing, numeracy), transforming it into

Multiliteracies, which require more competencies in facing the 21st century. The introduction of the literacy concept acts as an umbrella theory that guides the creation of digital-based educational technology. This thesis argues that literacy is not a simple dichotomous category consisting of literate/illiterate. From the perspective of Multiliteracies, the notion of understanding literacy can be viewed from wider contexts (i.e. process, application, and discourse) by examining socio-cultural aspects (e.g. technology). Therefore, this thesis tries to investigate how this shift in the concept of literacy has affected digital novelty in the field of education. Furthermore, this thesis suggests that ICT-based education can be utilized not only as a tutor, but also as a teaching aid, or as a learning tool. As nations (i.e. governments) often do not prioritize education, social entrepreneurs may come to the rescue as problem-solvers. Therefore, by evaluating social entrepreneurs' digital innovation works, we can gain a precious understanding and insights into how social entrepreneurs transformed their views (i.e. determinist, instrumentalist, critical) and executed them in their business. As elaborated upon by Weewardena and Mort (2006), the primary objective of a social business influences how entrepreneurs respond to risks, identify environmental obstacles, find a revenue model, and manage resources to guarantee the sustainability of a business.

Drawing from the theoretical foundation for digital innovation proposed by Kim, Miranda, and Olaciregui (2008), before implementing their innovation, social entrepreneurs need to consider several aspects, such as location and cultural sensitivity, practical usage, theoretical practicability, viable scalability, and economic scalability. One of the fundamental assumptions is thus that, as a medium, technology is highly related to sociocultural aspects that can guarantee sustainability. In keeping with this, the framework of Kim, Miranda, and Olaciregui (2008) was chosen as a guide to the analysis of this research that was utilized in analyzing the implementation of the digital innovation. In addition, the theory of Austin et al. (2006) and Noruzi, Westover, and Rahimi (2010) on discovering opportunities was incorporated into the analysis in order to strengthen the arguments by pinpointing market failure, resource mobilization, mission, and performance measurement: aspects which all contribute to the successful implementation of an ICT-based educational innovation. The last part of the theoretical framework is a discussion of certain advantages and motives for social entrepreneurs to enroll in a prize-based competition as an alternative funding mechanism, and thus assist the development of the business in the long haul. The conceptual framework (see Figure 2.1) reveals the interconnection of selected concepts that were investigated, thus presenting an overview of the basis for this study.
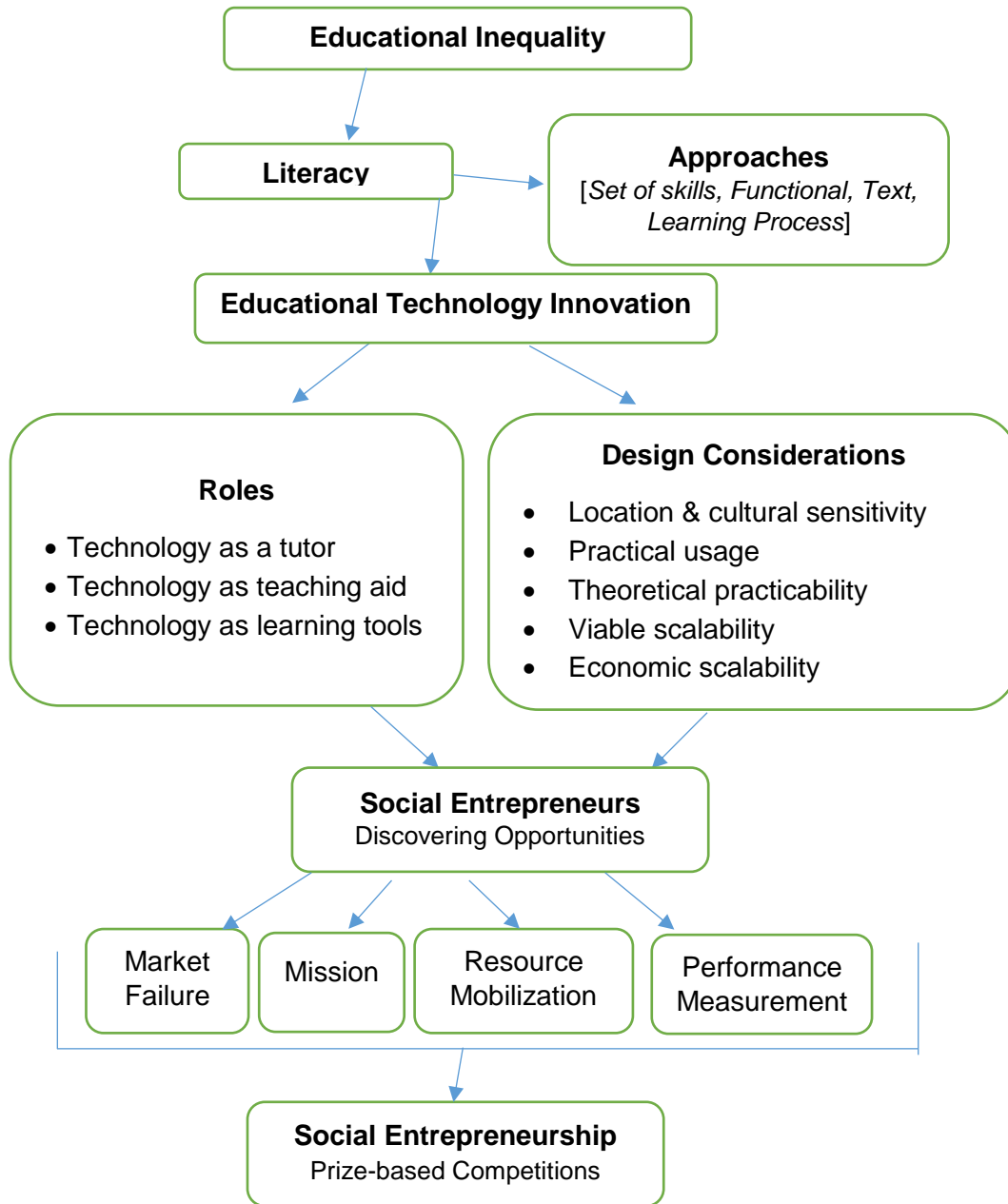
Figure 2.1 Conceptual Framework

3. METHODOLOGY

3.1 Research Design Justification

Qualitative research methods were chosen as the approach to investigating the main research question and the sub-questions within the realm of this thesis (see Table 3.1):

Table 3.1 Overview of research questions and accompanying methods

Main research question	How do social entrepreneurs address literacy challenges through their digital innovations?	Method: In-depth interview and Content Analysis
Sub-question 1	What forms of ICT-based literacy innovations are being created and who are the target audiences?	Method: In-depth interview and Content Analysis
Sub-question 2	What challenges do these social entrepreneurs face in the collaboration process of the production and dissemination phases of ICT-based literacy applications?	Method: In-depth interview
Sub-question 3	What motivates social entrepreneurs to enter a prize-based competition?	Method: In-depth interview

In order to answer the abovementioned questions, 12 social entrepreneurs agreed to form a research sample for this Master's thesis (see Table 3.2). The social entrepreneurs contacted were from the current Adult Literacy XPRIZE (hereafter: ALEXP) and Global Learning XPRIZE (hereafter: GLEXP) competitions which served as the research populations. One of the main considerations in choosing these competitions was based on a study conducted by Arora (2016) which listed ALEXP and GLEXP as the two largest social entrepreneurship's competitions out of 28 involving ICT-based educational innovation. In the current phase of the competition, XPRIZE has selected the officially registered teams based on their designated criteria, thus ensuring that social entrepreneurs sampled in this study have created digital innovations concerning education inequalities. Further explanation regarding the participants is provided in the sample section of within this chapter.

Table 3.2 Sample of social entrepreneurs who participated in this thesis

No.	INTERVIEWEES	ROLE/JOB POSITION	APPLICATIONS	LOCATION
1	Byron Davies	Founder	Black Swan Learning	U.S.A
2	Caspar Groeneveld	Director	Learn Smart Pakistan	Pakistan
3	David Goldberg	CEO	CSM Learn	U.S.A
4	Frank Ho	CEO	Auto Cognita	Hong Kong
5	Ira Sockowitz	CEO	Learning Game Studios	U.S.A
6	Isabelle Duston	CEO & Co-Founder	MoToLi	U.S.A
7	James Williams	CEO	We All Can Read	U.S.A
8	Jeanette Greeff	Founder	Leap to Know	South Africa
9	Jonathan Blank	CEO	Reading Kingdom	U.S.A
10	Neesha Desai	Chief Product Officer	Squiggle Park	Canada
11	Samir Jain	Founder	Bodha Guru Learning	India
12	Subhajit Roy	CEO	Gurukul (KHRISNA)	India

Silverman (2011, p.55) emphasizes that one of the main advantages of qualitative research is its ability to "study phenomena," which is not attainable if the quantitative method is applied. Moreover, Passer (2014) further explains that qualitative research is able to produce a holistic or thematic description and understanding of a phenomenon which is primarily acquired through generally unstructured, contextual and non-numeric datasets. Hence, it provides flexibility to explore numerous interpretations that emerge from the datasets (Berg & Lune, 2014; Gras, Moss, & Lumpkin, 2014). Additionally, implementing a qualitative method enriches the capacity to comprehend the 'how' and 'why' that occur in the same topic while it is also beneficial in examining organizational development practices, which are often interpreted differently by various stakeholders (Sofaer, 1999).

This thesis proposes to seek knowledge on the topics of how social entrepreneurs establish an ICT-based educational innovation and how they overcome the challenges faced in addressing literacy. Simultaneously, the motivators that drive social entrepreneurs to take part in a prize-based competition were also studied. Previous research regarding the subject of social entrepreneurship concluded that this type of research is hard to quantify (Lee, Battilana,

and Wang, 2014; Gras, Moss, & Lumpkin, 2014; Weerawardena & Mort, 2006). Moreover, qualitative methods are more frequently used in the field of educational technology research (Ross, Morrison, & Lowther, 2010; Luo, 2011). Furthermore, in respect of data collection methods, a study conducted by Lee, Battilana, and Wang (2014) found that the qualitative data collection methods used most frequently in social entrepreneurship are in-depth interviews and content analysis, which are discussed further in the next section.

3.2 Semi-Structured Interviews

In order to increase reliability when conducting content analysis study, researchers are encouraged to collect data from multiple sources with the aim of validating similar findings (Berg & Lune, 2014; Woodrum, 1984). This section discusses the semi-structured interview, which is defined as being "organized around a set of predetermined open-ended questions, with other questions emerging from the dialogue between the interviewer and interviewee" (DiCicco-Bloom & Crabtree, 2006, p.315). The purpose of using semi-structured interviews was to allow flexibility and to uncover implicit meanings, while still keeping to the objective of the inquiry and the theoretical framework (DiCicco-Bloom & Crabtree, 2006, p.315). In relation to multiple cases, interviews should resemble a guided conversation based on the research questions, rather than structured queries (Yin, 2014). An interview guide acts as an agenda for the interviewer with additional remarks to aid the interviewer's progress throughout the session (Robson, 2011; p.227). However, adaptation can be made to an extent, depending on the interviewee's response to a range of subjects (Matthews & Ross, 2010; p.221; Robson, 2011; p.279). Thus, using open-ended questions allowed a greater complexity of responses and enhanced the formation of questions and supplementary information as the researcher "can't anticipate the various ways in which people are likely to respond to a question." (Dillman, 1978, p.87). Therefore, throughout the interviews, the researcher can modify the questions to probe the respondent's perspectives in exploring main issues as they emerge (Dicicco-Bloom & Crabtree, 2006). The next section provides an explanation of the sampling method, participant selection, the sample, and the procedure.

3.2.1 Sampling Method

In qualitative research, the sample size is considered relative when it takes into account the type of investigation, available resources (i.e. financial, number of researchers), and time feasibility (Sandelowski, 1995). In qualitative research aimed at discerning the essence of experience on a certain topic (i.e. phenomenological studies), a minimum of six participants is

suggested by Morse (1994), while Creswell (2013) suggests five to 25 participants. An increasingly common design in research on social entrepreneurship is to compare data across multiple cases (Cooney, 2011; Lee, Battilana, & Wang, 2014). For example, Di Domenico, Haugh, and Tracey (2010) conducted a qualitative study of eight social enterprises in the United Kingdom to describe the process of building social enterprises. Another study, involving nine social entrepreneurship organizations, was conducted by Weerawardena and Mort (2006) to assess their business purpose.

In terms of the sampling procedure for a qualitative method, a key concern is that each sample must have the same probability as all other samples being represented (McMillan, 2000; Woodrum, 1984). Hence, random sampling was implemented using a known population. The basis for this implementation was also utilized in a previous study, led by Liu and Ko (2012), on how nonprofit organizations learn their market capabilities by opting for charity retail businesses in the United Kingdom. Liu and Ko (2012) identified the sample by randomly selecting and contacting 90 organizations from a pre-existing database, which group was subsequently reduced to a final sample of eight organizations that fitted the characteristics and were willing to participate. Therefore, based on the abovementioned studies, this thesis applied a similar sampling method by randomly contacting social entrepreneurs of a known population, namely participants in the ALEXP and GLEXP competitions. XPRIZE, as the largest social enterprise intermediary in the field of prize-based competitions for social entrepreneurs, aims to incentivize teams by catalyzing investment and innovation within an educational sphere. Thus, this ensures that the registered participants are representative as a population of high-potential social entrepreneurs (Lee, Battilana, Wang, 2014).

3.2.2 Invitation to Participate

Out of a total population of 244 registered teams from the ALEXP and GLEXP competitions, 163 teams (67%) did not have any email or website that would enable correspondence. An email was sent to the other 81 teams containing: an introduction to the researcher, an explanation regarding the purpose and scope of the study, and an interview schedule (see Appendix A). The email was sent over the period 20 March–5 April 2017, requesting team leaders to voluntarily partake in this thesis. The interviews, which lasted approximately 43-65 minutes, were conducted in the period 5–18 April 2017, thereby taking into account the availability of the interviewees. Of the 81 teams approached, 33 teams could not participate for various reasons (e.g. did not have time to build the innovation, had discontinued the innovation); one team withdrew from the scheduled interview because of a scheduling conflict, and one team was

excluded because the interview could not be finished on schedule. The remaining 34 teams did not reply to the initial invitation email. E-mail reminders were sent six and ten days later in the hope of prompting a response. Individuals were also contacted via Twitter and Facebook to optimize the response rate. Thus, this Master's thesis focused on a sample of registered teams that were available to be contacted and willing to participate. In total, 12 organizations took part in this Master´s thesis, which exceeds the average range of six to nine organizations in previous studies on a similar topic (Di Domenico, Haugh, & Tracey, 2010; Weerawardena & Mort, 2006). A more detailed explanation of the participants is provided in the next section.

3.2.3 Sample

The sample consisted of 12 social entrepreneurs (see Table 3.2) involved in an ICT-based digital educational innovation who were participating in either the ALEXP or the GLEXP competition or in both. Only one team (i.e. Auto Cognita) participated in both competitions simultaneously. Participants who had joined the GLEXP are: Leap to Know, KHRISNA (Gurukul), Education App for All (MoToLi), Learn Smart Pakistan, Bodha Guru, Black Swan Learning, and Squiggle Park. Participants who had joined the ALEXP are CSM Learn, Reading Kingdom, We All Can Read, and Learning Games Studios (XENOS). The following explanation of characteristics is divided into two aspects: the interviewee's demographics and the related organization.

 The participants' ages ranged from 30 to 63 years old, and the majority of them were males (n=10). The level of education showed that the participants held a minimum of a Bachelor's Degree, while the highest had a Doctorate Degree (Ph.D.), and half of them had a Master's Degree with a range of majors. The interviews were conducted with the principal decision-maker of each of the organizations, as they are regarded as the individuals who possess a broad knowledge and who adhere to a specific philosophy regarding the characteristics of the organization, its long-term strategy and its performance (Weerawardena & Mort, 2006). Of those who participated in the research for this Master's thesis, 11 were chief executives or founders, and one held a position as a Director.

 Organizational characteristics, in terms of country of origin, show that the majority of organizations were based in the United States of America (n=6), followed by India (n=2) and the other four were from Pakistan, Hong Kong, Canada, and South Africa. The social enterprises were established between 2006 and 2016. In other words, the oldest organization that participated in this thesis had been operating its social business for 11 years, and the youngest

for slightly more than a year. Based on current numbers of employees, the organizations' scales ranged from employing one to 55 workers.

In connection with the competition phase, of the 12 participants, two organizations (i.e. Squiggle Park and Bodha Guru) stated during the interview that they had not been competing in the second phase of the GLEXP competition since January 2017, as they had already launched the digital innovation themselves. The researcher decided to retain these two respondents based on four main considerations. First, all 12 participants had not been treated differently by XPRIZE when developing their innovation. Second, the digital innovation established by these two organizations was currently being utilized in real educational settings. Third, the two participants offered valuable information that contributed to a broader understanding of the designated topics. And, last but not least, those two participants can be used as 'triangulation' to optimize the range of data derived from the other 10 participants.

Triangulation has been defined as "essentially providing multiple measures of the same phenomenon" (Yin, 2014, p.99). As Sofaer (1999) explains, the notion of 'triangulation' is often used by qualitative researchers to recognize the minimum that all participants seem to agree on by scrutinizing different perspectives. In addition, the type of triangulation employed in this Master's thesis to achieve a more holistic analysis is classified as 'data source' (Knafl & Breitmayer, 1991). Based on the principles of knowledge convergence and the confirmation of findings, the collection and appraisal of this type of data are capable of improving the data quality and capturing a more expansive interpretation of the unit under study, thus increasing the validity of the research (Knafl & Breitmayer, 1991).

Based on a prior study conducted by Herring (2004) regarding computer-mediated communication, this Master's thesis applied a similar sampling method known as the participant-based method. Therefore, the sample includes not only interview transcripts, but also the available ICT-based educational innovations related to the social entrepreneurs being studied. For various reasons, not all digital innovations of the 12 participants were available for examination (e.g. a demo could not be provided, still in the prototyping process, and confidentiality). Therefore, based on accessibility, the researcher only had access to nine digital educational innovations which were available for analysis. These are as follows: Learn Smart Pakistan, CSM Learn, Auto Cognita, We All Can Read, Reading Kingdom, and Squiggle Park. Three ICT-based innovations were only accessible via a video demo: Gurukul (KHRISNA), Mother Tongue Language (MoToLi), Bodha Guru, and Learning Games Studios. Two applications could not be accessed as they were still under development (confidentiality): Black

Swan Learning and Leap to Know. In addition, information that was available was also obtained from the participants' official websites and served to enhance the analysis.

3.2.4 Procedure

Prior to an interview session, an interview guide was designed to assist the researcher during the data collection process. The questions were designed to be open-ended to widen the ensuing discussion and further provoke the views and opinions of the participants (Creswell, 2013). The interview guide focused on the topics determined by the essential concepts gained from the conceptual framework, which was divided into four categories: social entrepreneurship, literacy, educational ICT-based innovation, the collaboration process in production and dissemination, and motivation to enter a prize-based competition. The corresponding semi-structured interview guide used for this research is provided in the appendix (see Appendix B). Additional relevant documents regarding the organization were studied prior to the interview process, which assisted the thematic analysis, and post-research inquiries (Creswell, 2013).

After the interview schedule had been set, the interview guide was sent to the interviews two days in advance in order to give the participant sufficient time to prepare. Although the researcher mainly aimed at conducting face-to-face interviews, taking into account time constraints, geo-location, and financial resources, as suggested by qualitative researchers (Creswell, 2013; Sturges & Hanrahan, 2004), interviews are still justified if conducted online via computer-mediated communication (e.g. Skype). Therefore, use was made of computer-mediated communication (henceforth, CMC) in this Master's thesis whereby the interviewer and the individual interviewees took part in a real-time audio and video conversation via a live messenger (e.g. Skype, Facetime, WhatsApp).

CMC is regarded as more akin to a face-to-face interview since it involves the same preparation (Babbie, 2010; Sturges & Hanrahan, 2004). One obvious disadvantage of the CMC interview method is that it sacrifices the researcher's ability to observe informal and non-verbal communication shown by interviewees (Creswell, 2013). Each interview session started with a general introduction to the researcher's background to build up a rapport. This was followed by additional elaborative information regarding the research outlook and briefly reminding the interviewee of the outline topics. Finally, explanations concerning the confidentiality of responses and a request for permission to record the interview session were provided digitally. Upon closing the interview session, each participant was asked whether there were any additional suggestions for topics to discuss or modifications to be made and was then informed that the researcher might contact him/her again if necessary.

3.3 Qualitative Content Analysis

In innovation and social entrepreneurship spheres, content analysis (henceforth, CA) is often conducted to tap constructs and concepts embedded within the perspective of founders (i.e. beliefs, attitudes, organizations), concerning best practices to tackle social issues for marginalized groups (Alvord, Brown, & Letts, 2004; Johnson & LaMontagne, 1993). Berg and Lune (2014; p.335) defined CA as "a careful, detailed, systematic examination and interpretation of a particular body of material to identify patterns, themes, biases, and meanings." Krippendorff (2004, p.18) on the other hand, defined CA as "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use." Its goal is "to identify important themes or categories within a body of content, and provide a rich description of the social reality created by themes/categories as they are lived out in a particular setting" (Zhang & Wildemuth, 2009, p.318), from within an unstructured and large volume of data (Berg & Lune, 2014). Hence, CA is used to discern origins within dataset that tend to be overlooked in structured methods (Krippendorff, 2004). In order to transform the dataset to answer the proposed research questions, the researcher applies analytical constructs which can be derived from: (1) current theories or practices; (2) experts' knowledge or know-how; and also (3) preceding research (Krippendorff, 2004).

3.3.1 Unit of Analysis

According to Berg and Lune (2014), researchers must determine which units of analysis will be included by implementing content analysis strategy. The key aspect is that the data are not only useful in providing relevant evidence to answer the research questions, but they also need to be able to deliver a particular message between the sender and receiver (White & Marsh, 2006). Kippendorff (2004, p.18) widened text to include "other meaningful matter," which might involve, for instance, images on a Web site (White & Marsh, 2006). Therefore, visualization can also be subjected to content analysis either independently or by observing patterns and relationships between images and text (White & Marsh, 2006). In analyzing the dataset, this thesis was inspired by previous research conducted by Marsh and White (2003, p.652), which stressed the connections between images and text segments (i.e. strings of words). By adopting the same analogy, in order to enhance the analysis, this thesis identified general patterns related to text segments derived from the digital innovations created by social entrepreneurs.

Frequently, the text is related to what precedes and follows it (White & Marsh, 2006). For example, in this thesis, an overview of social entrepreneurs' digital innovations was drawn up prior to the interview. This provided an initial characterization of the social entrepreneurs'

innovations by identifying key features (McMillan, 2000). Next, after the interview transcriptions had been completed, the researcher re-evaluated the content of the ICT-based innovations in relation to the theoretical framework and connected it to insights received from the social entrepreneurs. Hence, a general theme was generated. The textual content analysis consists of seven major elements that can be included: words or terms, themes, characters, paragraphs, items, concepts, and semantics (Berg & Lune, 2014). In the realm of this Master's thesis, only relevant phrases in the transcriptions were used for reporting analyses in order to answer the predetermined research questions; these are described in more detail in the data analysis section.

Additionally, in analyzing the digital innovation, the focus was not only on the text, but rather on how the innovation functioned either as a tutor, a teaching aid, or a learning tool (Ross, Morrison, & Lowther, 2010), and on the types of literacy (UNESCO, 2006) that it addresses based on the theoretical framework. That theoretical framework was also used as a pre-determined coding, while the researcher also allowed possibilities for other themes to arise. Overall, the initial patterns that emerged in the analysis of the digital innovations and the interviews were examined in relation to theoretical assumptions, as well as deviations from these. Hence, this method also functioned as 'triangulation' as explained earlier. The following section discusses the data analysis procedure in more detail.

3.4 Data Analysis: Thematic Analysis

The introduction of thematic analysis by scholars as a method of analyzing qualitative data goes beyond the quantification of plain words or sentences (Guest, MacQueen, & Namey, 2012). Instead, as explained by Corbin and Strauss (1990), the thematic analysis focuses on the identification and description of both implicit and explicit ideas within the dataset to arrive at particular themes by elaborating categories into related dimensions (Vaismoradi & Turunen, 2013). Thematic analysis is viewed as the appropriate method of analysis, as the purpose of this Master's thesis can be achieved by identifying, analyzing, and depicting common themes or patterns that extend across an entire set of texts (Braun & Clarke, 2006; Ten Have, 2014), which is essential to describe the topics (Fereday & Muir-Cochrane, 2006). Thematic analysis is independent of theoretical commitments of grounded theory, so it provides the flexibility that allows themes to emerge from rich yet complex data (Braun & Clarke, 2006; Vaismoradi, Turunen, & Bondas, 2013). Therefore, the analysis is regarded as a dynamic mechanism whereby the researcher collects, evaluates, reflects, clarifies, and utilizes various creative procedures to decipher analytical issues and address unusual circumstances in a way that

permits classification into conceptual statements (Corbin & Strauss, 1990). Although the researcher's flexibility of judgment is needed to determine a theme, it is also immensely important to differentiate between 'hearing' what the data are actually saying, and what the researcher wishes them to say (Braun & Clarke, 2006; Corbin & Strauss, 1990).

The analytic process progresses from description to interpretation. The researcher first observes for repeated semantic patterns across the data and interprets the significance and meaning of the themes by referring to the theoretical framework (Braun & Clarke, 2006). The procedure from text description to interpretation is made explicit by using a thematic network (Attride-Stirling, 2001; Braun & Clarke, 2006). A thematic network depicts the prevalent themes at three levels of coding (i.e. themes) and demonstrates relationships between them: open coding, axial coding, selective coding, after which the data are processed into valuable overarching categories (Boeije, 2010). Thematic analysis was chosen to guide the analysis of the in-depth interviews conducted for this Master's thesis because of its explorative nature, rigor, and flexibility, as attested by previous scholars. Riessman (2008, p.112) emphasized that reliability has regularly been addressed as being harder to implement with this method since "more interpretation goes into defining the data items (i.e. codes) as well as applying the codes to a chunk of text." Despite challenges concerning reliability, the thematic analysis is regarded as the most useful method in trying to identify complexities of meanings within a word-based dataset (Riessman, 2008; Vaismoradi, Turunen, & Bondas, 2013).

There are two approaches to identifying themes within text in a thematic analysis: inductive and theoretical thematic analysis (Braun & Clarke, 2006). In this thesis, the theoretical thematic analysis was used whereby the analysis was based on the researcher's pre-existing theoretical interest. The process of coding is thus guided by the proposed research question and done primarily at a semantic level which derives from a realist/essentialist paradigm in which the researcher assumes a unidirectional relationship between experience, meaning, and language (Braun & Clarke, 2006). In order to gain valuable insights, the analysis was performed in five steps as suggested by Braun and Clarke (2006). First, familiarization with the data, after the interviews were recorded and transcribed through manual transcription: the researcher repeatedly read through the entire data. The transcripts of 12 conducted interviews can be found in the Annex section accompanying this Master's thesis (see Annex A). The data were subsequently reduced to the most relevant content in the process of open coding.

The second step is to generate the initial code. In this phase, the researcher coded interesting features of the data systematically using open coding, axial coding, and selective coding. The 'open coding' requires the researcher to read and recheck the text for in-depth

analysis and to recognize any concepts that become visible by critically evaluating the data (Babbie, 2010). Open-coding is described as "descriptive and low-inference" and it "increases the conceptual level of the data" (Boyce & Neale, 2006, p.179). Even though the open-coding structure is non-evasive, the general scope of the researched themes was kept in mind whilst re-reading the texts. 'Axial coding' generally appeared from the open coding as the two are interrelated with one another (Boyce & Neale, 2006; Guest & MacQueen, 2008), and aimed "to identify the *core* concepts in the study." (Babbie, 2010, p.423). Thus, previously identified concepts can be re-grouped according to larger key themes present. After identifying the larger key themes, the researcher's final step within the coding scheme is to create a 'selective coding.' In this last step of the coding process, all the previous themes and concepts are further conceptualized and integrated in order to determine the few *central* themes present within the text (Babbie, 2010; Boyce & Neale, 2006), which then assist the researcher in focusing on and developing the analysis (Howitt & Cramer, 2008).

The third step is to search for themes, which involves sorting various kind of codes into potential themes while also combining all relevant coded data extracts within identified themes to create overarching themes. For instance, in order to answer the third sub-question, *what encouraged social entrepreneurs to join a prize-based competition*, the category "product development" and "skill enrichment" were merged with the main theme "guidance for improvement." Documentation of the various coding steps performed in the thematic analysis is available in the external annex accompanying this Master's thesis (see Annex B).

The fourth step is to review themes. In this step, themes that emerged were refined and evaluated while simultaneously rechecking the supporting quotations. The fifth step is to define and name themes, which involves detecting the essence of each theme and opting for whichever feature of the data encapsulates each theme. Again, the accompanying narratives were rechecked to assure the production of a coherent story in the results chapter. The five steps are followed by written analysis to outline themes that emerged in relation to the abovementioned research questions, also by providing supporting evidence derived from the dataset. It is important to embed the relevant theoretical framework to support and create arguments regarding the notion. Moreover, by triangulating two qualitative methods, namely content analysis and the in-depth semi-structured interviews, in combination with data gathering from a different group of participants who were not in part of the XPRIZE competition but who still continued to establish their digital innovation, the researcher aims to answer the main research question and explore the research question: *how do social entrepreneurs address literacy challenges through their digital innovations?*

4. RESULTS & DISCUSSION

The following chapter analyzes the data collected in the 12 semi-structured interviews with social entrepreneurs within the realm of ICT-based educational innovation. Additionally, analysis of their social innovation is also included. As already elucidated in the methodological framework, the interview questions were structured according to four main areas: social entrepreneurship, literacy, collaboration in production and implementation, ICT-based educational innovation, and prize-based competition. Conducting a thematic analysis of the collected data resulted in additional themes emerging. Three sub-questions were created in order to aid the investigation of the main research question. Therefore, each section is divided based on the prevalent sub-question, which is followed by an explanation of the themes that emerged within each question, along with the conclusion and critical analysis in relation to supplement or refine the theoretical framework.

Overview of Findings
Based on the sub-questions mentioned previously in the Introduction and Methodological chapters, emerging patterns were detected in the dataset. The analyses led to several main themes as follows:

SQ1: *What forms of ICT-based literacy innovations are being created and who are their target audiences?*

Themes: *Technology as a tutor, Technology as a teaching aid, and Technology as a learning tool.*

The analysis highlights the contradictions currently present between the nature of innovation in educational technology being used autonomously and its use as a teaching aid. Though all digital innovation mentioned the effectiveness of utilizing their innovation in the education sphere, discrepancies were found between viewing technology as a tutor, as teaching aid, and as a learning tool. Moreover, in respect of the audience, although the claim for inclusivity to provide educational equalities does arise, in order for SEs to be able to incorporate their technology as an educational tool, the audience needs to be targeted. An educational innovation is not for all audiences. However, from a business sense, all of these innovations targeted organizations to finance their innovation, whether they were schools, non-governmental organizations, or commercial companies. In addition, the analysis also highlighted types of literacy being incorporated based on the digital innovation.

SQ2: *What challenges do these social entrepreneurs face in the collaboration process of the production and dissemination phases of ICT-based literacy applications?*

Themes: *Location and cultural sensitivity (lack of qualified teachers, lack of supporting infrastructure, market characteristics), Practical usage (software and device compatibility, data analytics, feedback mechanisms), Theoretical practicability (personalized and general content), Economic scalability (monetization, credibility of the innovation), Viable scalability, and Strategic alliance establishment.*

The analysis of this section highlights that educational innovations need to be supported by a conducive ecosystem because, as mentioned in the framework, education is a profoundly political act. Many factors are capable of contributing to the success of a digital innovation. For instance, a social enterprise may have knowledge of content, or expertise in technology, but if it cannot map out the locality and culture where the application will be used, or cannot establish good networking with government or school education, then it may jeopardize its success rate in improving the learning outcome. Moreover, the analysis extends the theory to include the capability of acquiring a strategic partnership. A theory mentioned previously in the framework explains most external factors, but disregarded the internal problem of how a social enterprise operates.

SQ3: What motivates social entrepreneurs to enter a prize-based competition?

Themes: *Social motives, Recognition in innovation, Interconnected network, Guidance for improvement.*

The analysis of this section highlights the contradictory belief that prize-based competitions (henceforth, PBC) encourages innovation, as there are rules by which competitors have to abide. Besides resulting in four themes, four recommendations are provided based on the analysis of the interviews. This section also raises the matter of tension between maintaining idealism of a PBC while also realizing the need to be supported by the advertiser. As an intermediary, a prize-based competition is a business model that works in a multi-sided market (i.e., users, advertisers, sponsors, community), which means it is difficult to satisfy everyone involved. Additionally, further recommendations for prize-based organizers are provided in terms of mentorship, marketing strategy, incentive variation, and platformization.

4.1 Forms of ICT-based Literacy Innovations and Target Audience

SQ1: *What forms of ICT-based literacy innovations are being created and who are their target audiences?*

In order to acquire insights on sub-question 1, this section starts with describing social entrepreneurs' (henceforth, SEs) target audience by the types of literacy in which they incorporate. Followed by an explanation regarding forms of ICT-based literacy innovations created by SEs by analyzing it based on how SEs perceive the role of educational technology. Although 12 SEs were interviewed, the researcher only able to gain trial access to seven innovations to illustrate the experience which enhances the analysis of interviews (see Table 4.1).

Table 4.1 List of ICT-based innovation and additional sources of observation

ICT-based Innovation	Additional Observation		
	Video Demo	**Application Trial**	**Web Info**
Auto Cognita	❖	❖	❖
We All Can Read	❖	❖	❖
CSM Learning	❖	❖	
XENOS	❖		❖
Reading Kingdom	❖	❖	❖
Leap to Know	Confidential/In-Progress		
Black Swan Learning	Confidential/In-Progress		
Squiggle Park	❖	❖	❖
MoToLi	❖		❖
Gurukul	❖		
Bodha Guru	❖	❖	❖
Learn Smart Pakistan	❖	❖	❖

4.1.1 Target Audience

In order to understand the target audience at which SEs are aiming, this subsection is divided into two main themes: business-to-business (henceforth, B2B) and business-to-customer (henceforth: B2C). In determining the target audience, it really depends on the content of the platform, especially when trying to reach individual learners (B2C). However, selling the innovation to organizations (B2B) seems to apply to all SEs, regardless of the types of literacies

incorporated within the services. Based on the analysis of the interviews, the question remains, can ICT be designed for all? Or is it should be made targeted? These questions are dealt with at the end of this section.

4.1.1.1 Business-to-Business

In describing a business-to-business (henceforth: B2B) audience, this analysis also takes into account ICT-based educational innovations that have not yet been released but which already have a general pattern of who their target audience will be. As previously mentioned in the framework, SEs may serve an underprivileged market that does not have the capacity to buy the product, so collaboration with organizations is seen as an alternative means to support the implementation. More than half of the SEs also targeted the possibility of working with a non-governmental organization (henceforth, NGO) to support their dissemination, as most of them realized that the users and the payers will be from different sources. For instance, Jeanette Greff (Founder of Leap to Know) explained the importance of NGOs as their sponsors as follows: "*this app will be distributed to rural schools and we don't really believe that they have the money to pay.*" The finding corresponds to the findings of Noruzi, Westover, and Rahimi (2010) and Austin et al. (20016) who explained that SEs might face the condition of no market, a limited market (supported by beneficiaries), or a low-profit market.

All 12 SEs targeted organizations to disseminate their innovation. 10 out of 12 SEs targeted educational intermediaries (i.e. school, universities, tutors centers) to reach out to learners. Does this mean that every school is able to access the same technology? Neesha Desai (Chief Product Officer of Squiggle Park) elaborated the notion by explaining: "*we are looking primarily at schools that we know can pay. They are the one who are reaching these learners, who are struggling, and they often give extra funds to help them out.*" Another practical strategy concerning schools was that done by Caspar Groeneveld (Learning Director of Learn Smart Pakistan) who went to schools' network gatherings in Pakistan and conducted product demos to showcase Learn Smart Pakistan.

As for more established SEs, four SEs also applied the method called Software as a System (SaaS) to deliver their product. For example, Ira Sockowitz (Chief Executive Officer of XENOS) exclusively sells it to major organizations and aims at adult learners, "*because it's a better business model to deal directly with the organizations.*" Overall, all the SEs demonstrated the importance of targeting a B2B audience, as it will enhance their business in terms of reaching out to end-users, offer financial support and enable them to acquire relevant feedback thus resulting in a higher credibility for the innovation.

4.1.1.2 Business-to-Customer

Although all SEs' end-users are individual learners, three of the SEs targeted mainly adult learners because their innovation contain functional literacy within a larger context which requires a higher level of comprehension in understanding the given task. For instance, David Goldberg (Chief Executive Officer of CSM Learn) included professional workers (such as C-level learners) by aiming to generate high-performance learners through CSM Learn, which focuses on problem-solving skills. Meanwhile, Sockowitz cooperates with the hospitality industry to target the Hispanic people to learn English as a second language. For Goldberg and Sockowitz, the literacy embedded in their innovation is viewed as applied, practiced, and situated, aiming to provide progression in learners' socio-economic aspects (UNESCO, 2012).

Meanwhile, the audience targeted by 75% of SEs was students in the K-12 range. Eight of the SEs incorporated basic (i.e. foundational) literacy in their applications, which means they also accommodate illiterate learners. Meanwhile, Learn Smart Pakistan is the only ICT-based innovation which directly targeted only 9th and 10th Grade students to improve their skills in advanced Mathematics and English in accordance with the national curriculum. Two of the SEs explicitly mentioned their concerns about learners from low-income families and those from rural districts with no access to high-quality education. For example, Subhajit Roy (Chief Executive Officer of Bodha Guru) explained that in rural districts of India there are only tutor centers with unqualified teachers who deliver lessons.

An interesting finding is the fact that one-third of the SEs mentioned the home-schooling audience (i.e. parents) and students with learning disabilities as a potential market. For instance, Byron Davies (Founder of Black Swan Learning) explained that "*home-schoolers are now the fastest growing audience, because schools are so bad and they represent about three percent of the U.S. students.*" In sum, 12 SEs separated their target audience in terms of B2B or B2C as a means to supporting their business sustainability. Generating revenue through the B2B method is a beneficial strategy because it amplifies the implementation of technology to a massive number of users at once, while also generating a profit.

The analysis of interviews brought up the notion of utilization of ICT in education and inclusivity. Substantial evidence was made for ICT-based learning innovation as an effective way of reducing social exclusion (Webb, 2004). However, technological novelty is always established by taking into account human preferences. Hence, it is a non-neutral medium (Heemskerk, Brink, Volman, & Dam, 2005). Reflect upon the analysis of the interviews, the study of market feasibility was done by all SEs in designing what is best to cater their end-users. Feedback is incorporated from end-users to fulfill their needs, and the content team who directly

engaged with end-users was found to be responsible for delivering the relevant learning modules. Moreover, the diversity of catering K-12 students and adult learner have undoubtedly influenced how SEs have designed their technology regarding content, user experience, and what do they expect the student to achieve in the end.

Additionally, it was not clear how these technologies served learners who are for instance, color blind or deaf, as the technology involves a multitude of multimedia components such as audio, images, motion, and colorful user interfaces. The findings indicate that the notion of "Universal Design" in educational technologies has the potential of overlooking such cases, which may result in more technical barriers for particular learners (Benigno, Bocconi, and Ott, 2007), and hence contribute to social exclusion. In other words, to be perceived useful, SEs need to pin down precisely who are their audience, comes with customized perspective on understanding the appropriate learning approaches, and required deeper analysis on the most suitable system. Thus, this thesis argues that it is impossible for ICT-based educational innovation to be pedagogically neutral. Moreover, the findings, hence, oppose to the popular belief described by Webb (2004) regarding the potential of ICT-based learning system able to minimize social exclusion, as it requires the creation of personalization to cater particular type of users and flexibility to adapt with the most relevant pedagogy.

4.1.2 Forms of ICT-based Educational Innovations Created by Social Entrepreneurs

This section explains the forms of ICT-based educational innovations created by SEs by combining the content analysis of their innovations and the analysis of the interviews. Three themes emerged: Technology as a tutor, Technology as a teaching aid, and Technology as a learning tool. The majority of SEs support the notion that although their digital innovation can be operated autonomously, it is not to intended to replace existing teachers. SEs claimed that their innovation works best with proper guidance, whether these are parents or formal educators. Technology as a tutor and as a teaching aid share similar characteristics in that they are implemented in a classroom, thereby enabling teachers to expand their teaching methods. In terms of content, the majority of applications focus on basic literacy, especially in the role of tutor and teaching aid. In the role of a learning tool, the applications focus more on teaching functional literacy. The effectiveness of ICT-based applications in the education sphere depends largely on how they are utilized and the purpose they serve. Each theme is described by demonstrating the available applications enhanced by the explanations from the SEs. Further discussion follows at the end of each theme.

4.1.2.1 Technology as a Tutor

In the theoretical framework, technology in the role of a tutor provided lessons and drill-and-practice exercises tailored to a learner's learning path or personal needs, and it can be combined with multimedia content to make it more appealing to learners (Naccrarato, Pantano, & Tavernis, 2011; Ross, Morrison, & Lowther, 2010). Characteristics that categorize '*Technology as a tutor',* which are validated in the abovementioned literature, are: the technology can function with or without the presence of an educator; a learner can adjust their learning path; the content focuses more on teaching basic literacy; and it provide remedial and experimental higher-order thinking instructions to achieve mastery. Based on the interview analysis, five digital innovations matched this category: Auto Cognita, Gurukul, Leap to Know, MoToLi, and We All Can Read.

Auto Cognita

Frank Ho (Chief Executive Officer of Auto Cognita) explained Auto Cognita (see Figure 4.1) in terms of a tailor-made curriculum for basic literacy embedded in the application, stating that its purpose is to "*define granular learning objectives to evaluate the student's progress and adapt their learning path. Our content is designed to provide context and relevance which are keys to motivation.*" By embedding teaching basic literacy in a context, Ho explained, "in '*my story' section which is an interactive story, instead of memorizing the word, you can actually click on things and follow a story"* In 'My Story,' a child is involved in exploring and experimenting by choosing his/her own avatar (e.g. gender, skin color, hair) and then starting his/her journey in different places. By touching certain things, the learner can see an image, and learn the sentence by simultaneously hearing how it is spoken. The learner can move to different houses and solve mathematical problems in the market or go to a restaurant and practice ordering food from a menu. Ho also added that part of the learning application as a tutor is "*a self-learning method to literacy, where the core part is the phonics that work even without guidance or a teacher. It involves dragging and dropping things on the tablet."* Ho wrapped up his innovation and called this teaching method "*constructivist learning theory: you learn something by doing something and you learn from mistakes. In math, we use numbered blocks: you can manipulate by trying different blocks with different numbers."*

The researcher tried Auto Cognita on a smartphone, and found that design thinking principles had been e applied in the application to enhance the user experience and the user interface by providing a straightforward and minimalistic design with convenient white spaces. However, it still had some bugs as it sometimes suddenly crashed as a consequence of its large

size (1GB). Auto Cognita can be played autonomously, but it also enables students to create group activities such as competition and collaborative learning practices through Bluetooth. Auto Cognita's existence is not intended to entirely replace the role of human teachers; Ho felt that there are so many things technology can do, that it seems more scalable than building schools and recruiting millions of well-qualified teachers to fill the lacunas.

Figure 4.1 Screenshot of Auto Cognita in the mathematic block and a section of "My Story."

Gurukul [KHRISNA]

Gurukul teaches basic literacy through gamification and machine learning. The aim of Gurukul was to deliver a more interesting self-learning experience by incorporating an existing curriculum that works based on an Early Grade Rating Assessment (EGRA) system in a preferred language. Roy also believes in the notion that technology can increase learning motivation by incorporating short stories and movies that keep learners captivated. Gurukul is still in the development phase and has not been launched in any application stores. The researcher studied the video demo: the learner needs to solve literacy-related missions which are embedded in an adventurous journey through different settings (e.g. a rainforest, a snow-covered field, etc.) (see Figure 4.2.). The personalized learning contains phonemes, semantic awareness, letter-to-sound mapping, vocabulary comprehension, crossword puzzles, which all aid the process of learning alphabets, numbers, and shapes. By building this application, Roy did not suggest that the current conventional system should be removed, because the previously existing system contributes to education "*but it needs more advancement in adopting*

technology." Although the application can function independently, Roy emphasized that the presence of an educator will bring more leverage in the success rate of implementation as teachers can assure more student-centered lessons by "*ensuring the student's participation in their gadgets, then figure out how a particular student is performing.*"
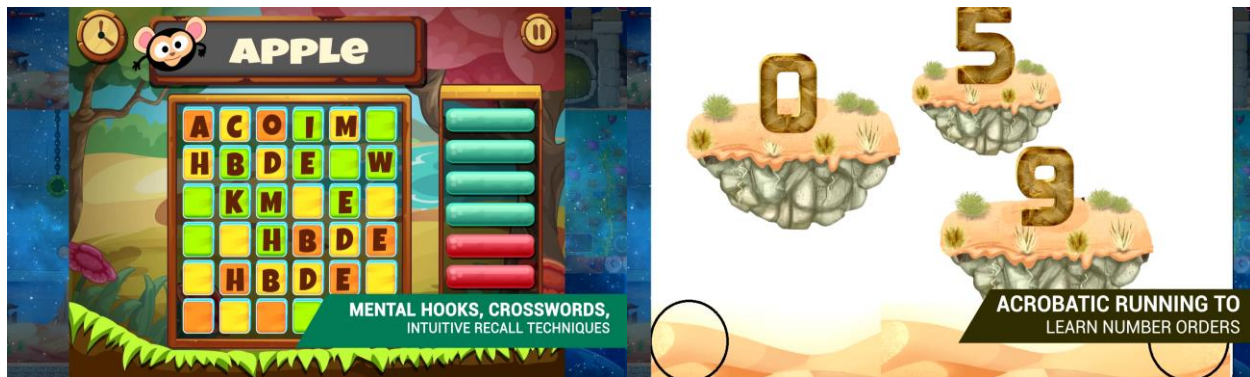

Figure 4.2 Content of Gurukul

Leap to Know

Little data could be observed from this application to add to the analysis from the interview as it is work-in-progress and a confidential matter. As a tutor, Greff explained that Leap to Know contains drill-and-practice simulation for remedial instruction "*which makes it easier for children to learn at their own pace. Also, it allows children to redo any exercise as many times as is required.*" The content of Leap to Know incorporates basic literacy (i.e. reading, writing, mathematics) because the poor quality of education in South Africa has resulted in underprivileged children struggling in early grades at school.

MoToLi (Mother Tongue Literacy)

MoToLi is a gamified learning application that teaches reading through interactive, engaging, and culturally responsive activities by integrating enjoyment, autonomy, and social connectedness, and it is enhanced by a digital library. Isabelle Duston (Chief Executive Officer) says that MoToLi provides educational opportunities for underprivileged children by creating open-source software in multiple languages. Duston believes that, by focusing on basic literacy, it provides fundamental knowledge as a means to overcome poverty. Duston further explained that MoToLi features mood-enhancing colors inspired by nature in order to attract children. Moreover, MoToLi has also embedded audio instructions with vocabulary that is accessible to children as young as five years old. MoToLi acts as a facilitator in encouraging active learning

and higher-order thinking by "*arranging skills in levels which include a set of activities to advance to the next step. When each activity is completed, the child receives a medal, and for each level that is accomplished, an audio book is added to the player's library.*" Moreover, using the skill map, both learner and educator are able to track progress. Duston went on to say that by "*providing immediate feedback and choice of activities, MoToLi motivates children to take control, to persist, and make progress from letter to syllable to word, to sentence-level skills, which we call a skill map.*" The researcher was unable to access the application by observing the video demo, but can confirm that the user interface is very colorful and clearly designed to appeal to children.
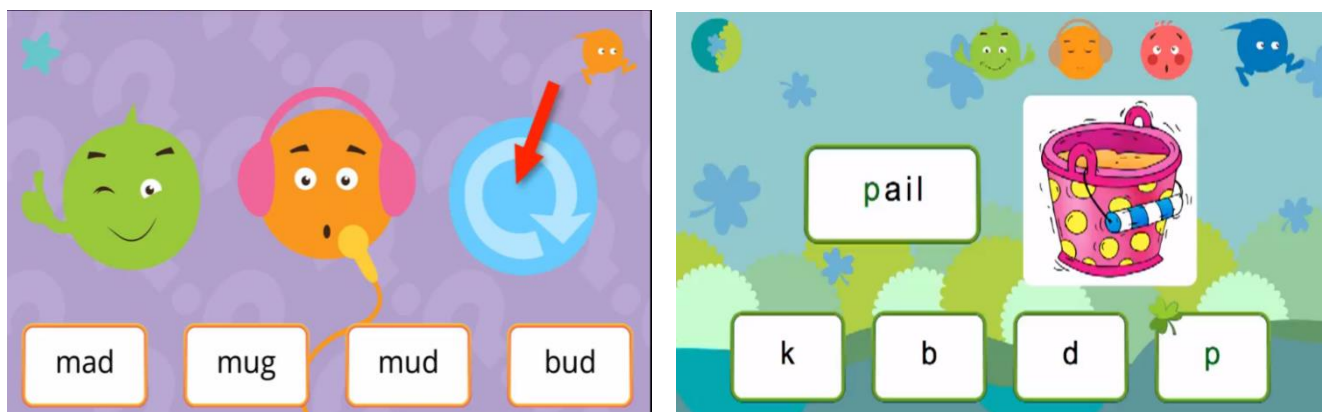

Figure 4.3 Screenshot of the MoToLi application

We All Can Read

We All Can Read (henceforth, WACR), which was made to teach English language to adults, is based on a book published in 1990 by Jim Williams (Founder) before it went online in 2007. The Android version of WACR is still in the development phase, so it was not available for downloading. Williams explained that WACR "*provides the way people learn how to read, spell, and pronounce English correctly with multi-sensory, step-by-step, and direct instructions, regardless of their background, and the aim is to achieve mastery by maintaining their pace*" WACR works with a subscription plan (ranging from USD $54 to $1,998) and it can be utilized either independently or with guidance (see Figure 4.4). The areas that form the main focus of the application, according to Williams, are phonemes, alphabetic understanding, vocabulary, and spelling. In addition, WACR combines video (Williams himself explains all the lessons), audio, and quizzes embedded within a total of 644 lessons which are divided into 64 units to attain proficiency in English. The researcher observed the trial version from the website, and

can confirm that the user experience and interface are very simple and subtle. The learner can download all transcripts of the videos and worksheets for relearning purposes.
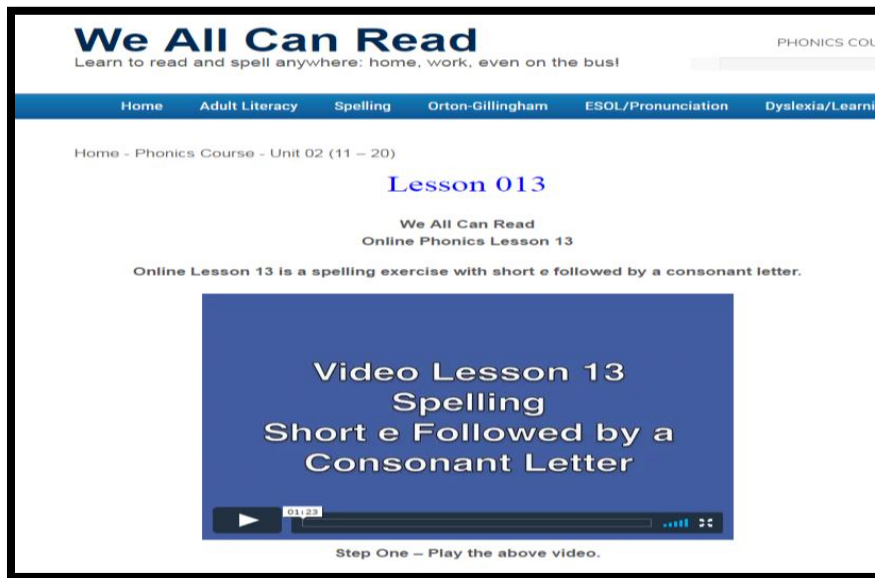

Figure 4.4 Screenshot of a lesson from We All Can Read

In viewing technology as a tutor, generally, the perspective of the SEs in this category were more related to Critical positioning mentioned in the framework by Warschauer (1998) which viewed that technology has its ecosystem (i.e. sociocultural) that any slight changes will affect the learning environment. The analysis of interviews revealed that ICT-based educational innovation in this category prioritize self-learning, contains basic literacy as their main curriculum with flexibility in how they present the lessons. The mindsets of the SEs were their innovation might be used in the most extreme condition with no teachers, no schools, or sufficient infrastructure for high-quality education to prevail, which has made technology the only leverage for those learners to expose themselves to a proper education. In addition, technology as a tutor facilitates higher-order thinking to ensure that the learner achieves their skill's proficiency through remedial instruction and standardized assessment by constructing the lessons accordingly. The aforementioned statement correspond with the notion provided by Ross, Morrison, & Lowther (2010) regarding the advantages of applying technology as a tutor mentioned in the framework.

However, a highly independent self-learning characterized in this category may impose to several notable problems such as maintaining self-discipline, learning proactivity, and develop meaningful interaction with fellow peers in which might hamper the learning outcome (Kim, Olfman, Ryan, & Eryilmaz, 2013). Although if applied in remote areas, such type of technology can be considered helpful, as it might be the only choice, this thesis posits the presence of facilitators (i.e. non-professional educator) are still necessary to guide and encourage learners' proactivity. Also, there is a growing trend in embedding virtual peers in form of a storytelling to improve literacy as it combines fun activity while improving linguistic skills (Ryokai, Vaucelle, & Cassell, 2003). Peer partner offered an equal-status as learners and deliver unique opportunity for children in negotiating or even coaching each other literacy activities. Most importantly, virtual peers' storytelling encourages collaboration and foster meaningful interaction with other learners which may influences independent learner to maintain their study as they might feel lonely. The virtual peer storytelling method can be an extension method of learning in order to establish playfulness in designing technology as a tutor, while also improving social skill.

4.1.2.2 Technology as a Teaching Aid

As previously mentioned in the theoretical framework, technology in the role of a teaching aid can either be in the form of software or hardware. The teaching aid is used to enable educators to increase pupils' engagement and their own effectiveness by producing, organizing, and delivering meaningful content while incorporating multimedia elements (Ross, Morrison, & Lowther, 2010). Characteristics for categorizing '*Technology as a teaching aid'* are validated in the abovementioned literature. The main characteristic shared by technology in the role of a teaching aid is that the presence of teacher is heavily involved in assuring the relevancy of content and refining the innovation to be effectively applied in a classroom. Hence, the majority of SEs supports the notion that their innovation is optimized when used in the presence of educators. In terms of content, the majority of these innovations consist of teaching foundational literacy, except for Learn Smart Pakistan which focuses on teaching advanced Mathematics and English subjects. Based on the interview analysis, five digital innovations matched with this category: Bodha Guru, Black Swan Learning, Learn Smart Pakistan, Squiggle Park, and Reading Kingdom.

<u>Bodha Guru</u>

Bodha Guru (henceforth, BG) involves software and also hardware to support the teaching ecosystem. Samir Jain (Founder of Bodha Guru) elaborated by explaining that the application works on any platform and that the hardware is filled with approximately 1,500 pre-loaded videos to be used by the teacher in the classroom. Why so many videos? Jain explained that the videos were divided into two categories: short-stories which function to explain the related concept in the form of drama, to maintain children's interest; and detailed video to provide practical examples of the topics embedded in the story. Moreover, Jain believes that technology enables the learner to improve his/her learning outcome by utilizing the application to practice reading and writing, and that this fosters creativity by getting the learner to create an e-book, in collaboration with the teacher, to measure his/her comprehension of a given lesson.

In this matter, BG goes a step further than just being a teaching aid, because it also functions as a learning tool, as learners were expected to create something out of it. How exactly are children able to do that? Jain explained that the application provides freedom for the learner to choose elements such as background, characters, and to write text related to a designated topic. After the e-book has been completed, BG provides feedback until it is eligible to be electronically published in their e-library which already contains 1,700 e-books from the community. Why combine technology as a teaching aid and a learning tool? Jain recapitulated that "*creativity is our first goal, followed by oral skills. Unfortunately, most learning systems consist of memorization and ignore the imagination.*" Based on the abovementioned statements, BG's principles in applying literacy is not limited to an autonomously learned basic skill, but is also applied and situational, in order to create an engaging learning experience. The researcher tried the BG application, and found that it contains various forms of active participation for learners to learns alphabets, numbers, and patterns; to identify alphabets, numbers, shapes, and colors; spelling, solving a puzzle, coloring, and writing. In the "Read" section it displays various e-books (see Figure 4.5) on diverse topics which are available free of charge.

Figure 4.5 Interface and sample page of an e-book created with Bodha Guru

Black Swan Learning

The Black Swan Learning (henceforth, BSL) application is still in the development phase, so the researcher could not acquire any additional information such as a demo, video, or web information that could thoroughly explain the application. BSL was created as a teaching aid as Davies believes that technology can improve the teaching methods for learning basic literacy by "*combining pedagogy in forms of instructional videos and programming."* Davies stated that BSL emphasizes system-thinking to learning that focuses on reading, arithmetic, and a second language in the first year. A unique aspect of BSL is that students are also taught computer programming which is a valuable skill in the future.

Learn Smart Pakistan

Learn Smart Pakistan (henceforth, LSP) was introduced in 2014 as a non-profit initiative with the purpose of delivering quality content to Pakistan's teachers and students that had 11,000 users in 2016. LSP is the only ICT-based educational application available in Pakistan to support learning outcome for 9th and 10th Grade students in understanding the subjects Math and English. The poor level of learning in Pakistan means technology has a high potential to improve learning interaction as students are not learning as they should. Groeneveld went on to

explain that LSP focuses on the functional literacy of literate children by providing remedial practice and meaningful feedback which teachers have failed to provide.

