AN INTEGRATIVE REVIEW OF FOURTEEN SELF-DIRECTED LEARNING MODELS

WF UYS
UNIVERSITY OF CAPE TOWN / NORTH-WEST UNIVERSITY

Abstract

Self-directed learning (SDL) is an important focus area in adult education. Despite its pervasiveness, SDL is criticised for its lack of a theoretical basis and applicability across contexts. Over time, various conceptual models have been advanced to illustrate the core concepts of SDL. It is not clear whether these various models are comparable. Therefore, it was necessary to evaluate these different models in terms of their conceptual constructs and applicability across contexts. This process was carried out in the current study by conducting an integrative review of fourteen models related to SDL and synthesising the key constructs into a revised model. Ten of these models refer specifically to the application of SDL in teaching contexts and were analysed further. The study found a fundamental relationship between these models and proposes an integrated model based on eight mutually exclusive constructs. This integrated model may aid scholars by providing a set of core constructs to develop the factors and variables of a theoretical SDL model.

Keywords: Self-directed learning; Models; Integrative review.

1. INTRODUCTION

Self-directed learning (SDL) is a widely researched area in adult learning research (see Knowles, 1975; Brookfield, 1984; Brockett & Hiemstra, 1991; Candy, 1991; Jonassen & Grabowski, 1993; Merriam, Caffarella & Baumgartner, 2007; Van der Walt, 2016; du Toit-Brits, 2018; Verster, Mentz & du Toit-Brits, 2018; Curran *et al.*, 2019). SDL is seen as a *process* of adult learning and as a list of personal *characteristics* or attributes that an adult learner exhibits (Garrison, 1997). The intended purpose of SDL is for diagnosing learning needs and plans in practice for both the adult learner and the adult educator (Knowles, Holton & Swanson, 2005). Knowles (1975: 18) defines SDL as:

> [A] *process* in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes.

Although Knowles' (1975) definition is widely accepted, the *process* of SDL remains obscure (Van der Walt, 2019). SDL occurs in a community of practice that cannot be viewed in isolation (Knowles, 1975: 18). In this community of practice, there are many related perspectives such as:

- adult learning (Knowles, Holton & Swanson, 2015);
- autodidactics (Tremblay & Theil, 1988);
- autagogy (Keats, 2009);
- heutagogy (Hase & Kenyon, 2000);
- self-determined learning (Blaschke, 2012);
- self-directed learning (Knowles, 1975);
- self-regulated learning (Panadero, 2017);
- independent learning (Moore, 1973);
- autonomous learning (Parnell & Procter, 2011);
- self-study (Loughran, 2007);
- self-teaching (Hills, 1976);
- self-instruction (Keirns, 1999); and
- learner-readiness (Guglielmino, 1978).

In practice, there are subtle and even significant differences between these perspectives. A review of these concepts over the preceding forty years or so may add significant value to the field of adult education but was beyond the scope of this study. Knowles *et al.* (2015: 76) recognise that adult

learning has been weakest in advancing a coherent approach "that offers more clear guidance to adult educators" in the classroom. This coherence is needed most when identifying the fundamental theoretical principles for applying SDL in practice. In the literature, these principles are mostly represented as theoretical or conceptual models. The value of such models, in general, is that they allow scholars to represent a particular aspect of reality schematically or diagrammatically. These models help to explain particular concepts and can also assist in predicting possible outcomes (Epstein, 2008). The internal consistency of such models may be tested empirically, their logical consequences can be evaluated, their relationship to data confirmed, and their underlying assumptions expressed (Epstein, 2008).

A broad search of the literature revealed several conceptual models that are related to SDL (Brockett & Hiemstra, 1991; Candy, 1991; 2004; Garrison, 1997; Grow, 1991; Hiemstra & Brockett, 2012; Pratt, 1988; Sawatsky *et al.*, 2017; Song & Hill, 2007; Stäuble, 2005). The problem with so many models is the difficulty of selecting an appropriate model for research or practical endeavours. Partially to blame for such a proliferation of models in the SDL literature are the different meanings, concepts and terms ascribed to them linguistically. Efforts to construct a comprehensive model by Garrison (1997) and Oswald (2003) mainly emphasise instructional design. Later models such as Carpenter (2011) and Hiemstra and Brockett (2012) do not incorporate all the prior models but focus on a minimum set of constructs, as discussed below. The diversity of these models surfaces the need to know which aspect of SDL they refer to and how these factors are related to each other. If a set of cohesive constructs could be represented, it becomes equally important that they are parsimonious and comprehensive. In addition, our understanding of SDL has changed over time, necessitating a review of such models (see Candy, 2004; Carpenter, 2011; Curran *et al.*, 2019; Song & Hill, 2007).

The objective of this integrative review was, firstly, to identify comparable models that pertain to SDL and, secondly, to synthesise an integrative model to aid both the selection and shared understanding of the constructs as used in these models. The primary research question that the current study examined was whether these different models are expressing the same constructs, or whether there are several competing concepts that each model addresses. Secondary research questions explored these overlapping areas and whether they could be represented in a unified and coherent way. This was carried out according to the research method described below.

2. MATERIALS AND METHODS

There are many commonalities amongst literature review strategies, such as meta-analysis, systematic reviews, qualitative reviews and integrative reviews (Whittemore & Knafl, 2005: 547). This model review was based on an integrative review process (Whittemore & Knafl, 2005). An integrative review is a literature review to "define concepts, to review theories, to review evidence, and to analyse methodological issues of a particular topic" (Whittemore & Knafl, 2005: 548). An integrative review comprises five stages, namely:

1. a clear identification of the purpose and problem of the review;
2. a well-defined literature search;
3. evaluation of the theoretical models;
4. analysis of the models; and
5. presentation in the form of a synthesis of models (Whittemore & Knafl, 2005: 549).

An integrative review was best suited for this study as a "specific review method that summarises past empirical or theoretical literature to provide a more comprehensive understanding" (Whittemore & Knafl, 2005: 546). Following is an elaboration of the above steps in greater detail.

The purpose of the integrative review was to identify all the related models that represent the process of SDL. The problem was the proliferation of such models. The literature search was undertaken across a number of scholarly databases, namely ERIC, EBSCOHost, ScienceDirect and Google Scholar, utilising the search terms of 'self-directed learning' OR 'self directed learning' AND 'model' that appear in the title and covering the period 1980 untill 2019. The results were limited to books, theses, full-text publications and peer-reviewed articles in English. The initial search returned 35 articles, three books and a thesis. Non-relevant articles were eliminated, resulting in the fourteen models that were included in this review. For example, articles that referred to statistical models or

non-SDL models, such as the LENA learning model framework (Arnold, 2015), were excluded. A related instrument, referred to as the Learner Readiness Assessment Scale (LRA) or Self-Directed Learning Readiness Scale (SDLRS) (see Guglielmino, 1978; Merriam *et al*., 2007) was excluded. These instruments have been influential in providing a framework for assessing LRAs and SDL development before and after interventions, but do not constitute a conceptual model for SDL *per se*. Studies that built on earlier models of SDL were also excluded unless they contributed substantially to the current debate. For example, Curran *et al*. (2019: 87) added 'digital connectivity', 'digital literacy' and 'credibility of information' to Hiemstra and Brockett's (2012: 158) person process context (PPC) model without contributing to the core theoretical constructs. It appears as if the research on SDL models have stalled with the PPC model (Hiemstra & Brockett, 2012: 158) and that there is limited recent research on SDL models besides Sawatsky *et al.'s* (2017) model.

The selected articles were then critically reviewed to identify the particular model used and isolate the key theoretical constructs and their origins (Glasgow School for Business and Society, n.d.). The actual terms that the authors used for their constructs were extracted from the models and are summarised in Table 2 in the appendix. These were then grouped according to similar or related terms in Table 1 for further analysis. It is suggested that Table 1 be used as a reference guide when reading the results and discussions that follow. For example, 'skill with SDL' (see Oswald, 2003), 'understanding how to learn' (see Stäuble, 2005), 'process orientation' (see Brockett & Hiemstra, 1991) and 'process' (see Hiemstra & Brockett, 2012) were all grouped under the common concept of 'process' in Table 1. In the discussion section, it is shown how the synthesis from Table 1 was used to develop the integrative framework (Pozzebon, Rodriguez & Petrini, 2014).

3. RESULTS

From the systematic search, fourteen models were identified for further analysis. These are listed in chronological order:

- Pedagogical and andragogical relationship model (Pratt, 1988: 167);
- Contextual model of SDL (Long, 1988a);
- Staged self-directed learning (SSDL) model (Grow, 1991);
- Domains of self-direction (Candy, 1991: 23);
- Personal responsibility orientation to learning (PRO) model (Brockett & Hiemstra, 1991: 25);
- Dimensions of SDL (Garrison, 1997: 22);
- Andragogy in practice model (Knowles, Holton & Swanson, 1998);
- Three-factor SDL model (Oswald, 2003);
- SDL in the digital age (Candy, 2004);
- Model of lifelong learning (Stäuble, 2005: 2);
- SDL in online environments (Song & Hill, 2007: 31);
- Person, process, context (PPC) model (Hiemstra & Brockett, 2012: 158);
- Model of critical reflection through SDL (Wang & Cranton, 2012: 24); and
- Model of resident SDL (Sawatsky *et al.*, 2017: 3).

A summary and review of each of these fourteen models follow below.

3.1. The pedagogical and andragogical relationship model

Pratt (1988: 167) presents a model that contrasts pedagogical versus andragogical support and direction on an x–y axis. Although he does not represent this as an SDL model *per se*, Pratt's (1988) model is widely used by later SDL practitioners to categorise their interventions.

In his model, Pratt (1988: 163) recognises that "people come to educational situations with varying degrees of prior knowledge, experience, commitment, and self-confidence". Therefore, they require different forms of instruction due to differing levels of dependence or independence and their individual need for direction or support. Pratt proposes four stages of dependence through which a learner could pass on their way to self-directedness, namely:

- high learner dependence, i.e. the learner needs direction and support;

- medium to high dependence, i.e. the learner needs direction with minimal support;
- greater independence, i.e. the learner needs support but is reasonably self-directing; and
- self-directedness, i.e. the learner is capable of providing his or her own direction and support.

The first two stages require a pedagogical approach where the teacher provides most of the support or direction for the learner. The latter two, an andragogical approach where the educator collaborates with the learner to achieve common objectives. A teacher needs to determine whether a learner needs support on *how* to do a task, or direction on *what* to learn or do, or motivation on *why* learning is important for him or her and how this will be assessed (Pratt, 1988: 168). The first three of these constructs are directly related to the primary tenets of learning, namely knowledge (*what* is to be done), skills (*how* it is to be done) and attitude (*why* it is important or relevant) (Clark, 2012). The fourth element (the basis of evaluation), refers to the level of competence of the learner. To see an application of this model using these foundational constructs, please see Uys and Chigona (2020).

In common with more recent models, such as those by Brockett and Hiemstra (1991), Garrison (1997) and Song and Hill (2007), Pratt (1988) recognised the attributes of a learner or person (*who*). He did not go into as much detail on a learner's personal characteristics, for example, the SDLRS scale (see Guglielmino, 1978; Merriam *et al.*, 2007). His model also did not consider the *resources* that the learner needs (see Song & Hill, 2007). Neither did he consider the aspect of *location* or *context*, i.e. where teaching occurs or where the learner is situated, such as in the case of distance or online learning. Lastly, there is a gap in Pratt's (1988: 168) model on which particular *subject* or topic is being taught (Sawatsky *et al.*, 2017). This omission is significant as the subject will influence a particular learner's interest and motivation or on the way it could best be taught.

3.2. Contextual model of SDL

Long (1988a) presents a model that illustrates the psychological and pedagogical tension between the learner and the educator. Long (1988a) acknowledges that this model is based on Lewin's (1952) force-field theory that isolates four constructs of contextual, personality, social and situational control. For Long (1988a: 3), psychological control indicates the "degree to which the learner … maintains active control of the learning process". This is illustrated in a four-quadrant model representing the balance between high and low control. In terms of Long's (1988a) model (Quadrant I), there is congruency when the learner has high psychological control, i.e., is self-directed) and the pedagogical control is low, i.e., the educator allows the learner the freedom to learn for themselves. Another complementary quadrant (Quadrant IV) is found where the learner has a low level of self-directedness and the educator exercises a high degree of instructional control. The two conflicting quadrants (Quadrants II & III) are found where neither the learner nor the educator exercises a high degree of psychological or pedagogical control (i.e. not much happens), or where both the learner and the educator exercise a high degree of psychological and pedagogical control.

Although Long's (1988a) model does not specifically include personal aspects, such as motivation, dependency or competence from Pratt (1988), one could infer that these are implicit in terms of psychological control. Long (1988a) is not explicit about the SDL instructional design as it is understood today; namely that it is collaborative or task-oriented, among others; yet, it allows implicitly for the degree of freedom between learner and educator control of whatever the pedagogical needs are, such as learning goals, resources or modes of evaluation. Long's (1988a) model has limited value in representing the constructs of SDL. It does however assist us in understanding why attempts by educators to foster SDL with learners who have a low degree of intrinsic motivation may fail. He also recognises that "given the confusion about what qualifies as self-directed learning, it is not difficult to imagine how professors and teachers are confused about what supports and stimulates self-directed learning" (Long, 1988b: 25).

3.3. Staged self-directed learning (SSDL) model

One model that caters for an educator to adapt their teaching style depending on the level of self-directedness of the learner is the SSDL model of Grow (1991). Grow (1991) found strong resistance to the collaborative approach that he had developed with adult learners in mind, from some of the college students who were not ready for self-directed learning. In order to make sense of the

differences between self- and other-directed education, he developed the staged self-directed learning model (SSDL).

Grow (1991) attributed the inspiration for this model to the situational leadership styles of Hersey and Blanchard (1988); yet, he unwittingly built on the four quadrants of Pratt (1988), a source which he cited in his article. Contemporarily, these learning styles are frequently represented together with the learning stages of Pratt (1988). This staged model "proposes a way [that] teachers can be vigorously influential while empowering students toward greater autonomy" (Grow, 1991: 128). As such, this model provides a framework for teachers to assess the learner's needs in action and adjust their teaching style accordingly. Based on this framework, a unique teaching approach is best suited to learners at each stage (Grow, 1991).

3.4. Domains of self-direction

Candy's (1991: 23) model represents four domains of self-direction, namely:

- personal autonomy - self-direction as a "personal attribute";
- self-management - self-direction as "the willingness or ability to manage one's overall learning endeavours";
- autodidactics - self-direction as the "independent pursuit of learning without formal institutional support or affiliation"; and
- learner-control – self-direction as "learner-control of instruction".

These four domains can respectively be mapped to the core constructs in terms of who the learner is based on his or her personal attributes, which strategy the learner adopts in terms of self-management, why the learner learns, as well as how he or she learns. Like Pratt (1988) before, Candy (1991) did not consider context (where), the subject (which), resources (with) or time (when) as part of the domains of self-direction model.

3.5. Personal responsibility orientation to learning (PRO) model

Brockett and Hiemstra (1991: 27) present a personal orientation to learning (PRO) model that builds on the SDL literature, which emphasises the responsibility of learners for their own learning as well as recognising the context of such learning. This model is grounded on the humanistic philosophies of Maslow, Rogers and Knowles (see Brockett & Hiemstra, 1991). Brockett and Hiemstra's (1991) model represents five aspects of SDL, namely responsibility orientation (why), process orientation (how), personal orientation (who), self-direction (what), and the social context (where and when). They say:

> Individuals who enter a learning situation with a clear idea of *how* and *what* they wish to learn are likely to become frustrated and disenchanted if not given the freedom to pursue these directions (Brockett & Hiemstra, 1991: 27).

Despite its widespread usage, Brockett and Hiemstra's (1991) model appears to have deficiencies in its applicability in the classroom (Banz, 2009). Later studies, such as that by Stockdale and Brockett (2011), validated the constructs that were used in this model; however, they limited the application of the PRO model to studies in higher education and called for a general model that can be adopted in other contexts such as the "workplace, community, social service agencies and adult basic education" (Stockdale & Brockett, 2011: 176). In 2012, Hiemstra and Brockett (2012) updated this model to the person, process, context (PPC) model, which will be reviewed in section 3.12.

3.6. Dimensions of SDL

Garrison (1997: 22) introduced three dimensions of self-directed learning, namely the motivational dimension (entering tasks), the self-management dimension (control), and the self-monitoring (responsibility) dimension. Garrison's (1997) model was independently validated by Abd-El-Fattah (2010) using partial least squares to indicate the degree of relationships between each dimension. Although Garrison (1997: 22) discussed each dimension separately in his model, he recognised that these dimensions are closely connected in practice. Garrison (1997) advocates a collaborative approach to SDL, much like Pratt (1988) and Grow (1991).

Control of the learning environment is determined by the proficiency of the teacher and the learner (who), the resources that are available to them (with), and the interdependence that is established as a result of the learning environment (where). Conflating what learners need to manage, how they manage it, and which resources they use makes the self-management dimension complex to understand. Self-management is concerned with how learners carry out the learning task, including the choice and enactment of learning tasks and the use of suitable resources. Garrison's (1997) indicate that self-management relates to what learners need to do concerning a particular learning task (Garrison, 1997: 23). The role of the educator is to "provide the support, direction and standards necessary for a successful educational outcome" (Garrison, 1997: 23). The self-monitoring dimension of Garrison's (1997) model is concerned with the ability of the learner to manage his or her own learning process by relating newly acquired knowledge to existing knowledge through a process of reflection. Self-monitoring is intimately connected with the management of learning tasks and activities. The motivational dimension of Garrison's (1997) model recognises the effort required to initiate learning (entering motivation) and maintain learning tasks or goals (task motivation). In practice, however, Garrison (1997) combine the choice or selection of goal with the process of entering a task. Garrison (1997) recognises that motivation can be described as 'commitment' or the congruency of attitudes, feelings and goals. Garrison (1997) also includes competency as "the perceived skills, ability and knowledge of the individual while assessing goals" (Garrison, 1997: 27). The emphasis in SDL teaching is on transferring task control issues to learners in order to sustain their motivation (see Garrison, 1997).

Part of the challenge in understanding Garrison's (1997) model is the large degree of overlap between the different dimensions. Garrison (1997) recognised that when the teacher makes choices in terms of any or all of these dimensions, learners relinquish their responsibility for learning in that dimension. Unfortunately, this reflects the reality that much of the control in formal teaching situations is in the teacher's hands. Garrison (1997) did, however, recognise that lifelong learning and online learning are slowly shifting the balance of control to the learner.

3.7. Andragogy in practice

The andragogy in practice model of Knowles *et al.* (1998) is "an expanded conceptualization of andragogy that incorporates domains of factors that will influence the application of core andragogical principles" (Knowles *et al.*, 2005: 156). Even though this model is not an SDL model *per se*, it is widely used to represent core SDL principles. The earliest version of this model was published in 1998 by Knowles *et al.,* and has remained unchanged in later editions. It is, however, possible that Knowles *et al.* (1998) had conceptualised such a model at an earlier stage. The andragogy in practice model (Knowles *et al.*, 2005: 149) has three separate constructs, namely the goals and purposes of learning; individual and situational differences; and core adult learning principles. Goals and purposes "provide a frame that shapes the learning experience" (Knowles *et al.*, 2005: 157) and needs to consider the individual, institutional and societal goals and growth in learning. Individual and situational differences consider the variable of subject matter characteristics, situational characteristics and individual learner characteristics. Core adult learning principles comprise the six principles of adult learning as a foundation for the adult learning experience, namely:

- learners need to know why, what and how;
- self-concept of the learner (learning is autonomous and self-directing);
- prior experience (resources and mental models);
- readiness to learn (life-related, developmental tasks);
- orientation to learning (problem-centred, contextual); and
- motivation to learn (intrinsic value, personal payoff) (Knowles *et al.*, 2005: 149).

Knowles *et al.* (1998) emphasise that the model can (and is) used from the inside out or even outside in, either in advance of an intervention (learner analysis) or at the least starting with the six core principles of andragogy and working from there as a basis.

3.8. Three-factor SDL model

Oswald (2003) compiled a three-factor model of SDL as encapsulated by prior authors and grouped these into three major factors: the learning situation, the learner's attributes, and components of

learning. These factors represent "the relationship between the key factors and the components of SDL" (Oswald, 2003: 24). The first factor, the learning situation (context or where) comprises three elements of the SDL experience, namely opportunity, support and collaboration. The learning situation represents the SDL learning environment, whether this occurs in a classroom or in the field, and how the teacher supports SDL. Context also includes "those components of the learning environment … such as resources, peers and external factors" (Oswald, 2003: 26). Factor two, the learner's attributes (who), represent the learner's skill in the content domain and his or her self-directing capabilities. Components in the third factor (how) represent how learners approach the learning situation. This includes cognitive learning aspects, such as critical reflection on both the learning process and the content. It also refers to the learners' goals and motivation for learning in the content domain.

3.9. SDL in the digital age

In 2004, Candy revised Knowles *et al.*'s (1998) model to incorporate online learning. This is effectively a new model that represents a six-stage sequential process of online learning and does not represent a conceptual model of SDL. The six-stage process involves "engaging with online learning; locating information and resources; evaluating the quality of digital resources; assimilating information; reconceptualising understandings; and networking" (Candy, 2004: 2). This process has value in teaching learners about information management but only represents one dimension of SDL (i.e., how) and therefore fell outside the scope of this study.

3.10. