

The ecological approach to construct entrepreneurship education: a systematic literature review

Systematic
literature
review

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Received 2 December 2021
Revised 25 February 2022
Accepted 31 March 2022

Abstract

Purpose – The research effort on entrepreneurship education has been mainly for the higher education settings and on the individual level of analysis. On the contrary, this research urges scholars to expedite attention to the secondary education settings, especially in the emerging economies in Asia and Africa. This paper aims to reveal the existing landscape of literature development on the topic and promote ecological approaches of constructing entrepreneurship education programs in schools. It advocates the “incubator” role of schools for students and the necessity of establishing socially embedded entrepreneurship education as the playground for future entrepreneurs.

Design/methodology/approach – This study followed the systematic literature review as its research design. It obtained 1,555 publications from six academic databases and 60 more publications from expert consulting and backward snowballing technique. Data screening resulted in a total of 101 relevant publications with the upper secondary education as their research context. The qualitative integrative synthesis method was then applied to integrate research evidence to the five circles of systems according to Urie Bronfenbrenner’s ecological systems theory.

Findings – This study contributes to the entrepreneurship education and youth career development literature, especially in the developing countries. Results discovered that entrepreneurship education



The authors have no conflicts of interest to disclose. This work was supported by the JSPS Postdoctoral Fellowships for Research in Japan (Grant number: P19779); the Grants-in-Aid for Scientific Research (Grant number: 19F19779); the New Teacher Startup Support Funding at the Toyohashi University of Technology.

programs, when interacting with ecological systems, resulted in training success. The most frequently studied systems were microsystems; here, there was a dominant focus on program-level reporting and analyzing. There was less focus on other systems such as mesosystems, exosystems or macrosystems. Moreover, only one study was associated with chronosystems, suggesting a significant research gap regarding the longitudinal studies. However, this review validated the different approaches to delivering entrepreneurship education in emerging and developed economies.

Research limitations/implications – One limitation of this research lies in the methodology. The inclusion criteria limited the studies to the context of upper secondary education and excluded those of secondary education in general. The sampling method limited the power of this research to analyze and discuss policy-level studies because policies most likely embrace the whole secondary education level as its target. Another limitation is associated with the lack of experimental studies in assessing the comparative advantages of following the ecological approach when constructing entrepreneurship education. It, therefore, remains an undiscussed matter within this study regarding whether following the ecological approach means empirically a better educational choice or not.

Practical implications – This study discusses the implications for policymakers, especially in emerging economies, and suggests that awareness, attention and funding are needed to empower youth entrepreneurship education from an ecological systems view.

Originality/value – To the best of the authors' knowledge, this research is one of few studies that use the ecological systems theory in the context of entrepreneurship education with the purpose of focusing on environment-level analysis instead of individual-level analysis. Through the systematic literature review, this study proposes an ecological approach to comprehend, guide, evaluate and improve the design and implementation of entrepreneurship education programs in schools based on well-articulated research evidence. The research can inform both researchers and educators by offering a holistic perspective to observe and evaluate entrepreneurship education programs and their levels of social connectedness.

Keywords Systematic literature review, Entrepreneurship education, Ecological systems theory, Career choices, Upper secondary education, Adolescents

Paper type Literature review

1. Introduction

The success of any startup is associated with a proactive and iterative process that optimizes talents by adapting to the available resources and the surrounding environment. In many developed economies, students are given the experience of running a company at a young age through startup simulation activities such as competitions or virtual reality games. Providing immersive environments to young people to prepare them for these environments can help build an entrepreneurial culture in society. In emerging economies in Asia and Africa, entrepreneurship education for the youth is either delivered through traditional teaching-oriented education or replicating programs from developed economies, occasionally with the assistance of international nongovernmental organizations (NGOs). However, there have been few locally adaptive curricula that consider contextual factors in emerging economies. Therefore, the first goal of this study was to examine youth entrepreneurship education literature to validate the above perceived differences between developed and emerging economies.

When replicating developed economies' success stories of youth entrepreneurship education, school leaders, administrators and teachers in emerging economies must not oversimplify their approaches because entrepreneurship education is culturally and contextually bound (Lewis and Massey, 2003). There is no magic method to teaching entrepreneurship education, only methods that need to be adapted to multiple factors, such as pedagogical objectives, audience characteristics and institutional, cultural and organizational constraints (Fayolle and Gailly, 2008). While replicating proven effective teaching methods for less context-sensitive subjects such as mathematics and chemistry is not only advisable but also highly encouraged, pedagogical judgments can be quite different

when teaching more context-sensitive subjects such as entrepreneurship as proven teaching methods in such subject areas are commonly techniques that have only been proven in a specific sample of students and specific social conditions. To give a simple example, does a masculine-oriented curriculum work equally as well on a female student group? When introducing foreign teaching methods to local classrooms, individual student profiles and environmental characteristics need to be examined carefully for the localization of these teaching methods. Therefore, the second goal of this study was to reveal the different environments that could collaborate with local schools to help develop focused and relevant youth entrepreneurship education.

To fulfill these two goals, this study took a community psychology lens to conduct systematic literature review (SLR) research. As this is the first SLR effort to identify, evaluate and synthesize the relevant individual youth entrepreneurship education studies for the upper secondary education level, the research can give guidance to researchers, education practitioners and decision-makers. The SLR research was specifically focused on the secondary school setting because this is where entrepreneurship education can be more widely promoted. This study emphasizes the importance of establishing ecological approaches to the design, delivery and evaluation of school-based entrepreneurship education programs in emerging economies. Because of the goal of validating the differences in youth entrepreneurship education delivery between developed and emerging economies, this study's results can give guidance to policymakers, especially in emerging economies.