Besides producing software, LSP also provides the hardware that can be implemented in class as teachers often lack the qualifications to teach. As elaborated upon by Groeneveld, "*we give them video content on a certain topic that can help them to teach. So, the worst teachers can rely on our content by utilizing a projector and a computer, while better teachers can expand the content by making it more practical.*" How does this improve students' participation in class? Groeneveld explained that "*students have 'clickers' that allow them to give answers to teachers' questions, and these are recorded in the computer and be synchronized via the cloud.*" Hence, LSP helps improve the teaching environment by encouraging proactivity in both educators and students. This tool called 'clickers' was similar to a study conducted by Ross, Morrison, and Lowther (2010) involving an Interactive Classroom Communication System, in which student were provided with immediate feedback by studying each student's track record and increasing teaching–learner engagement.

The researcher tried the application both via the website and using the app, and found the user interface and the experience very interesting. The researcher could choose which lessons and subjects were provided. The subject Mathematics for a 9th Grader consists of 180 lessons ranging from matrices and determinants to linear equations and inequalities. The subject English consists of 40 lessons ranging from comprehension, vocabulary and phrases, to grammar. All of the lessons are embedded with learning videos, exercise drills, games, writing assignments, and quizzes. Students are also provided with a personal dashboard that measures their performance in terms of accuracy, and which can be compared with other users across the nation.

One noteworthy effort to enhance the usage of this application, LSP is also implementing a learning competition that can be done using the app. The program is named 'Learn Smart Pakistan Summer Challenge' in both subjects and is being participated in by 1,314 students, 219 teachers, 332 schools, and 78 cities internationally. Within the competition, there are also awards for the best student in each subject, the best teachers (most innovative and helpful), and the school champion. LSP is the only digital application that applies a well-integrated offline activity as an extension of in-class teaching.

Figure 4.6 Example of English subject 'Grammar' combined with writing assignment in LSM

Squiggle Park

As a teaching aid, Squiggle Park (henceforth, SP) focuses on teach Pre-K and 2ⁿᵈ Graders to read, in terms of phonemic awareness, alphabet, and phonics, reading fluency, also vocabulary and spelling, focusing on words used most frequently and then divided into 15 worlds, each consisting of 7-15 stages. Desai further mentioned that "*the method allows students to read regular text much faster. So you practice your graphing, the phoning and matching them."* Desai also pointed out that literacy in learning the alphabet involves a lot of drill-and-practice which is helped by technology in terms of "*what sounds this letter can make, and see how it's used in various words, and understand how to find that word, as well as how to recognize very frequent*

words." SP also allows learners to control the pace at which they want to explore different levels and in finishing all the given tasks, so they know what their current ability is.

As it was designed as a teaching aid, does it help the teaching process? Desai elaborated, saying that the teachers give positive feedback and that it works really well in classrooms while improving learners' results. Moreover, children felt reinforced and challenged by the rewards given after completing a stage, and replay it to acquire as many rewards as they could. The presence of an SP is not only helpful for the learner but also it makes the educator's role easier by adjusting which subject they want to teach more in-depth within a small group, where they feel it will be more effective than using it for the whole class. The researcher tried the demo, and feel that the user experience and user interface of the SP were very nice and sophisticated, as well as being user-friendly. The login system is clearly separate for teachers and students: there are two different logins, first for the group and for an individual player, which are all icons, which helps the illiterate learners. Then, students can choose which World they want to work with and go through the stages (see Figures 4.7 and 4.8).
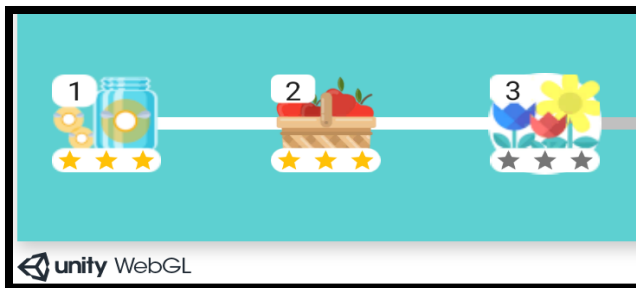
Figure 4.7 Example of stages in a 'World' on with the stars are a reward for a student's performance in finishing the stage.
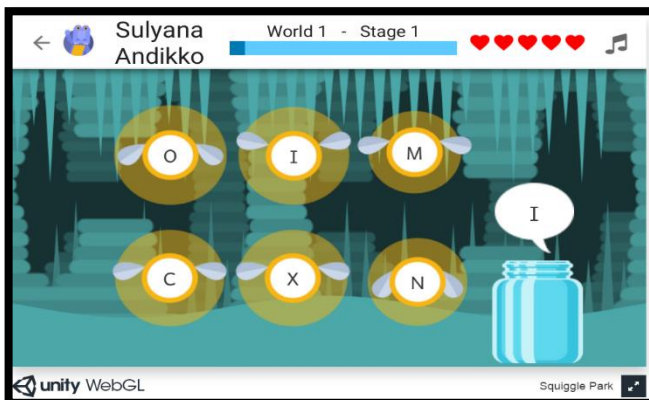
Figure 4.8 Example of the content in a stage by matching the uppercase letter with the letter above the jar by hearing the phonic.

<u>Reading Kingdom</u>

Reading Kingdom (henceforth, RK) is an application to support a learning ecosystem for children studying English by learning the underlying structure of a language in 13 different methods. RK aims at teaching students to read and write with comprehension at a 3rd Grade reading level in 12 – 18 months. Jonathan Blank (Chief Executive Officer of Reading Kingdom) explained "*so we teach kids six language skills based on meaning in a context instead of just sound. Before we give them the book to read, we teach them all the words in the book so they know the spelling, pronunciation, and meaning used in context of all the words.*" Those six skills of reading and writing consist of sequencing, writing, sounds (phonology), meaning (semantics), grammar (syntax) and comprehension. Based on the abovementioned statements, the content of literacy taught by RK not only includes basic literacy but also enables learners to comprehend literacy as a text within a context, to decode underlying meanings.

The program was designed to be adapted and personalized for each student and can be used both at school and home. As a teaching aid, Blank mentioned that RK is not a replacement for a teacher's role in directing and monitoring a student's progress, but "*what our program does is allows us to enable each student to get an individualized learning experience.*" The researcher tried RK, and discovered that there is a placement test to determine the student's ability in reading and writing. The test involves visual sequencing and the ability to use a keyboard to type texts. If the student does not already possess both skills, then they are directed to the 'Seeing Sequences' format that teaches both abilities (see Figure 4.9). The learners are also assessed based on their reading and writing capability (see Figure 4.10). The test ensures that learners start to learn the program based on their current skills and eventually understand how texts are used in a context.

Figure 4.9 Example of Reading Kingdom's "Seeing Sequences" that the learner needs to type the letter from left to right to match the upper text colored in black.

Figure 4.10 Example of Reading Kingdom's "Reading and Writing" that determines the learner's capability to optimize the learning process which gradually becomes more complex.

Based on the analyses of interviews, technology as a teaching aid corresponds to the Instrumental perspective mentioned by Warschauer (1998), who positioned technology as needing to be integrated into the lesson, favoring learning objectives and managed by teachers. The majority of SEs realize that technology is not the answer to every educational problem, so they view teachers as their main collaborator, which influences their innovation's design (e.g. Squiggle Park redesigned the login system to cater for illiterate learners). The findings correspond to the notion suggested by Mumtaz (2000) that teachers can provide knowledge regarding the relevant curriculum and the way a lesson should be taught, which then directly impacts the innovation. Substantial evidence is presented regarding teachers being able to monitor a student's progress in grasping the material, providing motivational support in assisting learners to engage with learning interaction, which eventually minimizes the risk of under-achievement (Benigno, Bocconi, & Ott, 2007). In addition, Benigno, Bocconi, and Ott (2007) argued that the teacher plays a vital role in maintaining inclusive classrooms with the help of ICT resources which provide opportunities to improve school achievement, along with increasing autonomy, enthusiasm to learn new things, and nurturing self-esteem among learners.

However, several concerns emerged from the analysis of interview in the role of technology as a teaching aid. According to Jay and Jay (2003), teachers is also seen as a problematic source in the success rate of implementing ICT-based educational innovation as their beliefs in ICT are more often than not, become inhibitors more than a catalyst. Moreover, Jay and Jay (2003) argues that teacher's beliefs could reflect upon how technology is utilized as another medium used merely as a helpful tool than for a transformational purpose. Meanwhile, Bingimlas (2009) explained the barriers concerning teachers were the lack of confidence,

unqualified, and limited access to resources in order to upgrade their knowledge. As a technology designed for teaching aid depends heavily on the role of educators, based on the findings, this thesis thus suggests that the implementation of ICT-based educational innovation will be harder to prevail without the proper balance of also educating the teachers about the potential of technology to enhance their learning experience. Hence, also increasing teacher's relevant competencies. Teachers' role should be seen as a form of human assistance, who can provide guidance in determining suitable educational software and necessary assistive technologies that cater to bring equality for students.

4.1.2.3 Technology as Learning Tools

The theoretical framework described technology in the role of a learning tool as an instrument for assisting learners to shape their knowledge (Smeet, 2005), to create a more cooperative atmosphere in the learning process, while also increasing a learner's problem-solving skills (Ross, Morrison, & Lowther, 2010). Two SEs support the notion that literacy is only part of their innovation, because 'real' literacy is when it is being applied in a certain context (i.e. work, in the community), as it has increased an individual's comprehension in problem-solving skills which eventually upgrades their socioeconomic status. Hence, both targeted literate learners, the content of these digital innovations is functional literacy, and utilized ICT as a cognitive tool. Two ICT-based educational innovations fit these criteria: XENOS (Learning Games Studios) and CSM Learn.

<u>XENOS (Learning Games Studio)</u>

XENOS is a sophisticated social learning game that aids the improvement of English, French, Portuguese, and Spanish as a second language. XENOS views literacy as an applied and situational context (i.e. functional literacy) in combination with a learning process where no drills or quizzes are involved. Instead, XENOS establishes engaging experiences that require effective implementation of language skills; it contains 3,000 frequently used words and phrases and is divided into nine stages of a mission. XENOS teaches English with a task-based social online game which is specifically designed by a language scientist and is instructionally designed to teach reading, writing, listening and speaking skills. However, Sockowitz emphasizes that XENOS is not a gaming company, instead, "*we are an educational company that uses a pedagogical approach to teach. And game-based learning has a lot of research behind it as a pedagogical approach, so it's validated*" Furthermore, through XENOS, Sockowitz

aims at providing an educative opportunity to individuals to improve themselves in term of socio-economics (e.g. acquire a better job, serving communities), free of social judgment and pressure that might inhibit the learning process.

Observation of the video demo, in the social virtual world, showed that the learner can create an avatar that resembles his/her appearance, then choose his/her native language and the language they want to learn. They can then choose the mission which consists of tasks the learner need to accomplish (see Figure 4.11), and the learner has an individualized view of this learning path to track the progress. XENOS also offers social interaction by allowing learners to engage with another learner to complete the mission in order to upgrade a level (see Figure 4.12). Why does social interaction matter? Sockowitz says, "*they walk around their social virtual world, and they can meet and interact with other people, just as if they were in a class."* XENOS provides players with a role and responsibility and with a clear sense of control of what they need to achieve while learning the languages. The interesting part is the replication of classroom interaction, so the game will not only improve a learner's language proficiency but also develop their interpersonal skills in the real world. Although XENOS is considered as a learning tool, it can function as a supplemental activity to the existing curriculum which will enhance the learner engagement, participation, and gains. Moreover, XENOS also offers an opportunity of incorporation into a teacher-facilitated model, permitting a contribution to the arrangement and order of a particular course. Personalization within XENOS is allowed in the time a player is given to create the avatar of themselves and in choosing which mission to explore.

Figure 4.11 Example of the task that needs to be completed in a mission in XENOS.

Figure 4.12 Simulation of social interaction in XENOS.

CSM Learn

CSM Learn teaches functional literacy and sees basic literacy as part of this. The ultimate point that Goldberg wishes people to achieve through CSM Learn is to "*make people more aware of the dignity of work. So we want to provide everybody with skills that they can learn in a professional context and believe that they are a worthy person.*" As a self-learning online course, Goldberg emphasized that CSM Learn not only analyzes a student's performance "*but reacts to the way the student feels - their frustrations, focus, struggles, and successes to reach a high level of performance.*" The content of CSM Learn is divided into three main categories as follows: *Cognitive* – identifies thinking errors and improves learning effectiveness; *Metacognitive* – provides students a sense of control of their learning style and the program delivers feedback based on answers; and *Non-cognitive* – the belief that learners can finish the lesson by analyzing patterns of frustration, resulting in student growth in mindset and persistence.

Goldberg stressed the importance of self-efficacy as "*you have succeeded in some way, if you know how you did it, then you can reproduce it while also being able to demonstrate this to other people. Therefore, CSM also certifies traits and behaviors and mindsets such as persistence, attention-to-detail, and self-efficacy*" The certificate, which can be purchased as an optional, remarks that a learner has finished the program accordingly. CSM Learn is the only application of study that provides certification (cost $39 USD) upon completing the lessons. CSM Learn as a learning tool places literacy in an applied and situated context, also as a learning process, which provides an alternative instructional methodology that can operate in parallel with schools. As the target audience of CSM Learn targets is adult learners, what do they expect their learners to achieve? Goldberg explained about individuals achieving High-

Performance: "*mastering problem-solving skills with math and literacy and being persistent by expecting the best of yourself. Pushing on despite failure, setting high expectations, and maintaining commitment.*"

The researcher reviewed CSM Learn, and found that the program started with a brief explanation about the course and then asked multiple choice questions to ensure that the learners are fully aware of what to expect from the program. Next it directed the learner to problem-solving questions in mathematics called 'Reading the Ruler" (see Figure 4.13), in which the learner needs to measure the specific height and width from the shown ruler. Another sample of problem-solving skills involved text called 'Reporting a Problem" in which the learner needs to choose which information is the most important based on the sentence provided in the beginning (see Figure 4.14).

Figure 4.13 Example of CSM Learn's problem-solving skill, "Reading a Ruler"

CSM LEARN

CSM Course

Message Center

No unread messages

Reporting a Problem

Part 1 of 1   1

My Home Page

Order CSM Certificate

Submit a Suggestion

CSM Help

Logout

No calculator for this problem

Terms of Use

© 2004-2017 CSMlearn

Problem Statement

Susan Foster works at Paramount Steakhouse and is having a problem with her mixer. Unsure of how to fix it, Susan sends an email to the manufacturer's product support team.

Below are seven pieces of information, all of which are true. Click on the boxes in front of the 4 most important pieces of information to include in the email.

☐ The mixer broke Thursday at 3:50.

☐ When we turn on the mixer, black smoke comes out of the motor.

☐ I work 3 nights a week.

☐ Our T78/954 Mixer is broken.

☐ A new employee put an extra large amount of fruit in the mixer.

☐ My friend said that he thought that he could fix the mixer, but my boss won't let him touch it.

☐ I dried the mixer very carefully and oiled the motor.

Check Answers →

If you don't know how to do all of the questions, you should still enter answers to all the questions you can.

Figure 4.14 Example of CSM Learn's problem-solving skill, "Reporting a Problem"

There were several noteworthy concerns emerged in this categorization. First, the term 'Multiliteracies' mentioned by Kalantzis, Cope, and Harvey (2003), Gee (1999), and Elmborg (2006) in the theoretical framework who viewed literacy more as integrated practice within numerous contexts in a society than merely as an intellectual activity also appeared in the interview and application's content analysis in viewing technology as a learning tool. Both SEs challenged the notion of understanding literacy in terms of reading, writing, and mathematics. Instead, they both viewed literacy by also taking social and structural functions into account, as learners need to overcome diversity in facing "21st Century" future challenges.

Secondly, within technology as a learning tool, is that it extent the notion of using technology as merely a tool, but by looking at the content and application, it also acts as a cognitive tool. The tension derived from utilizing technology as a learning tool is whether it is perceived as 'learn from' or 'learn with'. Wang, Hsu, Reeves, and Coster (2014) argue that the integration of technology as a learning tool usually involves passive learning and viewed as a 'learn from' which according to Kim and Reeves (2007), brings no significant improvement to the learning outcome. Meanwhile the 'learn with' technology perspective is also known as a cognitive tools, which allows student to decipher relevant and complex problems, while improving higher-order cognitive skills, thus, embrace creativity (Wang, Hsu, Reeves, and Coster, 2014). Based on the content analysis both XENOS and CSM Learn, both deliver their

content not for learners to learn from technology, but moreover, it requires high cognitive capacity to for instance, solve certain missions, establish online social interaction, train problem solving skills, and analyzing learner's traits in handling frustration. Hence, the technology encourage learner to 'learn with' technology, thus, foster a more constructivist approach to improve learner's cognitive skills. This thesis contributes to the extent of the old-fashioned perception of viewing technology as merely an instrument (i.e. medium) for learning mentioned in the theoretical framework (Gee, 2003; Nawaz & Kundi, 2010; Smeets, 2005).

4.2 Challenge in the Collaboration Process of Production and Dissemination

SQ2: *What challenges do these social entrepreneurs face in the collaboration process of the production and dissemination phases of ICT-based literacy applications?*

Social innovation is always established through a combination of factors involving joint discourses based on two principles: a sense of responsibility and a sense of hope. Therefore, in order to acquire insight into the second sub-question of this thesis, the challenge in the collaboration process relates to the considerations in designing an ICT-based educational innovation combined with the opportunity of a discovery process mentioned in the framework. As an effort to improve education, the implementation of an ICT-based innovation needs to consider many factors such as: location and cultural sensitivity, practical usage, theoretical applicability, economical scalability, viable scalability. Within the analysis, one theme emerged that expanded the previously mentioned framework: strategic alliance establishment. The market is not the only factor that determines the success rate of technology implementation. The following discussion addresses the newly emerged theme and sub-themes obtained from the interviews with SEs.

4.2.1 Location and Cultural Sensitivity

Two new sub-themes emerged in the analysis of the interviews: the lack of qualified educators and the lack of supporting infrastructures.

4.2.1.1 Lack of Qualified Educators

Seven out of 12 SEs explicitly pointed out that the problem in education is mainly because of the lack of qualified teachers. For instance, Roy explained that India also faces the same

condition as identified by XPRIZE that "*even if there are good teachers, they come to the city, and leve behind only unqualified teachers.*" In a more extreme location such as Pakistan, work ethic has also become a major part of the problem among educators and has resulted in a poor learning outcome, as mentioned by Groeneveld: "*the learning results are poor because 40% of teachers are absent from schools.*" As technology can act as a teaching aid, the lack of commitment and qualifications may hinder the effectiveness of the technology in creating a more engaging learning experience. As Khan, Hasan and Clement (2012) explained, the successful use of ICT in the classroom depends on the teacher's attitude and on him/her having sufficient knowledge to improve the learning outcome. Therefore, several SEs shared the sentiment that they also need to be responsible in providing digital pedagogies for educators in order to optimize technology implementation in classrooms and also take into account the feedback they receive, so teachers feel more motivated.

4.2.1.2 Lack of Supporting Infrastructures

70% of the SEs mentioned that the infrastructures that are needed to support the learning system are either scarce or entirely unavailable, and that this affects the production and implementation of educational digital innovations. Greff mentioned the size of classes, which makes it difficult for teaches to provide pupils with individual attention. Jain expressed his concerns regarding the market that does not possess any smartphones. Moreover, infrastructure can be politicized into the realm of religion, as Groeneveld described that *"the internet is distrusted in a country like Pakistan because it is an Islamic country and the internet is thought to bring bad things. Moreover, technology need electricity, but there is no electricity in schools, so schools need a generator, UPS."*

As with most innovations, educational technology innovations are advancing rapidly*,* so utilizing up-to-date ICT resources remains a key factor for the dissemination of technology (Khan, Hasan & Clement, 2012). However, it is even harder for the implementation of ICT in education to prevail, where there is still an unequal distribution of supporting infrastructure, thus creating a digitally divided society (Semali & Asino, 2014). The lack of external factors such as access to infrastructures and technical support is regarded as a primary barrier to transforming teaching methods (Prestridge, 2012). Broad agreement existed among the interviewees that problems concerning infrastructures and educators play a major role in the dissemination of ICT-based educational innovations. The condition of infrastructures will have implications for how SEs decide to implement their technology to increase educational quality. Moreover, the

findings are strongly related to Kim, Miranda, and Oliciregui (2008)'s study mentioned in the theoretical framework.

4.2.2 Practical Usage

During the analysis of interviews, three new sub-themes emerged: software and device compatibility, data analytics, and feedback assessment.

4.2.2.1 Software and Device Compatibility

Half of the SEs agreed that the creation of software should be followed by the technical compatibility of operating devices and platforms. For instance, Ho explained that the large size of Auto Cognita still needs to be reduced and that the platform only work on the most recent devices. Besides content, especially for developers who produce technology as a teaching-aid, the user interface is also considered a major aspect of catering for illiterate learners or solving the problem of incompetent educators. For example, Desai applied graphics as a password in the login system instead of text. Groeneveld eliminated the underscore symbol in the login system because teachers are unfamiliar with it. A beneficial aspect of start-ups is that improvements happen really fast. Several SEs shared the same sentiments on the fact that they regularly receive feedback from educators who are involved in the process of implementation, which allows them to create a frequent update to improve the learning experience of end-users. Based on the analysis, clarity of how to incorporate technology in an educational setting is not only important for end-users, but also for the educators who facilitate the process. By taking into account educators or content specialist considerations, the application can be made more relevant for implementation in the classroom. The findings correspond to those of Petrie and Avery (2011), who found that it is essential to create a clear instructional mechanism embedded in the innovation so that facilitators are able to operate it and can thoughtfully consider how to implement it appropriately.

4.2.2.2 Data Analytics

The majority of SEs conducted constant iteration and prototyping by incorporating data analytics in order to ensure that the software and hardware performed as expected and users are able to engage in order to reach mastery. For instance, as pointed out by Roy, "*testing an innovation needs to be good, feedbacks should be spontaneous, and data analytics should be used to understand the user's behavior.*" Data analytics can be obtained by incorporating offline feedback from relevant parties and then integrate it in updates. However, the option of choosing

the suitable parties for elevating the innovation should be made wisely. For instance, Blank argued that "*we build prototypes, we do the majority of our testing in-house, we then hire external testers, we used to try to obtain public data, but nobody was giving us any valuable responses.*" One option is to involve the educator as collaborator. For example, Desai created an in-house teacher's team because "*we're always looking for feedback from teachers. What works in your classroom, what are kids struggling with, how we can make this more fun? So they connect us to our end-users.*" Data analytics is highly related to the process of building feedback assessment, which is explained in the next section.

4.2.2.3 Feedback Assessment

One-third of the SEs subtly mentioned how ICT-based educational technology should focus on constructing an objective evaluation regarding a learner's capability. Ideally, feedback assessment represents how a student actually performed, because it has a psychological impact on the learner. For example, Goldberg argued that "*in the United States, the way the education system tests people is heartless, and student accept it as their self-identity for the rest of their lives.*" Groeneveld also agreed with this notion, whereby he explained that the negative learning climate in Pakistan was too discouraging for students to even ask for feedback: "*if there is a problem with a student, the teacher's feedback sounds so aggressive and unappealing.*" An insightful notion regarding the feedback mechanism was also pointed out by Blank: "*people hate being embarrassed in public. Software lets students learn at their own pace without fear of embarrassment, so it makes them more encouraged to learn and try new things.*"

The remarks of the interviewees thus indicate that innovators should also taking into account how to provide a valuable feedback assessment in their ICT-based innovation, which enables students to learn and relearn by identifying their strengths and weakness. Post-learning data utilization such as feedback assessment enables automated data gathering from end-users. It might not only increase the student's cognitive skill, but also nurture them psychologically to stay motivated. The findings are also supported by Mayer (2008) who explained that proper feedback can function as behavior reinforcement and cognitive interpretation simultaneously. Moreover, integration of the digital medium and a learner's performance measurement results in a 'quiet assessment' in the form of computationally analyzed information in which both learners and educators can instantly use the data for the betterment of a teaching interaction (Gibson & Webb, 2015; p.698). Assessing literacy has become immensely crucial for demonstrating evidence on how the technology has confidently influenced the learning process based on a user's current level of understanding (Black et al.,

2010). In general, the abovementioned statements made by SEs are also strongly related as indicated in the theoretical framework, to the fact that the content design for both software and hardware needs repetitive testing and prototyping for measuring performance in order to aid the learner to achieve mastery (Kim, Miranda, & Olaciregui, 2008).

4.2.3 Theoretical Practicability

This thesis suggests that although the application of ICT-based educational programs might increase attractiveness for the learner, it is still up to the content to create user engagement. The analysis of interviews shows that half of the SEs agree that in terms of theoretical practicability, the key is to balance the technology and pedagogy sides in order to improve the learning outcome. For instance, Sockowitz stressed that in order to understand how his innovation has improved the learning outcome, he conducts a pre-test and a post-test on learners to evaluate the progress derived from XENOS. However, although from a theoretical perspective the content must be educative, several SEs stressed that the essence of an ICT-based educational program is how to keep the user using the application for as long as possible, since there are so many digital-based educational platforms already in existence. Half of the SEs, like Jain for instance, try to create a balance between technology, pedagogy, and creativity, in order to project similar situations to those in a classroom, but say that the "*team should translate the app to make it fun.*" A theme that emerged throughout the discussion was that the option of ICT-based educational innovation should apply tailored or generic content that might affect the learning process.

4.2.3.1 Personalized and Generic Content

There are two major discussions about what needs to be considered in the personalization of content or simply make use of already exists. More than half of the SEs explicitly stated that personalization of content is mandatory so that learners can be treated objectively. For example, Blank emphasized that "*you'll have some students who have various degrees of knowledge. There is no way for you to teach without either being way too advanced for the beginner students or boring the hell out of the advanced students.*" Several SEs tries to simplify the design, using lots of multimedia enhancement, as done by Roy in which he injects current curriculum and modified it in the form of short stories, an e-book, and movies to maintain the learner's curiosity. The abovementioned statements are strongly related to what Kim, Miranda, and Olaciregui (2008) suggested – as mentioned in the theoretical framework – that multimedia

phrasebooks and short-stories tailor-made to increase vocabularies are a remarkable addition for improving the learning outcome for children.

On the contrary, what if the freedom to create a personalized curriculum is not an option? In an extreme condition such as that in Pakistan, as expressed by Groeneveld, the success rate of technology implementation needs to adhere to a curriculum created almost 50 years ago in order to be relevant to teachers. This is certainly a threat, as one of the crucial factors for the effective integration of ICT-based educational innovation is depends on the quality of curriculum's decision decided by teachers (Jay & Jay, 2003), Moreover, research have shown that to achieve a high-quality learning environment, the curriculum has to triggered critical thinking and stimulates thoughtful and persistent discourse (Jay & Jay, 2003). And with the abovementioned fact emerged in the analysis, this thesis strongly dispute the notion of implementing inflexible content as it will decrease the effectiveness of ICT-based literacy innovation that enables personalization. All in all, as an instrument, the improvement in learning outcomes depends on how well-integrated the technology is within the courses to supports the designated objectives (Warschauer, 1998). A study conducted by Genlott and Gronlund (2016) resulted that student who utilize ICT-based to learn math with insufficient clarity of pedagogical practice performed worse than the traditional teaching method. Although content is one of the essential elements in creating the digital innovation, in the educational sphere, in order to be relevant for users, educators, and even the nation (i.e. government), an SE needs to reflect on his/her content in relation to the current curriculum. As recapitulated by Roy, "*when it comes to making a solution in the education field that is able to transform learners, It's the customer who designs the game.*"

4.2.4 Economic Scalability

In terms of economic scalability, this section illustrates challenges faced by SEs in relation to government and schools. As discussed in the theoretical framework, Martin and Osberg (2015) mentioned that among SEs, the lack of access to investment has become a major obstacle to achieving impact on a large scale. The notion was supported by eighty percent of the SEs, who agreed that the difficulties in accessing funds for their innovation were the main reason inhibiting their social impact. For instance, Goldberg pointed out that an investor's primary care is about profit and less about social impact. Hence, this affects daily operationalization, as stressed by Roy, because of the increasing costs of devices needed to be able to operate the software. If the software's main target is the underprivileged market, then it is hardly possible for end-users to buy it which means the majority of the SEs rely on sponsors.

Is there another alternative? One-third of the SEs tried to cooperate with the government. However, does this actually solve the problem? On the one hand, successful collaboration with the government might result in the innovation being applied in an enormous amount of schools simultaneously. On the other hand, selling software to the government is challenging for several SEs because the bureaucracy and policy sometimes only benefit certain parties. As pointed out by Groeneveld and several other SEs, slow bureaucracy, unpredictable changes, and bribery are major obstacles in working with the government. The issue of corruption in the educational sphere has been identified as a major barrier in working with the government because official tends to misuse the budget and in the end, there might be only insignificant enhancement found in the overall educational sphere (Khan, Hasan, & Clement, 2012).

Instead of only focusing on reaching out to the government, SEs also have the opportunity to shift to another channel, as explained by several SEs such as Desai, who empowered teachers by "*utilizing teachers' networks because teachers trust teachers before they trust anyone else.*" However, working with schools is also not without its challenges; one-third of the SEs described a similar situation to that mentioned by Blank who argued that timing is of the essence when selling to schools because their buying cycle is very slow. Moreover, in Pakistan, where the education conditions are terrible, working with schools is even riskier. Groeneveld argued that the cost of technology implementation is three times higher than the yearly average budget spent by an educational institution on one student. The abovementioned statement is in line with the notion described by Martin and Osberg (2015) that in order to measure business performance, social entrepreneurs need to calculate real costs and the costs of intervention, and quantify the impact that is generated by the innovation.

Overall, in terms of working with schools and governments, there are indeed pros and cons that should be taken into account by SEs when reflecting on their social business capability. As explained by Steyaert and Katz (2004), and by Thompson, Alvy and Lees (2000), entrepreneurs have the chance to establish a new combination of existing resources in disseminating a solution by mobilizing support of other pivotal persons. More than half of the SEs interviewed still considered schools as the primary place for SEs to test and improve their innovation by incorporating students' feedback. Therefore, working with schools can be considered pivotal despite the challenges because it can improve the relevancy of an intervention to both educators and learners. Additionally, working with – rural – schools can be seen as part of SEs responsibility to provide hope by training unqualified teachers who may never have chance to upgrade their ability. As illustrated by Daniel, West, and Mackintosh

(2006), as mentioned in the theoretical framework, the emphasis is on the fact that access, costs, and quality of education are interconnected to one another. Consequently, the 'market failure' condition identified by the SEs influences their business model, as is explained next. Two sub-themes emerged in the analysis of the interviews: monetization and credibility of innovation.

4.2.4.1 Monetization

SEs also need profit to assure sustainability of their social business. Based on the analysis of the interviews, profit involves complex decisions in the educational sphere. Half of the SEs who have already launched their innovation mentioned that, as a social business, one of the crucial differences from commercial entrepreneurs is a no-advertisement revenue model policy. Moreover, Jain emphasized that "*maintaining a balance between scaling-up and cost saving is really important in order for the app to remain accessible for underserved students.*" Interestingly, Desai mentioned that, in the long term, Squiggle Park is finding an opportunity with a buy-one-get-one business model where "*essentially if you have the money, you could pay it forward for your kid's school, and in return, we give the license to another school or individual who cannot afford it.*" The monetization strategy is strongly related to the target audience. Forty percent of the SEs mentioned some alternatives to monetizing their digital innovation by networking with *non-government organizations* and other educational companies based on a revenue-sharing model in the process of dissemination. As for the end-users, a third of the SEs applied for the free-trial method, because, as pointed out by Blank: "*people appreciate things that they pay for.*"

4.2.4.2 Credibility of the Innovation

The analysis of interviews shows that almost 35% of the SEs subtly explained the importance of acquiring credibility from a reliable third-party to provide leverage for potential partnerships, thus, ensuring social business sustainability. For example, Greff illustrated the connection between credibility and finding sponsors thus: "*companies in South Africa want you to have a proven success record before they invest in your idea.*" Three SEs emphasized the necessity of providing credibility by involving third-party evaluation. For instance, Sockowitz stated, "*we have two of them validating our software by studying the users and determining whether or not they make progress from our software.*" Blank stressed the importance of thoroughly utilized user feedback to improve different aspects of the program to make it more user-friendly.

To sum up, with the diversity of alternatives presented in the analysis, the SEs make use of various forms of revenue models to best fit their products, thereby paying consideration to their target market. Profit was never the primary objective of a social business that was realized by the majority of the SEs, and that is also the reason they preferred to first build business relationships (e.g. commercial companies, government, venture capitals, and NGOs), and then disseminate the innovation. Those abovementioned statements corresponds to the notion stated by Noruzi et al. (2010), that recognizing a predictable long-term revenue model (i.e. sources) is one of the essential keys to establishing sustainability and creating a larger impact. Regarding credibility, the findings support the notion mentioned by Sahlman (1996), that it is indeed extremely important for SEs to achieve credibility and a good reputation will not only provide added value for the people who work for them but also provide confidence in collaborating with external parties in delivering social values to their stakeholders. However, as hiring a third-party evaluator might be costly, another method, for example, providing free-trials to individual users, can be considered as a more subtle strategy for most social businesses in education.

4.2.5 Viable Scalability

Ninety percent of SEs have their in-house technology team to deal with technical matters as the software needs to be constantly updated. This was different for Williams and Greff who have more limited resources and knowledge regarding technology; they need to either learn by themselves or hire outsourced developers. The problem with outsourced developers, as illustrated by Greff, is that "*we have to pay them upfront because they are unwilling to work on risk. Developers struggle to keep to the deadlines and when they deliver there are bugs that need to be fixed which makes the process even longer*". By having in-house software development, SEs can have more freedom and speed-up the development process. For example, Desai explained that, "*we do a lot of cycles of revising, brainstorming and we start framing it by imagining how it will flow and then we run it with multiple people in our team by incorporating feedbacks*". All in all, it is immensely helpful for social businesses specialized in technology to acquire their own in-house IT team. Not only it will speed up the iteration and development process, but it can also convince other strategic allies (explained in the next section) which will increase the chance of being more sustainable. The abovementioned statement is in line with the notion explained by Kim, Miranda and Olaciregui (2008), that SEs need relevant expertise, e.g. developers from prototyping, modification, and field testing to

tackle practical problems derived from the innovation, and thus speed up the update of the innovation.

4.2.6 Strategic Alliance Establishment

One newly emerged theme that derived from the analysis of the interviews is that strategic alliance establishment within and outside a social business is also viewed as a challenge in the successful of technology implementation. In this theme, the issues that emerged relate to internal employment (i.e. recruitment, coordination, commitment, and retention) and also to building a strategic partnership. Almost half of the SEs mentioned the importance of recruiting the right people (including volunteers) which helps in the establishment of full-time employment, and the difficulties of maintaining the team's motivation. For instance, Jain utilized the universities channel to recruit people and implements several core duties with a holistic approach to keep his team feeling challenged and motivated: "*with such a small team, the software team is involved in providing feedback on the video. My creativity team also act as content researcher.*" Another alternative applied by one-third of SEs is to recruit a freelancer such as a linguistic translator, a content producer, and a multimedia graphics specialist to strengthen the existing team. Regarding coordination, one-third of the SEs who have geographically separated team members mentioned the utilization of technology intermediaries such as Skype, Slack, and internal management software to coordinate while also simultaneously setting the next target precisely and monitoring progress. On the other hand, building relevant external strategic partners is also considered important by the majority of the SEs. More than half of the SEs stated that managing strategic partners is capable of amplifying their business scale. As mentioned by Goldberg, "*a lot of our investors are going to be foundations, angel investors, and social impact funds, so building your network by going to conferences, incubators, and socializing with other entrepreneurs is critical*"

Overall, strategic alliance establishment confirms the notion of how SEs discover their opportunities by mobilizing their external and internal resources, because addressing social issues is often multifaceted and requires bridging diverse groups (Austin et al., 2006; DiDomenico, Haugh, & Tracey, 2010; Peredo & Chrisman, 2006). Primarily, the remarks made by the interviewees indicate the increasing challenges of employing the right human resources, not only based on their expertise but most importantly, people who believe in the social mission in the first place. Consequently, according to Sahlman (1996), as mentioned in the framework, it is important for SEs to be creative in finding a balance between financial and non-financial rewards to team members by providing appropriate added value.

4.3 Social Entrepreneur's Motivation to Enter Prize-based Competitions

SQ3: What motivates social entrepreneurs to enter a prize-based competition?

Within the theoretical framework, this thesis argues that an alternative source of funding is immensely desired as there has been a minimum support from the government to fill the gap between social needs and social services. The analysis of the interviews with social entrepreneurs (henceforth, SEs) in response to the third sub-question, revealed four refining themes that emerged: social motive, innovation recognition, guidance for improvement, and an interconnected network. Additionally, recommendations from SEs for prize-based competitions to be more valuable for them are also described in the end of this section in terms of mentorship, marketing strategy, incentive variation, and platformization issues.

4.3.1 Social Motives

The majority of the SEs agreed that their participation in a prize-based competition such as XPRIZE was because of its social mission and purpose. Eight out of the 12 SEs who had already been in the education sphere long before the competition even begun, explicitly stated that the mission within the competition is a resemblance of what they had been doing for the past years in order to overcome educational inequalities. For example, as Blank pointed out, "*XPRIZE has a great reputation. Most importantly, it was in our field and the thing is, we had this program for children and schools. Adults feel bad enough about not being able to read. They can't read, and they're taught by using something that looks like it's for a child and it feels even worse.*" One can assume that the social mission is internally related to the SEs and it is the spirit of running their business. Sockowitz broadly elaborated "*I always been motivated by public service, helping to educate people to get the skills they need to get a good job.*" Duston continued emotionally, "I just cannot *not* do it. *Their mission is exactly my mission. I find some people who believe in what I believe in.*"

While social missions are part of social enterprise, it is also wise to conduct a feasibility study of the social business in order to identify a scalable solution for the long haul. Groeneveld extensively explained, "*these things could not be used 10-15 years ago in these countries, but today, most families have access use smartphones, or most schools can have access to at least one computer, and suddenly technology can be within the reach of lowly private schools or public schools compared to ten years ago.*" The notion is also supported not only by established social entrepreneurs but also by emerging social entrepreneurs. Ho was inspired by ALEXP and GLEXP before he created Auto Cognita with his other three full-time partners, because "*the*

problem is well-defined, and the innovation is scalable, we do not need lots of members on the team, but the potential impact is huge." All in all, the question remains, why does the social mission need to be larger than the profit itself? Goldberg, for instance, stressed that it is because "*it is going to be tougher. Every day you basically say "is this the right direction on which I should be spending my next money? " and if it's not, know when to kill your darling.*" Additionally, the social mission that can be combined with SEs' expertise is also highly motivating in order to create better access for children throughout the world. Those abovementioned reasons were also confirmed by Desai and Jain who continued with their innovation outside the competition.

