*International Journal of Learning, Teaching and Educational Research*
*Vol. 24, No. 10, pp. 254-278, October 2025*
*https://doi.org/10.26803/ijlter.24.10.12*
*Received Jun 20, 2025; Revised Aug 14, 2025; Accepted Sept 10, 2025*

# Fostering Entrepreneurial Learning through Authentic Assessment in a Self-Directed Learning Environment: A Systematic Literature Review

**Effiness Harawa Kamanga*** **and Danél Kruger**
North-West University
Potchefstroom, South Africa

**Abstract**. Entrepreneurial learning fosters value creation beyond traditional business-orientated aims but remains underdeveloped in South African schools. With rising youth unemployment and dropout rates, there is a need for alternative strategies to equip learners for success in business and life. Self-directed learning promotes autonomy and the skill sets required for entrepreneurial learning, while authentic assessment connects learning to the needs of the community and workplace. However, there is scant research that explores the way the practice of authentic assessment in self-directed learning environments can support entrepreneurial learning. This systematic literature review explores how entrepreneurial learning can be fostered through authentic assessment in self-directed learning environments in South African secondary schools. Inclusion criteria were used to select existing literature on authentic assessment, self-directed learning and entrepreneurial learning and examine it to map out key processes for implementing authentic assessment in self-directed learning environments that teachers can use as a guide to foster entrepreneurial learning. After completing the literature search and screening process, 23 studies were analysed using a thematic synthesis approach. The findings identified key design principles that provide a conceptual basis for integrating authentic assessment practices into self-directed learning to foster entrepreneurial learning that is applicable across various secondary school subject areas.

**Keywords:** assessment; authentic assessment; entrepreneurial learning; self-directed learning.

## 1. Introduction

Globally, entrepreneurship education has become a central topic owing to its potential to improve the social and economic development of underprivileged communities (Boldureanu et al., 2020). Entrepreneurship education is a process

*Corresponding author: Effiness Harawa Kamanga; *Effiness.Kamanga@nwu.ac.za*

aimed at strengthening independent business protagonists (entrepreneurs) with a value orientation towards a sustainable society (Lindner, 2018). Although entrepreneurship education has traditionally been rooted in an economically driven and business-orientated domain, recent literature highlights the importance of entrepreneurial learning (EL) as a tool for value creation, rather than focusing solely on business creation or self-employment (Du Toit, 2023; Fejes et al., 2019). EL is a process that aims to create proactive and self-reliant individuals capable of transforming ideas into actions (Morselli & Morselli, 2019). The main benefit of investing in EL is that it can equip learners with the entrepreneurial skills, attributes, knowledge and mindset that enable success in business and life in general (Du Toit & Kempen, 2020).

In the South African school context, EL is, however, underdeveloped; moreover, teachers may lack the knowledge and skills to implement it across different school subjects (Du Toit & Kempen, 2020). A problem identified in the literature on EL is the need for research on effective instructional design to achieve the expected EL outcomes (Morselli & Morselli, 2019). The outcomes of EL include proactive, exploratory and collaborative learning behaviours (Nogueira, 2019). The current research attempts to address, at least partially, the recommendation of Du Toit and Kempen (2020) that pedagogical guidance is needed to support teachers to ensure that the outcomes intended for EL in each school can be realised.

An appropriate instructional design can provide pedagogical guidance for this endeavour. Among the challenges faced in the South African secondary school context is the increasing school dropout rate among Grade 10 and 11 learners. Approximately 50% of the learners in any given cohort drop out before Grade 12 (Runhare et al., 2021). Grade 12 is the exit level of formal schooling in South Africa, which means that more than half of all learners entering Grade R (the year before Grade 1) do not complete their formal schooling.

Approximately 10.3 million young people in South Africa did not engage in employment, education or training in the final quarter of 2024 (Statistics South Africa, 2024). This number represents approximately 43.9% of the population aged 15 to 24 years. The rate of non-participation in employment, education or training increases every year; this group represents individuals who have withdrawn from the labour market and are not enhancing their skills base through education and training (Statistics South Africa, 2024).

Various national and international studies have been conducted on the profile and needs of this group of people and have found that most of the individuals in this group have not obtained a matric qualification (De Lannoy & Mudiriza, 2019). This finding can be linked to the effects of the high dropout rate among South African learners. Various interventions have been proposed for people who do not participate in employment, education or training, including promoting access to quality education (De Lannoy & Mudiriza, 2019) and providing entrepreneurial opportunities to enhance self-efficacy and learner motivation (Matli & Ngoepe, 2021).

A self-directed learning (SDL) environment offers the benefit of increasing learner motivation (Zhu et al., 2020), thereby providing a promising avenue for curbing learner dropout in secondary schools in South Africa. SDL is a purposeful endeavour that fosters personal growth, autonomy, sound decision-making and responsibility (Brandt, 2020). SDL environments enable learners to solve problems, be innovative and realise their potential (Brandt 2020). Focusing on instructional design, where EL is viewed as a value creation learning process, can encourage learners to take greater ownership of their learning – an attribute directly associated with SDL (Du Toit, 2023).

SDL is crucial for equipping individuals with skills that will enable them to adapt to and thrive in a rapidly changing world (Brandt, 2020; Lãma, 2021). Moreover, an SDL environment has the potential to promote a learner's intellectual development, leading to improved cognitive quality of life for better thinking skills (Din et al., 2016). SDL environments can also equip learners more adequately for higher education, employment and life in general (Bolhuis & Voeten, 2001), which is a goal advocated by EL.

Authentic assessment (AA), as part of instructional design, plays an important part in improving learners' SDL skills to learn on their own (Olivier, 2021). The concept of AA has its historical foundations in the work of Wiggins (2011). It involves engaging learners in applying their skills and knowledge to solve real-life problems, making the activity and its assessment more authentic (Lund, 1997). AA grew out of the need to move away from traditional assessment practices that emphasise rote learning and objective testing, which are recognised as inadequate for preparing learners for the world of work (DiMartino et al., 2007; Litchfield & Dempsey, 2015).

It provides learners with opportunities to learn directly through the assessment process, rather than using it solely to evaluate the result of teaching and learning (Azim & Khan, 2012; Brown, 2015). Moreover, AA seeks to imitate the duties and performance standards commonly encountered in the professional realm (Villarroel et al., 2018), thereby aligning learners' school preparation better with the requirements of the world of work.

Although the number of studies focusing on AA in fostering EL outcomes is on the rise, research into the role of AA within SDL environments in fostering EL outcomes for secondary school learners remains limited. For instance, Kusdiyanti et al. (2023) examined AA through the lens of case-based learning to enhance the economic literacy and self-efficacy of students in vocational schools. Similarly, Welsandt et al. (2024) developed a technology-based AA instrument to survey economic literacy from the eighth grade in German federal state schools, which is geared towards the subject of economics. In another example, AA has been applied in challenge-based learning to evaluate engineering students' 21st-century skills related to innovation and EL (Scroccaro et al., 2025). While these studies highlight the value of incorporating design features such as case-based learning, technology and challenge-based learning to support the implementation of AA in fostering EL, their focus remains confined mainly to economics- and

engineering-related subjects (Kusdiyanti et al., 2023; Scroccaro et al., 2025; Welsandt et al., 2024). Consequently, these design features provide insufficient guidance for designing AA approaches that address a broader range of EL outcomes that can be applied across various school subjects.

Considering the discussion above, the present study contributes by providing insight into AA within the SDL environment as an instructional design appropriate for providing pedagogical guidance to foster EL in South African secondary schools. The existing literature demonstrates that the roles of educators and SDL enhance entrepreneurial endeavours through a constructivist learning environment (Ngah et al., 2019). However, a practical understanding of the way AA within SDL environments can be applied in the South African secondary school context to foster EL remains underdeveloped. To address this research gap, the following secondary research questions were posed:

- What are the expected EL outcomes applicable to South African secondary schools?
- What are the characteristics of the South African secondary school SDL environment?
- What are the characteristics of AA and the processes for implementing it in the SDL environment of South African secondary schools?