The remainder of this article is organized as follows. The literature review introduces the reasons for selecting upper secondary education as the education level of interest and using ecological systems theory (EST) as the SLR research synthesis framework. The methodology section explains the methods used to select, review and synthesize the relevant literature. The results section presents an articulated framework based on the EST – the ecological systems of embedding entrepreneurship education. It also reports the overall distribution of literature among the identified environments and detailed synthesis results by environment. The discussion section outlines the implications for policymakers. Finally, it concludes with the limitations of the study and suggests future research directions.

2. Literature review

2.1 *Entrepreneurship education and upper secondary education*

We are facing the biggest number of youth (15–24 years old) as a percentage of the total population in humankind's history according to the Organisation for Economic Co-operation and Development (OECD, 2017) and approximately 80% of them reside in developing countries in Asia and Africa (United Nations, 2015). A large number of this population start working, often in the informal economy, at a very young age without pursuing higher education (International Labour Organization, 2020). Studying youth entrepreneurship education at the upper secondary education level is important. Because most personality traits form in childhood and adolescence (Erikson, 1993) and students still have open career options (Gasse, 1985; Gorman *et al.*, 1997), the upper secondary education level has been found to be the most determinant phase for developing young entrepreneurs (Filion, 1994). Therefore, entrepreneurship education should target first at developing latent entrepreneurship in young learners (Agboola, 2021). The reality urges for more entrepreneurship education studies and practices dedicated to the upper secondary education context, right before students leave schools and dive into societies. Instead, more studies opted to investigate entrepreneurship education in higher education settings and thus missed the opportunity of benefiting a rather larger youth population with their research (Johansen and Schanke, 2013; Lautenschläger and Haase, 2011; Oosterbeek *et al.*,

2010; Rodrigues *et al.*, 2010). A recent meta-analysis of 23 quantitative studies examined the impact of entrepreneurship education on students at primary, secondary and tertiary levels and concluded that more entrepreneurship education research should be conducted in education levels outside university settings (Martínez-Gregorio *et al.*, 2021).

While a handful of literature at the upper secondary education level commonly studies personality traits and behavioral dispositions, which are on the individual level of analysis, the ecological environment analysis of entrepreneurship education is comparatively less seen (Aggarwal and Shrivastava, 2021). Scholars argued that a more holistic approach, which includes examining personality traits, social context and developmental periods in the life span, is needed to understand youth's career choice of entrepreneurship (Fumero *et al.*, 2015; Saw and Schneider, 2012). It is, therefore, crucial to study environments within which students behave. As described by the renowned developmental psychologist Professor Urie Bronfenbrenner: "If we want to change behavior, we have to change environments" (Bronfenbrenner, 1992). Because the explanations for what we do and why we do closely depend on our characteristics' interactions with our environments, past and present. Schools were, therefore, suggested to adopt the ecological or systems views regarding school change and development (Thomson, 2007) and to perceive their students as active, competent and vocal members of the shared society (Maitles and Deuchar, 2006).

2.2 Ecological systems theory and the research applications

One widely adopted theoretical framework that offers the ecological or systems views toward human development is Urie Bronfenbrenner's EST theory. The theory suggests that individual's developments are involved into connected and interactive stable ecosystems, which can include microsystems, mesosystems, exosystems, macrosystems and chronosystems (Bronfenbrenner, 1992). The EST offers a complete framework to understand influential factors of individual behaviors and enables researchers to understand the influences of environments on individual's behavioral changes (Tang *et al.*, 2016).

The application of EST in the education research can be traced back to in the 1990s regarding school violence interventions (Astor *et al.*, 1996), learning attitude (Spencer *et al.*, 1997) and nursery education (Evans and Fuller, 1998, 1999; Odom and Diamond, 1998). Later the application was extended to many other children and adolescents education-related topics covering health, arts, technology, moral and career development, etc. The perhaps first study that applied the phenomenological variant of EST to investigate career development of youth investigated what strengths and skills of low-income African American youth helped them engage with career development activities (King and Madsen, 2007). In 2011 an Icelandic doctoral thesis based on the EST presented the ecology of feasible development for innovation training in primary and lower secondary schools, which considers five settings: personal factors, microsystems, mesosystems, exosystems and macrosystems, and rated the development progress on the scale of basic (1) to ideal (4) with detailed descriptors for each scale and each setting (Jónsdóttir, 2011, p. 244). The EST model was also used to investigate the role played by school counselors in enhancing foster care youth's readiness toward career and college (Williams, 2016). Recently there has shown an accelerating number of applications of EST in career development education. One study applied the EST to investigate how the local business environment affect entrepreneurs' ability of translating personal resources into firm performance (Lux *et al.*, 2020). Another study developed the college student major and career self-efficacy ecology model (Kitchen *et al.*, 2021). The *International Journal for Research in Vocational Education and Training* in 2021 even dedicated a whole special issue to publish seven articles that used adapted EST as

the conceptual framework to review and compare research on the internationalization of vocational education and training (Gessler *et al.*, 2021).

The research effort of applying EST to entrepreneurship education has been only a recent development among scholars. The first and also the only study so far, which was targeting secondary education instead of higher education, used the EST to investigate whether different environments affect entrepreneurship education intention of 1,770 Indian high school students (Aggarwal and Shrivastava, 2021). The authors believed that until their study, the EST had not been applied yet in entrepreneurship education research. However, their statement was not correct. Even although only in a small number, some previous similar studies were found in the higher education settings. For instance, the status quo of entrepreneurship education of higher education level in China was analyzed with the EST (Xue, 2012). The quality of predictors of entrepreneurial intent in an Italian university was examined using EST (Arrighetti *et al.*, 2013). The importance of the meeting in relation to entrepreneurial learning was evaluated by using EST in two learning contexts: a research circle at a university and an elementary school (Christensen and Lelinge, 2016). The EST was said to provide a relatively new and comprehensive approach to establish a macrolevel relationship between environments and entrepreneurial intention (Aggarwal and Shrivastava, 2021).

2.3 Systematic literature review and qualitative evidence synthesis

The purpose of identifying education patterns and multilevel environments from the literature determined that the SLR research design is a good fit for this research. SLRs offer collective insights by theoretically synthesizing related studies into fields and subfields, which increase the methodological rigor, and by accumulating knowledge from a range of studies, they result in a reliable knowledge base for practitioners and managers (Tranfield *et al.*, 2003, p. 220).

Existing reviews have either focused on either entrepreneurship education in general (Baptista and Naia, 2015; Blenker *et al.*, 2014; Busenitz *et al.*, 2003; Byrne *et al.*, 2014; Coviello and Jones, 2004; Gorman *et al.*, 1997; Henry and Lewis, 2018; Lorz *et al.*, 2013; Martínez-Gregorio *et al.*, 2021; Naia *et al.*, 2014; Sirelkhatim and Gangi, 2015; Wang and Chugh, 2014), entrepreneurship education at higher education levels (Bécharde and Grégoire, 2005; Nabi *et al.*, 2017; Pittaway and Cope, 2007; Rideout and Gray, 2013) or training for professional entrepreneurs (Dainow, 1986). Therefore, to the best of our knowledge, this study is the first SLR on the topic of entrepreneurship education for the upper secondary education level.

An SLR can synthesize both numeric and qualitative evidence depending on the research purpose, data heterogeneity and available human resources. The synthesis of qualitative evidence can be roughly divided into either interpretative or integrative synthesis approaches (Boland *et al.*, 2017). The interpretative synthesis approach identifies concepts and categories that are not inductively fixed in advance, and the integrative synthesis approach seeks to extract, describe and summarize data from different studies using clearly defined or specified concepts and categories. The five EST systems (Bronfenbrenner, 1992) can be used as an integrative synthesis framework to deduce and summarize data from selected studies. Bronfenbrenner has often been praised for drawing attention to the contextual variations in human development and moving developmental psychology toward more ecologically valid studies of human developments in their natural environment (Darling, 2007). Bronfenbrenner (1979, p. 4) himself claimed that EST also “seeks to demonstrate the scientific utility of the ecological model for illuminating the findings of previous studies and for formulating new research problems and designs.” This theory,

therefore, is a good guide for the synthesis of past literature to analyze the environments needed to construct entrepreneurship education in the upper secondary school settings.

3. Methodology

This study adopts the SLR as its research design based on the work by [Tranfield *et al.* \(2003, p. 214\)](#) and [Pittaway and Cope \(2007, p. 482\)](#). A review protocol was devised to guide the review process (Available at <https://osf.io/632nx>). The inclusion and exclusion criteria are shown in [Table 1](#).

A pilot search was conducted to test keywords and fine-tune them against the generated results. The fine-tuned keywords were used to search relevant studies in six databases (Evidence-Based Medicine Reviews, Emerald Insight, ERIC, Dissertations and Theses A&I, Research Library and Scopus). Different search strings were created for each database ([Table 2](#)), and the advanced search function was used to search for results. The results were exported and coded for relevance by two groups of researchers. Each group had one senior coder, one junior coder and one arbitrator. To include more relevant studies, publication lists of highly productive authors or HPA (High Performance Authors, with at least three publications on the topic) and highly cited authors or HCA (High Citation Authors, associated with the 20 most-cited articles on Google Scholar) were also thoroughly searched. The backward snowballing technique was applied to search for relevant publications in the references of selected publications. The group coding also applied to the above supplementary search results.

As a result, a total of 101 studies covering 87 journal articles, seven dissertations and theses, four conference papers, two book chapters and one report were selected as relevant studies. The entire data set's evolution is shown in the PRISMA flowchart ([Figure 1](#)). PRISMA is an acronym for Preferred Reporting Items for Systematic Reviews and Meta-Analyses (www.prisma-statement.org). The flow diagram helps authors to depict the flow of

Table 1.
Inclusion and
exclusion criteria

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none">• Written in English language• Publication years: 1990–2019• Age group: 15–19 years old• Highly relevant to studying “entrepreneurship education in high school setting”• Education settings: higher/upper secondary education or high schools• Using stakeholders, especially of high school settings as (part of) sample to study entrepreneurship education phenomenon. These stakeholders include but not limited to high school students, high school teachers, school principals, government, companies• Directly study different aspects of entrepreneurship education programs/activities in high school setting (e.g. pedagogy, teaching methods, student performance)	<ul style="list-style-type: none">• Written in non-English language• Publication years: 1989 and before, 2020 and after• Age group: 14 and younger or 20 and older or partially covering 15–19 years old but not as majority to confidently conclude the results represent the interested age group• Apparently, wrong/irrelevant/off-topic information exported from the databases• Education settings: primary education, lower secondary education, higher education, community college, charter schools, adult education, at-work training and other settings that are not related to upper secondary education level• Topic is only relevant to high schools OR only relevant to entrepreneurship/entrepreneurship education but not both