The abovementioned statements are strongly related to previous findings by Huster et al. (2017) and by Kotha, George, and Srikanth (2013), who emphasized that prize-based competitions have intangible advantages to inspire aspiring or emerging social entrepreneurs in both launching a business and enhancing the belief to pursue their mission. The mission is translated by the establishment of social value and by delivering a scalable solution to immediate social problems (Austin et al., 2006; Dacin, Dacin, & Tracey, 2011; Douglas 2010). Overall, participation in a prize-based competition by SEs was seen as a channel for them to solve a scalable problem and enhance the mission they believed in by helping people within the realm of their expertise.

4.3.2 Recognition in Innovation

Ten out of the 12 SEs accentuated that the notion of entering a prize-based competition such as XPRIZE is to receive substantial exposure given by the organizer's credibility, thus enabling their innovation to become known worldwide, thus bringing more partners and more consumers. But most important, for Groeneveld, is to educate the market that their digital product is relevant. Sockowitz further elaborated, "*if I want my product to do well on the market, I need other products to do well too. So people understand, there is a market for this stuff.*" Recognition is also related to credibility as derived from the prestige of the competition's scale, as SEs are defined by how they can contribute to envisioning uncertainty within an environment (Thompson, Alvy, & Lees, 2000). For instance, Greff explained "*If we were chosen as one of the finalists, it would give us prestige; it was tested by judges. They even provide access and the infrastructure for field testing*". Therefore, XPRIZE's involvement in the pilot testing offers trustworthiness in assuring their product has been evaluated appropriately before distributing it. Duston pointed out the impact in terms of field testing: "*you've got months of development before you can put it on the market. You cannot launch a product with a defect program.*" The

pilot testing in a remote area in Tanzania also attracted Groeneveld who developed the application designed for underprivileged children in Pakistan, because "*what we do is innovative, we aim at the middle of the normal distribution of average students in rural Pakistan, who are going to school but not learning anything. So we can make a difference.*"

Recognition of an innovation, as derived from the prestige of the competitions, will automatically attract media exposure which can aid to scaling-up the business. For SEs, scaling up is not only translated in terms of profit, it is also the impact they can provide by the innovation itself. This is strongly related to a study conducted by Huster et al. (2017) which showed that the prestige and credibility a competition brings to the business is one of the main reasons that social entrepreneurs are willing to join a prize-based competition. As suggested by Arora (2016), prize sponsors with a high-caliber image can offer social entrepreneurs the quality mark derived from affiliation with such organizations; this is very valuable in generating attention and t building future relevant partnerships. As social entrepreneurs will find difficulties in influencing a new market or trying to obtain investors in their innovation, the result of exposure and credibility embedded within the competition will support the process of finding meaningful partnerships, as discussed in the next sub-section.

4.3.3 Interconnected Network

The literature cited in the previous section has identified that one of the main reasons why social entrepreneurs participate in a prize-based competition is to expand their network of relevant business parties (Huster et al., 2017). Seventy percent of the interviewees agreed that a prize-based competition provides immense opportunities to acquire potential partnerships that can include team members, distributors, customers, and even investors. For instance, Goldberg pointed out that a social business needs to find, "*trusted influential people within the community you are working with, be it schools, colleges, and to learn from them.*" While Groeneveld further elaborated that potential partners can be in terms of, "*either in the implementation, content, or technology.*" A competition enables SEs to gather like-minded people, as one of Ho's team-members is from the United States and was recruited because of the XPRIZE and is currently responsible for the content. Overall, the majority of social entrepreneurs agreed to the notion that one of the main advantages of participating in a prize-based competition is to acquire important partners. As recapitulated by Goldberg, "*business development is about building potential partnerships.*"

4.3.4 Guidance for Improvement

More than half of the interviewees stressed the important role that prize-based competitions have delivered in order to develop their product, and thus, increase the number of consumers. While their product was being developed, ninety percent of SEs also needed to develop their skills. As pointed out by Roy, participation in XPRIZE was seen as a life-changing decision as he resigned from his job and start developing the innovation by observing the real field and market feasibility. Interestingly, only 42% of SEs subtly mentioned the chance of winning financial rewards to aid development of their innovation. Hence, continuous progress is what is primarily sought by the majority of SEs. For instance, Davies explained that "*XPRIZE gave us an extra stimulus and inspiration so we can improve our ideas and software*". The abovementioned notions are understandable, as XRPIZE provides a clear schedule and objectives that need to be achieved. Thus, it helps by directing participants to enhance their innovation.

However, as prize-based competitions such as XPRIZE offer an astounding nominal prize, they requires a social business to be sustainable. Hence, SEs must prepare adequate resources (e.g. funding, human resources). A third of the SEs subtly provided elements worthy of considering before participating in a competition that might affect the production process. For instance, Desai argued that although the spirit carried by the competition was positive, choices need to be made on how to fund the organization, since there is no guarantee of any money while the business continues. There was broad agreement that prize-based competitions also developed entrepreneurial skills. These results thus confirm the assumptions made by previous scholars introduced within the theoretical framework (Acar & Ende, 2015; Huster et al., 2017; Kwong, Thompson & Mei Cheung, 2012; Yitshaki & Kropp, 2016). Nonetheless, this thesis fills the gap in the literature regarding the impact of prize-based competitions on social businesses, as several of the abovementioned concerns are worth noting.

The intention of a prize-based competition is to find a relevant solution by creating social impact for designated communities instead of encouraging innovation. This thesis assumes that the larger the nominal prize of a competition, the higher the stakes will be, thus, more resources (e.g. fund, human resources, and partners) will be needed to prevail regardless how good the innovation is. The findings indicated that it would have been naive for the SEs to enter a prize-based competition mainly because of the money, as the risk involved is huge. A sharply defined mission needs to be combined with strategic moves, a competent team, and meaningful partnerships. As an intermediary, it is not entirely up to the prize-based competition if the innovation created by SEs finally prevails, as progress is what distinguishes success from

failure. The success of SEs is defined by how they fight their battles and how they conquer their own – and most probably others' – doubts.

With all those abovementioned findings, are there still room for improvements that would make prize-based organizers be more valuable for SEs? The analysis of the interviews further revealed four notable recommendations in terms of mentorship, marketing strategy, incentive variation, and platformization in order to establish a more supportive innovation ecosystem. A third of the SEs subtly mentioned the long duration and that it needs to be shortened, Sockowitz explained that "*In 2 years a lot of small companies could go away if you are not financially sustainable".* As XPRIZE offers no mentorship, Greff noted that it is important to provide a frequent schedule of guidance to ensure they are on the right track. Although XPRIZE does provide clear objectives and goals, mentorship is considered one of an important aspects for an SE in participating in a prize-based competition. As mentioned by Huster et al. (2017), a prize-based competition could assign relevant experts and a non-governmental organization who are in the field of social business to guide the participants.

Although XPRIZE has been known to have been involved with significant networking partners, two SEs subtly mentioned that this was not simultaneously followed by their marketing strategy. For instance, Ho explained that "*they are not very proactive in generating more publicity."* Additionally, one-third of the SEs made comments about variation in incentives. For example, Davies pointed out that providing an incentive for collaboration "*will improve their probability of winning.*" Based on the information provided in XPRIZE's guidelines, they will choose 15 semi-finalists from all entries submitted in the first phase, and will only grant $100,000 USD to five finalists who are selected based on a six-month field testing. Hence, leaving 10 innovators with no staged nominal incentive of any kind. The final noteworthy suggestion was provided by two SEs who dropped out of the competition because of the platform's complexity. As illustrated by Jain, XPRIZE needs to be flexible as long as their innovation works on the required Android platform, because "*we have already built our innovation in some other open platforms. This means we have to take a five-year step back from what we have achieved to date*" Additionally, Desai noted that *"Our system requires an internet connection, and XPRIZE requires that it runs stand-alone."*

So why does the platform inhibit innovation? A platform such as Android functions as an online service to content intermediaries who relate to users (i.e., to utilize, develop and deploy applications), advertisers, and even policy-makers (Gillespie, 2010; Helmond, 2015). As XPRIZE is also considered as an intermediary for delivering innovation, the analysis of the interviews revealed tensions between maintaining idealism by serving what is best for the

participants (i.e. the community) while also catering to advertisers' needs. A platform as a multi-sided market business model contains discourse, as it not only allows developers to run an application, but because they afford an opportunity to communicate, interact, or generate profit while also analyzing their users, thus creating strategic business decisions (Gillespie, 2010; Helmond, 2015).

Within the scope of XPRIZE, Google (i.e. the producer of Android) acts as a supplier for the tablet in the field-testing phase ("Global Learning XPRIZE," n.d). The advantage is obvious for both organizer and sponsor: it lowers the competition's costs, while simultaneously aiding the marketing strategy of Android of exposure in the underprivileged market which is harder to reach. As this has proved to inhibit innovation based on the analysis of the interviews, this is what is called a consequences of platformization in terms of economic interest through the commodification of user activities and content developers (Helmon, 2015). Additionally, although Android might have a logical reason for lowering the costs to produce the application and it is the most widely used platform with 78 percent penetration in 2013 (Keane, Keane, & Blicblau, 2016), 40% of the SEs mentioned that it is not a favorable environment for producing a high-quality application. Nonetheless, one-third of the SEs viewed XPRIZE as already having done what it was supposed to do.

5. CONCLUSION

5.1 Conclusion

As discussed in the previous chapters, this research is mainly contributes to scholarship by identifying challenges in the implementation of ICT-based educational innovation and forms of innovation being produced to overcome literacy in order to answer the main research question "*How do social entrepreneurs address literacy challenges through their digital innovations?"* This section will highlight several noteworthy key findings regarding the analysis derived from an in-depth interview and content analysis of 12 social entrepreneurs.

It appears to be evident that ICT-based educational technology is not a stand-alone factor in trying to improve learning outcome. The success rate of implementation in the educational setting need to face a significant amount of challenges including taking into account, for instance, market characteristics, sociocultural aspect, relevant pedagogical content, economic scalability. The study of market characteristics by SEs showed that ICT-based technology is not to serve every student the same way. It needs to be targeted to particular audience, and content (i.e. functional/foundational literacy) must be relevant to those who is going to implement it (e.g. teachers). Moreover, it will affect the design of technology either as a tutor, teaching aid, or learning tools. Therefore, the findings imply that it is impossible for ICT-based educational innovation to be pedagogically neutral. Hence, fail to reduce social exclusion. Overall, SEs emphasized that their digital innovation in education was not to replace the presence of teachers. Instead, it will help improve the teaching environment. The findings of this study also imply that the role of technology as a tool can be extended to become a cognitive tool (i.e. mind tool) which allows students' creativity to be explored (i.e. Multiliteracies) in overcoming complex problems that will help shape their designated skill in facing the 21st Century challenges.

Regarding prize-based competition, in contrary to popular belief that it encourages innovation, it can also contain a factor that might inhibit such as platformization. As an intermediary, a prize-based competition serves a multisided market, which eventually will not cater everyone's needs. The participation of SEs in a prize-based competition needs to be thoroughly considered as it requires a sustainable financial resource, human resources and meaningful partnerships. Last but not least, this thesis implied triangulation method by including two SEs who did not continue to Phase 2 of GLEXP to enrich and verify the data gathered from the other 10 participants. Safely said, the collected data contribute and validate the notion made by the other 10 SEs involved in the realm of this thesis to contribute in the internal validity.

5.2 Theoretical Implications

First of all, this thesis contributes to an overall knowledge regarding social entrepreneurship and the prospective role of ICT-based learning platforms as not many empirical studies addressed this issue (Kim, Miranda, Olaciregui, 2008; Nolan, 2009; Zahra, Gedajlovic, Neubaum, & Shulman, 2008). The advancement of ICT-based educational innovation has provided substantial possibilities in transforming education (Arora, 2016). This thesis shows more insights in how social entrepreneurs adapt technology in trying to improve educational sphere, thus, literacy. Additionally, shows the challenges in how ICT-based educational technology is designed (i.e. tutor, teaching aid, and learning tools) and implemented to cater particular audience. Hence, it raises a tension of whether technology can be seen as a neutral platform of social inclusivity.

Secondly, although SEs are supposed to create newness in novelty, in term of education, more often than not, SEs need to comply to a diverse group (i.e. educators, investor, NGOs, government). Moreover, the diverse group has own agenda, and pressures to deal with that might influence or even determine the relevancy of the innovation within the realm of overcoming social issues. Thirdly, the important notion in the implementation of ICT-based educational technology was the fact that the present is not to replace human educator. The role of a teacher cannot be diminished and distinct in enhancing learning outcome.

Lastly, regarding prize-based competitions, this thesis contributes to the knowledge regarding how prize-based competition can act to be more valuable for social businesses since this notion is less discussed in the empirical perspective (Kwong, Thompson, & Mei Cheung, 2012; Ross & Byrd, 2011). As price-based competitions by nature are bound to certain rules and served multi-sided market (e.g. advertiser, users, communities), the notion of encouraging innovation might not be able to implement fully. Thus, the notion of 'platformization' emerged as a central debate. Overall, most of the findings correspond strongly to the theories presented in the theoretical framework.

5.3 Practical Implications

Social Entrepreneurs

Based on the findings of this research, this study could provide valuable, practical implications for fellow aspiring, emerging or established social entrepreneurs who place concerns in improving education (i.e. literacy) through ICT-based innovation. For aspiring SEs, this thesis can be used as guidance regarding discovering opportunity process and external challenges which resulted in how will the ICT-based intervention will be produced to aid the learning

process. The notable difficulty that extends the current scholarship is the notion of managing internal human resources concerning recruitment, maintaining motivation, and also providing added value to enhance commitment. Additionally, this thesis also provides insights in producing an ICT-based educational innovation that fosters social inclusivity. Moreover, this thesis also shed lights in providing elements to be considered for SEs before participating in prize-based competitions that might influence the sustainability of innovation. This thesis argues that the higher the nominal prize, the higher the risk of losing the company in the end with no proper evaluation of supporting resources. In the analysis of interviews, none SEs mentioned that the financial reward as their primary motivators. Instead, it is the development of innovation that they were primarily chasing along the way. In a more philosophical notion, the majority of SEs felt like it was a natural calling to participate in competitions which they believed in the mission and purpose. Hence, the participation is also viewed as a self-actualization.

Formal Educational Institutions

As mentioned in the introduction, previous research suggests that the potential of adapting technologies for literacy development remains largely untapped in an educational setting (Flewitt, Messer, & Kucirkova, 2015). This thesis agreed to the notion that ICT-based educational technology can be a potential key to developing learning outcome derived from embedded multimedia content and interactivity (Kim, Miranda, Olaciregui, 2008; Owston, et al., 2009; Paraskeva, Mysirlaki, & Papagianni, 2010). Therefore, this thesis provides insights for formal educational institutions who are planning to implement ICT-based educational more than just a tool. Instead, schools aim at comprehensively transforming the learning mechanism that placed personalization and customized lessons to adapt learner's path beforehand.

Government Policies

As elucidated in the Introduction that previous literature found that governmental support contributes to fostering the formation and sustainability of social entrepreneurs (Short, Moss, & Lumpkin, 2009). However, Yitshaki and Kropp (2016) suggested that the government gave only a minimum of attention to social welfare issue which subsequently created a gap between the fulfillment of social needs and providing an appropriate social service. This thesis showed that several SEs aimed at working with the government to massively aid the notion of providing quality education which delivers opportunities to be widely accessible. Although working with government is perceived to be beneficial to several SEs, the bureaucracy and corruption were two main inhibitors the SEs can enlarge their social impact within a society. Hence, this thesis

provokes better insights for the government to improve their services to foster SEs to address social issues that the government seems failed to overcome.

Prize-based Competitions' Organizers

The presence of prize-based competitions as intermediaries for SEs to access necessary resources (e.g. funding, exposure, network) is viewed as fundamental. However, as every competition, there are certain terms and conditions that need to be applied. Hence, it is impossible to satisfy everyone＇s needs. As prize-based competition serves several target market simultaneously, the terms and conditions that have been implemented might benefit to one market (e.g. advertisers) but not the other (e.g. community) which based on the findings, can inhibit the opportunity of SEs to partake as a problem solver. Factors such as mentorship, marketing strategy, platformization, staged nominal incentive to foster collaboration emerged within the discussion. Therefore, by applying the findings of this thesis to all of the prize-based competition＇s organizers, they could positively influence the quality of social innovation generated by SEs.

5.4 Limitations and Future Research

Although as mentioned in the methodological chapter, the qualitative methods are the most favorable method when studying social entrepreneurship and educational technology, the research conducted in the realm of this thesis has certain limitations. First of all, due to the time frame limitation, financial aspects, and geographic disparity, this all semi-structured interviews were done through computer-mediated communication (CMC) such as Skype, Whatsapp, and Facetime. As mentioned in the methodological framework, although interviews with CMC is more akin to a face-to-face interview, the researcher sacrificed the observation of interviewee＇s informal and non-verbal communication that might have enhanced the datasets (Creswell, 2013).

Although the data collection was still achievable as desired, future study should take into account the limitation CMC interview before deciding to implement this method.
Secondly, concerning content-analysis, although the chosen method allows identifying common patterns in the data analysis, the method might influence the validity of the findings because it can cause oversimplification on the interpretation of the dataset. Additionally, due to the time span of the research, the inter-coder coding to provide more objectivity was not possible to be applied. Therefore, although there were two SEs were used as triangulation to confirm the data,

the results were still prone to bias. Future studies could investigate the designated topic involving multiple researchers, thus, researcher triangulation. Thirdly, when analyzing the ICT-based educational technology innovation, although there was some additional information such as video demo, website, and trial demo, not all applications can be studied equally due to confidentiality, and some were still in the development process. Therefore, future research can focus on several developed applications to acquire a deeper comprehension. Fourthly, regarding the sample, the social enterprises being observed were in various stages which have been running between one to 11 years. Future research can be taken into account to opt either social enterprises who are still in the early stage (i.e. premature) or in a more established stage (i.e. mature) which might provide a different type of challenges.

Based on the findings from this study, there are also some future research topics than can be taken into account in the realm of ICT-based educational innovation. Regarding target audience, the interesting finding was that one-third of social entrepreneurs targeted home-schooling students, which means there will be no educators available, except parents to guide. However, as mentioned in the introduction, parents who are inexperienced in schooling environment is one of the leading causes of poor learning outcome (UNESCO, 2006). The topic in studying home-schoolers can be in consideration to use ICT-based educational technology, how do end-users perceive it will improve the learning outcome which can derive both from the perspective of parents or student or even psychological effects the learner feels by using it. Regarding the type of innovation, the majority of SEs agreed that ICT-based educational innovation is not an answer to all educational problem and that the role of teachers will never diminish by its presence. Teachers are considered to be a major collaborator in designing the content to be injected into the application. Therefore, future research regarding educators who utilize technology to enhance the learning experience and not merely as a tool can be studied. The study design can even be experimental for measuring the effectiveness of ICT-based educational innovation on improving the learning outcome within a classroom.

Moreover, in the realm of utilizing ICT in forms of gaming can be found in several patterns of innovation studied in this thesis, an extended version of it can also be studied to supplement the findings. One of the extended versions exciting to be considered is the rise of instructional design in virtual reality technology that has been proved to improve the learning outcome (Mechant, et al., 2014). The study of its potential in providing a more vivid experience for learners to explore the diverse topic located in another part of the world seems very interesting to be explored.

