Enhancing Self-Directed Learning Readiness in Entrepreneurship Education

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Worldwide entrepreneurship education (EE) is gaining popularity as an employability skill to prepare learners for a future of adaptability and lifelong learning. Its scholarship, however, is concerned that we have lost sight of what works, why, and how in EE. This is especially true for such novel learning objectives as preparation for lifelong learning. This quasi-experimental, mixed methods research sought answers to the question: of how EE pedagogy influences students' self-directed learning readiness (SDLR). Statistically significant relations were found, especially between self-efficacy and SDLR. The impact of EE was found to be highly significant, which was explained by the effect of a stage-wise, mixed pedagogy approach to teaching/learning. Enhancement of self-efficacy and motivation for self-directed learning was found to benefit from a continuous cyclical teaching-learning process combining passive, participative and self-steered learning within and throughout each step of the learning process, in simulated and authentic learning contexts.

Keywords: self-directed learning readiness, autonomy, self-efficacy, motivation, entrepreneurship education, pedagogy

INTRODUCTION AND RATIONALE

The dynamics of the globalized, digitalized, knowledge economy demand its participants to be able and willing to continuously invest in their professional development through lifelong, self-directed learning (Mulcahy, 2019; OECD, 2020; Levy, 2018; WEF, 2018; EPSC, 2016). Policymakers have begun to promote entrepreneurial competence as a coping strategy for employability, not as much with a focus on business initiation but more as a skillset to discover and exploit (employment) opportunities (European Commission, 2018a, 2018b; EPSC, 2016). As a result, educational institutions around the world are broadly introducing entrepreneurship education modules, often pioneering a variety of pedagogical approaches. From reviews of the EE literature, we know that there is a significant relationship between EE and entrepreneurial skills, intention, and outcomes (Lorz *et al.*, 2013; Martin *et al*, 2013; Nabi *et al*, 2017). Most EE studies focus on entrepreneurial intention as the outcome variable; however, the lack of rigor in EE studies casts doubt over the validity of many studies and the literature remains inconclusive about the effects of EE. Longva and Foss (2018) argue that "*EE cannot be treated as a black box*" (p.370) and further rigorous research is needed to come to a more fine-grained understanding of the influence of contextual factors in EE. Research, they suggest, should lead to more robust evidence of the impact of specific pedagogy on certain groups of students. In a recent review from Nabi and colleagues (2017), they call for future studies to examine other types of EE impact and suggest exploring contextual factors to explain

contradictory findings in the literature. To this end, this study heeds this call by exploring whether EE has an impact on SDLR.

Research on the effectiveness of Entrepreneurship Education (EE) reveals that an increasingly critical voice is heard among EE scholars who are concerned with the rapid expansion of EE at all levels of education. The main concerns are related to the fragmentation of EE modules evaluated in the discourse in terms of EE content, pedagogy, course duration (from two weeks to two years), and sample populations of target audiences (from primary, secondary, and tertiary education) and learning objectives, its pioneering character, and the level of understanding of what is effective (Fayolle, Verzat and Wapshott, 2016; Mwasalwiba, 2010) for the different purposes for which it intends to educate (Kamovich and Foss, 2017). This is especially true for learning objectives that are related to academic skill development (Tseng, 2013; Morris & König, 2020). This paper, therefore, explores the question of how entrepreneurship education can contribute to preparing students for self-directed (lifelong) learning readiness, examining a case study based on the world's most broadly applied format of EE, that of the Junior Achievement Student Company (JASC) program.

The study is undertaken utilizing pragmatic methodology, making use of a convergent mixed methods research design that applies deductive analysis. The complementarity instead of triangulation of results allows the use of results of one method (qualitative) to elaborate, enhance or illustrate the results from the other method (quantitative). From the self-directed learning literature, a conceptual framework for understanding self-directed learning readiness in a formal education setting was developed, which was used to explore relatively overlapping phenomena and different aspects of SDLR. From it, a 22-question cross-sectional survey was developed to evaluate students' behaviors reflective of maturity levels of autonomy, self-efficacy, and motivation for self-directed learning, pre- and post-participation in EE as well as questions for the open-question surveys and semi-structured, focus group discussions with participants.

The paper offers two propositions. The first is the conceptual framework that sets out three major themes through which self-directed learning readiness can be understood (figure 1). The second proposition is that self-directed learning readiness can be enhanced through a stage-wise, mixed-pedagogy approach to entrepreneurship education, as applied in modules grounded in the JASC program. The term self-directed learning is defined as *"a process in which individuals take the initiative, with or without the help of others, to diagnose their learning needs, formulate learning goals, identify resources for learning, select and implement learning strategies, and evaluate learning outcomes"* (Knowles, 1975, p.18). The proposed stage-wise, mixed-pedagogy approach to EE consists of four phases of learning throughout the learning process of the EE module: i) familiarization with entrepreneurship models, methods, and tools through passive learning about entrepreneurship theory; ii) recognition of how learned theory is applied in authentic settings through passive/participative learning; iii) practicing with entrepreneurial theory and skill in participative, in-class simulation workshops, and iv) experiencing the application of entrepreneurial theory and skill in the authentic, real-world setting of entrepreneurship, through self-driven learning activities (figure 2). The paper aims to explore how students experience learning in such a stage-wise, mixed pedagogy approach to EE and how this contributes to their willingness and ability to identify and pursue learning opportunities.

THEORETICAL BACKGROUND

Self-directed learning (SDL) theory originates in adult education (Knowles, 1975) and is strongly related to self-determination theory (Deci & Ryan, 1991). Learners, predominantly adult learners, are viewed as self-directed and responsible for decisions about their personal development. SDL recognizes the needs of learners to develop specific attitudes, abilities, and (intrinsic) motivation to take ownership of their learning process, for monitoring and managing their learning progress, and to extend their learning within and beyond the school's curriculum.

The literature identifies four aims of SDL: (1) to enhance the ability of learners to be self-determined (Knowles *et al*, 1998) and gradually mature from dependent to self-directed learners (Grow, 1991); (2) to support transformational learning (Mezirow, 1990; Brookfield, 1986) and advance individual learning

experiences based on learners' self-knowledge and awareness of their own needs; (3) to promote emancipatory learning and social action (Merriam *et al.* 2007) towards understanding and knowledge about the nature and root causes of unsatisfactory circumstances and the development of strategies to change them (Thompson, 2000); and (4) to promote lifelong learning to remain current in today's information-rich society where the value of knowledge decreases rapidly (Morris, 2019). The complexity and dynamics of the current knowledge economy, characterized by the rapid growth of information and the evolution of digital (learning) environments, demand increasing levels of self-efficacy and self-direction for gaining and maintaining relevant knowledge and skills (OECD, 2017; EPSC, 2016). In an SDL process, the learner instead of the educator assumes the responsibility to achieve the learning objectives and meet the personal goals or perceived demands of the individual context in which the learning takes place.

There are multiple dimensions, or constructs, of SDL that have been used in the literature (Beckers et al, 2018; Morris, 2019). Studies generally focus on three dimensions (Sawatsky *et al*., 2017). The first dimension highlights the learning process and managing the learning tasks, for instance, self-planning and self-managing of the process (Long & Agyekum, 1983; Brockett & Hiemstra, 1991; Grow, 1991; Garrison, 1997). The second dimension comprises learner characteristics and attitudes and brought forward a variety of assessment tools (Guglielmino, 1977; Oddi, 1986; Hendry & Ginns, 2009; Stockdale & Brockett, 2011; Shen *et al.*, 2014; Lopes & Cunha, 2017), many of which build upon the self-directed learning readiness survey (SDLRS) by Guglielmino.

SDL enables individuals to improve their self-confidence, autonomy, motivation, and lifelong learning skills (O'Shea, 2003). Studies that applied the SDLRS and similar (self)assessment tools show that self-directed learners are task-oriented, set clear goals for themselves, and plan, manage, and monitor their learning process in line with their goals (Grow, 1991; Garrison, 1997). They also learn to cope with ambiguity (Stockdale & Brockett, 2011), to motivate and activate themselves, to search for and evaluate new approaches, and to work autonomously (Guglielmino, 1977; Long & Agyekum, 1983; Oddi, 1986; Brockett & Hiemstra, 1991; Garisson, 1997). Learners become active participants and deep learners in the learning process (Spencer & Jordan, 1999), which benefits higher-level thinking skills such as creativity, problem solving, and critical thinking (Bouchard, 2009; Doolan, 2013) as well as academic success and development (Telkkol & Demirel, 2018). Therefore, the proposition brought forward in this paper is:

H1 *autonomy, self-efficacy, and motivation for learning tasks are positively related to SDLR.*

Advancing Self-Directed Learning Readiness Through Entrepreneurship Education

For a learner to be ready for independent learning, he/she must have learned the skills of independent study and be willing to use them (Mocker and Spear, 1982 p.1), which calls for the active involvement of educators. The objective of the educator in this process is to cultivate confidence and competence amongst learners to facilitate self-directness in learning and in creating developmental needs awareness. Developmental needs awareness requires the learner to be *'critically aware of* [contextual or situational] *meaning and self-knowledge'* (Garrison, 1997, p.19) to become conscious of incompetence (Grow, 1991; Candy, 1991). Most learners in formal higher education settings tend to lack this awareness though, as they generally do not have (practical) experience within their field of study (Guglielmino, 2013). To achieve critical awareness of meaning and self-knowledge *'external activities and internal reflective dimensions are* [therefore] *to be fused'* (Garrison, 1997, p.19). Constructivist learning theory postulates that knowledge and skills learned inside the classroom should be applied in real-life situations to achieve true deep learning, (Mezirow, 2000), emphasizing the need for contextualizing what is to be learned with didactical approaches such as action-based, inquiry- or problem-based learning that are more practical than theoretical. Instructional models or learning theories that seem to embrace such an approach to learning, and elements of which are incorporated in entrepreneurship education, include experiential learning (John Dewey, 1938); discovery learning (Jerome Bruner, 1961, 2009), situated learning (Lave and Wenger, 1990), transformative learning (Mezirow, 2000) and heutagogy (Hase and Kenyon, 2000). All these learning theories share the view that learning should be context-based.

Contextual learning is conceptualized as the purposeful organization of circumstances within the learning context (Mocker and Spear, 1982) that provide an attractive yet challenging new situation to students, that triggers recognition of a development need and a desire or sense of urgency to fulfill the learning requirements (Gibbons, 2002). It contends that when subject matter content is contextualized, students are motivated to make connections between knowledge and its application in authentic settings (Candy, 1991; Danis, 1992). Students proposedly feel stimulated to actively participate in learning activities when these are considered relevant and engaging (Briner, 1999). According to the theory of motivation (Deci and Ryan, 1991), levels of motivation to engage in challenging learning tasks depend on one's perceived level of task-related self-confidence and autonomy, in combination with a matching level of an experienced support from others. For students to act autonomously in challenging learning situations they, therefore, need to perceive themselves to be situationally competent, or task ready. The role of the teacher in these contextualized, experiential teaching/learning settings is more facilitative than directive, gradually shifting from learning content to the process of learning itself (Morris, 2019; Mulcahy, 2019; Giddings, 2015), and thus advancing students' SDL readiness (Guglielmino, 2013; Grow, 1991; Hase & Kenyon, 2000; Hiemstra & Brockett, 2012).

A specific example of this type of experiential learning that is rapidly gaining popularity in entrepreneurship education is the venture creation program (VCP). In these VCPs, the creation of a real-life venture is the primary vehicle for learning (Lackéus & Middleton, 2015). Students are immersed in the authentic and real-life situation of starting and running a business to trigger them to develop, practice, and experience with knowledge and competence required to succeed real-time, and to reflect on the consequences of their actions, rather than by learning about entrepreneurship from lectures and case studies. In these action-based pedagogies, learners are expected to be proactive, taking agency of their ongoing learning activities in the broader external context, and not passive recipients. Active reflection is often used to learn from the experience, building and improving capabilities and competence.

Learning is not a unidirectional, standardized activity though, and rarely does a one-size-fits-all approach satisfy all students. This holds for passive learning approaches as much as for active learning approaches and may explain the variation found in EE literature about the efficacy of EE for the development of entrepreneurial competencies. One may even argue that for some students, the active, experiential learning approaches in EE, especially those that require high levels of autonomy and self-confidence, negatively affect students' sense of entrepreneurial competence, as was discovered in a study conducted by Oosterbeek *et al.*, (2010). On that note, Kolb (1984) describes how students apply different learning strategies and benefit from different learning styles.

Learning is defined as *"the process whereby knowledge is created through the transformation of experience"* (Kolb, 1984 p.38), but achieving transformational experience, he argues, depends on a foundational level of understanding of abstract concepts and how these may be applied flexibly in a range of situations. This may be especially true for concepts as abstract to undergraduate learners as business or entrepreneurship. Depending on the preferred learning style, some may learn best from the concrete entrepreneurial experience itself (e.g., learning through experiencing entrepreneurship in a VCP, in which one learns from reflection on success, failure, and active recovery (Politis, 2005). Others are better served by first obtaining a thorough theoretical and/or conceptual understanding (e.g., learning about entrepreneurship through lectures and cases) before executing an experiential learning activity. Regardless of the preferred learning style, Schunk (2009) argues, students, require skills of independent study and feel confident to use them to become independent learners who are able and willing to proactively engage in challenging learning tasks.

To educate for SDLR, Grow (1991) recommends differentiating between learners, '*matching teaching and learning styles as learners advance through stages of increasing self-direction*' (p.125). The proposed 'stage-wise' approach iteratively applies a variety of pedagogies to match the student's perceived level of task readiness. The role of the educator gradually changes from initially authoritarian, characterized by informational lecturing) for instructor-dependent learners, towards facilitative and delegate supervision (generally applied in internships, dissertation supervision, individual work, or self-directed study groups) of self-directed learners (Grow, 1991; Timmermans, 2022). Garrison (1997) theorized that higher student

satisfaction levels and therefore higher levels of motivation to engage in a self-directed learning task may be expected when the level and type of involvement of the educator (task control) matches with the learner's perceived level of SDL readiness (employing self-management and self-monitoring).

Although EE gradually shifted from passive learning about entrepreneurship towards more learner-centered pedagogy (Hagg and Gabrielsson, 2019), insufficient understanding is available about how students experience learning in EE and how this might encourage them to pursue personal learning opportunities. Suggestions are made that the pedagogical development may be the result of pioneering instead of thoroughly considered educational grounding (Béchard and Grégoire, 2005; Fayolle and Gailly, 2008).

Recent efforts made towards deeper embedment of EE in educational science include a sequential, stage-wise approach to learning that starts with behaviorist knowledge transfer and moves through social and situated learning towards existential learning, as proposed by Robinson and colleagues (2016). Bell and Bell (2020) applied this concept in their proposed framework for experiential learning, emphasizing the need for teaching foundational knowledge before its application in an authentic situation. Macht and Ball's (2016) argumentation for the importance of the authenticity of the teaching-learning setting aligns with this view, which, Robinson *et al.* (2016) argue, does require a radically different approach to learning. Learning settings, these scholars propose, should accommodate existential, transformative learning approaches to convert undergraduate students into entrepreneurial, risk-taking, and self-directed learners. Such existential learning situations should represent the authentic professional field for which the students are educated and should facilitate the authentic experience of the consequences of choices made in conducting the learning activities. It is in these environments, the theory indicated, that students become aware of their learning needs and are stimulated to act upon these. What the authors did not discuss, and what seems to be ignored in the EE literature, is the importance of practicing with knowledge and skill in a safe learning environment before experiencing the effects of the task in a real-world setting.

This paper explores how practicing entrepreneurial learning tasks in an in-class simulation, following passive learning about entrepreneurship theory and its application, to generate task-related self-efficacy before applying the learning task in the authentic, real-world setting, contributes to students feeling ready for the learning task. The paper examines the relationship between such a stage-wise, mixed pedagogical approach and students' perceived self-efficacy and autonomous motivation to 'proactively approach' the learning activities. The proposition brought forward in this study is that:

H2 a stage-wise, mixed pedagogical approach to entrepreneurship education enhances self-directed learning readiness through its positively moderating effect on learner autonomy, self-efficacy, and motivation for the learning tasks in EE.

FIGURE 1
CONCEPTUAL FRAMEWORK FOR UNDERSTANDING SDLR
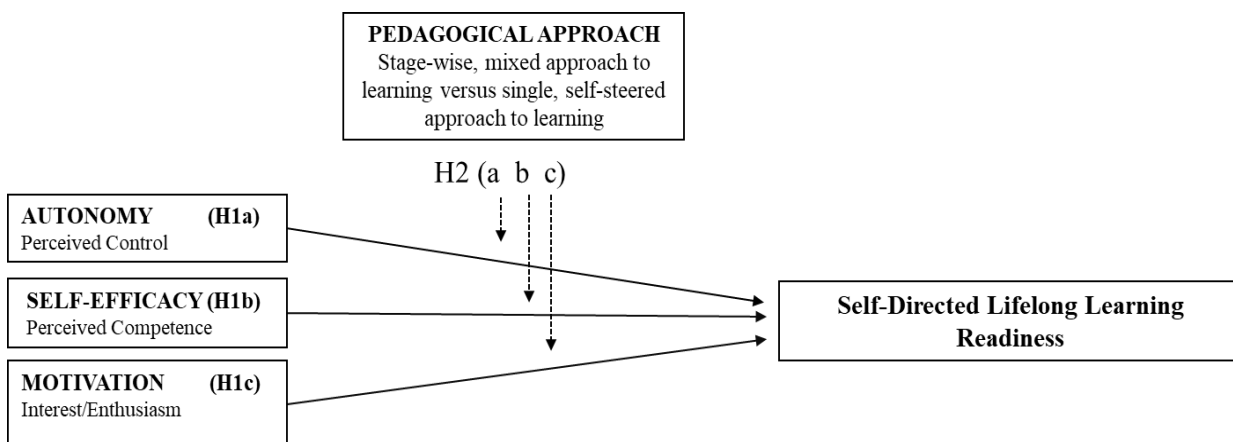
METHODOLOGY

Because the field of EE is so broad and fragmented, the choice for this paper was made to focus on a case study that applies the proposed stage-wise, mixed pedagogical approach. The selected case study was chosen because it represents the most broadly applied format of entrepreneurship education, that of Junior Achievement's Student Company Program (JACP). More than 10 million students participate in a JACP module offered by their local (higher) education institution each year, to experience a guided, hierarchically supported approach to entrepreneurship education (Junior Achievement, n.d.). Within the selected case study, a concurrent or parallel (QUAL+QUAN) mixed methods research design (Creswell and Plano-Clark, 2018) was applied. Creswell and Plano Clark (2018) refer to a similar mixed method design as convergent as *"it brings together the quantitative and qualitative data analysis for comparison or combination to obtain a more complete understanding of the phenomenon studied"* (p.65).

Five data sets have been collected to evaluate the EE-SDLR relationship, two quantitative and three qualitative. A cohort of students was invited to take part in various survey questionnaires at two subsequent moments in their EE module, which is a compulsory module in the BSc IB study program, at the start, halfway through, and upon completion. The procedure used to collect quantitative data was a purposive homogeneous sampling approach, inviting all the participants in the selected module though a post with a hyperlink to the survey questionnaires in the module's digital learning environment. All students have equal access to this digital learning environment and could self-select their participation in this research, therefore with an equal chance and without bias. At the mid-term of the case-study module, an open-question survey to gain explanatory data about how students experienced the proposed teaching-learning approach in the module was distributed among the initial research participants via personalized emails. Upon completion of the module, all participants in the pre-intervention survey were invited to retake the cross-sectional survey and to participate in an end-term open-question survey. The fifth and final data set consists of two semi-structured focus group interviews, one with students and one with educators in the case study module.

Research Setting

The case study EE course hereafter referred to as VCP, is compulsory in the curriculum of the Bachelor of Science in International Business program at a Dutch university of applied sciences and is part of the first-year program. The rationale for choosing this module as the case study for this research is that the module is a slightly amended version of the world's most broadly taught EE module, Junior Achievement's Student Company Program (JACP). The JACP method combines passive, participative, and self-steered (Aadland and Aaboen, 2018), learning about, in, for, and through entrepreneurship and is used by numerous HEIs around the world. It is a full semester, 8 EC course, across 20 weeks, that combines different pedagogical approaches to EE. The module applies Biggs constructive alignment theory (Biggs, 1984) and consists of a mix of learning activities, ranging from reflective observation to active experimentation, to develop the relevant cognitive frameworks for students to understand how knowledge gained inside the classroom can be applied in real-life situations. The course is divided into two separate but related modules, each running for the duration of 10 weeks and assessed with equal weighting.

During the first module, the emphasis is on learning about entrepreneurship, and the material is delivered through a mix of lectures, case studies, and interactive workshops. One day per week the students gather for a full-day session, which starts with an explanatory, theoretical lecture, followed by a guided workshop and an unsupervised afternoon session to execute the lessons learned in the lecture and workshop. After the full-day session, the students are expected to spend more time working on entrepreneurial projects. Learning goals and activities are broadly pre-defined and consist of competency development in opportunity recognition, idea generation, concept development, stakeholder engagement, idea, and concept validation, business modelling, and business planning as well as pitching and presenting. University faculty give lectures and guide the workshops in collaboration with guest lectures from experienced entrepreneurs. The first module concludes with a business plan and pitch competition. Students are assessed on the learning activities they have executed and a reflection on their development. In this phase of the course, learning typically builds upon knowledge and understanding gained from observation, imitation, and modeling

(social development); students are facilitated to co-construct their context-specific knowledge and understanding with their teams (social learning theory).

In the second module, the students execute the business plan. During this second phase, the company is formally registered at the Dutch Chamber of Commerce through Young Enterprise and the students learn following experiential learning theory and entrepreneurial learning theory (Politis, 2005). In this learning phase, the central focus is on the hands-on experience-based action learning approach, learning from action and reflection on the experience (experiential learning) of starting and running the entrepreneurial venture, transforming the experience into deeper learning about opportunity recognition, coping with liabilities of newness (entrepreneurial learning) and self-directing their (learning) goals and process. Assessment of the students is based on a model of continuous observation and interaction regarding competence development and a critical reflection paper on the performance of the business and the student's development in the process of creating and running the new venture.

Data Collection Instruments

The quantitative phase of the study was conducted using a quasi-experimental, time-series design. A web-based survey using Praioritize® software was distributed to students enrolled in the VCP module through an announcement in each of the modules' digital learning environments. The surveys consisted of 22 questions that gathered data on learner characteristics (autonomy, self-efficacy, and motivation) and perceived self-directed learning readiness. To inform the survey, the author drew on the Personal Responsibility Orientation SDL Scale (PRO-SDLS), a self-assessment tool that consists of 25 Likert-scale questions (Stockdale & Brockett, 2011), the SDL readiness scale (SDLRS), a self-assessment tool that consists of 58 Likert-scale questions (Guglielmino, 1977) and the EntreComp Framework (Bacigalupo et al., 2016). The independent variables of learner characteristics were measured using 5-item Guttman-scale questions. Motivation, self-efficacy, and autonomy were proxied using statements of agreement on various topics such as talking to stakeholders, accepting challenges, or determining goals. To proxy the change in motivation, self-efficacy, and autonomy, respondents were asked to take the post-intervention survey, which indicated whether their competencies had changed as a result of the EE intervention. Cronbach's alpha for the independent variables was 0.781 in the post-intervention survey and 0.682 in the pre-intervention survey.

The dependent variable, self-directed learning, was measured by drawing on and adapting questions from the Self-Directed Learning Readiness Scale (SDLRS) (Guglielmino, 1977). Prior studies have used SDLRS to explore learner readiness – the attitudes, abilities, and motivation – to engage in a self-directed learning process (Guglielmino, 1977). Characteristics, capabilities, and behaviors associated with SDL readiness, as indicated by the SDLRS, include independence, confidence, persistence, initiative, creativity, critical (self-)evaluation, patience, self-efficacy, curiosity, and a desire to learn. From the SDLRS, 5-point Likert-scale questions were adopted that related to learning styles, goal setting, and planning. Cronbach's alpha for the dependent variable was 0.727 in the post-intervention survey and .823 in the pre-intervention survey.

The qualitative process evaluation sought to gain a deeper understanding of how and why pedagogical approaches applied in the VCP did, or did not, have the desired effect on learners' autonomy, self-efficacy, and motivation for self-directed learning. Data collection for this purpose was realized through conducting open-question surveys as well as semi-structured individual and focus group interviews with experts, students, and teachers.

Data Collection

Data were collected in two (2) phases; pre- and post-intervention, from the 2021 cohort of students participating in the VCP. In total N=724 students were invited to take part in the pre-intervention phase of the research, from whom a total of N=314 completed surveys have been collected and analyzed. In the post-intervention phase, all N=314 students who had completed the pre-intervention survey and had given consent for future participation in the research were invited. From these, N=185 completed surveys were collected and analyzed.

Open invitations to participate in the qualitative phase of the study VCP were posted in the digital learning environment of the module. At mid-term and toward the end of the semester students were informed that they could complete an open-question survey to evaluate their experience with the module. This resulted in N=114 completed mid-term evaluation surveys, and N=271 completed end-term evaluation surveys.

Data Analysis

Factor analyses of the independent variables of learner characteristics and dependent variables of self-directed learning readiness were conducted. The varimax rotation factor analysis was used to extract the principal components, which were then loaded into distinct constructs with values greater than 0.6. to meet the reliability threshold. These factor structures were used as measures for the independent and dependent variables in the multiple and simple linear regression analyses. The descriptive statistics (table 1) describe the basic features of the research, addressing the generalizability of the study as well as the volume and fit of the data collected for the models used. The demographic data collected was converted to numerical identifiers.

All survey results were entered into SPSS and the individual questions for each factor were summed and averaged for a total factor score. Four multiple linear regression models were used to evaluate the findings and to determine the significance of the relationship between the independent variables and the dependent variable. A T-Test was conducted to determine the significance of the variation between the results pre-and post-intervention. Statistical significance levels are reported at 5%, 1%, and <0,1%.

TABLE 1
DESCRIPTIVE STATISTICS

RESEARCH PARTICIPANTS	Gender		Study Ambition			Career Ambition		
Descriptives Population	Male	Female	Prepare for Master Degree	Business & Management	Entrepreneurship	Business & Management	Entrepreneurship	Other
Sample 2021 (VCP CCE)	51%	49%	15%	67%	18%	64%	24%	12%

The collected data included control variables and was controlled for gender, study ambition, and career intention. For example, the respondents were asked whether they intended to pursue a career in management or entrepreneurship (self-employment). These control variables were coded as categorical or dummy variables.

For the analysis of the qualitative data, template analysis using the operationalized constructs as presented in the conceptual framework as the main variables for coding was applied. The collected descriptions and discussions of the participants' experiences have been further analyzed through analytic deduction (AD). The AD was added to formulate explanations of the survey results. The quantitative and qualitative data sets were simultaneously analyzed, followed by synthesis and integration in the interpretation phase.

RESULTS

Multiple linear regression analyses were used to test the two propositions brought forward in the conceptual framework that: (H1) autonomy (a), self-efficacy (b), and motivation (c) predict self-directed learning readiness, and (H2) that their predictiveness might be positively moderated by learning in a stage-wise, mixed pedagogy approach to EE. Evaluating and comparing both datasets, from the pre-intervention and the post-intervention phase, allowing the detection of possible interaction effects of the stage-wise, mixed EE pedagogy.

In model 1 the effects of the control variables – gender, career ambition, and study intention – on the dependent variable (self-directed learning readiness) in the pre-intervention phase were tested. Model 2

shows the effects of the predictive value of the independent variables autonomy (a), self-efficacy (b), and motivation (c) for self-directed learning readiness. Model 3 tested the effects of the intervention (H2) on the relationship between the independent and the dependent variable.

The results in model 2 shows that prior to participation in the VCP the participants' learning characteristics predict SDLR with a statistical significance (<.001). The results suggest that this is predominantly the effect of the relationship between autonomy and SDLR (β.291, p<.001), and that of self-efficacy with SDLR (β.141, p<.05) relationship.

The results in model 3 show the moderating effect of the proposed stage-wise, mixed pedagogy approach to teaching-learning, as applied in the VCP, on the strength of the relationship between the personal learning characteristics and SDLR. The results illustrate that the predictive value of autonomy remained of no statistical significance for SDLR and decreased (from β.291 to β.116). The value of self-efficacy gained considerable value (from β.141* to β.462***) as a predictor of SDLR. The results also show a strengthening of the motivation x SDLR relationship (from β-.005 to β.223*).

TABLE 2
PREDICTIVE VALUES OF PERSONAL CHARACTERISTICS FOR SDLR

Variables	Model 1	Model 2	Model 3
Control Variables			
Gender	.069	.061	-.012
Study Intention	.016	.013	.077
Career Ambition	.058	.060	.007
Personal Characteristics x SDLR: PRE-Intervention			
Autonomy		.291***	
Self Efficacy		.141*	
Motivation		-.005	
Personal Characteristics x SDLR: POST-Intervention			
Autonomy			.116
Self Efficacy			.462***
Motivation			.223*
F value	.90	6.59***	31.49***
R2	.009	.124	.521
Adjusted R2	-.001	.105	.504

a. Dependent variable is Self-Directed Learning Readiness

Gender coded as 0=male, 1=female
***p < .001; **p< .01; *p< .05

Comparison of the pre-intervention and the post-intervention results illustrate an enhancement of the relationship between personal characteristics and self-directed learning readiness from just under 11%

(R^2Adj .105, $p<.001$) to just over 50% (R^2Adj .504, $p<.001$) as a result of participation in the VCP. The results support both propositions, providing empirical evidence that increased autonomy, self-efficacy, and motivation have a positive effect on self-directed learning readiness and that participation in a stage-wise, mixed pedagogy EE module has a moderating effect on this relationship. The coefficients of the post-intervention results indicate a statistically significant relationship between autonomy, self-efficacy and motivation, and self-directed learning readiness and a substantial enhancement between the pre-intervention results ($F(6,280)=6.59$, $p<.001$) and the post-intervention results $F(6,174)=31.49$, $p<.001$).

The enhanced strength of the relationship found in the results of the multiple linear regression analysis only means that personal characteristics became more predictive for SDLR. It does not tell us if students became more, or less autonomous, self-efficacious, motivated for SDLR, or ready to approach self-directed learning tasks in and beyond the module. The author, therefore, conducted a Paired Sample T-Test to compare Mean values and determine if the variation between the Mean values pre- and post-intervention was of statistical significance. These results show that the intervention had a significantly positive effect on students' perceived self-efficacy. The .57 difference between the Mean of self-efficacy pre-intervention ($M = 2.95$, $SD =.64$) and post-intervention ($M = 3.52$, $SD =.68$) was substantial enough to be statistically significant ($t=8.755$, $p<.001$), indicating that the students ($N=185$) experienced an enhancement of self-efficacy. Perceived SDLR was found to have increased with a Mean value increase of $+.45$ (from $M = 3.06$, $SD =.57$ pre-intervention to $M = 3.51$, $SD =.60$ post-intervention), which too proved to be a statistically significant increase ($t=6.814$, $p<.001$). Students perceived autonomy and motivation appear to have decreased as a result of the intervention (autonomy from $M = 3.05$, $SD =.72$ pre-intervention to $M = 3.01$, $SD =.51$ post-intervention, and motivation from $M = 3.45$, $SD =.70$ pre-intervention to $M = 3.25$, $SD =.73$ post-intervention), of which only the $-.20$ Mean difference proved to be significant ($t = 6.814$, $p=<.01$).

TABLE 3
PAIRED SAMPLE T-TEST RESULTS

	Paired Samples Statistics				T-Test			
		Mean	N	Std. Dev	Std. Error Mean	t	p	MD	df
Pair 1	Autonomy_Post	3,01	178	0,51	0,04	-0,580	0,281	-.04	177
	Autonomy_Pre	3,05	178	0,72	0,05				
Pair 2	Self_Efficacy_Post	3,52	180	0,68	0,05	8,755	<.001	.57	179
	Self_Efficacy_Pre	2,95	180	0,64	0,05				
Pair 3	Motivation_Post	3,25	185	0,73	0,05	-2,784	<.01	-.20	184
	Motivation_Pre	3,45	185	0,70	0,05				
Pair 4	SDLR_Post	3,51	176	0,60	0,05	6,814	<.001	.45	175
	SDLR_Pre	3,06	176	0,57	0,04				

Explanation for the results was sought in the qualitative data set. For this paper, the author focused on the mid-term survey results to understand how the various pedagogies applied in the case study (lectures, in-class practical workshops, and self-steering real-world experiential learning) had affected the students' sense of control (autonomy), self-efficacy and motivation for the transformative learning tasks in the authentic setting of starting and running the student company. The mid-term survey used open-ended questions to gain a deeper understanding of the impact of each pedagogical approach. Participants were asked to reflect on the various pedagogical approaches and how these had affected (positive or negative) their sense of:

1) feeling in control to independently approach the learning challenges (autonomy),
2) feeling empowered to approach the learning challenges, and
3) feeling enthused (intrinsically motivated) to approach the learning challenges.

The results illustrate that the classroom-based lectures and tutorials were perceived as contributing to task-readiness to independently take control (autonomy) and to feeling empowered (self-efficacy) to proactively engage in the learning challenge. 58% of the reflective responses on the effect of "engagement in the lectures" indicated a have positively affected the participants' sense of being in control (autonomy) over the learning process; and 59% of the responses indicated a positive effect on feeling empowered (self-efficacy) to conduct the learning challenges, against 15% and 9% respectively negative or neutral responses. The lectures seem to not have contributed to motivation for the learning tasks.

The in-class workshops, in which the students practiced with the application of the newly acquired entrepreneurship-related knowledge and skill, such as for example conducting customer orientation research, interviewing stakeholders, pitching to investors, and selling to strangers, appear to have been an important enhancer of the students' perceived task-readiness. As many as 63% of the responses were indicative of a positive contribution to empowerment as a result of the workshops. These results illustrate that the stage-wise, mixed pedagogy approach to teaching and learning did indeed generate a positive contribution to the participants' task readiness. The positive effects of the workshops were explained in the free response items as:

> *"It felt more confident after practicing with fellow students before talking to real customers"* (FRI 248)

> *"Sharing ideas and visions with team members and people I known before talking to companies gave me confidence"* (FRI 238)

> *"It made me feel prepared for taking that challenging step of reaching out to strangers"* (FRI 238)

In alignment with the proposition made in the literature that the role of the educator should flexibly shift between that of instructor (expert), coach, organizer, supervisor, and sometimes even that of a participant in the learning process, to match the needs of the student (Candy, 1991), the case study VCP CCE facilitates such flexible role shifting to some degree. Students are guided through the start-up process with weekly assignments to execute a phase in the start-up process of which they had received instruction that week and which they had practiced in the workshop in the class. This structure was chosen to facilitate collaborative learning, in which students can engage at their level and pace and feel supported and sufficiently free to execute the assignments as they see fit for themselves. That students appreciate this flexibility is illustrated in the following extracts:

> "*The validation assignments (out of class) provided me with tangible information but didn't quite know how to proceed with it, and if the questions made were correct, so it helped that we could consult our teacher and the business advisor for help*" (FRI240)

> *"The combination of theoretical and more practical, real-life research and validations tasks made the module fun"* (FRI247)

> "*I was really happy with the insights (project wise and personal wise) provided by our coach. She provided us with good feedback and helped us great*" (FRI 116).

To understand how (what experiences in) the experiential (or existential) learning activities in the VCP had affected the students' perceived task readiness and SDLR, the free-response items of the mid-term and end-term surveys were consulted. As many as 183 free response items (41%) mentioned the positive influence of the authentic, contextualized learning tasks, of which 67 (37%) mention that it is particularly the experiencing success with their choices made in the learning process had the strongest effect on the students' self-efficacy and motivation. The following extracts illustrate this:

"Creating a business from scratch and achieving your goals is empowering for me. It gives me the motivation to achieve big things. The course has been from the start very enthusiastic and empowering to do something." (FRI 49)

"That people were interested in buying our product triggered me to research how best to market our business." (FRI 225)

"I enjoy the fact that I can see what it's like to create our own company from scratch. It is a very fulfilling experience to see a raw idea transform into something real, tangible" (FRI 46)

The above does not explain the slight, but significant decrease in students' motivation. Further exploration of the quantitative dataset, using a Pearson Correlation test, found a significant correlation (r (187) = .38**, p<.001) between motivation and the unique situation of the SARS-Cov-2 enforced lockdown of society. Students had more difficulty motivating themselves to participate in the online collaborative learning sessions (r (189) = .27**, p<.001), struggling with the required reach-out to potential stakeholders (r (188) = .30**, p<.001), and to deal with rejection or experiencing failure (r (189) = .26**, p<.001). The following extracts of the free response items to what affected the students' motivation support these findings:

"The fact that this needed to be done online due to Covid-19 led to many restrictions and made it more difficult to execute the business." (FRI 122)

"Not being able to contact stakeholders." (FRI 261, 262)

"Not knowing the other students [because never met in person] on my [venture] team made it hard for me to motivate myself." (FRI 299).

DISCUSSION

This study evaluated the effect that a stage-wise, mixed-pedagogy approach to entrepreneurial competence development, such as applied in a VCP module that is grounded in the world's most broadly taught EE module, that of the Junior Achievement Student Company Program, might have on enhancing undergraduate business students' levels of self-directed learning readiness. The study hypothesized that such a hierarchical approach to competence development, in which the educator iterates various didactical approaches to meet the learning need of students as they go through the entrepreneurial learning process, would lead to higher levels of autonomy, self-efficacy, and motivation for self-directed learning, and to higher levels of self-directed learning readiness. Confirmation was found of the importance of matching instruction and guidance with students' individual needs, whether to help students find and validate information, provide clear instruction, or give constructive feedback. From the extensive review of the literature on self-directed learning and educational theory we learned that a divide exists between students thriving and students struggling in experiential learning programs, such as those applied in the contemporary VCPs. To feel confident to take on challenging learning tasks, students require some degree of familiarity with the associated knowledge and skillset, an observation stated in the educational literature (Bandura, 1993; Candy, 1991). It was suggested that exposing students to learning tasks that are radically different from what they are used to (Bell and Bell, 2020), such as those of starting and running a student company as a mandatory part of an undergraduate business program, and for which they, therefore, feel insufficiently ready, benefits from a hierarchical approach to building students' task-readiness and motivation (Eccles, 2005; Eccles & Wigfield, 2002; Pintrich and Schunk, 2002). The study provided evidence for this, revealing significantly enhanced levels of self-efficacy (p<.001) and self-directed learning readiness (p<.001) upon completion of the case study VCP. These effects were found to be the predominant

result of the in-class workshops in which the students could practice the required entrepreneurial competence before getting out into the real world to execute the VCP learning activity. Students expressed feeling more confident to proactively approach challenging learning tasks independently after practicing in the safe setting of a classroom, feeling better prepared for taking on the learning challenges, and feeling more comfortable after discussing approaches with teammates and having been able to practice before going into the real world. The study provides evidence for the relationship between self-efficacy and motivation for self-directed learning. Students indicated to have felt supported in the stage-wise, mixed pedagogical approach evaluated from working with and getting feedback from peers and teachers.

Motivation and self-efficacy were found to have strongly gained predictive value for self-directed learning. The results confirmed that self-efficacy is the key characteristic that predicts learner engagement in challenging learning tasks. Self-efficacy was found to be statistically significant ($p < .001$) for SDLR with a predictive value of 46%, versus 14% before participation in the case study VCP, which was found to be the effect of experiencing success (and failure) in executing the learning tasks in the authentic setting of starting and running the student company. These observations confirm the proposition brought forward in the educational theory that students tend to 'approach' learning challenges more proactively when they feel sufficiently confident for the task, and emphasizes the essence of cultivating learner confidence, or self-efficacy, in existential, transformative learning situations such as VCPs.

The study also confirmed the benefits of familiarising students with conceptual and contextual knowledge and how this can be applied in the authentic setting of the real world, as proposed by Guglielmino (2013), Merriam and Caffarella (1999) and Grow (1991), especially concerning students' perception of being in control and feeling empowered. Having a teacher available in differing roles, switching between instructor, coach, organizer, supervisor, and sometimes participant, depending on what the team or student needed, was found to be an important factor for student satisfaction, autonomous motivation, and perceived self-efficacy.

Finally, the study confirmed the relationship between autonomy, self-efficacy, motivation, and self-directed learning readiness, and provides evidence that this relationship is positively moderated by a stage-wise, mixed EE pedagogy, as proposed in the teaching-learning framework designed for this study (See: figure 2).

CONTRIBUTIONS

Contribution to Literature
The entrepreneurship education literature seems to be divided about the efficacy of EE, stating that more fine-grained understanding is needed about how students experience learning in EE and how their experiences affect their motivation to pursue learning opportunities. This paper provides a contribution to the literature by providing a deeper understanding of the efficacy of entrepreneurship education, focusing on entrepreneurial behavior towards (lifelong) learning, a theme only recently gaining attention in the EE literature. It is among the few studies in the EE literature that use an academic development outcome as a dependent variable. The study unpacks EE pedagogy and provides an important contribution to the effects of compulsory venture creation programs for bachelor-level business students and a deeper understanding of what causes those effects. It has scant knowledge about the impact of compulsory, instead of voluntary, venture creation education. This is of considerable interest given the EU's objective that "all young people should benefit from entrepreneurship education, including at least one practical entrepreneurial experience during formal education" (European Commission, 2018b, p.3). Most venture creation programs are voluntary components of bachelor and master-level programs, which leads to a self-selection bias towards entrepreneurial intention, aptitude, or attitude. The research contributes to the efforts made for the embedding of EE in educational science, aligning the various teaching-learning activities to relevant educational theories in the proposed teaching-learning framework and explaining their effects on students.

FIGURE 2
PROPOSED TEACHING-LEARNING FRAMEWORK FOR ENHANCING SELF-DIRECTED LEARNING READINESS IN ENTREPRENEURSHIP EDUCATION (EE-SDLR FRAMEWORK)
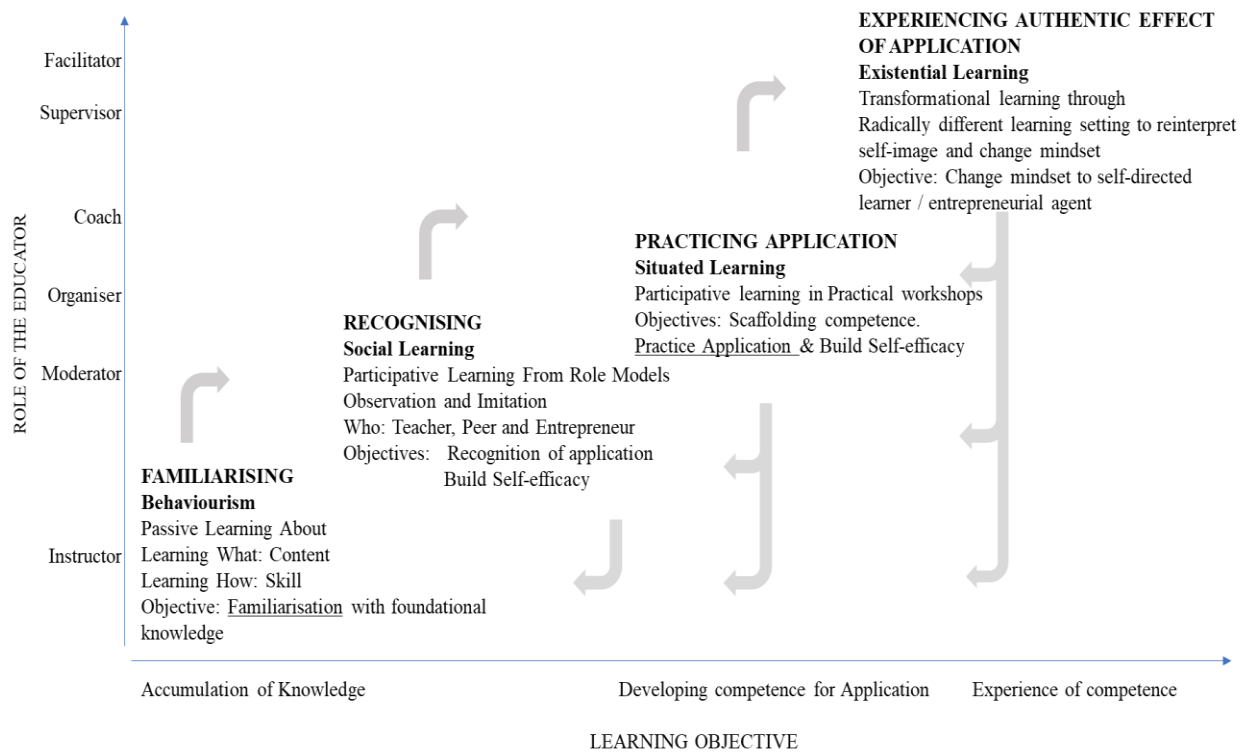
Contribution to Practice

To the practice of entrepreneurship education, the study contributes by proposing a practical teaching-learning framework for EE that links EE learning activities with teacher roles (table 4), in alignment with established educational theory (Fayolle and Gailly, 2008; Bechard and Gregoire, 2005). The proposed teaching-learning framework builds upon Robinson and colleagues (2016) proposed integration of teacher-led and student-centered learning approaches and aligns with Macht & Ball's (2016) authentic alignment framework, and Bell& Bell's (2020) proposed approach to experiential learning. It adds to these frameworks the proposition to implement all the various stages of the learning cycle within each phase of competence development, within each EE module.

TABLE 4
OPERATIONALIZATION OF PROPOSED EE-SDLR TEACHING LEARNING FRAMEWORK

Who for: Audience	Undergraduate students in formal (business) higher education				
For which results: ILOs	Self-Directed Lifelong Learning Competence development in International Business				
Category	**What: Content**	**How: Pedagogical Methods**	**Why: Learning Objectives**	**Teacher Role**	**Assessment**
Stage 1 - Familiarisation: Passive Learning (About) Entrepreneurship (Teacher-directed learning)	Pre-Classroom based generation of theoretical understanding of theme, topic, method and tool. Blended learning – ensure students enter stage 2 at equal level of cognitive understanding	Lectures, Direct instruction, Modelling (Guest lectures). Blended learning: recorded lectures to support theory to be studied; pre-lecture quizz to determine status-quo of students' level of understanding and need for further explanation	Scaffolding knowledge to frame what is to be learned. Developing cognitive framework to understand what and how knowledge about entrepreneurial topics, methods and tools are applied in real-life settings	Instructor, Expert	Oral or Written test; Explanation
Stage 2 - Recognition: Participative Learning (About) Entrepreneurship Active Learning (Teacher Moderated, Peer-directed learning)	Classroom based recognition of theoretical application in authentic settings. Testing ideas and concepts against reality	Tutorials, Case studies, debates, presentations, company visits, feasibility studies and research projects	Recognition of application in authentic settings, Learning how knowledge is to be applied. Promote interaction and engagement. Get students talking about and engaging with content	Tutor, Moderator	Debate, Presentation, Business Plan competition, Feasibility study, Research paper
Stage 3 - Practicing Application: Participative Learning (In & For) Entrepreneurship (Peer-directed learning)	Classroom based application of topics, methods and tools	Workshops, role play, drama problem solving exercises, simulations, competitions	Progressive skill development to enhance autonomous motivation. Promote practice of competence. Enhance confidence to execute competence in real-world	Organiser, Coach, Facilitator, Resource consultant	Plan of approach to application, pitch
Stage 4 - Experiencing Application: Existential Self-Driven Learning (Through) Entrepreneurship (Peer- and Self-directed learning)	Real-world experience with application of topics, methods and tools and Reflection	Authentic venture and/or value creation project tasks, Student based consulting programmes	Learning from experiencing consequences of actions and choices. Collaborative creation of value in confrontation with and application of required knowledge and skills. Discovery and pursuit of personal learning needs and goals.	Supervisor, Facilitator, Resource consultant, Participant	Reflection, Portfolio

LIMITATIONS AND FUTURE RESEARCH

The results of the research reflect only the collective experiences of one specific group of participants, reporting their experiences within the unique setting of participation in one unique EE module at one unique university. Another important limitation of this research is that it was conducted during the unique situation of the SARS-Cov-2 imposed lockdown of society. Repetition of the research with the same population under "normal" circumstances of campus-based teaching may result in different outcomes. Finally, the research was conducted for the provision of a professional doctorate and therefore a single-person research project. Important elements are likely to have been overlooked that would contribute to our enhanced understanding of the EE-SDLR relationship.

Even though the case study represents a very broadly applied version of EE, repetition of the research is recommended with similar student groups in similar EE modules at different universities and different educational levels to deepen and broaden our understanding of the EE-SDLR relationship.

REFERENCES

Aadland, T., & Aaboen, L. (2018). Systematising higher education: A typology of entrepreneurship education. *Entrepreneurship, Innovation and Education*. Edward Elgar Publishing.

Bacigalupo, M., Kampylis, P., Punie, Y., & Van den Brande, G. (2016). *EntreComp: The Entrepreneurship Competence Framework*. Luxembourg: Publication Office of the European Union; EUR 27939 EN. doi: 10.2791/593884

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist*, *28*, 117–148.

Béchard, J.P., & Grégoire, D. (2005). Entrepreneurship Education Research Revisited: The Case of Higher Education. *Academy of Management Learning & Education*, *4*(1), 22–43.

Beckers, J., Dolmans, D.H., Knapen, M.M., & van Merriënboer, J.J. (2018). Walking the tightrope with an e-portfolio: Imbalance between support and autonomy hampers self-directed learning. *Journal of Vocational Education & Training*, *71*(2), 260–288.

Bell, R., & Bell, H. (2020). Applying educational theory to develop a framework to support the delivery of experiential entrepreneurship education. *Journal of Small Business and Enterprise Development*, *27*(6), 987–1004.

Biggs, J.B. (1984). Differentiation of Learning Processes within Ability Groups. *Educational Psychology*, *4*(1), 21–39. DOI: 10.1080/0144341840040103

Bouchard, P. (2009). Pedagogy without a teacher: What are the limits? *International Journal of Self-Directed Learning*, *6*(2), 13–22. Retrieved from http://www.sdlglobal.com

Briner, M. (1999). *What is constructivism?* University of Colorado at Denver School of Education. Retrieved from https://curriculum.calstatela.edu/faculty/psparks/theorists/501const.htm

Brockett, R.G., & Hiemstra, R. (1991). A conceptual framework for understanding self-direction in adult learning. *Self-Direction in Adult Learning: Perspectives on Theory, Research, and Practice*. London and New York: Routledge. Retrieved from informal education archives: http://www.infed.org/archives/e-texts/hiemstra_self_direction.htm

Candy, P.C. (1991). *Self-Direction for Lifelong Learning*. San Francisco: Jossey-Bass Publishers.

Creswell, J.W., & Plano Clark, V.L. (2018). *Designing and Conducting Mixed Methods Research* (3rd Ed.). Thousand Oaks, CA: SAGE.

Danis, C. (1992). A unifying framework for data-based research into adult self-directed learning. In H.B. Long & Associates, *Self-directed learning: Application and research* (pp. 47–72). Norman: Oklahoma Research Center for Continuing Professional and Higher Education, University of Oklahoma.

Deci, E.L., & Ryan, R.M. (1991). A motivational approach to self: Integration in personality. In R. Dienstbier (Ed.), *Nebraska Symposium on Motivation* (Volume 38). *Perspectives on Motivation* (pp. 237–288). Lincoln: University of Nebraska Press.

Dick, W., & Carey, L.M. (1978, 1985, 1990, 1996). *The systematic design of instruction* (Eds.), (pp. 1–4.) New York: HarperCollins.

Doolan, M.A. (2013). A Pedagogical Framework for Collaborative Learning in a Social Blended E-Learning Context. *Increasing Student Engagement and Retention in e-learning Environments: Web 2.0 and Blended Learning Technologies*, *6*(G), 61–285.

Eccles, J.S. (2005). Subjective Task Value and the Eccles *et al*. Model of Achievement-Related Choices. In A.J. Elliot, & C.S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 105–121). Guilford Publications.

Eccles, J.S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. Annual Review of Psychology, *53*(1), 109–132. https://doi.org/10.1146/annurev.psych.53.100901.135153. In Schunk, D.H. (2009). *Learning theories*. Pearson International Edition, Prentice Hall Inc., New Jersey.

EPSC. (2016). The Future of Work, Skills and Resilience for a World of Change. *EPSC Strategic Notes*, (13). Retrieved from https://ec.europa.eu/epsc/sites/epsc/files/strategic_note_issue_13.pdf

European Commission. (2018a). *Learning never Stops.* Directorate-General for Employment, Social Affairs and Inclusion. Doi: 10.2767/65786.

European Commission. (2018b). *Council Recommendation on Key Competences for Lifelong Learning*. Official Journal of the European Union, (C189/01). Retrieved April 29, 2021, from https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018H0604(01)&from=EN

European Commission. (2021). Retrieved from https://ec.europa.eu/growth/smes/supporting-entrepreneurship/education_en

Fayolle A., & Gailly, B. (2008). From craft to science. Teaching models and learning processes in entrepreneurship education. *Journal of European Industrial Training*, *32*(7), 569–593.

Fayolle, A., Verzat, C., & Wapshott, R. (2016). In quest of legitimacy: The theoretical and methodological foundations of entrepreneurship education research. *International Small Business Journal*, *34*(7), 895–904. DOI: 10.1177/0266242616649250

Garrison, R. (1997). Self-Directed Learning: Toward a Comprehensive Model. *Adult Education Quarterly*, *48*(1), 18–33. DOI: 10.1177/074171369704800103

Gibbons, M. (2002). *The self-directed learning handbook: Challenging adolescent students to excel*. San Francisco, CA: Jossey-Bass.

Giddings, S. (2015). *Self-Directed Learning (SDL) in Higher Education: A Necessity for 21st Century Teaching and Learning*. Faculty of Education, partial publication of Doctoral Thesis, Brock University St. Catharines, Ontario.

Grow, G.O. (1991). Teaching Learners to be Self-Directed. *Adult Education Quarterly*, *41*(3), 125–149. Retrieved expanded version from http://ww.longleaf.net/ggrow

Guglielmino, L.M. (1977). Development of the self-directed learning readiness scale. (Doctoral dissertation, University of Georgia). *Dissertation Abstracts International*, *38*, 6467A.

Guglielmino, L.M. (2013). The case for promoting self-directed learning in formal educational institutions. *SA-eDUC*, *10*(2).

Hagg, G., & Gabrielsson, J. (2019). Systematic Literature Review of the Evolution of Pedagogy in Entrepreneurial Education Research. *International Journal of Entrepreneurial Behavior & Research*, *26*(5), 829–861.