Database	Search string
Evidence-based medicine reviews (EBMR)	((“entrepreneur*” or “entrepreneur* education” or “entrepreneur* program*” or “business education” or “enterprise education”) and (“high school*” or “middle school*” or “secondary school*” or “secondary education” or “pupil*” or “adolescent*”).ab.
Emerald insight	((abstract:“entrepreneur* education”) OR (abstract:“entrepreneur* program”) OR (abstract:“entrepreneur*”) OR (abstract:“business education”) OR (abstract:“enterprise education”)) AND ((abstract:“high school”) OR (abstract:“middle school”) OR (abstract:“secondary school”) OR (abstract:“secondary education”) OR (abstract:“pupil”) OR (abstract:“adolescent”))
Scopus	ABS ((“entrepreneur* education”) OR (“entrepreneur* program”) OR (entrepreneur*) OR (“business education”) OR (“enterprise education”)) AND ABS (“high school”) OR (“middle school”) OR (“secondary school”) OR (“secondary education”) OR pupil* OR adolescent*)
ERIC	ab((entrepreneur* NEAR/3 education) or (entrepreneur* NEAR/3 program*) or (entrepreneur*) or (business NEAR/3 education) or (enterprise NEAR/3 education)) AND ab((high school*) or (middle school*) or (secondary school*) or (secondary education) or pupil* or adolescent*)
Dissertations and theses A&I	ab((entrepreneur* NEAR/3 education) or (entrepreneur* NEAR/3 program*) or (entrepreneur*) or (business NEAR/3 education) or (enterprise NEAR/3 education)) AND ab((high school*) or (middle school*) or (secondary school*) or (secondary education) or pupil* or adolescent*)
Research library	ab((entrepreneur* NEAR/3 education) or (entrepreneur* NEAR/3 program*) or (entrepreneur*) or (business NEAR/3 education) or (enterprise NEAR/3 education)) AND ab((high school*) or (middle school*) or (secondary school*) or (secondary education) or pupil* or adolescent*)

Table 2.
Search strings used
on academic
databases

information through the different phases of a systematic review and map out the number of records identified, included and excluded, including the reasons for exclusions (PRISMA, 2021).

All titles and abstracts of the selected studies were skimmed to gain some familiarity with the overall coverage. Then, each study was read in detail, and the numeric and qualitative data related to the two study goals was collected. Using EST as the synthesis framework, the framework analysis in Oliver *et al.* (2008) was applied, which is a structured and transparent method for the analysis of primary qualitative data as it begins with a priori framework of the concepts and themes against which the data is extracted and synthesized, and also maps the features of each identified theme or topic area to allow for data further interrogation (Boland *et al.*, 2017).

4. Results

There are five concentric circles in EST: microsystems, mesosystems, exosystems, macrosystems and chronosystems, with the individual human positioned in the center of all circles. The identified environments based on the synthesis results were added within each circle, and eventually, the effort led to the ecological systems for constructing entrepreneurship education (Figure 2).

The allocation of publications in different circles can be viewed in Figure 3. The most studied circle was microsystems (74%: 75 out of 101 publications), while exosystems (29%), macrosystems (13%) and mesosystems (9%) were comparatively less studied.

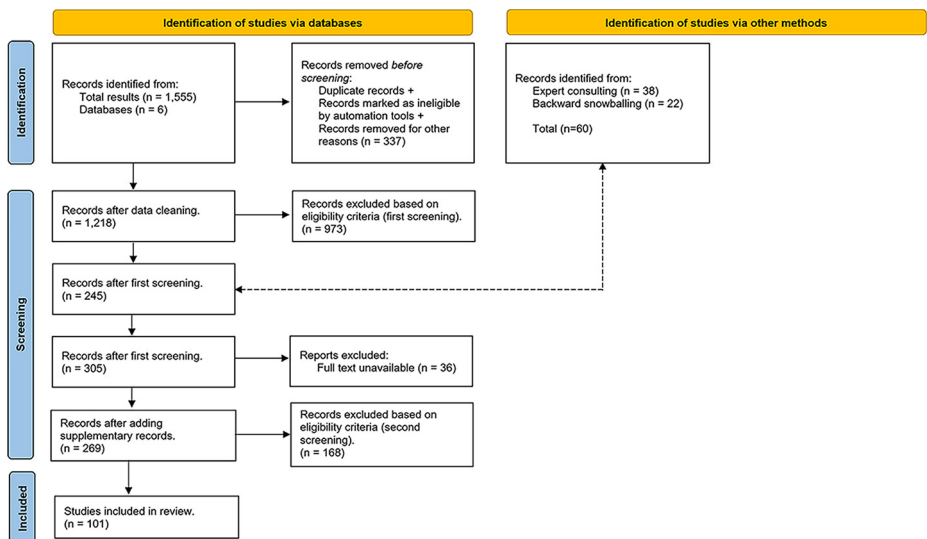


Figure 1.
PRISMA flowchart of
study selection

Source: Adapted from Page *et al.* (2021)

Chronosystems were the least studied with only one publication found. In the following paragraphs, detailed results within each circle of systems will be presented.

4.1 *Microsystems*

A microsystem is “a pattern of activities, roles, and interpersonal relations experienced by the developing person in a given setting with particular physical and material characteristics” (Bronfenbrenner, 1979, p. 22). Microsystems are immediate social settings where the individual students are directly participating. Out of the literature, four microsystems were perceived: school, family, community and media.

These microsystems were not evenly covered by the literature but heavily skewed toward the school microsystem (35 out of 40 microsystems’ studies). Most school microsystem studies were dedicated to sharing or evaluating program-level or class-level experience and generic impact of entrepreneurship education. Only four studies investigated teachers’ characteristics, such as their perspective (Waghid, 2019), influence (Wibowo and Saptono, 2018), qualification (Pihie and Bagheri, 2011a) and self-efficacy (Pihie and Bagheri, 2011b).

The other three microsystems received scant attention and were mostly treated as side discussion in studies. Parental influence was often investigated as one control variable and typically measured by self-report data from students. Very few studies directly collected data from parents or studied family influence as its primary interest. Among four studies that did mention or study family influence (Jufri *et al.*, 2018; Opoku-Antwi *et al.*, 2012; Saptono, 2016; Schröder and Schmitt-Rodermund, 2006), only one case study had the primary research interest of family environment and discovered its positive influence on influencing students’ entrepreneurial attitude and behaviors (Jufri *et al.*, 2018). The community microsystem was not found as a primary research interest in the sample either, but its involvement in

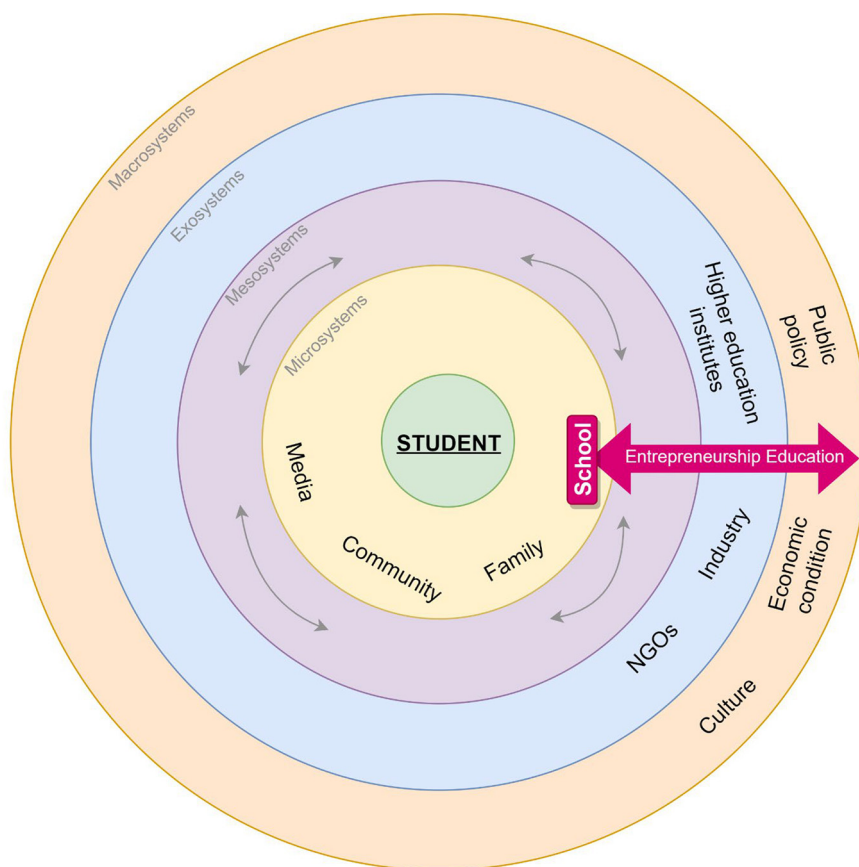


Figure 2.
Ecological systems
for constructing
entrepreneurship
education

Source: Authors; graphic tool: draw.io

entrepreneurship education was found in the circle of mesosystems, which will be explained later. There are only two studies investigating the influence of media on shaping entrepreneurial youth (Mothibi and Malebana, 2019; Rohman *et al.*, 2019). These findings suggested that the media coverage had significant positive correlations with entrepreneurial intention and its antecedents, and using social media had positive impact on the entrepreneurial interest of students resulting in a significant effect on entrepreneurial readiness.

4.2 Mesosystems

A mesosystem:

[...] comprises the interrelations among two or more settings in which the developing person actively participates (such as, for a child, the relations among home, school, and neighborhood peer group; for an adult, among family, work, and social life) (Bronfenbrenner, 1979, p. 25).

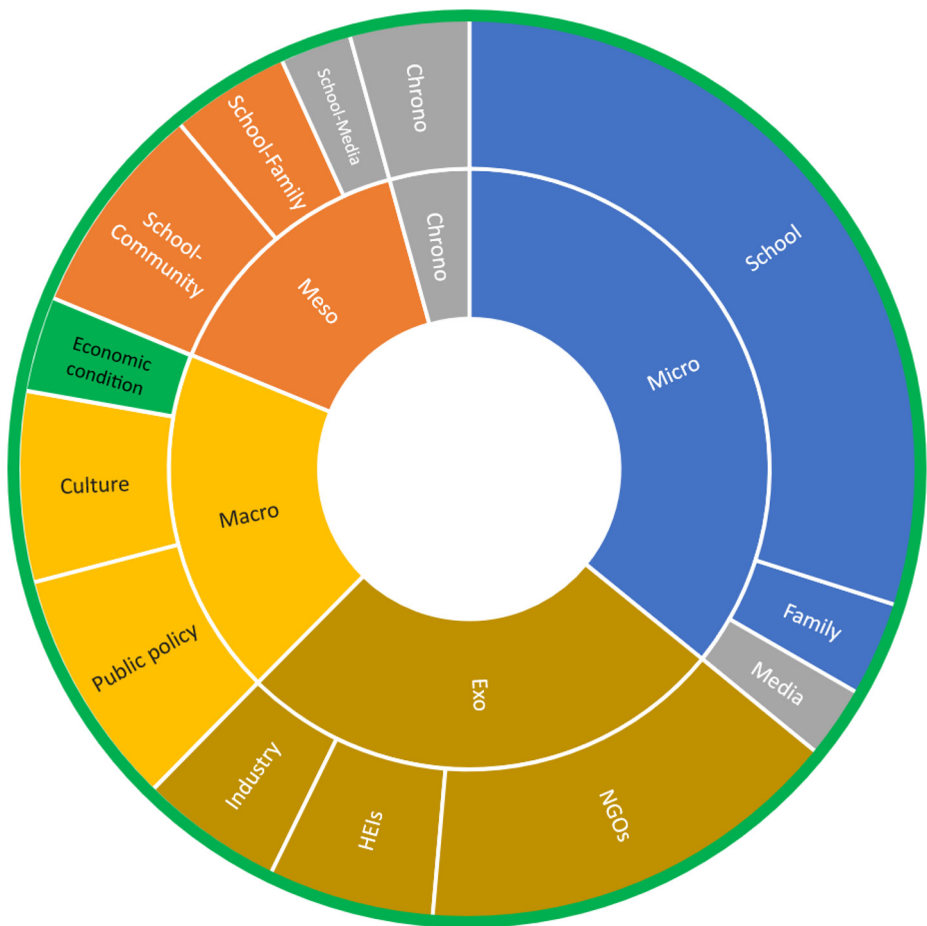


Figure 3.
Segmentation and
distribution of studies
by circle of systems

Source: Authors; graphic tool: Microsoft Excel

Mesosystems involve the interaction among the immediate microsystems. The school–community interaction was the most seen (9 out of 9 mesosystems’ studies) compared to the school–family interaction (3 out of 9) and the school–media interaction (0).

While there were multiple studies on communities’ engagement in offering entrepreneurship education to school pupils (Casey, 1996; Fitzgerald, 1999; Fumero *et al.*, 2015; Heinert, 2016; Karmokar and Shekar, 2018; Noworatzky, 2018; Paquin, 1990; Tingey *et al.*, 2016; Zabaneh, 2017), one most exciting story came from the White Mountain Apache Tribe. The tribe partnered with the Johns Hopkins Center for American Indian Health to design and develop the Arrowhead Business Group–Apache Youth Entrepreneurship Program (ABG) for a high school of American Indian students in the community (Tingey *et al.*, 2016). The 16-lesson ABG curriculum had ten lessons taught at a tribally owned site in the community, and it included a community-based selling event with the selling benefits returned to the community via charitable contribution or donation. After the curriculum, the

youth who started businesses were assigned a community-based mentor and had access to additional outside mentoring provided by community volunteers. The close partnership between the community and the high school was one of key success factors of the project.

On the other hand, involving parents in their children's entrepreneurship education was very rare. Only three cases were found (Fitzgerald, 1999; Heinert, 2016; Karmokar and Shekar, 2018). In three public high schools in Chicago, parents were involved in an entrepreneurship and community economic development initiative to volunteer in the classroom, attend programs at parent development centers and help plan curriculum, etc. (Fitzgerald, 1999). In the underrepresented communities, such as Maori and Pasifika in New Zealand, parents lack an understanding of career pathway choices and opportunities; therefore, the educational intervention program actively involves parents to increase their awareness and knowledge together with their children (Karmokar and Shekar, 2018).

4.3 Exosystems

An exosystem refers to:

[. . .] one or more settings that do not involve the developing person as an active participant, but in which events occur that affect, or are affected by, what happens in the setting containing the developing person (Bronfenbrenner, 1979, p. 25).

Three exosystems that can better the offering of entrepreneurship education in schools were identified: higher education institutes, industry and NGOs.

Embedding in schools the existing entrepreneurship education curriculum and support offered by NGOs was one frequently reported approach in the literature (18 out of 29 exosystems studies). The JA Worldwide was the most-mentioned and most-examined NGO because of its popular entrepreneurship education program: Junior Achievement–Young Enterprise Company Program (14 out of 29). This program was considered the best practice of entrepreneurship education for upper secondary school students in Europe (European Commission, 2005). Among 14 nations that reported this program, researchers in Norway, the UK, the USA and Belgium were the most active in sharing experiences and results.

Another exosystem that was collaborating with upper secondary schools was higher education institutes (7 out of 29 exosystems studies). For instance, the Teen Entrepreneurs Competition hosted by the Hong Kong Institute of Education was an open competition among high schools in Hong Kong (Man and Yu, 2007). The Arrowhead Business Group curriculum was developed by Johns Hopkins University and used in an American Indian high school in Arizona (Tingey *et al.*, 2016). The Durham Summer School was developed by the University of Durham to educate students from secondary schools, sixth form and further education colleges (Jones and Iredale, 2006).

Industrial involvement was found in six studies (Karmokar and Shekar, 2018; Mthunzi, 2000; Noworatzky, 2018; Paquin, 1990; Winarno *et al.*, 2019; Zabaneh, 2017). For instance, in South Auckland of New Zealand, a number of science, technology, engineering and mathematics (STEM) projects were established, which invited scientists, technologists and entrepreneurs in the STEM fields to offer hands-on workshops to local high school students (Karmokar and Shekar, 2018). In a private high school in the San Francisco Area of the USA, business mentors from a wide range of fields, such as sports, laws, medicine, ministry, education and technology, were involved to provide feedback on student group work and guest lectures to support student projects (Zabaneh, 2017).

4.4 Macrosystems

A macrosystem refers to:

[...] consistencies, in the form and content of lower-order systems (micro-, meso-, and exo-) that exist, or could exist, at the level of the subculture or the culture as a whole, along with any belief systems or ideology underlying such consistencies (Bronfenbrenner, 1979, p. 26).

Three macrosystems were identified: public policy, economic condition and culture.

The public policy was the most studied in the circle of macrosystems (10 out of 16 macrosystems studies). Both OECD and European Commission argued that any nation should position entrepreneurship education as the central in their education policy (Johansen, 2013). Studying the “prescribed” curricula in the policy documents (Fejes *et al.*, 2019; Zenner *et al.*, 2017) became one common approach to examine the macrosystem of public policy (Ierapetritis, 2017; Du Toit and Kempen, 2018). For instance, Fejes *et al.* (2019) used curriculum theories by Lindensjö and Lundgren (2000) and Bernstein (2000) in analyzing and interpreting the policy documents related to curriculum reform in Sweden. Their results revealed that entrepreneurship education has a dual definition (narrow and broad) in the policy documents, which caused difficulty in transforming and realizing the policy-driven curriculum reform.

When comparing the research sites of 101 studies (Figure 4), this research discovered that Indonesia (23 out of 101 publications), the USA (13), South Africa (10) and Norway (9) were the four most active countries that studied entrepreneurship education at the upper secondary education level.

The matching of the economic development status of the research site host countries and the entrepreneurship education formats found that research from emerging economies reported more traditional lecturing and developed economies reported more experiential youth entrepreneurship education that involved projects or competitions. Of the 101 studies, 66 examined entrepreneurship education programs as educational interventions with 37 being curricular studies, 31 being extracurricular studies and two overlapping studies that saw entrepreneurship education as both curricular and extracurricular development. Of the 37 curricular studies, 16 were from nine developed economies, and the remaining 21 were from six emerging economies. Of the 31 extracurricular studies, 28 were from 12 developed economies, and only one was from an emerging economy – Nigeria.

A total of eight studies mentioned culture as influential factor to entrepreneurial activities and entrepreneurship education. Only two studies studied it extensively. The

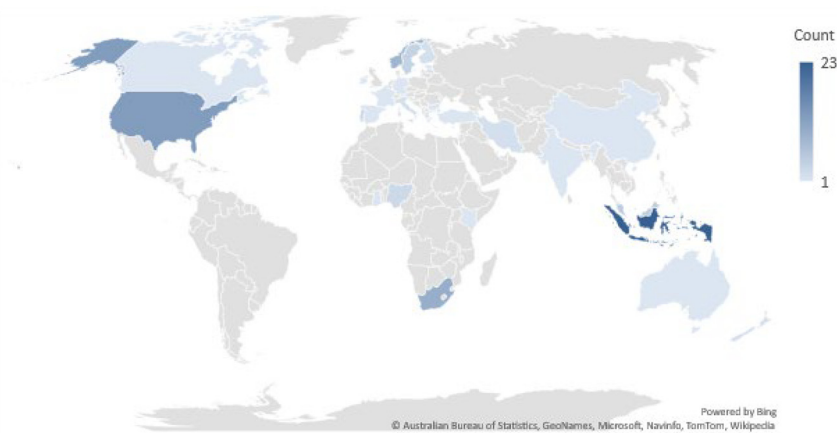


Figure 4.
Research sites by
country

Source: Authors; graphic tool: Microsoft Excel

sociocultural factors such as collectivistic and extended family relationship-oriented culture were found to mediate the effects of family environment, network and parental socioeconomic status and proactive personality on adolescents' entrepreneurial intention in Nigeria (Salami, 2019). A comparative study of two groups of Syrian migrant high school students living respectively in Turkey and in Germany showed that: in Germany, where rules and laws are more applied in a clear way, migrant students used more internal control mechanisms and believed they were in control of their own successes and failures; instead, their counterparts in Turkey, where rules and laws are not so clearly applied, used more external control mechanisms and believed that the surrounding forces determined their faith (Baltaci, 2017).

4.5 Chronosystems

In Bronfenbrenner's initial discussion of ecological systems (1979), the chronosystems were not introduced. This fifth circle was added in his later work in 1986 as systems that reflect change or continuity across time that influences each of the other systems (Neal and Neal, 2013), which can be, for instance, the student enters the upper secondary school or graduates from it.

The only study on chronosystem was by Elert *et al.* (2015). This quantitative research explored the impact of participating in a nationwide (Sweden) entrepreneurship education program, the Junior Achievement Company Program (JACP), during high school on long-term entrepreneurial outcomes later in life (during the middle age), which included the probability of starting a new firm later in life, entrepreneurial income generated and firm survival. The principal findings were that JACP participation during high school time, when compared to nonparticipation, could positively affect long-term entrepreneurship performance, such as propensity to create a new startup and entrepreneurial income, but there was no difference between groups regarding the firm survival.

5. Implications for policymakers

This study used the EST as an integrative synthesis framework to synthesize existing research evidence on entrepreneurship education for upper secondary school students. Results revealed the dynamic interactions between individual students and their surrounding ecological systems when the entrepreneurship education was delivered in the ecological approach. Overall, most studies investigated program–student interaction in the school microsystem and NGO–program–student interaction in the exosystems, while other systems at the meso-/macro-/chrono-level were much less explored. It also revealed the different entrepreneurship education format choices between developed and emerging economies with the former more connected to extracurricular studies and the latter more connected to curricular studies. These results have important implications for policymakers, especially in emerging economies.

Our current education system is fundamentally biased toward the outdated employee culture (Gibb, 1984). But our new generation is facing a turbulent and uncertain future without secured employment as a promise. To prepare the youth for a future that is unpredictable and constantly changeable, we need to cultivate entrepreneurial citizens and prepare an environment that supports entrepreneurs and conveys the message that the entrepreneur is recognized and valued in society (Krueger *et al.*, 2000). In other words, we must foster an entrepreneurial culture that can thrive on creativity, innovation, individualism, need of achievement and risk-taking behaviors (Mthunzi, 2000). The key role of entrepreneurship education to shape an entrepreneurial culture in young people has been recognized in broad entrepreneurship education literature (European Commission, 2012;

Henderson and Robertson, 2000; Isaacs *et al.*, 2007; Johansen and Clausen, 2011; Man and Yu, 2007; Morakinyo and Akinsola, 2019; Pratten and Ashford, 2000; Stevenson and Lundström, 2001). The definition of curriculum, according to Lawton (1975, pp. 6–7), is “a selection from the culture of society,” which is to selecting and transmit certain aspects of our way of life, types of knowledge, attitudes and values to the next generation by entrusting specially trained professionals in elaborate and expensive institutions (Mthunzi, 2000). To foster an entrepreneurial culture, we must embed entrepreneurship education through purposefully selected curriculum in schools. Thus the public policy must better reflect the desired ends of entrepreneurship education, including evidence to support these ends (Pittaway and Cope, 2007).

Policymakers need to be aware that the school environment alone is insufficient in fostering entrepreneurialism in students (Saptono, 2018). Bronfenbrenner (Bronfenbrenner, 1979, p. 5) describes the two-person system as the dyad, which is one of the basic units of analysis. He also concurred to several findings and indicated that the capacity of a dyad to serve as an effective context for human development is crucially dependent on the presence and participation of third parties, and if such third parties are absent or play disruptive instead of supportive roles, the developmental process will break down. Therefore, it is significantly important to extend the dyad (e.g. program–student) to the “ $n + 2$ ” systems (triads and tetrads, etc.) and transform the school into an “incubator” or terminal that connects students to bigger social contexts and their players. The “Ecological Systems for Constructing Entrepreneurship Education” from this study could support the decision-making process to identify and assemble potential system circles to collaboratively construct entrepreneurship education programs with schools by, for instance, sharing infrastructure, facilities and staff, and being involved in cross-training.

The policy-level support is particularly essential when it comes to emerging economies with a rich variety of cultures and economic conditions. Cultural differences exist between countries regarding practices in entrepreneurship education (Baker, 2000; Pittaway and Edwards, 2012). This study discovered that developed economies and emerging economies tend to have different entrepreneurship education approaches. The result aligned with a previous study which showed that the intervention characteristics of entrepreneurship promotion differ significantly between high- and low- or middle-income countries (Kluve *et al.*, 2017). The entrepreneurship training interventions were also found to offer the greatest effects in low- or middle-income countries (Kluve *et al.*, 2017). Therefore, policymakers in emerging economies must pay attention to optimizing the social and economic benefits of entrepreneurship education by investing adequate funds to activate the interactions between the different ecological systems. These funds should be diversified to promote the establishment of different partnerships between the schools, higher education institutes, industries, NGOs, families and communities, which would motivate different ecosystem stakeholders to collaborate to achieve the common goal of bettering the quality of youth entrepreneurship education.

However, because of the resource scarcities, structural gaps and institutional voids often faced by emerging economies (Cao and Shi, 2021), policymakers in these countries need to prioritize investment to empower entrepreneurship education as this could lead to entrepreneurial activities in the informal sector rather than the formal sector. A recent review (Bruton *et al.*, 2021) suggested that entrepreneurship within the formal sector in emerging economies tended to benefit the already advantaged and exclusionary institutions prevented those in the informal sector from participation; however, entrepreneurship in the informal sector can result in more inclusive institutions and decrease economic inequalities.

Therefore, policies need to be focused on using youth entrepreneurship education as leverage to reduce the economic inequalities in emerging economies.

Networks play a greater role in the entrepreneurial ecosystems in emerging economies than in advanced economies and also have unique characteristics, such as relying more heavily on informal networks, partnering with foreign entrants, weak networks between entrepreneurs unable to sustain robust entrepreneurial ecosystems, entrepreneurs often self-driven or motivated by their families/friends, limited aids from support organizations and public policies and supporting programs suffer from duplication and ineffective coordination (Cao and Shi, 2021). Policymakers in emerging economies need to regard schools as important players in the whole entrepreneurial ecosystems identify the strengths and weaknesses of these networks, and advance entrepreneurship education in schools to prepare the human capital for the entrepreneurial ecosystems and the entrepreneurial society.

6. Conclusion and limitations

This study applied a rigorous scientific method to map and synthesized 30-year research evidence on entrepreneurship education at the upper secondary education level. Guided by the EST, the study developed the ecological systems for constructing entrepreneurship education.

Some limitations exist in this research. Several studies that used secondary education in general (lower and upper) as the context were excluded. However, policies usually cover the entire secondary education level instead of covering exclusively the upper secondary education level. Hence, this study's sample may have excluded several policy studies that can be relevant to the review. Some publications were derived from the same research project and may present redundant evidence, such as nine studies in Norway (Johansen, 2013, 2014, 2016, 2017, 2018; Johansen *et al.*, 2012, 2013; Johansen and Clausen, 2011; Johansen and Foss, 2013; Johansen and Schanke, 2013), which could have skewed the results. Another limitation is associated with the lack of experiment studies in the sample, which could assess the comparative advantages of following the ecological approach when designing/implementing processes of entrepreneurship education. It, therefore, limits the debate on arguing whether following the ecological approach means empirically a better educational choice or not.

The developed ecological systems of entrepreneurship education revealed the systemic structure and interactions that had not been displayed before in the literature. It has the potential to inform future research agenda, school practices and policymaking decisions in the domains of entrepreneurship education and youth development. Future researchers can consider taking on action research to collaborate with local schools on developing socially embedded entrepreneurship education programs using the ecological systems developed by this study. It is also recommended to conduct research on weaker links in the ecological systems, such as school's adoption of media in entrepreneurship education programs and longitudinal studies of long-term impact of entrepreneurship education programs.

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