Introducing a Learning Ecology framework for entrepreneurial learning

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Introduction

Entrepreneurship and learning are intrinsically linked. Entrepreneurial learning research considers entrepreneurship as a learning process, where it is assumed that within the entrepreneurship process, entrepreneurs learn from their past experiences (Politis, 2005), failures (Cope, 2011) though experimentation and repetition, which in turn increases their confidence and expertise (Minniti & Bygrave, 2001). A central concept in entrepreneurship and entrepreneurial learning is Entrepreneurial Self-Efficacy (ESE), as one of the primary outcomes of entrepreneurial learning.

However, there remain multiple leaps in logic when determining how ESE is developed and measured. For example, many studies employ pre- and post-intervention surveys that lack texture of the process by which people learn to become entrepreneurial. This paper draws on the education literature to identify two key constructs that help link learning opportunities to the development of ESE: Learning ecologies (e.g. Bronfenbrenner, 1979) and student engagement (e.g., Fredricks et al. 2004; Lawson & Lawson, 2013). To recognise that entrepreneurial learning is not just for students, we rename the latter to learner engagement. By drawing on these concepts from education, this paper address the growing appeals for better integration between entrepreneurship and educational science to provide

theoretical foundations rooted in education and learning (Hagg & Kurczewska, 2019; Pittaway & Cope, 2007).

First, the concept of learning ecologies is somewhat analogous to the concept of entrepreneurial ecosystem where learning and development is the outcome of the former and entrepreneurial activity for the latter. A learning ecology perspective views learning as an ecological phenomenon that enables the learner to engage in multiple contexts (Barron, 2004; Jackson, 2016), develop relationships, utilise resources in order to learn and develop. This multi-contextual view of learning has been applied primarily to students learning via formal curriculum in classroom, supported by learning outside the classroom. This paper enhanced this multi-contextual aspect by recognising that entrepreneurs engage in multiple contexts, often simultaneously.

The recognition that entrepreneurs learn across multiple contexts is relatively recent, as indicated by Welter's (2011) critique of the entrepreneurship literature focussing on a single context and a recent systematic literature review by Toutain et al. (2017). The contextualised perspective of entrepreneurship affirms that entrepreneurship happens in multiple diverse contexts (business, social, institutional) (ibid.). By extension, entrepreneurship education also requires a multi-contextualized perspective as it weaves together a myriad of factors influencing the learning process of an entrepreneur (Cope, 2005; Rae, 2005; Thomassen et al. 2019). Despite the need to recognise a multi-contextualised perspective in entrepreneurship, it requires an additional framework to integrate them into one holistic model. For this reason, we look to the educational psychology literature to develop a new framework for entrepreneurial learning.

The second concept this study draws on is the concept of engagement. While learning ecologies perspective provides a framework, the concept of engagement would explain *how*

the entrepreneur engages in various activities and interacts with stakeholders and resources within a context. The education literature emphasizes the central role of the concept of engagement in understanding and enhancing students' learning (Ryu & Lombardi, 2015; Kahu, 2013; Carroll et al., 2021), but has not been explored in the context of entrepreneurship education until now.

By exploring the 'when', 'where' and 'who' dimensions of learning ecologies of entrepreneurs, this study aims to open up discussions on the richness, diversity and dynamic nature of learning ecologies of entrepreneurs in entrepreneurship education literature. The 'when' and 'where' dimensions defines the contexts in entrepreneurship and 'who' refers to the stakeholders involved. The 'when' dimension in this study refers to the aspects of engagement in each context and 'where' dimension can be referred to the multiple contexts.

Further, there has been a call for further research on the development of ESE amongst individuals in childhood, adolescence and early adulthood in the context of entrepreneurship education (Newman et al. 2019). While our theorising is based on research about adults (e.g. university students and young professionals), we believe the proposed framework and propositions are applicable to a broader range of people, including 'lifewide learning' (Jackson, 2011).

In the following literature review section, this study briefly reviews the literature about entrepreneurial learning, with emphasis on ESE, followed by the literatures relating to learning ecologies and engagement, resulting in broad propositions about their role in the development of ESE. Then, in the theory development section, we unpack the learning ecology and engagement concepts further to develop more concrete propositions that link different components of the learning ecology and different dimensions of engagement to ESE development. Lastly, we conclude with a discussion about implications for further research.

Overall, this study brings together the education and entrepreneurial learning literatures to overcome the critical limitations of each of them. Even in the education literature, the constructs of learning ecologies and learner engagement have been rarely combined to explain how students develop (general) self-efficacy and capabilities, let alone adapting such a model to entrepreneurship. Incidentally, this study contributes back to the entrepreneurial ecosystem literature, through reinforcing the importance of engaging or connecting within an ecosystem. The entrepreneurial ecosystem literature recognises the importance of networks and connections, but remains relatively silent about the more qualitative or relational aspects of networks and how people engage with others in their immediate network. Last, but not least, these contributing literatures from education will improve the explanatory strength of how, when or where different programs actually engage learners to develop ESE, thereby contributing to addressing the recent critiques about ESE measurement (Glackin & Phelan, 2020).

Literature review

This section briefly reviews the literature on entrepreneurial learning, with emphasis on the primacy of ESE, and provides an overview of the learning ecology concept and learner engagement concept from the education literature.

Entrepreneurial Learning and Self-Efficacy

Aligning with our socioecological perspective, social cognitive theory of Bandura (1977) argues that learning occurs as a result of reciprocal interactions between an individual, her behaviour (engagement) and environmental context (learning ecologies). These interactions lead to acquisition of knowledge, skills, beliefs and attitudes (Schunk & Mullen, 2012). The concept of self-efficacy can be used to understand the influence of these interactions on the individual learner (ibid.).

Previous research shows that ESE has been used effectively for increasing students' convictions that they can execute the required entrepreneurial behaviour to create a new venture (Bayrón, 2013; Drnovšek et al. 2010; Chen, Greene & Crick 1998). This study embraces the definition propose by Boyd & Vozikis (1994), who define ESE as the strength of an individual's belief that s/he is capable of successfully performing the roles and tasks of an entrepreneur (Boyd & Vozikis, 1994; Chen et al., 1998). ESE provides an insight into what makes potential entrepreneurs maintain their initial efforts to reach for new business opportunities.

An entrepreneur is said to have high levels of self-efficacy when s/he firmly believes in their capability to perform a task successfully. Entrepreneurs with high degrees of ESE are more likely to perceive the positive outcomes as a result of performing a task (De Noble et al., 1999). Gist (1987) points out that a high level of ESE can help individuals maintain their efforts until their primary goals are met. Individuals who possess high ESE visualise success scenarios, which helps them to focus and perform (Bandura, 1989). People who perceive themselves as inefficacious are likely to visualise failure scenarios, affecting their performance negatively (Bandura, 1989). Individuals with higher levels of ESE recognise greater opportunities and are likely to be willing to take more risks in the pursuit of these opportunities (Bacq et al., 2017).

If we look to the burgeoning entrepreneurship education literature, we see many studies focussing on entrepreneurship courses, extra-curricular activities (Preedy et al. 2020, Pocek et al. 2021), and venture creation programs (Politis et al. 2019) and their impact on entrepreneurial learning. However, they are predominantly framed from the perspective of formal programs that provide education to individuals, characterised by transactional knowledge transfer. This overlooks the ecosystem level properties of the program or the

ecosystem in which the programs exist, which enable learning as co-production of knowledge within a system (akin to Polk, 2015).

Although scholars have conceptualized entrepreneurial learning as dynamic, constructivist and contextual in nature (Rae, 2005; Politis, 2005; Nogueira, 2019; Cope, 2005), literature in this area is constrained to entrepreneurial learning as (1) an individual/team/organization level phenomenon (Breslin, 2019), (2) socially situated process (where interactions are limited between entrepreneurs, communities) (Pocek et al. 2021), (3) an experiential process (Politis, 2005; Kolb, 2015) including learning from failure (Cope, 2005; 2011), and (4) vicarious learning (Cope, 2005; Holocomb et al. 2009; Zozimo et al. 2017). Largely absent from these perspectives is a more holistic consideration of the ecosystem or ecology in which the learning occurs as a result of the entrepreneur's interactions and engagement. An ecological perspective provides us with a means to examine entrepreneurial learning as an aspect of the human experience that is complex and multilayered (Jackson, 2016). After introducing complementary concepts from the entrepreneurial ecosystem literature, this section segues to discuss pivotal education studies in the area of learning ecologies.

Entrepreneurial Learning in Ecosystems

Broadening entrepreneurial learning to be more than formal entrepreneurship education, enables considering the bulk of entrepreneurship to be a learning process. By recognizing that learning is an inherent and integral part of entrepreneurship, we enable consideration of entrepreneurship and entrepreneurial learning occurring across multiple contexts, well beyond the classroom. The breadth of contexts available is recognised in the concept of entrepreneurial ecosystems (EE) (Spigel, 2020). Recently, the concept of EE has gained popularity among entrepreneurship researchers and it acts as a conceptual tool to understand the emergence of high-growth entrepreneurship as a result of the interactions and

interdependencies between various actors and elements within a geographical region (Spigel, 2015). Stam & Spigel (2018, p.407) defines an EE as "a set of interdependent actors and factors co-ordinated in such a way that they enable productive entrepreneurship within a particular territory". The ecosystem approach shifts the focus from the entrepreneur to the environment in which entrepreneurial activities occur. Although EEs provide resources such as networks, investment capital and skilled workers, the availability of the resources depend on the willingness of the actors or the interaction between the entrepreneur and other actors (Spigel, 2020). The field of EE research therefore emphasizes that entrepreneurship is not a solo journey, but a complex interplay of various factors and actors.

Pugh et al. (2019) argue that learning should be embedded in the concept of EE, with higher education institutions playing a significant role in building and strengthening their regional EE, whereby learning provides benefits beyond the individual level to regional EE level. Whilst entrepreneurs are one of central actors in EEs, a new holistic perspective is needed for understanding the process of entrepreneurial learning as a result of interaction between entrepreneur and specific elements in the EE. Given the considerable significance of the role of entrepreneurial learning in new venture creation activities, it is surprising that EE literature has not explored how entrepreneurial learning occurs as a result of interaction between entrepreneurs and other actors/factors in the regional EE.

Learning Ecologies (LE)

The concept of ecology was introduced in the early 70s by Bronfenbrenner (1979) through his influential work on ecological systems theory to understand human development. According to his ecological systems theory, in order to understand human development, the entire ecological system must be considered which is nested in nature. This paradigm highlights the significance of activities and interactions between individual and different ecosystems within the nested ecosocial system (Jackson, 2016). The ecological theory

highlights how an individual develop as a result of his interaction with his environment. Brown (2000) introduced the concept of ecology in the process of learning. He argued that Web 2.0 enabled Learning Ecologies (LE) to emerge as it connects people to diverse knowledge, communities and ideas. While Brown (2000) uses ecology as a metaphor to describe how web can act as a transformational medium that enables people to interact, access and learn through multiple resources, Richardson (2002) construes the concept of LE as learning occurring in formal and informal situations. Richardson (2002) analysed the role of e-learning in shaping LE of students and found that e-learning supports student interactions with multiple resources and content, thereby, enabling students to construct LE using personalised interactions with resources and content.

Grounded on Brown (2000) and Richardson (2002), the idea of LE advanced through the seminal works of various researchers who featured different aspects and elements of LE (Barron, 2004; Barron, 2006; Siemens, 2005; Jackson, 2016). One of the influential works in the LE literature has been made by Brigid Barron. Barron (2004) proposed a foundational, integrated/holistic conceptualization of LE, which considers the whole of relationships, resources, interactions, plural contexts (formal, informal) explaining learning across multiple settings. Barron's (2004) conceptualization of the concept has the individual as the organising central node in the system. While considering physical context, relationships, distributed resources as critical sources of learning, interaction with these elements provide opportunity for learning. She examined how technological fluency was developed in students across multiple contexts (formal and informal) and to what extent expertise influenced the context and activities with their LE. Barron (2006) proposes that once an individual encounters certain experiences, social networks, activities, resources (collectively addressed as ideational resources) which can spark interest in learning. Once they are interested, individuals develop and create new learning opportunities for themselves.

Another pivotal work in LE literature was contributed by Jackson (2016). Jackson (2011c) introduces the concept of lifewide learning which embraces learning that emerges though activities in *multiple* contexts (all formal, informal and social environments, directed or self-regulated learning, physical or virtual space) and situations which individuals inhabit simultaneously. Building on the idea of lifewide learning, Jackson (2016) explores the concept of LE to visualise the dynamics of the complex process of learning and it delineates the interaction between different elements of the ecology such as contexts, relationships, resources, capabilities and process. An individual's personal LE develops from the situations (contexts) and is aimed at attaining goals (develop capabilities) through their interactions with their environment, which consequently lead to the process of learning and development. Their personal LE consists of themselves, the processes and spaces they create, the activities they participate, their relationships with others and networks, tools and artefacts and technologies they use.

From the analysis of key contributions in the area of LE, several authors have made significant efforts in conceptualization of LE. Majority of the studies fall in the category of education research and under the area of social sciences (Sangra et al. 2019; Jackson, 2016; Barron, 2006; Esposito et al. 2015). However, previous studies were limited to pedagogy and have not yet addressed learning in disciplines. Only a few works in the LE literature examined the concept of LE in other disciplines such as linguistics (Hibbert, 2011; Ngo & Eichelberger, 2020; Cabot, 2018), STEM (Johnston, Southerland & Sowell, 2006; Yelland & Waghorn, 2020; Gupta et al. 2019; Brunhaver et al. 2012). Several studies have applied this ecological approach to understand how various groups of individuals learn such as entrepreneurial mothers (Christian, Sangra & Gonzalez-Sanmamed, 2016), doctoral students (Esposito, Sangra & Maina, 2015) and teachers (Van den Beemt & Diepstraten, 2015; Ranieri et al. 2019; Sangra, Gonzalez-Sanmamed & Guitert, 2013). Further, a large number of

existing studies in LE literature focussed on e-learning (Andrews & Haythonthwaithe, 2011), technological fluency (Barron, 2004), digitally mediated educational context (Esposito et al. 2015), ICT skill development (Barron, 2006).

Acknowledging the multidimensional nature of LE, Gonzalez-Sanmamed et al. (2019) conducted a Delphi study to provide a systematic framework to theorize LE. They identified key components of an individual's LE, which is categorized into extrinsic (learning process) and intrinsic dimension (learning dispositions). While the intrinsic dimension includes components such as conceptions, motivations and expectations that are related to an individual's character and dispositions for learning, the extrinsic dimension includes processes that relate to individual's learning path throughout life such as (contexts, actions, relationships and resources). These elements are linked to each other and doesn't work alone in isolation (ibid.).

A closer look at the literature of LE reveals that no previous study except for Christian et al. (2016) has applied the concept of LE in entrepreneurship. Christian et al. (2016), however, examined how entrepreneurial mothers developed their personal LE for capacity development which was heavily focussed on the digital informal learning. Grounded on Barron (2006) and Jackson (2016), LE approach can be used to examine entrepreneurial learning process across multiple formal as well as informal contexts. Using the extrinsic dimensions (components such as actions, resources, relationships and contexts) of Gonzalez-Sanmamed et al. (2019), this study intends to delineate the concept of LE of entrepreneurs across multiple formal, non-formal and informal contexts.

Drawing on the LE concept allows us to develop propositions about its relationship to ESE. Analogous to the literature that munificent environment strongly influences

entrepreneurial self-efficacy and intentions to start a new venture (Bacq et al. 2017; Tang, 2008), we therefore propose:

Proposition 1: *The development of ESE is positively affected by the munificence of the learning ecology.*

Learner engagement

The LE construct helps us to understand the 'when' and 'where' of the learning process. In order to comprehend 'how' the entrepreneur interacts with various activities, resources, relationships in multiple contexts, the concept of engagement is operationalized in this study. We shorten learner engagement to just 'engagement' to avoid conflation with the previous LE abbreviation. Drawing on education research, student engagement can be considered as one of the predictors of learning and personal development (Carini et al., 2006). The construct of engagement is the conceptual glue that connects "student agency" to important contexts (home, school, university, incubator, accelerator, community) and in turn to the learning outcomes (Reschly & Christenson, 2012; Lawson & Lawson, 2013).

Fredricks et al. (2004) conceptualized engagement as a multidimensional construct and developed three dimensions which is widely used in research to measure engagement. They define student engagement in terms of (a) Behavioural engagement (participation, effort, persistence, asking questions, attendance) (b) Affective engagement (positive or negative reactions to teachers, peers, and how these can create ties to a context or institute or how it can influence their willingness to do the work) (c) Cognitive engagement (thoughtfulness and willingness to exert extra effort). Fredricks et al. (2004) argues that considering the behavioural, cognitive and emotional aspects of engagement simultaneously

yields rich characterization of students as well as to understand the interactive effects between facilitators of engagement and the students.