## 2. Theoretical framework

The research is underpinned by a social constructivist learning perspective. The social constructivist learning theory is based on the seminal work of Lev Vygotsky in 1968. The theoretical underpinnings of the social constructivist learning theory emphasise the interaction between learners and their environments, where mediation is viewed as the central mechanism driving development and learning (Saleem et al., 2021). In SDL environments, teachers are expected to implement learner-centred instructional teaching–learning strategies, such as role play, cooperative learning, problem-based learning, debates and project-based learning, to promote learners' SDL skills (Golightly, 2018; Larson et al., 2020; Mentz & Van Zyl, 2018).

One potential hindrance to fostering SDL skills in the South African secondary school context is teachers' preference for and use of teacher-centred approaches, which are based on the behaviourist view of learning and do not leave room for SDL (Johnson & Van Wyk, 2016). Instead, a social constructivist view of learning facilitates the application of skills in SDL environments, promoting SDL skills (Lubbe & Mentz, 2021). This alignment is the result of the pedagogical foundations of an SDL environment, which are congruent with a social constructivist approach, where knowledge construction and meaning making occur through collaborative engagement in activities (Lubbe & Mentz, 2021).

The goal of EL is to develop strong self-regulated students who can face uncertainty and solve societal problems (Hägg & Kurczewska, 2022). Self-directed learners can enhance their skills to address the evolving challenges and demands they encounter, sustaining the competence needed to react and adapt to problems

and make the most of opportunities that arise, which is essential for entrepreneurship (Morris & König, 2020). SDL and EL have a reciprocal relationship, as individuals need to take the initiative to pursue opportunities in a contextualised learning environment (Hägg & Kurczewska, 2022; Timmermans, 2023). Such a learning environment can be created through AA, which is positioned within the social constructivist learning perspective.

## 3. Methodology

The section below discusses the research methodology according to various components.

### 3.1 Systematic literature review

Literature reviews are designed to provide an evaluation of the existing research, and not just a mere description of previous research (Li & Wang, 2018). A systematic literature review facilitates the exploration of relevant existing literature based on clearly defined criteria and guided by specific research questions (Mengist et al., 2020). For this research, a systematic literature review was suitable, as it facilitated a comprehensive examination of the existing knowledge of AA, SDL and EL. This approach enables the critical evaluation and integration of various research domains, which may be challenging to accomplish through singular empirical methods, such as qualitative, quantitative or mixed-method studies (Kraus et al., 2020). A systematic literature review was conducted following the guidelines proposed by Cabrera et al. (2023).

### 3.2 Selection criteria

Our research included papers published from 2000 to 2024, as this timeframe was expected to ensure the review encompassed recent advancements and current perspectives on SDL, AA and EL, while also integrating foundational studies that had influenced the field, as explained by Xiao and Watson (2019). The selection of a time parameter that limits the review to the past two decades ensures relevance, methodological consistency and applicability to contemporary research and practice (Cabrera et al., 2023).

Previous studies may be cited for historical context or theoretical foundations; however, the emphasis is on recent peer-reviewed literature. The inclusion criteria employed in this review are as follows: publications in the English language for accessibility; publications on EL, SDL and AA that are relevant to the research questions and are available through open-access peer-reviewed journals; and empirical or non-empirical studies. Conversely, the research excluded publications that were not in English, as well as non-peer-reviewed journals publishing work on EL, SDL and AA or work that was not relevant to the research questions.

### 3.3 Literature search

The reviewed publications were retrieved from multiple databases, such as Google Scholar, Scopus, ERIC, Web of Science, EBSCOhost and PsycINFO. Diverse databases were used to ensure that studies fitting within the scope of the

search were not omitted, thereby allowing for a rich and integrative synthesis (see Cabrera et al., 2023). The Boolean operators used during the initial search were "AND" and "OR", with the following terms searched for: "entrepreneurship education" OR "entrepreneurial learning" OR "entrepreneurial learning outcomes" OR "entrepreneurial mindset" OR "self-directed learning" OR "authentic assessment".

These search terms were also coupled with "South Africa" OR "secondary education" and synonyms such as "high school", given that Du Toit and Kempen (2020) indicate that the South African Curriculum and Assessment Policy Statement (CAPS) document lacks explicit elaboration on the outcomes of EL. The findings from the comprehensive literature review on EL, SDL and AA are discussed next, with a focus on their implications for the South African secondary school context.

**3.4 Quality assessment criteria**

To ensure an unbiased selection of sample studies, we engaged an independent peer researcher to screen and verify the alignment of the selected studies with the research questions, as suggested by Kraus et al. (2020). The adopted systematic literature review process involved identifying the main thrust or key points from each piece of literature selected in the review, which resulted in an overview of or partial insight into the issues under scrutiny (see Cabrera et al., 2023). Consequently, we used a PRISMA flowchart to check and report on the comprehensive quality of the process employed in the systematic literature review. The PRISMA flowchart is shown in Figure 1.

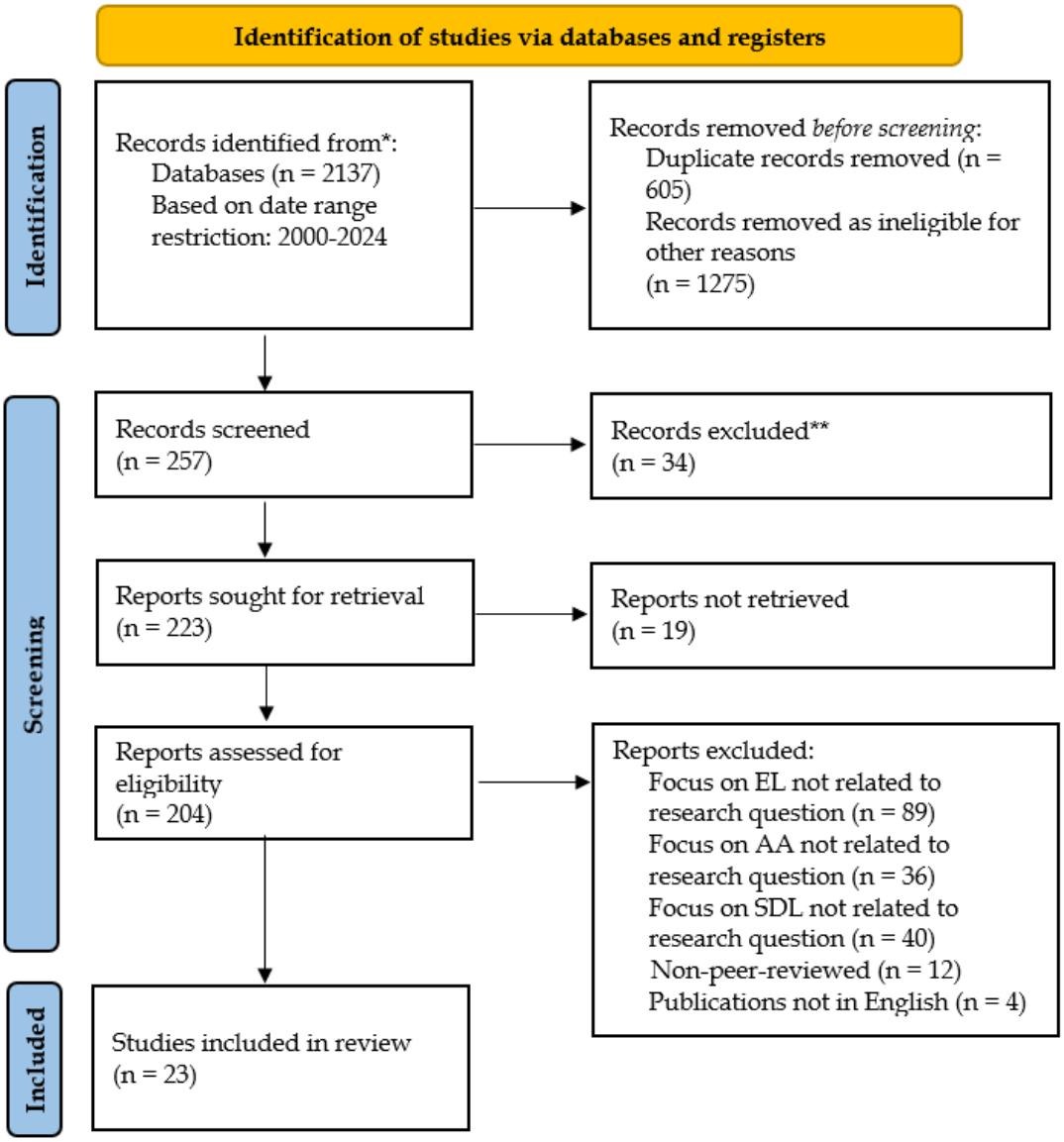


**Figure 1: PRISMA flow diagram of the systematic literature review process**

### 3.5 Data analysis and reporting of review

The extracted data were analysed using thematic coding. This involved organising large amounts of information obtained by studying each publication to facilitate comprehension through the categorisation of information into prevalent themes across the reviewed literature (see Cabrera et al., 2023). A potential challenge in generating themes during a systematic literature review is the risk of personal interpretation that may influence the identification of themes.

To mitigate this challenge, our process of generating themes involved identifying descriptors from the selected studies that were relevant to the research questions and presenting them in a tabular format, which included evidence from the literature source. The descriptors from the sample studies were organised by placing the literature sources with similar recurring items close to one another, which were grouped into subthemes, which were further characterised by assigning the collective subthemes to a thematic code, as described by Cabrera et

al. (2023). Based on the findings, we developed a conceptual framework for fostering EL through AA in an SDL environment. The conceptual framework is shown in Figure 2.

## 4. Results and interpretation

This section begins with a description of the expected EL outcomes applicable to the South African secondary school context. After that, the characteristics and processes of an SDL environment applicable to South African secondary schools and the characteristics and processes for implementing AA in an SDL environment applicable to the South African context are described.

### 4.1 Outcomes of entrepreneurial learning for secondary school education in South Africa

In the South African education curriculum, the outcomes of EL have not yet been defined explicitly, as entrepreneurship is featured in a fragmented and limited form, according to Du Toit (2023). The literature shows that developing an entrepreneurial mindset is a feature of EL outcomes (e.g. Kuratko et al., 2021; Santos et al., 2019). Moreover, Du Toit (2023) advocates an alternative way to construct and expand EL by developing an EL mindset. Considering this evidence, the concept of an entrepreneurial mindset offers a promising avenue for determining relevant EL outcomes relevant to secondary school education in South Africa. An entrepreneurial mindset can be described as the mental perspective that precedes one's actions and feeds one's emotions, allowing one to be innovative.

Table 1 presents themes that represent features of an entrepreneurial mindset, aligned with the aim of EL. Through this synthesis, a broader scope of EL outcomes that can be applied to secondary school education in South Africa was obtained.

**Table 1: Themes representing features of an entrepreneurial mindset that align with the aim of EL**

| Theme | Descriptors from sample studies | Sample studies |
|---|---|---|
| Features of a skills-based and behavioural entrepreneurial mindset | Ability to self-regulate by setting personal goals.<br><br>Creativity and innovative approaches, motivation, tenacity, resilience, acceptance of failure and curiosity.<br>Capability to perceive, respond and organise information swiftly in reaction to an evaluative decision amid uncertainty regarding a potential chance for advantage.<br>Collaborating in a team setting, applying critical and creative thinking and communication skills.<br>Autonomous, initiative-driven, inventive, competitive, risk-taking behaviours and the pursuit of optimal prospects through methodical, synchronised and concentrated implementation. | Larsen and Neergaard (2024)<br>Nadelson et al. (2018)<br>Kuratko et al. (2021)<br><br>Kleine and Yoder (2011)<br>Pidduck et al. (2023) |
| Features of an affective | Being motivated. | Nadelson et al. (2018) |

| | | |
|---|---|---|
| entrepreneurial mindset | Having compassion or concern for others and curiosity and openness towards others and being motivated to learn and acquire new knowledge and skills.<br>Persisting through and learning from failure, demonstrating voluntary social responsibility. | Larsen and Neergaard (2024)<br><br>Kleine and Yoder (2011) |
| Features of a cognitive entrepreneurial mindset | The ability to regulate one's thought processes in response to a fluctuating and unpredictable task environment, i.e. cognitive adaptability.<br>Perceived controllability and a growth mindset embody the conviction that human traits are adaptable and can be cultivated via effort, learning and skills enhancement and believing in one's capacity to accomplish tasks. | Kuratko et al. (2021)<br><br>Larsen and Neergaard (2024) |

The findings show that an entrepreneurial mindset is a multilayered construct (see Table 1) that can be summarised into three themes: features of a skills-based or behavioural entrepreneurial mindset; features of an affective entrepreneurial mindset; and features of a cognitive entrepreneurial mindset. The features of an entrepreneurial mindset shown in Table 1 represent the way EL is understood in the literature, which involves a combination of skills, motives and thought processes. The manifestation of these three entrepreneurial mindsets in secondary schools in South Africa necessitates a critical engagement with the guidelines stipulated in the CAPS. The CAPS document guides teaching, learning and assessments within the South African education system (Maharajh et al., 2016) and is based on the following principles (Department of Basic Education [DBE], 2011):

- social transformation
- active and critical learning
- high knowledge and high skills
- human rights
- inclusivity
- environmental and social justice
- valuing indigenous knowledge systems

These principles are generic and applicable across different subjects or disciplines and grade levels. However, the focus of this research is on subjects in the secondary school context. The alignment between the features of an entrepreneurial mindset and the CAPS document is implicit in the CAPS principles, which focus on indigenous knowledge systems and environmental and social justice (DBE, 2011), overlapping with the purpose of cultural, environmental and social value creation in EL (Du Toit, 2023). The CAPS principles related to the focus on value creation in EL provide teachers with guidance to align learners' development of the features of an entrepreneurial mindset, preparing them for life and work after school.

Teachers often face challenges in implementing the CAPS principles (Sepadi & Molapo, 2024), which also extend to those principles that align with the purpose of value creation in EL for promoting the features of an entrepreneurial mindset (Du Toit & Kempen, 2020). However, conceptualising EL as a process involving

observable actions that demonstrate proactive, collaborative and exploratory EL behaviours can address this concern (Nogueira, 2019). We suggest that using the three types of EL behaviour indicated by Nogueira (2019) can provide structure, enabling the researcher to organise and translate the identified features of an entrepreneurial mindset into EL outcomes that are relevant to South African learners. The features of an entrepreneurial mindset (shown in Table 1) have been translated into EL outcomes based on the conceptualisation of the EL behaviours proposed by Nogueira (2019) and in alignment with the CAPS principles. The EL outcomes described below can, therefore, serve as a potential guide for secondary school teachers in South Africa when implementing EL.

*4.1.1 Outcomes of proactive entrepreneurial learning*

The outcomes of proactive EL comprise learner behaviours and entrepreneurial mindsets that are future-orientated and support change and innovation (Nogueira, 2019). These outcomes include the following: the capacity to perceive, respond and organise information swiftly in reaction to an evaluative decision amid uncertainty over a potential chance for advantage (Kleine & Yoder, 2011); being motivated, creative, innovative and curious (Nadelson et al., 2018); having a growth mindset (Larsen & Neergaard, 2024); and the capacity to be adaptive, versatile and self-regulating in one's thought processes (Kuratko et al., 2021).

Based on the conceptual similarities, these features of an entrepreneurial mindset can lead to outcomes associated with proactive EL learner behaviours, as they align with future-orientated characteristics that support change and innovation. Moreover, the identified features of an entrepreneurial mindset that align with proactive EL behaviours are regarded as essential to guarantee that learners acquire and use knowledge and skills in ways that are significant to their own lives, as stipulated in the CAPS (DBE, 2011).

*4.1.2 Outcomes of collaborative entrepreneurial learning*

The outcomes of collaborative EL involve behaviours related to engagement with others in the learning process (Nogueira, 2019). This aspect coincides with the following identified features of an entrepreneurial mindset: communication skills and the ability to collaborate in a team setting (Kleine & Yoder, 2011); empathy, compassion or concern for others, and curiosity and openness towards others (Larsen & Neergaard, 2024); and demonstrating voluntary social responsibility (Kleine & Yoder, 2011).