REFERENCES

Acar, O.A., & van den Ende, J. (2015). Understanding fear of opportunism in global prize-based science contests: Evidence for gender and age differences. *PLOS One, 10*(7), 1-13. doi:10.1371/journal.pone.0134898

Alvarez, S.A., Barney, J.B., & Anderson, P. (2012). Forming and exploiting opportunities: The implication of discovery and creation processes for entrepreneurial organizational research. *Organization Science, 24*(1), 301-317. doi:10.1287/orsc.1110/0727

Alvord, S.H., Brown, L.D., & Letts. C.W. (2004). Entrepreneurship and societal transformation: An exploratory study. *The Journal of Applied Behavioral Science, 40*(30), 260–282. doi: 10.1177/0021886304266847

Amit, R., & Zott, C. (2001). Value creation in e-business. *Strategic Management Journal, 22*(6–7), 450–493. doi:10.1002/smj.187

Arora, P. (2016). Prizes for innovation: Impact analysis in the ICT for education sector. *UNESCO Report* [Background Paper]. Retrieved from: http://payalarora.com/UNESCO%20Paper-Prizes-for-Innovation-Arora2016.pdf

Attride-Stirling, J. (2001). Thematic networks: An analytic tool for qualitative research. *Qualitative Research, 1*(3), 385–405. doi:10.1177/146879410100100307

Austin, J., Stevenson, H. & Wei-Skillern, J. (2006). Social and Commercial entrepreneurship: Same, different, or both? *Entrepreneurship Theory and Practice, 30*(1), 1–22. doi:10.1111/j.1540-6520.2006.00107.x

Babbie, E. (2010). *The practice of social research.* Wadsworth, OH: Cengage Learning.

Benigno, V., Bocconi, S., & Ott, M. (2007). Inclusive education: helping teachers to choose ICT resources and to use them effectively. *eLearning Papers, 6,* 1-13. Retrieved from: http://www.ictliteracy.info/rf.pdf/e-learningpapers_ICT.pdf

Berg, B.L., & Lune, H. (2014). *Qualitative research methods for the social sciences* (8th Ed.). Essex, UK: Pearson Education.

Bertacchini, F., Bilotta, F., Pantano, P., & Tavernise, A. (2012). Motivating the learning of science topics in secondary school: A constructivist edutainment setting for studying Chaos. *Computers & Education, 59*(4), 1377–1386. doi:10.1016/j.compedu.2012.05.001

Bingimlas, K.A. (2009). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *EURASIA Journal of Mathematics, Science & Technology Education, 5*(3), 235-245. Retrieved from: https://eric.ed.gov/?id=EJ905676

Black, et al. (2010). Validity in teacher's summative assessments. *Assessment in Education: Principles, Policy, & Practice, 17*(2)*,* 215-232. doi:10.1080/09695941003696016

Boeije, H. (2010). *Analysis in qualitative research.* London, LDN: SAGE Publication.

Borins, S. (2000). Loose cannons and rule breakers, or enterprising leaders? Some evidence about innovative public managers. *Public Administration Review, 60*(6), 498-507. Retrieved from: http://www.jstor.org/stable/977433

Bornstein, D. (2004). *How to change the world: Social entrepreneurs and the power of new ideas.* Oxford, UK: Oxford University Press.

Boyce, C. & Neale, P. (2006). *Conducting in-depth interviews: A guide for designing and conducting in-depth interviews for evaluation input.* Watertown, MA: Pathfinder International.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. doi:10.1191/1478088706qp063oa

Brush, C.G. (2008). Pioneering strategies for entrepreneurial success. *Strategic Direction,, 24*(9), 21-27. doi: 10.1108/sd.2008.05624iad.003

Burnett, C. (2009). That's more like how they know me as a person: One primary pre-service teacher's stories of her personal and 'professional' digital practices. *Literacy, 43*(2), 75–82. doi:10.1111/j.1741-4369.2009.00517.x

Chambers, B., Slavin, R.E., Madden, N.A., & Gifford, R. (2008). Technology infusion in a Success for All: Reading outcomes for First Graders. *The Elementary School Journal, 109*(1), 1-15. doi:10.1086/592364

Choi, N. & Majumdar, S. (2013). Social entrepreneurship as an essentially contested concept: Opening a new avenue for systematic future research. *Journal of Business Venturing, 29*(3), 363 – 376. doi:10.1016/j.jbusvent.2013.05.001

Cooney, K. (2011). An exploratory study of social purpose business models in the United States. *Nonprofit and Voluntary Sector Quarterly, 17*(2), 137-161. doi:10.1177/0899764009351591

Corbin, J.M. & Strauss, A. (1990). *Basics of qualitative research: Grounded theory procedures and techniques.* Thousand Oaks, CA: SAGE Publication.

Corus, C., & Ozanne, J. (2011). Critical literacy programs: Can business literacy be a catalyst for economic and social change? *Journal of Macro Marketing, 31*(2), 184-198. doi:10.1177/0276146710395594

Cosseboom, L. (August 19, 2014). Ruang Guru wants to overhaul online-to-offline education in Indonesia, gets funding from East Ventures. *Tech in Asia*. Retrieved from: https://www.techinasia.com/indonesia-jakarta-ruangguru-belva-devara-iman-usman-east-ventures-seed-funding-investment

Creswell, J. W. (2013). Q*ualitative inquiry and research design: Choosing among five approaches* (3rd Ed.). Thousand Oaks, CA: SAGE Publication.

Dacin, M. T., Dacin, P. A., & Tracey, P. (2011). Social entrepreneurship: A critique and future directions. *Organization Science*, *22*(5), 1203-1213. doi:10.1287/orsc.1100.0620

Darling-Hammond, L. (2010). America's commitment to equity will determine our future. *Phi Delta Kappan, 91*(4), 8-14. doi:10.1177/003172171009100403

Damani, B., & Sardeshpande, V. (2015). Social change using innovation and technology. In S. Majumdar, S. Guha, & N. Marakkath (Eds.), *Technology and Innovation for Social Change*, pp. 125-141. doi:10.1007/978-81-322-2071-8_8

Damianov, D.S., & Peeters, R. (2015). Prize-based mechanisms for fund-raising: Theory and experiments [*Working Paper*]. Retrieved from: http://www.lancaster.ac.uk/staff/desilvad/DamianovPeeters-20150302.pdf

Daneels, E. (2002). The dynamics of product innovation and firm competencies. *Strategic Management Journal, 23*(12), 1095-1121. doi: 10.1002/smj.275

Daniel, J., West, P., & Mackintosh, W. (2006, August). *Exploring the role of ICTs in addressing educational needs: Identifying the myths and the miracles*. Paper presented at NADEOSA 10th Anniversary Conference, Pretoria, South Africa. Retrieved from: http://dspace.col.org/bitstream/handle/11599/1393/2006_Daniel_ICT_Myths_Miracles_Transcript.pdf?sequence=1&isAllowed=y

Dees, J. G. (1998). *The meaning of "social entrepreneurship"*. Stanford University: Draft Report for the Kauffman Center for Entrepreneurial Leadership, pp. 1 – 6. Retrieved from: https://entrepreneurship.duke.edu/news-item/the-meaning-of-social-entrepreneurship/

DeSantis, L., & Ugarriza, D.N. (2000). The concept of theme as used in qualitative nursing research. *Western Journal of Nursing Research*, *22*(3), 351–372. doi:10.1177/019394590002200308

Dicicco-Bloom, B., & Crabtree, B.F. (2006). The qualitative research interview. *Medical Education, 40*(4), 314–321. doi:10.1111/j.1365-2929.2006.02418.x

Di Domenico, M., Haugh, H., & Tracey, P. (2010). Social bricolage: Theorizing social value creation in social enterprises. *Entrepreneurship Theory and Practice, 34*(4), 681–703. doi:10.1111/j.1540-6520.2010.00370.x

Dillman, D.A. (1978). *Mail and telephone surveys: The total design method.* New York, NY: John Wiley and Sons.

Diochon, M.C. (2004). *Entrepreneurship and community economic development.* Quebec, QC: McGill-Queen's University Press.

Douglas, H. (2010). Divergent orientations of social entrepreneurship organizations. In K. Hockerts, J. Mair, & J. Robinson (Eds.), *Values and Opportunities in Social Entrepreneurship*, pp. 71-195. Retrieved from http://www.palgraveconnect.com/pc/doifinder/10.1057/9780230298026

Elmborg, J. (2006). Critical information literacy: Implications for instructional practice. *The Journal of Academic Librarianship, 32*(2), 192-199. doi:10.1016/j.acalib.2005.12.004

Estrin, S., Mickiewicz, T., & Stephan, U. (2013). Entrepreneurship, social capital, and institutions: Social and commercial entrepreneurship across nations. *Entrepreneurship Theory and Practice, 37*(3), 479–504. doi:10.1111/etap.12019

Fereday, J., & Muir-Cochrane, E. (2016). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, *5*(1), 80-92. doi:10.1177/160940690600500107

Flewitt, R., Messer, D., & Kucirkova, N. (2014). New directions for early literacy in a digital age: The iPad. *Journal of Early Childhood Literacy*, *15*(3), 289-310. doi:10.1177/1468798414533560

Fryer, R., & Levitt, S. (2004). Understanding the Black-White test score gap in the first two years of school. *Review of Economics and Statistics, 86*(2), 447-464. doi:10.1162/003465304323031049

Foo, M.D, Wong, P. K., & Ong, A. (2005). Do others think you have a viable business idea? Team diversity and judges' evaluation of ideas in a business plan competition. *Journal of Business Venturing*, *20*(3), 385-402. doi:10.1016/j.jbusvent.2004.04.001

Gee, J.P. (1999). Critical issue: Reading and the new literacy studies: Reframing the National Academy of Sciences Report on reading. *Journal of Literacy Research, 31*(3), 355-374. doi:10.1080/10862969909548052

Gee, J.P. (2000). Teenagers in new times: A new literacy studies perspective. *Journal of Adolescent & Adult Literacy, 43*(5), 412-420. Retrieved from http://www.jstor.org.eur.idm.oclc.org/stable/40017078

Gee, J.P. (2003). What video games have to teach us about learning and literacy. *Computers in Entertainment (CIE) - Theoretical and Practical Computer Applications in Entertainment, 1*(1), 20-24. doi: 10.1145/950566.950595

Gee, J.P. (2010). A situated-sociocultural approach to literacy and technology. In E.A. Baker (Ed.), *The new literacies: Multiple perspectives on research and practice,* 165-193. New York, NY: The Guildford Press. Retrieved from: https://books.google.nl/

Genlott, A.A., & Gronlund, A. (2016). Closing the gaps e Improving literacy and mathematics by ICT-enhanced collaboration. *Computers & Education, 99*, 68-80. doi:10.1016/j.compedu.2016.04.004

Gibson, D.C., & Webb, M.E. (2015). Data science in educational assessment. *Education and Information Technologies, 20*(4), 697-713. doi:10.1007/s10639-015-9411-7

Gillespie, T. (2010). The politics of 'platforms'. *New Media & Society*, *12*(3), 347-364. doi:10.1177/1461444809342738

Government expenditure on education. (n.d). Retrieved from World Bank's official site: http://data.worldbank.org/indicator/SE.XPD.TOTL.GD.ZS

Goldin, C., & Katz, L. F. (2008). *The race between education and technology*. Cambridge, MA: Harvard University Press.

Gras, D., Moss, T.W., & Lumpkin, G.T. (2014). The use of secondary data in social entrepreneurship research: Assessing the field and identifying future opportunities. In Jeremy Short (Ed.), *Social Entrepreneurship and Research Methods (Research Methodology in Strategy and Management, Vol.9),* pp.49 - 75. doi:10.1108/S1479-838720140000009011

Guclu, A., Dees, J. G., & Anderson, B. B. (2002). The process of social entrepreneurship: Creating opportunities worthy of serious pursuit. *Center for the advancement of Social Entrepreneurship*, *1*, 1-15. Retrieved from: http://s3.amazonaws.com/academia.edu.

Guest, G., & MacQueen, K. (2008). Reevaluating guidelines in qualitative research. In G. Guest & K. MacQueen (Eds.), *Handbook for team-based qualitative research*, Lanham, MD: Altamira Press, 205-226.

Guest, G., & MacQueen, K., & Namey, E.E. (2012). *Applied thematic analysis.* Thousand Oaks, CA: SAGE Publication.

Gustavsen, B. (2012). Social innovation and action research. In H-W. Franz, J. Hochgerner, & J. Howaldt (Eds.), *Challenge Social Innovation: Potentials for Business, Social Entrepreneurship, Welfare and Civil Society,* pp. 353-366. doi:10.1007/978-3-642-32879-4

Harman, J. (November 2, 2016). Going for the learning prize with Shlomy Kattan of XPRIZE. *Leading Learning.* Retrieved from: http://www.leadinglearning.com/episode-55-shlomy-kattan-xprize/

Hébert, R.F. & Link, A.N. (1989). In search of the meaning of entrepreneurship. *Small Business Economics, 1*(1), 39 – 49. doi:10.1007/BF00389915

Helmond, A. (2015). The platformization of the web: Making web data platform ready. *Social Media + Society, 1*(2), 1-11. doi:10.1177/2056305115603080

Heemskerk, I., Brink, A., Volman, M., and Dam, G.T. (2005). Inclusiveness and ICT in education: A focus on gender, ethnicity and social class. *Journal of Computer Assisted Learning 21*(1), 1–16. doi:10.1111/j.1365-2729.2005.00106.x

Herring, S. C. (2004). Content analysis for new media: Rethinking the paradigm. In *New research for new media: Innovative research methodologies symposium working papers and readings* (pp. 47-66). Minneapolis, MN: University of Minnesota School of Journalism and Mass Communication. Retrieved from: https://www.sfu.ca/cmns/courses/2012/801/1-Readings/herring%20CA%20for%20new%20media.pdf

Howitt, D., & Cramer, D. (2008). *Introduction to research methods in psychology* (2nd Ed.). Edinburgh, UK: Prentice Hall.

Huffman, D., & Quigley, J.M. (2002). The role of the university in attracting high tech entrepreneurship: A Silicon Valley tale. *The Annuals of Regional Science, 36*(3), 403-419. doi:10.1007/s001680200104

Huster K., Petrillo C., O'Malley G., Glassman D., Rush J., & Wasserheit J. (2017). Global social entrepreneurship competitions: Incubators for innovations in global health? *Journal Of Management Education, 41*(2), 249-271. doi:10.1177/1052562916669965

Ireland, R. D., Hitt, M. A., & Sirmon, D. G. (2003). A model of strategic entrepreneurship: The construct and its dimensions. *Journal of Management, 29*(6), 963–989. doi:10.1016/S0149-2063_03_00086-2

Jay, M. E. & Jay, H.L. (2003). *Teaching with computers: Strategies that work in Grades K-6.* New York, NY: Neal-Schuman Publishers, Inc.

Johnson, L.J., & LaMontagne, M.J. (1993). Research methods: Using content analysis to examine the verbal or written communication of stakeholders within early intervention. *Journal of Early Intervention, 17*(1), 73-79. doi:10.1177/105381519301700108

Kalantzis, M., Cope, B., & Harvey, A. (2003). Assessing Multiliteracies and the new basics. *Assessment in Education: Principles, Policy & Practice, 10*(1), 15-26. doi:10.1080/09695940301692

Keane, T., Keane, W.F. & Blicblau, A.S. (2016). Beyond traditional literacy: Learning and transformative practices using ICT. *Education and Information Technologies, 21*(4), 769-781. doi:10.1007/s10639-014-9353-5

Khan, M.S.K., Hasan, M., & Clement, C.K. (2012). Barriers to the introduction of ICT into education in developing countries: The example of Bangladesh. *International Journal of Instruction, 5*(2), 61-80. Retrieved from: https://eric.ed.gov/?id=ED533790

Kim, B., & Reeves, T.C. (2007). Reframing research on learning with technology: In search of the meaning of cognitive tools. *Instructional Science, 35*(3), 207-256. doi:10.1007/s11251-006-9005-2

Kim, P., Miranda, T., & Olaciregui, C. (2008). Pocket school: Exploring mobile technology as a sustainable literacy education option for underserved indigenous children in Latin America. *International Journal of Educational Development, 28*(4), 435-445. doi:10.1016/j.ijedudev.2007.11.002

Kim, P.H. (2009). Action research approach on mobile learning design for the underserved. *Educational Technology Research and Development, 57*(3), 415-435. doi:10.1007/s11423-008-9109-2

Kim, R., Olfman, L., Ryan, T., & Eryilmaz, E. (2014). Leveraging a personalized system to improve self-directed online educational environments. *Computers & Education, 70,* 150-160. Doi: 10.1016/j.compedu.2013.08.006

Kirzner, I.M. (1997). Entrepreneurial discovery and the competitive market process: an Austrian approach. *Journal of Economic Literature, 35*(1), 60–85. Retrieved from: http://econfaculty.gmu.edu/pboettke/summer/summer%20docs/kirzner1997.pdf

Klopfer, E., Osterweil, S., Groff, J., & Haas, J. (2009). Using the technology of today in the classroom today: The instructional power of digital games, social networking, simulations and how teachers can leverage them. *The Education Arcade*, *1*, 1-20. Retrieved from: http://education.mit.edu/wp-content/uploads/2015/01/GamesSimsSocNets_EdArcade.pdf

Knafl, K.A., & Breitmayer, B.J. (1991). Triangulation in qualitative research: Issues of conceptual clarity and purpose. In J.M. Morse (Ed.), *Qualitative nursing research: A contemporary dialogue,* pp. 226-239. Thousand Oaks, CA: SAGE Publication. doi:10.4135/9781483349015.n26

Knight, F. (1921). *Risk, uncertainty and profit.* New York, USA: Houghton Mifflin. Retrieved from: https://books.google.nl/books

Kotha, R., George, G., & Srikanth, K. (2013). Bridging the mutual knowledge gap: Coordination and the commercialization of radical science. *Academy of Management Journal, 56*(2), 498-524. doi:10.5465/amj.2010.0948

Krippendorff, K. (2004). *Content analysis: An introduction to its methodology* (2nd Ed.). Thousand Oaks, CA: SAGE Publication.

Kwong, C., Thompson, P., & Mei Cheung, W. (2012). The effectiveness of social business plan competitions in developing social and civic awareness and participation. *Academy of Management Learning and Education, 11*(3), 324-348. doi:10.5465/amle.2011.0007A

Januszewski, A., & Molenda, M. (2008). *Educational technology: A definition with commentary*. New York, NY: Lawrence Erlbaum Associates.

Johnson, L.J., & LaMontagne, M.J. (1993). Research methods: Using content analysis to examine the verbal or written communication of stakeholders within early intervention. *Journal of Early Intervention, 17*(1), 73-79. doi:10.1177/105381519301700108

Lee, M., Battilana, J., & Wang, T. (2014). Building an infrastructure for empirical research on social enterprise: Challenges and opportunities. *Research Methodology and Strategy Management, 9*, 241-264. doi:10.1108/S1479-838720140000009017

Lin, C., & Yang, C. (2009). An Analysis of Educational Inequality in Taiwan after the Higher Education Expansion. *Social Indicators Research, 90*(2), 295-305. Retrieved from http://www.jstor.org/stable/27734790

Liu, G., & Ko, W.-W. (2012). Organizational learning and marketing capability development: A study of the charity retailing operations of British social enterprise. *Nonprofit and Voluntary Sector Quarterly, 41*(4), 580-608. doi:10.1177/0899764011411722

Luo, H. (2011). Qualitative research on educational technology: Philosophies, methods and challenges. *International Journal of Education, 3*(2), 1-16. doi:10.5296/ije.v3i2.857

Mair, J. & Martí, I. (2006). Social entrepreneurship research: A source of explanation, prediction, and delight. *Journal of World Business, 41*(1), 36–44. doi:10.1016/j.jwb.2005.09.002

Mair, J. & Marti, I. (2009). Entrepreneurship in and around institutional voids: A case study from Bangladesh. *Journal of Business Venturing, 24*(5), 419–435. doi:10.1016/j.jbusvent.2008.04.006

Mair, J., Marti, I., & Ventresca, M.J. (2012). Building inclusive markets in rural Bangladesh: How intermediaries work institutional voids. *Academy of Management Journal, 55*(4), 819–850. doi:10.5465/amj.2010.0627

Marsh, E.E., & White, M.D. (2003). Taxonomy of relationships between images and text. *Journal of Documentation, 59*(6), 647-672. doi:10.1108/00220410310506303

Martin, R.L., & Osberg, S. R. (2015). *Getting beyond better: How social entrepreneurship works* [iPad version]. Boston, MA: Harvard Business Review Press.

Matthews, B., & Ross, L. (2010). *Research methods: A practical guide for the social sciences*. Essex, UK: Pearson Education Limited.

Maulani, A.M.A. (August 7, 2016). Ruang Guru: Seeking to revolutionize Indonesia's education sector. *E27*. Retrieved from: https://e27.co/government-relations-crucial-user-acquisition-strategy-edtech-startup-20160817/

Mayer, R.E. (2008). *Learning and instruction* (2nd Ed.). New Jersey, NJ: Pearson Education.

McEwan, P.J., Trowbridge, M. (2007). The achievement of indigenous students in Guatemalan primary schools. *International Journal of Educational Development, 27*, 61–76. doi:10.1016/j.ijedudev.2006.05.004

McMillan, S.J. (2000). The microscope and the moving target: The challenge of applying content analysis to the World Wide Web. *Journalism & Mass Communication Quarterly, 77*(1), 80-98. doi:10.1177/107769900007700107

Merchant, Z., Goetz, E.T., Cifuentes, L., Keeney-Kennicutt, W., & Davis, T.J. (2014). Effectiveness of virtual reality-based instruction on student's learning outcome in K-12 and higher education: A meta-analysis. *Computer & Education, 70, 29-40.* doi:10.1016/j.compedu.2013.07.033

Miyagishima, K. (2016). Education inequality among different social groups. *Hacienda Publica Espanola, 217*, 11-35. doi:10.7866/HPE-RPE.16.2.1

Morrison, G.R., Ross, S.M., Kemp, J.E., & Kalman, H. (2010). *Designing effective instruction: Applications of instructional design* (6th Ed.). New York, NY: John Wiley & Sons.

Morse, J. M. (1994). Designing funded qualitative research. In N.K. Denzin., & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd Ed.), pp.220-235. Thousand Oaks, CA: SAGE Publication.

Mulgan, G. (2012). Social innovation theories: Can theory catch up with practice? In H-W. Franz, J. Hochgerner, & J. Howaldt (Eds.), *Challenge Social Innovation: Potentials for Business, Social Entrepreneurship, Welfare and Civil Society,* pp. 183-195. doi:10.1007/978-3-642-32879-4

Naccarato, G., Pantano, E., & Tavernise, A. (2011). Educational personalized contents in a Web environment: Virtual museum net of Magna Gracia. In G. Styliaras, D. Koukopoulos, & F. Lazarinis (Eds.), *Handbook of research on technologies and cultural heritage: Applications and environments*, pp. 446-460. Hershey, PA: IGI Global. doi:10.4018/978-1-60960-044-0.ch022

Nawaz, A. & Kundi, GM. (2010) Predictor of e-learning development and use practices in higher education institutions (HEIs) of NWFP, Pakistan. *Journal of Science and Technology Education Research, 1*(3), 44-54. Retrieved from: http://www.academicjournals.org/JSTER

Nolen, A. L. (2009). The content of educational psychology: An analysis of top ranked journals from 2003 through 2007. *Educational Psychology Review*, *21*(3), 279-289. doi:10.1007/s10648-009-9110-2

Noruzi, M.R., Westover, J.H., & Rahimi, G.R. (2010). An exploration of social entrepreneurship in the entrepreneurship era. *Asian Social Science, 6*(6), 3-10. doi:10.5539/ass.v6n6p3

OECD. (2014). *Measuring innovation in education: A new perspective.* Paris, FR: OECD Publishing. doi:10.1787/9789264215696-en

Overview of Adult Literacy XPRIZE. (n.d). Retrieved from Adult Literacy XPRIZE official site: http://adultliteracy.xprize.org/about/overview

Overview of Global Learning XPRIZE. (n.d). Retrieved from Global Learning XPRIZE official site: http://learning.xprize.org/about/overview

Owston, R., Widerman, H., Sinitskaya, R. N., & Brown, C. (2009). Computer game development as a literacy activity. *Computers & Education, 53*(3), 977–989. doi:10.1016/j.compedu.2009.05.015

Palmer, D. (2005). A motivational view of constructivist informed teaching. *International Journal of Science Education, 27*(15), 1853–1881. doi:10.1080/09500690500339654

Paraskeva, F., Mysirlaki, S., & Papagianni, A. (2010). Multiplayer online games as educational tools: facing new challenges in learning. *Computers & Education, 54*(2), 498–505. doi:10.1016/j.compedu.2009.09.001

Passer, M.W. (2014). *Research methods: Concepts and connections.* New York, NY: Worth Publishers.

Peredo, A.M. & Chrisman, J.J. (2006). Toward a theory of community-based enterprise. *Academy of Management Review, 31*(2), 309–328. doi:10.5465/AMR.2006.20208683

Peredo, A.M. & McLean, M. (2006). Social entrepreneurship: A critical review of the concept. *Journal of World Business, 41*(1), 56–65. doi:10.1016/j.jwb.2005.10.007

Petrie, G. M., & Avery, L. (2011). Identifying our approaches to language learning technologies: Improving professional development. *English Teaching Forum*, *49*(3), 10-19. Retrieved from: https://eric.ed.gov/?id=EJ962384

Reardon, S. F. (2011). The widening academic achievement gap between the rich and the poor: New evidence and possible explanations. In G. J. Duncan & R. J. Murnane (Eds.), *Whiter opportunity? Rising inequality, schools, and children's life chances*, pp. 91–116. New York, NY: Russell Sage Foundation Press.

Riessman, C.K. (2008). *Narrative methods for the human sciences*. Thousand Oaks, CA: SAGE Publication.

Roberts, D. & Woods, C. (2005). *Changing the world on a shoestring: The concept of social entrepreneurship. University of Auckland Business Review*, 45 – 51. Retrieved from: http://www.thebookshelf.auckland.ac.nz/docs/UABusReview/2005_07_i01-05-asd.pdf

Robinson-Pant, A. (2004). *Women, literacy, and development*. London, LDN: Routledge.

Robson, C. (2011). *Real world research* (3rd Ed.). West Sussex, SXW: John Wiley & Sons.

Ross, L., & Byrd, K. (2011). Business plan competitions: Start-up "Idols" and their twenty-first century launch pads. *Journal of Higher Education Theory and Practice, 11*(4), 53-64. Retrieved from: https://ssrn.com/abstract=2690956

Ross, S.M., Morrison, G.R., & Lowther, D.L. (2010). Educational technology research past and present: Balancing rigor and relevance to impact school learning. *Contemporary Educational Technology, 1*(1), 17-35. Retrieved from: http://cedtech.net/articles/11/112.pdf

Ryokai, K., Vaucelle, C. and Cassell, J. (2003), Virtual peers as partners in storytelling and literacy learning. *Journal of Computer Assisted Learning, 19*, 195–208. doi:10.1046/j.0266-4909.2003.00020.x

Sahlman, W.A. (1996). Some thoughts on business plans. In W.A. Sahlman, H. Stevenson, M.J. Roberts, & A.V. Bhide (Eds.), *The Entrepreneurial Venture,* pp. 138-176. Boston: Harvard Business School Press.

Sahut, JM. & Peris-Ortiz, M. (2014). Small business, innovation, and entrepreneurship. *Small Business Economics, 42*(4), 663-668. doi:10.1007/s11187-013-9521-9

Sandelowski, M. (1995). Focus on qualitative methods: Sample size in qualitative research. *Research in Nursing & Health, 18*(2), 179-183. doi:10.1002/nur.4770180211

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business student* (5th Ed.). Edinburgh, UK: Pearson Education.

Schumpeter, J.A. (1934). *The theory of economic development.* Cambridge, CB: Harvard University Press.

Schumpeter, J.A. (1942). *Capitalism, socialism and democracy*. New York, NY: Harper.

Semali, L.M. & Asino. (2014). Post-literacy in the digital age: The use of mobile phones to support literacy practices in Namibia and Tanzania. *Prospects, 44*(1), 81-97. doi:10.1007/s11125-012-9254-6

Sen, P. (2006). Ashoka's big idea: Transforming the world through social entrepreneurship. *Futures, 39*(5), 534-553. doi:10.1016/j.futures.2006.10.013

Shane, S. (2000). Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science, 11*(4), 448–469. doi:10.1287/orsc.11.4.448.14602

Shane, S., & Venkatamaran, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review, 25*(1), 217–226. doi:10.5465/AMR.2000.2791611

Sharir, M. & Lerner, M. (2006). Gauging the success of social ventures initiated by individual social entrepreneurs. *Journal of World Business, 41*(1), 6–20. doi:10.1016/j.jwb.2005.09.004

Sharples, M., Corless, D., & Westmancott, O. (2002). The design and implementation of a mobile learning resources. *Personal and Ubiquitous Computing, 6*(3), 220-234. doi:10.1007/s007790200021

Short, J.C., Moss, T.W., & Lumpkin, G.T. (2009). Research in social entrepreneurship: Past contributions and future opportunities. *Strategic Entrepreneurship Journal, 3*(2), 161-194. doi:10.1002/sej.69

Silverman, D. (2011). *Interpreting qualitative data: Methods for analyzing talk, text, and interaction* (4th Ed.). London, LDN: SAGE Publications.

Smeets, E. (2005). Does ICT contribute to powerful learning environment in primary education? *Computers & Education, 44*(3), 343-355. doi: 10.1016/j.compedu.2004.04.003

Smeets, E., & Mooij, T. (2001). Pupil-centered learning, ICT, and teacher behavior: Observations in educational practice. *British Journal of Educational Technology, 32*(4), 403-417. doi:10.1111/1467-8535.00210

Sofaer, S. (1999). Qualitative methods: What are they and why use them? *Health services research, 34*(5), 1101-1118. Retrieved from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1089055/pdf/hsresearch00022-0025.pdf

Steyaert, C., & Katz, J. (2004). Reclaiming the space of entrepreneurship in society: Geographical, discursive and social dimensions. *Entrepreneurship & Regional Development, 16*(3), 179-196. doi:10.1080/0898562042000197135

Sturges, J. E., & Hanrahan, K. J. (2004). Comparing telephone and face-to-face qualitative interviewing: A research note. *Qualitative research, 4*(1), 107-118. doi:10.1177/1468794104041110

Szell, G. (2012). Social innovation, social entrepreneurship and development. In H-W. Franz, J. Hochgerner, & J. Howaldt (Eds.), *Challenge Social Innovation: Potentials for Business, Social Entrepreneurship, Welfare and Civil Society,* pp. 183-195. doi:10.1007/978-3-642-32879-4

Tegos, M. (December 9, 2015). Edtech startup Ruang Guru raises series A round from Venturra Capital. *Tech in Asia.* Retrieved from: https://www.techinasia.com/edtech-startup-ruangguru-raises-series-venturra-capital

Ten Have, P. (2004). *Understanding qualitative research and ethnomethodology* (1st Ed.). London, LDN: SAGE Publication.

Thompson, J., Alvy, G., & Lees, A. (2000). Social entrepreneurship - A new look at the people and the potential. *Management Decision, 38*(5), 328-338. doi:10.1108/00251740010340517

Underatuin, C. (2011). Can't we all get along? Content, technology and the battle for literacy. *Journal of Literacy and Technology*, *12*(3), 86-111. Retrieved from: http://midwestwisconsinreadingcouncil.pbworks.com

UNESCO. (2005). *Aspects of literacy assessment: Topics and issues from the UNESCO Expert Meeting.* Paris, FR. Retrieved from UNESCO official site: http://unesdoc.unesco.org/images/0014/001401/140125eo.pdf

UNESCO. (2006). *Education for all global monitoring report.* Paris, FR: UNESCO Publishing. Retrieved from: http://www.unesco.org/education/GMR2006/full/

UNESCO Institute for Statistics. (2013). *Adult and youth literacy: National, regional and global trends, 1985-2015.* Retrieved from: http://www.uis.unesco.org/Education/Documents/literacy-statistics-trends-1985-2015.pdf

UNESCO. (2015). Education for all global monitoring report 2000-2015: Achievement and challenges (2nd Ed.). EFA Global Monitoring Report Paris, FR. Retrieved from UNESCO official site: http://unesdoc.unesco.org/images/0023/002322/232205e.pdf.

UNESCO. (2017). *Reading the past, writing the future: Fifty years of promoting literacy.* Paris, FR: UNESCO Publishing. Retrieved from: http://unesdoc.unesco.org/images/0024/002475/247563e.pdf

Vaismoradi, M., Turunen, H. and Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing & Health Sciences*, *15*(3), 398–405. doi:10.1111/nhs.12048

Van Praag, C.M. & Versloot, P.H. (2007). What is the value of entrepreneurship? A review of recent research. *Small Business Economics, 29*(4), 351 – 382. doi:10.1007/s11187-007-9074-x

Warschauer, M. (1998). Researching technology in TESOL: Determinist, instrumental, and critical approaches. *TESOL Quarterly, 32*(4), 757-761. doi:10.2307/3588010

Wang, S-K., Hsu, H-Y., Reeves, T.C., & Coster, D.C. (2014). Professional development to enhance teachers' practices in using information and communication technologies (ICTs) as cognitive tools: Lessons learned from a design-based research study. *Computers & Education, 79,* 101-115. doi:10.1016/j.compedu.2014.07.006

Webb, S. (2004). Can ICT reduce social exclusion? The case of an adults' English language learning programme. *British Educational Research Journal, 32*(3), 481-507. doi:10.1080/01411920600635478

Weerawardena, J. & Mort, G.S. (2006). Investigating social entrepreneurship: A multidimensional model. *Journal of World Business*, *41*(1), 21–35. doi:10.1016/j.jwb.2005.09.001

White, M.D., & Marsh, E.E. (2006). Content analysis: A flexible methodology. *Library Trends, 55*(1), 22-45. doi:10.1353/lib.2006.0053

Wilson, F., & Post, J.E. (2013). Business models for people, planet (& profits): Exploring the phenomena of social business, a market-based approach to social value creation. *Small Business Economics, 40*(3), 715-737. doi:10.1007/s11187-011-9401-0

Woodrum, E. (1984). "Mainstreaming" content analysis in social science: Methodological advantages, obstacles, and solutions. *Social Science Research, 13*(1), 1-19. doi:10.1016/0049-089X(84)90001-2

Wu, C., & Liu, C-F. (2015). Acceptance of ICT-mediated teaching/learning systems for elementary school teachers: Moderating effect of cognitive styles. *Education and Information Technologies: The Official Journal of the IFIP Technical Committee on Education, 20*(2), 381-401. doi:10.1007/s10639-013-9290-8

Yin, R. K. (2014). *Case study research: Design and methods* (5th Ed.). Los Angeles, CA: SAGE Publication.

Yitshaki, R., & Kropp, F. (2016). Motivations and opportunity recognition of social entrepreneurs. *Journal of Small Business Management, 54*(2), 546-565. doi: 10.1111/jsbm.12157

Zahra, S. A., Gedajlovic, E., Neubaum, D. O., & Shulman, J. M. (2008). A typology of social entrepreneurs: Motives, search processes and ethical challenges. *Journal of Business Venturing, 24*(5), 519-532. doi:10.1016/j.jbusvent.2008.04.007

Zhang, Y., & Wildemuth, B.M. (2009). Qualitative analysis of content. In B. M. Wildermuth (Ed.), *Applications of Social Research Methods to Questions in Information and Library Science*, pp. 308-319. Westport, CT: Libraries Unlimited.

Zhao, Y. (2016). From deficiency to strength: Shifting the mindset about education inequality. *Journal of Social Issues*, *72*(4), 720-739. doi:10.1111/josi.12191

APPENDIX A – Email Correspondence to participants

Hello, Mr/Ms.
Team Leader of xxx GLEXP/ALEXP

My name is Sulyana Andikko, and currently, a Master Student at Erasmus University of Rotterdam, majoring in Media & Business (Proof of Enrollment attached). I also have been working as a Community Engagement Specialist in one of the largest national newspaper in Indonesia called KOMPAS Daily Newspaper for eight years. Throughout my professional career, I have had encounter many social entrepreneurs who are focusing on empowering literacy through technology. I am passionate in the creation of innovation and contributions being delivered from those social entrepreneurs to the society.

Therefore, I am conducting my Master thesis research regarding social entrepreneurship, which particularly focuses on ICT-Based Educational Literacy program that participates in the XPRIZE Adult Literacy Global or XPRIZE Global Learning competitions. My thesis is titled "Social Entrepreneurship: Addressing Challenges in ICT-Based Literacy Innovation."

As I searched the list of participants, I have encountered your company which I thought might be suitable as one of the participants to be studied. Therefore, through this email, you are invited to participate in this research voluntarily. The purpose of the research is to understand *how do social entrepreneurs address literacy challenges through digital innovation?*

Should you willing to participate in this study, the data collection process will be conducted through the online interview (i.e. video call) and carried out in the period of 5-15 April 2017. In general terms, the questions of the interview will be related to answering the aforementioned purpose. All data will be used strictly for academic purpose. You are always free not to respond any particular question or provide any additional data at any point. Also, you are free to decide whether I should use your name or other identifying information or not in this study.

Should you have any further inquiries about this research, feel free to contact me at any convenient time (vincentia.suly@student.eur.nl). I look forward to hearing from you, and I wish that your company will continue to inspire other in the future because I believe that sharing is the new currency.

Thank you for your kind cooperation and attention.

Best Regards,
Vincentia Sulyana Andikko
Media & Business
Erasmus University of Rotterdam

APPENDIX B – Interview Guide

Focus	No.	Questions
Social Entrepreneurship	1	What inspires you to become a social entrepreneur?
	2	What are the challenges in becoming a social entrepreneur? [*Probe*] Would you explain that further
	3	What are your vision and mission in becoming an entrepreneur?
Literacy as an Opportunity	4	How do you identify literacy as a chance for you to address? [*Probe*] Can you elaborate on that idea?
	5	How do you perceive technology-based learning platform helps in overcoming literacy? [*Probe*] Would you explain that further
Digital Innovation	6	How your digital innovation operates in improving literacy?
	7	What are the major challenges in the production and implementation of this application? [*Probe*] Would you give me an example?
	8	How do you mobilize your resources in producing this application (e.g. funding, staffing)?
	9	How do you describe your main target audience?
	10	What kind of impact or social values do you expect to create?
	11	Could you tell me more about the process you have encountered regarding prototyping? [*Probe*] Can you elaborate on that idea?
	12	How do you measure the performance?
	13	How has the progress or development of the application until now?
	14	How do you market your application?
Collaboration	15	Who are the parties that you need to collaborate with? [*Probe*] What are their roles?
	16	What are the challenges that need to be addressed in collaborating with other people? [*Probe*] Would you give me an example?
	17	How do you tackle those challenges?
Prize-based competition	18	What motivates you to join prize-based competition such as XPRIZE?
	19	What are the advantages of joining this kind of competition?
	20	What would you recommend for XPRIZE to be more valuable for you?
	21	What are the limitations in joining the prize-based competition?