Hase, S., & Kenyon, C. (2000). From andragogy to heutagogy. In *UltiBase Articles*. Retrieved from https://epubs.scu.edu.au/gcm_pubs/99/

Hendry, G.D., & Ginns, P. (2009). Readiness for self-directed learning: Validation of a new scale with medical students. *Med. Teach*, *31*, 918–920. doi: 10.3109/01421590802520899

Junior Achievement. (n.d.). *JA Worldwide*. Retrieved from https://www.jaworldwide.org/locations

Kamovich, U., & Foss, L. (2017). In Search of Alignment: A Review of Impact Studies in Entrepreneurship Education. *Education Research International*, pp 1–15.

Knowles, M.S. (1975). *Self-directed learning: A guide for learners and tutors*. Association Press, 291 Broadway, New York, New York 10007.

Knowles, M.S., Holton, E., & Swanson, R. (1998). *The Adult Learner* (5th Ed.). Houston, TX: Gulf Publishing.

Kolb, D.A. (1984). *Experiential learning: Experience as the source of learning and development* (Vol. 1). Englewood Cliffs, NJ: Prentice-Hall.

Lackéus, M., & Middleton, K.W. (2015). Venture creation programs: Bridging entrepreneurship education and technology transfer, *Education and Training*, *57*(1), 48–73.

Levy, J. (2018, August 22). *How AACSB Accreditation Encourages Experiential Learning*. Retrieved from https://capstonesource.com/aacsb-accreditation/

Long, H.B., & Agyekum, S.K. (1983). Guglielmino's Self-Directed Learning Readiness Scale: A Validation Study. *Higher Education*, *12*(1), 77–87.

Longva, K.K., & Foss, L., (2018). Measuring impact through experimental design in entrepreneurship education: A literature review and research agenda. *Industry and Higher Education*, *32*(6), 358–374.

Lopes, J.B., & Cunha, A.E. (2017). Self-directed professional development to improve effective teaching: Key points for a model, *Teaching and Teacher Education*, *68*, 262–274. doi:10.1016/j.tate.2017.09.009

Lorz, M., Sueller, S., & Volery, Th. (2013). Entrepreneurship Education: A Systematic Review of the Methods in Impact Studies. *Journal of Enterprising Culture*, *21*(02), 123–151.

Macht, S.A., & Ball, S. (2016). "Authentic Alignment" – A new framework of entrepreneurship Education. *Education + Training*, *58*(9), 926–944. https://doi.org/10.1108/ET-07-2015-0063

Martin, B.C., McNally, J.J., & Kay, M.J. (2013). Examining the formation of human capital in entrepreneurship: A meta-analysis of entrepreneurship education outcomes. *Journal of Business Venturing*, *28*(2), 211–224.

Merriam, S.B., Caffarella, R.S., & Baumgartner, L.M. (2007). *Learning in Adulthood. A comprehensive guide* (3rd ed.). San Francisco, CA: John Wiley & Sons, Inc.

Mezirow, J. (1990). How critical reflection triggers transformative learning. In J. Mezirow, & Associates (Eds.), *Fostering critical reflection in adulthood: A guide to transformative and emancipatory learning* (pp. 1–20). San Francisco: Jossey-Bass.

Mezirow, J. (2000). *Learning as transformation: Critical perspectives on a theory in progress.* San Francisco: Jossey-Bass.

Mocker, D.W., & Spear, G.E. (1982). Lifelong Learning: Formal, Non-Formal, Informal and Self-Directed. *The ERIC Clearinghouse on Adult, Career, and Vocational Education*. The National Center for Research in Vocational Education, Ohio State University.

Morris, T.H. (2019). Self-directed learning: A fundamental competence in a rapidly changing world. *International Review of Education*, *65*, 633–653.

Morris, T.H., & König, P.D. (2020). Self-directed experiential learning to meet ever-changing entrepreneurship demands. *Education + Training*, *63*(1), 23–49.

Mulcahy, D. (2019). Universities should be preparing students for the Gig Economy. *Harvard Business Review*. Retrieved from https://hbr.org/2019/10/universities-should-be-preparing-students-for-the-gig-economy

Mwasalwiba, E.S. (2010). Entrepreneurship Education A Review of Its Objectives, Teaching Methods and Impact Indictors. *Education and Training*, *52*, 20–47.

Nabi, G., Linan, F. Fayolle, A., Norris, K., & Walmsley, A. (2017). The impact of entrepreneurship education in higher education: A systematic review and research agenda. *Academy of Management Learning & Education*, *16*(2), 277–299.

O'Shea, E.A. (2003). Self-directed learning in nurse education: A review of the literature. *Journal of Advanced Nursing*, *43*, 42–70. doi: 10.1046/j.1365-2648.2003.02673.x

Oddi, L.F. (1986). Development and validation of an instrument to identify self-directed continuing learners. *Adult Education Quarterly*, *36*(2), 97–107.

OECD. (2017). *In-Depth Analysis of the Labour Market Relevance and Outcomes of Higher Education Systems: Analytical Framework and Country Practices Report, Enhancing Higher Education System Performance*. OECD, Paris.

OECD. (2020). *Education at a Glance 2020: OECD Indicators*. OECD Publishing, Paris. https://doi.org/10.1787/69096873-en

Oosterbeek, H., van Praag, M., & Ijsselstein, A. (2010). The impact of entrepreneurship education on entrepreneurship skills and motivation. *European Economic Review*, *54*(3), 442–545.

Pintrich, P.R., & Schunk, D.H. (2002). *Motivation in Education: Theory, research, and applications* (2nd Ed.). Upper Saddle River, NJ: Merrill/Prentice Hall.

Politis, D. (2005). *Entrepreneurship, career experience and learning: Developing our understanding of entrepreneurship as an experiential learning process*. Doktorsavhandling, Ekonmihögskolan vid Lunds Universitet.

Robinson, S., Neergaard, H., Tanggaard, L., & Krueger, N.F. (2016). New horizons in entrepreneurship education: From teacher-led to student-centered learning. *Education + Training*, *58*(7/8), 661–683.

Sawatsky, A.P., Ratelle, J.T., Bonnes, S.L., Egginton, J.S., & Beckman, T.J. (2017). A model of self-directed learning in internal medicine residency: A qualitative study using grounded theory. *BMC Medical Education*, *17*, Art. 227.

Schunk, D.H. (2009). *Learning theories*. Pearson International Edition, Prentice Hall Inc., New Jersey.

Shen, W., Chen, H., & Hu, Y. (2014). The validity and reliability of the self-directed learning instrument (SDLI) in mainland Chinese nursing students. *BMC Medical Education*, *14*(108). DOI:10.1186/1472-6920-14-108

Spencer, J.A., & Jordan, R.K. (1999). Learner centred approaches in medical education. *BMJ (Clinical Research Ed.)*, *318*(7193), 1280–1283. https://doi.org/10.1136/bmj.318.7193.1280

Stockdale, S.L., & Brockett, R.G. (2011). Development of the PRO-SDLS: A Measure of Self-Direction in Learning Based on the Personal Responsibility Orientation Model. *Adult Education Quarterly*, 61. DOI: 10.1177/0741713610380447

Telkkol, I.A., & Demirel, M. (2018). An Investigation of Self-Directed Learning Skills of Undergraduate Students. *Frontiers in Psychology*, *9*, 23–24.

Thompson, J. (2000). Emancipatory learning. *NIACE Briefing Sheet*, *11*.

Timmermans, A.N. (2022). *Preparing Undergraduate Students for Lifelong Learning, Lessons learned from Entrepreneurship Education*. Doctoral thesis, Northumbria University, Newcastle, UK. Retrieved from https://nrl.northumbria.ac.uk/id/eprint/50143/

Tseng, C. (2013). Connecting self-directed learning with entrepreneurial learning to entrepreneurial Performance. *International Journal of Entrepreneurial Behavior and Research*, *19*(4), 425–446.

World Economic Forum (WEF). (2018). *The Future of Jobs Report*. Centre for the New Economy and Society, WEF, Geneva, Switzerland. Retrieved from http://www3.weforum.org/docs/WEF_Future_of_Jobs_2018.pdf