Demonstrating social responsibility can be linked to social value creation in EL, which requires the application of innovation to enhance or address social issues or opportunities that benefit both the learner and community members (Du Toit, 2023). Overall, the features of an entrepreneurial mindset that align with collaborative EL behaviours are also fundamental to the CAPS, which aims to cultivate learners capable of functioning independently and collaboratively as team members and organising and managing themselves and their activities with responsibility and efficacy (DBE, 2011).

*4.1.3 Outcomes of exploratory entrepreneurial learning*

The outcomes of exploratory EL involve learner actions related to discovering new knowledge and the acquisition of skills (Nogueira, 2019). These outcomes coincide with the following identified features of an entrepreneurial mindset: taking risks and being autonomous, innovative, competitive, disciplined, coordinated and focused on execution to find the best possibilities (Pidduck et al., 2023); applying critical-thinking and problem-solving skills (Larsen & Neergaard, 2024); and being persistent and learning through failure (Kleine & Yoder, 2011).

These outcomes of exploratory EL align with the CAPS value of promoting an active and critical approach to learning, as opposed to rote and uncritical acceptance of established truths (DBE, 2011). These three outcomes of EL (proactive, collaborative and exploratory) are highly relevant to South African education, involving a range of skills, motives and mental processes that can be fostered in relation to EL, with value creation as a result (Du Toit, 2023). Facilitating the cultivation of these skills, motives and thought processes requires a learning environment that enables experimentation, collaboration, creativity and autonomy, in which teachers assume the role of facilitators (Du Toit, 2023; Lindberg et al., 2017). A similar stance is adopted in our research. Next, SDL environments are discussed.

**4.2 Self-directed learning environments in South African secondary schools**

A holistic understanding of the key characteristics and procedural requirements of SDL environments is necessary to provide pedagogical guidance that supports teachers in implementing SDL appropriately to facilitate EL using AA. SDL environments provide learners with opportunities to solve problems, be innovative and realise their potential (Brandt, 2020). However, the way learners in South Africa respond to SDL environments poses a unique challenge. For instance, learners may face a sense-making paradox: while the nature of SDL requires them to use deep-level thinking skills to process information sources meaningfully, they often lack the necessary knowledge to engage deeply with information sources and analyse them to gain understanding (Butcher & Sumner, 2011).

To mitigate this sense-making paradox in SDL, teachers should have a deeper understanding of what SDL, and its processes entail in order to scaffold SDL for learners (Robinson & Persky, 2020). Tables 2a and 2b provide a synopsis of the themes from the systematic literature review that describe the key characteristics and processes of SDL environments.

**Table 2(a): Themes and subthemes representing key characteristics and processes of SDL environments**

| Theme | Subtheme | Descriptors from sample studies | Sample studies |
|---|---|---|---|
| **SDL environments involve active learning processes with shared responsibilities that are goal-orientated** | Teachers' roles in SDL environments | Instructors should first comprehend what SDL entails and what the key components of facilitating SDL are. | Robinson and Persky (2020) |
| | | Instructors should scaffold SDL and create learning experiences that enable learners to determine the information in which they wish to attain proficiency. | Robinson and Persky (2020) |
| | | Teachers should encourage learners' SDL processes at every stage and foster SDL competence. | Morris (2019) |
| | | Teachers should provide support to learners in identifying their learning objectives, facilitating the process of learning towards those objectives and reflecting on past processes. | Schweder and Raufelder (2022) |
| | Learners' roles in SDL environments | Active learning, where the learner engages in decision-making concerning many elements of the learning experience. | Din et al. (2016) |
| | | Learners engage in decision-making regarding various elements of the learning experience through active learning. Collaboration and interaction among peers. | Din et al. (2016) |
| | Learning resources and strategies that support SDL | Learning materials should be clear and | Din et al. (2016) |

| | | | |
|---|---|---|---|
| | | provide precise instructions.<br>Reflection reports and digital portfolios.<br>The use of technology for learning.<br>Self-assessment, authentic assessment and guided participation.<br>Flipped classrooms, inquiry-based learning, learning contracts and problem-based learning | Kicken et al. (2009)<br>Din et al. (2016)<br>Jagals (2021)<br>Robinson and Persky (2020) |

**Table 2(b): Themes and subthemes representing key characteristics and processes of SDL environments**

| Theme | Subtheme | Descriptors from sample studies | Sample studies |
|---|---|---|---|
| **An SDL environment fosters SDL skills, abilities, attitudes and characteristics, which, in turn, increase the capacity for SDL** | SDL skills and abilities fostered in an SDL environment | Identifying learning needs, articulating educational outcomes clearly, selecting learning resources, choosing and executing suitable learning strategies and evaluating learning objectives.<br>The acquisition of SDL skills, including the capacity to evaluate one's own learning, identify personal learning needs and determine future learning objectives.<br>Problem-solving skills, collaboration and communication.<br>Developing and implementing learning objectives and reflecting on learning processes. | Ayyildiz and Tarhan (2015)<br>Kicken et al. (2009)<br>Robinson and Persky (2020)<br>Schweder and Raufelder (2022) |
| | SDL attitudes fostered in an SDL environment | Self-awareness, innovation and professionalism.<br>Learners should maintain a positive, independent, strategic and goal-orientated attitude and continued interest. | Robinson and Persky (2020)<br>Chen et al., (2022)<br>Ayyildiz and Tarhan (2015) |

| | | | |
|---|---|---|---|
| | | Internal and external motivation and eagerness to learn. | |
| | SDL characteristics fostered in an SDL environment | Learner is motivated, independent, disciplined and confident.<br>Learners actively construct knowledge, monitor and adjust their learning, achieve self-determined objectives and connect individuals, contexts and performance.<br>Learners should engage in problem-solving, critical thinking, lifelong learning and resource identification and take responsibility for their learning. | Ayyildiz and Tarhan (2015)<br><br>Chen et al. (2022)<br><br>Du Toit-Brits and Van Zyl (2017) |

The findings from the systematic review of the literature indicate that the SDL environment demonstrates a reciprocal relationship between the various process aspects of SDL (see Table 2a) and the characteristics of the SDL environment (see Table 2b), as evidenced by overlapping concepts. The process aspects of SDL and the characteristics or features of SDL are represented by two identified themes. First, the SDL environment encompasses an active learning process characterised by shared responsibilities and goal orientation.

Second, the SDL environment promotes the development of SDL skills, abilities, attitudes and characteristics, thereby enhancing the capacity for SDL. The intersection of the two themes implies that learners must possess SDL skills, attitudes, abilities and characteristics to enhance the process-orientated nature of SDL environments. Moreover, the inherent processes of SDL environments should cultivate the skills, abilities, attitudes and characteristics of SDL (Din et al., 2016). Consequently, the interplay between the SDL process aspects and the characteristic of SDL shapes the SDL environment.

### 4.3 Authentic assessment in self-directed learning environments in South African secondary schools

Through assessment practices, teachers can determine the extent to which learning has been achieved (Gunness et al., 2021). AA is rooted in assessment practices that rely on meaningful and precise learning outcomes associated with real-world tasks (Brown, 2015). Table 3 summarises the key characteristics of AA and the processes for facilitating it that emerged from the systematic literature review.

**Table 3: Themes representing key characteristics and processes of AA**

| Theme | Descriptors from sample studies | Sample studies |
|---|---|---|
| **Establishing what constitutes an AA task** | Identification of intended learning goals that align with the given task. | Murphy et al. (2017) |
| | Defining the context of assessment. | Frey et al. (2012) |
| | Must encompass advanced cognitive abilities and analytical problem-solving skills. | Moria et al. (2017) |
| | Requires learners to perform, create and produce a product or action. | Moria et al. (2017) |
| | Makes use of real-world contexts or simulations. | Moria et al. (2017) |
| | Makes use of tasks that represent meaningful teaching and learning activities. | Grant et al. (2021) |
| | AA should present a level of challenge. | Grant et al. (2021) |
| | The result should manifest as a performance or product. | Grant et al. (2021) |
| | Should foster the process and the transfer of knowledge from theory to practice and across learning contexts. | Grant et al. (2021) |
| **Establishing collaborative learning interactions** | Initiating and facilitating dialogue and communication between learners and educators. | Murphy et al. (2017) |
| | Should clearly describe learner roles. | Frey et al. (2012) |
| | Learners working collaboratively. | Moria et al. (2017) |
| | Should be non-intrusive, extending the daily classroom activity. | Grant et al. (2021) |
| **Establishing assessment criteria aligned with real-world situations** | Creation of rubrics and marking criteria. | Murphy et al. (2017) |
| | Scoring of learning outcome. | Frey et al. (2012) |
| | Execution of assessment criteria and interpretation of results. | Murphy et al. (2017) |
| | Criteria to assess learners' performance or products should align with measures employed in a real-world setting. | Grant et al. (2021) |
| **AA should make provision for feedback and reflection** | Evaluation of and reflection on the results. | Murphy et al. (2017) |
| | | Moria et al. (2017) |

| | | |
|---|---|---|
| | Should provide information about learners' strengths and weaknesses.<br>Facilitates opportunities for reflection on learning processes and the discussion of feedback. | Grant et al. (2021) |

Four themes have been identified as key characteristics and processes of AA (see Table 3). Next, each theme is discussed.

*4.3.1 Establishing what constitutes an authentic assessment task*

The theme "establishing what constitutes an AA task" (see Table 3) highlights aspects that constitute an AA task. AA tasks are commonly designed to be challenging and foster the transfer of knowledge (Grant et al., 2021). In addition, AA tasks should require learners to create a product or perform an action based on a real-world context or simulation (Moria et al., 2017). When designing an AA task, it is essential to align the intended learning goals with the given task (Murphy et al., 2017). Such alignment can be achieved by ensuring the task is grounded in real-world, performance-based and cognitively challenging scenarios (Frey et al., 2012).

Consequently, when designing AA tasks within an SDL environment, learners should be included in the processes of identifying issues from their real-life contexts and planning how to solve them (Azim & Khan, 2012). In doing so, learners will be driven by the need to produce value for not only their personal lives but also their community, which reflects the broader aspect of social value creation of EL that is needed in South Africa (Du Toit, 2023).

In South African secondary schools, AA requires tasks that mirror real-world challenges pertinent to learners lived experiences (DiMartino et al., 2007). Considering the socio-economic diversity and local challenges, including unemployment and inequality (Du Toit & Kemp, 2020), AA may emphasise meaningful problem-solving activities, such as proposing solutions to community-based issues or formulating business ideas that address local needs (Du Toit, 2023). Involving secondary school learners in identifying pertinent issues can foster social responsibility and guarantee that the learning experience transcends theoretical knowledge to achieve practical societal outcomes, aligning with the CAPS objectives of promoting critical thinking and active citizenship (DBE, 2011).

*4.3.2 Establishing collaborative learning interactions*

Establishing collaborative learning interactions in AA (see Table 3) addresses the social context during its facilitation by creating opportunities for learners to work together to build products (Grant et al., 2021). Therefore, constant or frequent dialogue between learners and educators is essential (Murphy et al., 2017). In addition, the execution of AA should be formative (Frey et al., 2012) and allow sufficient time for learners to ask questions and for teachers to provide feedback and guidance when needed (Murphy et al., 2017). The learning interactions associated with AA in an SDL environment require teachers to act as facilitators

of learning, providing guidance, support and scaffolding for the various activities of SDL (Murphy et al., 2017).

Collaborative learning interactions encourage a sense of personal and collective ownership, thereby empowering learners and enhancing accountability and cooperation, which align with SDL skills (Din et al., 2016) and EL skills (Nogueira, 2019). Both SDL skills and EL skills are necessary in the real-world context. In South African secondary schools, collaborative learning interactions as part of AA play a crucial role in fostering essential life skills that align with the aims of CAPS, such as preparing learners for civic engagement in a collaborative globalised world (DBE, 2011). Collaborative learning interactions foster a sense of individual and collective ownership, thereby empowering learners and enhancing accountability and cooperation, which align with SDL abilities (Din et al., 2016) and EL skills (Nogueira, 2019).

*4.3.3 Establishing assessment criteria aligned with real-world situations*

The theme "establishing assessment criteria aligned with real-world situations" (see Table 3) signifies the importance of creating rubrics and marking criteria for objectively assessing learners' performance or products that relate to real-life experiences (Frey et al., 2012; Grant et al., 2021; Murphy et al., 2017). Establishing assessment criteria is primarily regarded as the responsibility of teachers (Murphy et al., 2017).

Facilitating AA within an SDL environment, however, entails that, where possible, learners should assume some level of responsibility in setting the assessment criteria, as it enhances the authenticity of the assessment by fostering greater learner ownership and dedication towards their learning (Frey et al., 2012). Hence, Murphy et al. (2017) suggest that teachers communicate with and consult learners as the first step in ensuring that learners understand the principles of AA. Similarly, learner involvement should be considered for the overall setting of the outcomes, tasks and assessment criteria of EL within secondary education in South Africa.

In a learner-centred environment, teachers should allow learners to develop rubrics collaboratively for projects (Frey et al., 2012; Grant et al., 2021). The benefits of establishing assessment criteria collaboratively ensure that learners recognise the connection between assessment and real-world problem-solving. In doing so, AA can foster learners' ability to reflect critically on their performance against mutually agreed-upon benchmarks, thereby preparing them for the challenges of active citizenship and future employment (DBE, 2011).

*4.3.4 Authentic assessment should make provision for feedback and reflection*

The theme "AA should make provision for feedback and reflection" (see Table 3) emphasises the use of AA as a learning tool, instead of only as a summative measure of learning, as AA requires that feedback is provided to learners (Murphy et al., 2017). AA enables learners to reflect on their learning experiences by identifying their strengths and weaknesses (Grant et al., 2021; Moria et al., 2017). Learners are, therefore, required to reflect on the feedback provided to recognise gaps in their EL skills and knowledge (Murphy et al., 2017). This focus

on reflection and feedback is particularly important in the diverse South African educational context, where secondary school learners come from different socio-economic backgrounds and, consequently, need support to build confidence and resilience for their future academic achievement and career success.

## 5. Discussion

The literature review findings extend previous research by providing a more situated account of designing and implementing AA in an SDL environment, which requires aligning learners' abilities, skills, knowledge and attitudes with the outcomes necessary to foster EL. Teachers are instrumental in scaffolding learning experiences that equip learners to assume ownership of their learning. The implications of this action are significant for teachers in facilitating AA within an SDL environment for advancing EL within secondary education in South Africa.

Doing so entails the following: learners should be assisted in the overall setting of EL outcomes; learning needs concerning the expected EL outcomes should be identified; learners should be helped in the selection of resources; and appropriate strategies should be implemented as learners work collaboratively through the application of various skills in the learning process of value creation. Figure 2 provides an overall summary of the conceptual basis, informed by the systematic literature review, which offers insight into the way EL can be understood and enacted through AA in an SDL environment in South African secondary schools.