Majority of the previous research focuses on associating engagement to student dropout rates, academic success, classroom behaviours, which Zepke (2015) identifies as mainstream research. Beyond the mainstream research, Lawson & Lawson (2013) introduced socio-cultural ecological perspective to understand student engagement, which shifts the focus from learner in a classroom setting to a wider social context. This perspective plants the construct of engagement from the classroom/ institutional setting to the socio-cultural context where contribution of other stakeholders is also acknowledged. Lawson & Lawson (2013) argues the relevance of examining multiple combinations of activity engagements within a setting and activities across multiple ecologies (home, school, university) to understand the depth and complexity of the process of engagement. Further, Zepke (2011) and Bryson (2014) acknowledge the significance of ecological perspective towards engagement to address the complex interactions, dynamic and constructivist nature of student engagement. Building on the socio-ecological perspective in the engagement literature (Lawson & Lawson, 2013; Bryson, 2014; Kahu, 2013; Zepke, 2011) and acknowledging the principle of 'becoming' and 'transforming' (Solomonides, 2013), this study uses the concept of engagement dimensions to understand the interactions in the LE of entrepreneurs.

Drawing on the engagement concept allows us to develop propositions about its relationship to ESE. Building on the above, we recognise that merely participating in an LE is insufficient to developing ESE and therefore propose:

Proposition 2: *The development of ESE is positively affected by engagement in the learning ecology.*

Methodologically, most studies have relied on surveys to measure engagement quantitatively (Bond et al. 2020; Wang et al. 2016; Salmela-Aro et al. 2016; Balan & Metcalfe, 2012). A single survey instrument cannot measure student engagement due to its dynamic nature and conceptual breadth (Kahu, 2013; Porter, 2011). Scholars call for further in-depth qualitative work to address the emotions, diversity and interactions involved in the process of student engagement (Bryson & Hand, 2007).

Proposition development

To our knowledge, no previous study has used LE framework and the concept of engagement in the field of entrepreneurship. To fill this gap, this paper uses the concept of LE and engagement (drawn from the field of education research) to understand an individual's entrepreneurial learning experience in a holistic way bringing together, all the elements involved in her experience for learning and developing her ESE beliefs. In this section, we disaggregate the LE concept into its components and identify multiple dimensions of engagement, and then refine the general propositions above for specific components and dimensions.

Components of Learning Ecologies

Exploring 'when', 'where' and 'how' entrepreneurs develop ESE beliefs could be instrumental in understanding their entrepreneurial learning journeys. The answer to 'when' and 'where' could be provided using LE framework, while 'how' can be explored by the concept of engagement. The learning experiences of entrepreneurs using LE framework might lead to a better understanding of complex interactions of factors that led to the development of ESE beliefs. Building on the definition of LE proposed by Barron (2006), this study defines LE as "set of contexts (formal/informal/non-formal) comprised of configurations of activities, material resources, relationships and the interactions that emerge

from them, found in co-located physical or virtual spaces that provide opportunities for learning and competency development".

A LE perspective presumes that entrepreneurs are simultaneously involved in multiple settings. The interactions within a setting can lead to creation of new activity contexts in a new setting or pursuit of new learning resources or relationship with stakeholders outside the primary settings (Barron, 2006). Further, the concept of LE provides an integrated conceptualization of entrepreneurial learning experience as a complex phenomenon bridging formal, informal and non-formal learning experiences (Jackson, 2016). Drawing on Gonzalez-Sanmamed et al. (2019), LE of entrepreneurs include the following components:

(1) Contexts:

(a) Formal contexts. These are programs or courses within an institution, such as credit bearing programs within schools and universities, or educational programs by accelerators. There are a large number of studies in entrepreneurship education literature assessing the impact of entrepreneurship education programs in higher education (Piperopoulos & Dimov, 2015; Souitaris et al. 2007; Rauch & Hulsink, 2015, Iakovleva et al. 2014) and accelerators (Miles et al., 2017; Cohen, 2013).

(b) Non-formal contexts. These are optional programs, that learner join for experience or knowledge acquisition, such as Entrepreneurial clubs, Associations, networking events. Evidence suggests various entrepreneurship support initiatives such as student clubs and associations (Padillo-Angulo, 2019), mentoring programs (Austin & Nauta, 2016; Yang et al., 2017; Nowinski & Haddoud, 2019), internships (Bignotti and Botha, 2016; Yi, 2018), networking events (Pruett, 2012) enhance ESE beliefs of students.

(c) Informal contexts: This includes self-directed learning, and domestic or recreational contexts such as home. Evidence reveals that entrepreneurs employ a

complex network of strategies to manage their learning and knowledge acquisition in the early stages of a new venture (O'Shea and Buckley, 2010).

Based on the above reviews of specific contexts, we propose that:

Proposition 1a: *The development of ESE is positively affected by number of contexts which constitute an entrepreneur's the learning ecology.*

(2) Activities:

Activities are undertaken in any context. These are the primary means by which empirical ESE studies have theorised the development of ESE. Activities include customer interviews, writing business plans, attending workshops, joining online communities/networking. Evidence suggests that participation in workshops helps learners to gain specific knowledge and experience (enactive mastery) and provide exposure to mentors (social persuasion and feedback), which would influence their ESE beliefs (Pruett, 2012). Further, Bignotti and Botha (2016) suggest that entrepreneurship internships can positively influence the development of ESE (enactive mastery and observational learning) and entrepreneurial intentions. They argue that entrepreneurship internships provide an opportunity for learning by doing (enactive mastery), which would allow them to acquire skills that are required to run a business. Internships enable observational learning, as the interns get to follow an entrepreneur and learn from his/her experience, thereby influencing the ESE beliefs of student interns.

Proposition 1b: *The development of ESE is positively affected by number of activities an entrepreneur can access in their learning ecology.*

Note the term 'access', as distinct from engaging in the activity. The latter is addressed by the dimensions of the engagement construct.

(3) Resources:

Resources in an LE could be material (Web resources, co-working spaces, books) and social (networks, mentors). Greater access to resources help entrepreneurs feel confident in performing entrepreneurial tasks (Marshall et al. 2020; Klyver & Schenkel, 2013). Subhadrammal (2019) argues that networking events could influence student entrepreneurs' ESE beliefs, as these events provide them with an opportunity to create their own products and pitch them to prospective investors (enactive mastery). They receive feedback on their pitching (social persuasion) and had the opportunity to connect with other start-ups (Pruett, 2012; Miles et al. 2017).

Proposition 1c: *The development of ESE is positively affected by the depth and breadth of resources an entrepreneur can access in their learning ecology.*

(4) Relationships:

Relevant stakeholders to interact with include mentors, peers, teachers, customers, or staff (institutional). Baluku et al. (2019) highlight that mentoring is a form of entrepreneurial learning that strengthens an individual's entrepreneurial intent and their abilities to steer through the difficult start-up process (Laviolette et al., 2012; St-Jean & Mathieu, 2012; 2015).

Proposition 1d: *The development of ESE is positively affected by the depth and breadth of stakeholders an entrepreneur can access in their learning ecology.*

These four components reinforce each other and do not work in isolation (Gonzalez-Sanmamed et al. 2019). For instance, if an entrepreneur needs to write a business plan document, he needs to access certain resources and might have to consult with peers, mentors. An entrepreneur might be able to receive critical feedback if he has strong relationships with peers and other stakeholders. Therefore, this study proposes:

Proposition 1e: *The development of ESE is positively affected by the compounding effects of multiple contexts, resources, activities and relationships in their learning ecology.*

Dimensions of Learner Engagement

This study incorporates the construct of engagement to provide a better understanding of how entrepreneur interacts with various elements within his LE. Recent research suggests that engagement in learning activities emerge from the interaction between learners and their learning environment (Shernoff et al. 2006; Lawson & Lawson, 2013). Learner engagement is socially constructed and reconstructed by the learner through the interactions they have with their context and environment (Bryson, 2014). The research on the conceptualization of engagement in the field of entrepreneurship education has not been explored previously. This study aims to fill this gap by aiming for developing a systematic and theoretical analysis for the concept of engagement in the field of entrepreneurship.

Building on the definition by Wang, Fredrick, Ye, Hofkens & Schall (2016), this study defines engagement as the observable and unobservable qualities of entrepreneur's interactions with learning activities, resources and relationships within a context. Drawing on previous research, this study utilises three dimensions to measure the construct of engagement:

(1) Behavioural engagement:

This dimension mainly draws on the idea of participation and behaviours associated with learning such as effort, persistence, asking questions (Mahatmya et al. 2012) and initiative taking behaviours such as feedback seeking, extra effort, new ways to look at a material being taught (Finn & Zimmer, 2012). Active participation in workshop activities, mentoring programmes, networking events, student clubs could lead to development of ESE in entrepreneurs (Pruett, 2012; Pittaway et al. 2012; 2015). Therefore, this study proposes:

Proposition 2a: *The development of ESE is positively affected by active participation in the activities in the learning ecology.*

(2) Affective engagement:

The affective dimension includes 'feelings of being a significant member of the community' (belongingness) (Finn & Zimmer, 2012; Fredricks et al. 2016). Further, positive or negative reactions to teachers, peers, networks and other key stakeholders and how these can create ties to a context or institute or how it can influence their willingness to do the work. Mentors could be perceived as role models, which enables entrepreneurial learning by acquiring competencies through observation (Boyd & Vozikis, 1994). By engaging with guest speakers, students can compare and associate their own situations and experiences and role models can provide feedback, information pertaining to opportunity recognition, and how to deal with challenges and manage risk, which can affect the beliefs of students about their abilities to engage in entrepreneurial activities (BarNir et al., 2011; Ozdemir et al., 2016). Therefore, this study proposes:

Proposition 2b: *The development of ESE is positively affected by the strength or embeddedness of the relationships with stakeholders in the learning ecology.*

(3) Cognitive engagement:

This study uses the concept of self-regulated learning to understand/measure the cognitive engagement of entrepreneurs. This study adopts definition of Self-Regulated Entrepreneurial Learning (SREL) proposed by Winkler et al. (2021), which is "self-generated thoughts, feelings, and actions that are proactively planned and cyclically adapted to the attainment of personal entrepreneurial goals" (p.7). The SREL consists of three cyclical phases: forethought (goal setting, planning learning activities), performance (taking action and stay focused on task) and self-reflection (learner evaluates his performance based on the goals

set, attributions as to why the goals weren't met and plan further SREL cycles). Therefore, this study proposes:

Proposition 2c: *The development of ESE is positively affected by self-regulated learning practices to make sense of past engagement with the LE and to plan future engagement with the LE.*

These three dimensions reinforce each other, too, whereby the entrepreneurs receive compounding benefits to higher levels of overall engagement. Therefore, this study proposes:

Proposition 2d: *The development of ESE is positively affected by the compounding effects of active participation, stronger relationships and self-regulated learning.*

Conclusion

Drawing on the education literature, this study proposes a relationship between the munificence of the learning ecology and the level of engagement on the development of Entrepreneurial Self-Efficacy. To do so, we developed a theoretical framework to understand how individuals/entrepreneurs experience, navigate and participate in learning experiences that span multiple contexts and develop ESE beliefs. This paper looked at the intersection of entrepreneurial learners, their engagement in their immediate environment and attainment of entrepreneurial self-efficacy (as a proxy for learning). There have been significant advances in areas of research related to each of these areas of research, with one area occasionally referencing another. However, this paper sets out to be the first to combine them in a comprehensive and integrated way, and contextualised to entrepreneurship.

The significance of an ecological perspective to an entrepreneur is that it encourages them to see learning as a process that connects them in a holistic way to various stakeholders in their ecosystems. It enables them to appreciate the ways in which they engage with contexts and tasks, utilise and develop relationships and resources in order to do launch a

start-up. Theoretically, this framework and these propositions can be tailored to specific contexts and stages of learning (primary, secondary or tertiary education, adult learning, etc.).

This study has several practical implications. Educators, Incubator/Accelerator managers might be able to open up new possibilities for contexts, relationships and interactions as they appreciate that the learning ecologies of their students/entrepreneurs extend beyond the classroom/program. Also, they can understand what works for them and what not, whether their assumptions about student/entrepreneur learning are helping them fulfil their aspirations. Further, this framework could be used to design entrepreneurship curriculum and required resources in Higher education that would foster the entrepreneurial self-efficacy beliefs in students.

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