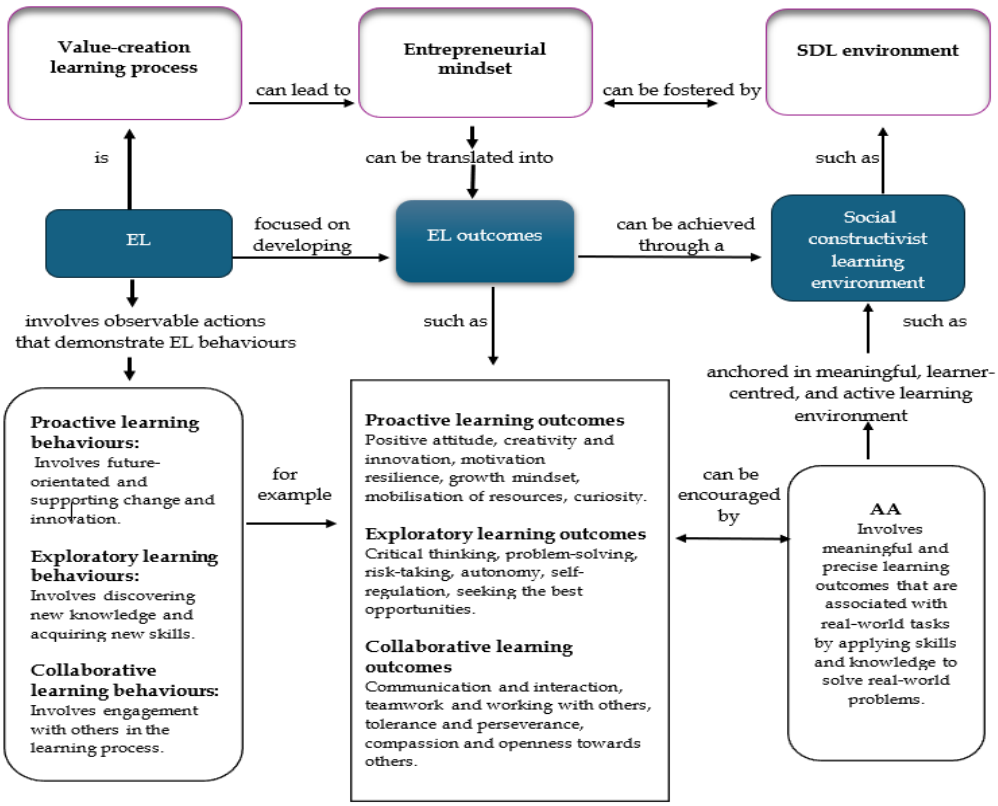


**Figure 2: Conceptual framework for fostering EL through AA in an SDL environment**

Source: Authors' own compilation based on a synthesis of the literature

A key feature illustrated in Figure 2 is that important design principles to foster EL in the secondary school context are anchored within a social constructivist learning environment in which assessment is regarded as paramount in building the capacity of SDL (Lubbe & Mentz 2021). As part of instructional design, AA in an SDL environment can build capacity for EL by incorporating real-world challenges that go beyond the South African classroom by mirroring the competencies needed in the world of work (DiMartino et al., 2007; Villarroel et al., 2020) and establishing the value-creation purpose of EL (Du Toit, 2023).

For instance, AA can promote EL by focusing on value creation by targeting the proactive, exploratory and collaborative outcomes of EL. The advantages of the outcomes of EL are that they can be tailored for any subject area. For instance, the outcomes of collaborative EL can be applied as learners working in collaboration, and the outcomes of proactive EL can be applied when learners regulate their learning. The outcomes of exploratory EL can be applied when learners apply critical-thinking skills, research skills and analytical skills to construct acquired knowledge actively.

Accordingly, actualising these outcomes of EL is best achieved through the practice of AA that is situated within an SDL environment, an approach that provides connections between real-world experiences and school-based ideas (Brown, 2015; Lund, 1997). It can be achieved by engaging in an AA task that requires learners to add value to a commonly used material or object (Fejes et al., 2019). Another example is teachers providing an AA task that requires learners to work collaboratively to produce something for a real-life community event based on the identified needs and challenges of the community (Fejes et al., 2019).

As the practice of advancing EL through AA in an SDL environment is not immune to limitations, the inclusion of possible limitations is necessary to identify areas for improvement to optimise the effectiveness of the potential use of AA within an SDL environment to advance EL in secondary education in South Africa. It emerged, for instance, that the concept of self-directedness is absent in South African science classrooms, leading to a lack of the skills required to implement innovative strategies, such as blended problem-based learning, which promote SDL environments (Sebatana & Dudu, 2022).

Although this finding by Sebatana and Dudu is not representative of all secondary school subjects in South Africa, it indicates the necessity for focused interventions, such as professional development opportunities for teachers aimed at establishing an understanding of SDL and its processes. In addition, the greater part of the South African education system faces challenges such as an absence of adequate training and professional development opportunities for teachers (Nkambule & Amsterdam, 2018) and a lack of basic infrastructure, such as electricity, school libraries and laboratories, in underprivileged schools (Spaull, 2013). These challenges may add to the complexities of implementing strategies that cannot support SDL through EL.

Furthermore, the South African curriculum is heavily focused on content delivery and standardised assessments (Kanjee & Sayed 2013), leaving little room for AA practices. In the light of these challenges, we recommend addressing systemic and contextual challenges for South African secondary school learners to benefit from AA within an SDL environment. Solutions include improving teacher training, increasing the availability of resources and adjusting the curriculum to support more flexible inquiry-based learning modalities (see Sebatana & Dudu, 2022; Spaull, 2013). In addition, Brown (2015) notes that establishing AA criteria may be difficult when assessing particular tasks for the first time; however, this challenge can be diminished through training and support and by drawing from existing rubrics, such as the one proposed by Azim and Khan (2012).

## 6. Conclusion

The objective of this systematic literature review was to identify outcomes of EL, as well as the characteristics and procedural requirements for an SDL environment and the implementation of AA in it. From this understanding, the intention was to determine key processes of AA in an SDL environment, which teachers can use as design principles to advance EL across various subject domains applicable to South African secondary schools. Three key themes of an entrepreneurial mindset—skills-based, affective and cognitive features—were identified, providing a structured approach to conceptualising the outcomes of EL. By framing the outcomes of EL within proactive, collaborative and exploratory learning behaviours, this research provides a pathway for integrating EL into the CAPS curriculum. It aims to overcome challenges in implementing CAPS principles by aligning classroom instruction and learning activities with the value-creation purpose of EL.

By integrating SDL environments with AA, this research underscores the potential for transformative learning experiences that not only equip learners with entrepreneurial skills but also cultivate critical thinking, creativity and adaptability. Future research can explore practical implementation strategies for AA within SDL environments, ensuring that EL principles are not just theoretical constructs but actively shape learners' education and prepare them for success in their lives, careers and businesses. Furthermore, although the design principles for advancing EL through AA in an SDL environment were provided for South African secondary schools, they also hold value for other teachers and educators, locally and internationally, who strive to advance EL in their subject areas.

## 7. References

Ayyildiz, Y., & Tarhan, L. (2015). Development of the self-directed learning skills scale. *International Journal of Lifelong Education*, *34*(6), 663-679. https://doi.org/10.1080/02601370.2015.1091393

Azim, S., & Khan, M. (2012). Authentic assessment: An instructional tool to enhance students learning. *Academic Research International*, *2*(3), 314-320. http://ecommons.aku.edu/pakistan_ied_pdcc/11

Boldureanu, G., Ionescu, A. M., Bercu, A. M., Bedrule-Grigoruţă, M. V., & Boldureanu, D. (2020). Entrepreneurship education through successful entrepreneurial models in higher education institutions. *Sustainability*, *12*(3), art. #1267. https://doi.org/10.3390/su12031267

Bolhuis, S., & Voeten, M. J. (2001). Toward self-directed learning in secondary schools: What do teachers do? *Teaching and Teacher Education*, *17*(7), 837-855. https://doi.org/10.1016/S0742-051X(01)00034-8

Brandt, W. C. (2020). *Measuring student success skills: A review of the literature on self-directed learning*. National Center for the Improvement of Educational Assessment. https://files.eric.ed.gov/fulltext/ED607782.pdf.

Brown, S. (2015). Authentic assessment: Using assessment to help students learn. *Relieve*, *21*(2), 1-8. http://dx.doi.org/10.7203/relieve.21.2.7674

Butcher, K. R., & Sumner, T. (2011). Self-directed learning and the sensemaking paradox. *Human–Computer Interaction*, *26*(1/2), 123-159. https://doi.org/10.1080/07370024.2011.556552

Cabrera, D., Cabrera, L., & Cabrera, E. (2023). The steps to doing a systems literature review (SLR). *Journal of Systems Thinking Preprints*, *23*(3), 1-27. https://doi.org/1054120/jost.pr000019.v1

Chen, C. H., Chen, K. Z., & Tsai, H. F. (2022). Did self-directed learning curriculum guidelines change Taiwanese high-school students' self-directed learning readiness? *The Asia–Pacific Education Researcher*, *31*(4), 409-426. https://doi.org/10.1007/s40299-021-00582-w

De Lannoy, A., & Mudiriza, G. (2019). *A profile of young NEETs: Unpacking the heterogeneous nature of young people not in employment, education or training in South Africa (No. 249)*. Southern Africa Labour and Development Research Unit, University of Cape Town.

Department of Basic Education. (2011). *Curriculum and assessment policy statement Grades 7–9: Natural Sciences*. Government Printing Works. https://www.education.gov.za/Portals/0/CD/National%20Curriculum%20Statements%20and%20Vocational/CAPS%20SP%20%20NATURAL%20SCIENCES%20GR%207-9%20%20WEB.pdf?ver=2015-01-27-160159-297

DiMartino, J., Castaneda, A., Brownstein, M., & Miles, S. (2007). Authentic assessment. *Principal's Research Review*, *2*(4), 1-8.

Din, N., Haron, S., & Rashid, R. M. (2016). Can self-directed learning environment improve quality of life? *Procedia – Social and Behavioral Sciences*, *222*, 219-227. https://doi.org/10.1016/j.sbspro.2016.05.150

Du Toit, A. (2023). Entrepreneurial learning: Creating value towards social justice. *Research in Educational Policy and Management*, *5*(3) 1-19. https://doi.org/10.46303/repam.2023.18

Du Toit, A., & Kempen, E. L. (2020). Effectual structuring of entrepreneurship education: Guidelines for overcoming inadequacies in the South African school curriculum. *Africa Education Review*, *17*(4), 41-55. https://doi.org/10.1080/18146627.2020.1868074

Du Toit-Brits, C., & Van Zyl, C. M. (2017). Self-directed learning characteristics: Making learning personal, empowering and successful. *Africa Education Review*, *14*(3/4), 122-141. https://doi.org/10.1080/18146627.2016.1267576

Fejes, A., Nylund, M., & Wallin, J. (2019). How do teachers interpret and transform entrepreneurship education? *Journal of Curriculum Studies*, *51*(4), 554-566. https://doi.org/10.1080/00220272.2018.1488998

Frey, B. B., Schmitt, V. L., & Allen, J. P. (2012). Defining authentic classroom assessment. *Practical Assessment, Research, and Evaluation*, *17*(1), 1-18. https://doi.org/10.7275/sxbs-0829

Golightly, A. (2018). The influence of an integrated PBL format on geography students' perceptions of their self-directedness in learning. *Journal of Geography in Higher Education*, *42*(3), 460-478. https://doi.org/10.1080/03098265.2018.1463974

Grant, K., Fedoruk, L., & Nowell, L. (2021). Conversations and reflections on authentic assessment. *Imagining SoTL*, *1*, 146-162. https://doi.org/10.29173/isotl532

Gunness, S., Tarling, I., & Haipinge, E. (2021). Gathering expert opinions on self-directed learning and online assessment using OER: A Delphi approach for redesigning student assessments. In D. Burgos, & J. Olivier (Eds.), *Radical solutions for education in Africa: Open education and self-directed learning in the continent* (pp. 59-86). Springer. https://doi.org/10.1007/978-981-16-4099-5_4

Hägg, G., & Kurczewska, A. (2022). *Entrepreneurship education: Scholarly progress and future challenges.* Routledge. https://doi.org/10.4324/9781003194972

Jagals, D. (2021). Assessment as an epistemological tool to facilitate metacognitive awareness and promote self-directed learning. In E. Mentz, & A. Lubbe (Eds.), *Learning through assessment: An approach towards self-directed learning* (pp. 123-142). AOSIS. https://doi.org/10.4102/aosis.2021.bk280.06

Johnson, L., & Van Wyk, M. M. (2016). Approaches to teaching EMS: The teacher-centered approach. In M. M. van Wyk, & K. Dos Reis (Eds.), *Teaching EMS in the senior phase* (pp. 104–120). Oxford University Press.

Kanjee, A., & Sayed Y. (2013). Assessment policy in post-apartheid South Africa: Challenges for improving education quality and learning. *Assessment in Education: Principles, Policy & Practice*, *20*(4), 442-469. https://doi.org/10.1080/0969594X.2013.838541

Kicken, W., Brand-Gruwel, S., Van Merriënboer, J., & Slot, W. (2009). Design and evaluation of a development portfolio: How to improve students' self-directed learning skills. *Instructional Science*, *37*, 453-473. https://doi.org/10.1007/s11251-008-9058-5

Kleine, R. E., & Yoder, J. D. (2011). Operationalizing and assessing the entrepreneurial mindset: A rubric based approach. *The Journal of Engineering Entrepreneurship*, *2*(2), 57-86. https://www.researchgate.net/publication/263730572_Operationalizing_and_Assessing_the_Entrepreneurial_Mindset_A_Rubric_Based_Approach

Kraus, S., Breier, M., & Dasí-Rodríguez, S. (2020). The art of crafting a systematic literature review in entrepreneurship research. *International Entrepreneurship and Management Journal*, *16*, 1023-1042. https://doi.org/10.1007/s11365-020-00635-4

Kuratko, D. F., Fisher, G., & Audretsch, D. B. (2021). Unravelling the entrepreneurial mindset. *Small Business Economics*, *57*(4), 1681-1691. https://doi.org/10.1007/s11187-020-00372-6

Kusdiyanti, H., Juariyah, L., Wilujeng, I., Anggarani, D., Bramantya, A., Febrianto, I., & Lazuardi, W. (2023). Authentic assessment based on case-based learning as a media for increasing vocational school students' economic literacy and self-efficacy in digital era. In *Proceedings of the 7th International Research Conference on Economics and Business*, IRCEB (Vol. 26). http://dx.doi.org/10.4108/eai.26-9-2023.2350724

Lāma, G. (2021). Self-directed learning in secondary education during remote study process: Case study in Latvia. In L. Daniela (Ed.), *Human technologies and quality of education* (pp. 309-320). University of Latvia Press. https://doi.org/10.22364/htqe.2021.22

Larsen, I. B., & Neergaard, H. (2024). What lies beneath: Using student reflections to study the entrepreneurial mindset in entrepreneurship education. *International Journal of Entrepreneurial Behavior & Research*, *30*(5), 1149-1176. https://doi.org/10.1108/IJEBR-06-2023-0578

Larson, J., Jordan, S. S., Lande, M., & Weiner, S. (2020). Supporting self-directed learning in a project-based embedded systems design course. *IEEE Transactions on Education*, *63*(2), 88-97. https://doi.org/10.1109/TE.2020.2975358

Li, S., & Wang, H. (2018). Traditional literature review and research synthesis. In A. Phakiti, P. de Costa, L. Plonsky, & S. Starfield (Eds.), *The Palgrave handbook of*

*applied linguistics research methodology* (pp. 123–144). Springer Nature. https://doi.org/10.1057/978-1-137-59900-1_6

Lindberg, E., Bohman, H., Hulten, P., & Wilson, T. (2017). Enhancing students' entrepreneurial mindset: A Swedish experience. *Education and Training*, *59*(7/8), 768-779. https://doi.org/10.1108/ET-09-2016-0140

Lindner, J. (2018). Entrepreneurship education for a sustainable future. *Discourse and Communication for Sustainable Education*, *9*(1), 115-127. https://doi.org/10.2478/dcse-2018-0009

Litchfield, B. C., & Dempsey, J. V. (2015). Authentic assessment of knowledge, skills, and attitudes. *New Directions for Teaching and Learning*, *142*(142), 65-80. https://doi.org/10.1002/tl.20130

Lubbe, A., & Mentz, E. (2021). Self-directed learning-oriented assessment and assessment literacy: Essential for 21st century learning. In E. Mentz, & A. Lubbe (Eds.), *Learning through assessment: An approach towards self-directed learning* (pp. 1-25). AOSIS. https://doi.org/10.4102/aosis.2021.bk280.01

Lund, J. (1997). Authentic assessment: Its development & applications. *Journal of Physical Education, Recreation & Dance*, *68*(7), 25-28. https://doi.org/10.1080/07303084.1997.10604979

Maharajh, L. R., Nkosi, T., & Mkhize., M. C. (2016). Teachers' experiences of the implementation of the Curriculum and Assessment Policy Statement (CAPS) in three primary schools in KwaZulu-Natal. *Africa's Public Service Delivery & Performance Review*, *4*(3), 371-388. https://doi.org/10.4102/apsdpr.v4i3.120

Matli, W., & Ngoepe, M. (2021). Life situations and lived experiences of young people who are not in education, employment, or training in South Africa. *Education+ Training*, *63*(9), 1242-1257. https://doi.org/10.1108/ET-10-2019-0231

Mengist, W., Soromessa, T., & Legese, G. (2020). Method for conducting systematic literature review and meta-analysis for environmental science research. *MethodsX*, *7*(2), art. #100777. https://doi.org/10.1016/j.mex.2019.100777

Mentz, E., & Van Zyl, S. (2018). The impact of cooperative learning on self-directed learning abilities in the computer applications technology class. *International Journal of Lifelong Education*, *37*(4), 482-494. https://doi.org/10.1080/02601370.2018.1513426

Moria, E., Refnaldi, R., & Zaim, M. (2017). *Using authentic assessment to better facilitate teaching and learning: The case for students' writing assessment.* Sixth International Conference on Languages and Arts (ICLA 2017), 18 October, Atlantis Press, 333-337. https://doi.org/10.2991/icla-17.2018.57

Morris, T. H. (2019). Self-directed learning: A fundamental competence in a rapidly changing world. *International Review of Education*, *65(*4), 633-653. https://doi.org/10.1007/s11159-019-09793-2

Morris, T. H., & König, P. D. (2020). Self-directed experiential learning to meet ever-changing entrepreneurship demands. *Education+ Training*, *63*(1), 23-49. https://doi.org/10.1108/ET-09-2019-0209

Morselli, D., & Morselli, D. (2019). The assessment of entrepreneurial education. In D. Morselli (Ed.), *The change laboratory for teacher training in entrepreneurship education: A new skills agenda for Europe* (pp. 17-36). Springer Open. https://doi.org/10.1007/978-3-030-02571-7_2

Murphy, V., Fox, J., Freeman, S., & Hughes, N. (2017). "Keeping it real": A review of the benefits, challenges and steps towards implementing authentic assessment. *All Ireland Journal of Higher Education, 9*(2801), 3231-3237. https://doi.org/10.62707/aishej.v9i3.280

Nadelson, L. S., Palmer, A. D. N., Benton, T., Basnet, R., Bissonnette, M., Cantwell, L., Jouflas, G., Elliot, E., Fromm, M., & Lanci, S. (2018). Developing next generation of innovators: Teaching entrepreneurial mindset elements across disciplines.

*International Journal of Higher Education*, *7*(5), 114-126. https://doi.org/10.5430/ijhe.v7n5p114

Ngah, R., Junid, J., & Osman, C. A. (2019). The links between role of educators, self-directed learning, constructivist learning environment and entrepreneurial endeavor: Technology entrepreneurship pedagogical approach. *International Journal of Learning, Teaching and Educational Research, 18*(11), 414-427. https://doi.org/10.26803/ijlter.18.11.25

Nkambule, G., & Amsterdam, C. (2018). The realities of educator support in a South African school district. *South African Journal of Education*, *38*(1), 1-11. https://doi.org/10.15700/saje.v38n1a1433

Nogueira, T. F. (2019). Entrepreneurial learning: What do we mean by it? *The Learning Organization*, *26*(6), 560-573. https://doi.org/10.1108/TLO-04-2018-0067

Olivier, J. (2021). Self-directed multimodal assessment: Towards assessing in a more equitable and differentiated way. In E. Mentz, & A. Lubbe (Eds.), *Learning through assessment: An approach towards self-directed learning* (pp. 51-69). AOSIS. https://doi.org/10.4102/aosis.2021.bk280.03

Pidduck, R. J., Clark, D. R., & Lumpkin, G. T. (2023). Entrepreneurial mindset: Dispositional beliefs, opportunity beliefs, and entrepreneurial behavior. *Journal of Small Business Management*, *61*(1), 45-79. https://doi.org/10.1080/00472778.2021.1907582

Robinson, J. D., & Persky, A. M. (2020). Developing self-directed learners. *American Journal of Pharmaceutical Education*, *84*(3), 292-296. https://doi.org/10.5688/ajpe847512

Runhare, T., Ouda, J. B., Vele, M. T., & Mudzielwana, N. (2021). School–community interventions to curb learner dropout: The perceptions of key education stakeholders in a rural South African school neighbourhood. *International Review of Education*, *67*(5), 591-610. https://doi.org/10.1007/s11159-021-09910-0

Saleem, A., Kausar, H., & Deeba, F. (2021). Social constructivism: A new paradigm in teaching and learning environment. *Perennial Journal of History*, *2*(2), 403-421. https://doi.org/10.52700/pjh.v2i2.86t

Santos, S. C., Neumeyer, X., & Morris, M. H. (2019). Entrepreneurship education in a poverty context: An empowerment perspective. *Journal of Small Business Management*, *57*, 6-32. https://doi.org/10.1111/jsbm.12485

Schweder, S., & Raufelder, D. (2022). Examining positive emotions, autonomy support and learning strategies: Self-directed versus teacher-directed learning environments. *Learning Environments Research*, *25*(2), 507-522. https://doi.org/10.1007/s10984-021-09378-7

Scroccaro, A., Engzell, J., & Norrman, C. (2025). Authentic assessment in challenge-based learning: How to assess 21st-century skills in innovation and entrepreneurship education. In E. Vilalta-Perdomo, A. Scroccaro, D. E. Salinas-Navarro, & R. Michel-Villarreal (Eds.), *The Emerald handbook of active learning for authentic assessment* (pp. 59-79). Emerald Publishing. https://doi.org/10.1108/978-1-83797-857-120251004

Sebatana, M. J., & Dudu, W. T. (2022). Enhancing Grade 10 Physical Sciences teachers' self-directedness in implementing blended problem-based learning. *Science Education International*, *33*(4), 427-437. https://doi.org/10.33828/sei.v33.i4.11

Sepadi, M., & Molapo, K. (2024). Exploring teacher understanding of Curriculum and Assessment Policy Statement document implementation in South African schools. *Frontiers in Education*, *9*, art. #1354959. https://doi.org/10.3389/feduc.2024.1354959

Spaull, N. (2013). *South Africa's education crisis: The quality of education in South Africa 1994–2011*. Centre for Development and Enterprise.

Statistics South Africa. (2024). *Quarterly labour force survey: Quarter 4:2024, Statistical release P0211*. https://www.statssa.gov.za/publications/P0211/P02114thQuarter2024.pdf

Timmermans, A. (2023). Enhancing self-directed learning readiness in entrepreneurship education. *Journal of Higher Education Theory and Practice, 23*(9), 231-249. https://doi.org/10.33423/jhetp.v23i9.6137

Villarroel, V., Bloxham, S., Bruna, D., Bruna, C., & Herrera-Seda, C. (2018). Authentic assessment: Creating a blueprint for course design. *Assessment & Evaluation in Higher Education*, *43*(5), 840-854. https://doi.org/10.1080/02602938.2017.1412396

Villarroel, V., Boud, D., Bloxham, S., Bruna, D., & Bruna, C. (2020). Using principles of authentic assessment to redesign written examinations and tests. *Innovations in Education and Teaching International*, *57*(1), 38-49. https://doi.org/10.1080/14703297.2018.1564882

Welsandt, N. C. J., Fortunati, F., Winther, E., & Abs, H. J. (2024). Constructing and validating authentic assessments: The case of a new technology-based assessment of economic literacy. *Empirical Research in Vocational Education and Training*, *16*(1), art. #4. https://doi.org/10.1186/s40461-024-00158-0

Wiggins, G. (2011). A true test: Toward more authentic and equitable assessment. *Phi Delta Kappan*, *92*(7), 81-93. https://doi.org/10.1177/003172171109200721

Xiao, Y., & Watson, M. (2019). Guidance on conducting a systematic literature review. *Journal of Planning Education and Research*, *39*(1), 93-112. https://doi.org/10.1177/0739456X17723971

Zhu, M., Bonk, C. J., & Doo, M. Y. (2020). Self-directed learning in MOOCs: Exploring the relationships among motivation, self-monitoring, and self-management. *Educational Technology Research and Development*, *68*, 2073–2093. https://doi.org/10.1007/s11423-020-09747-8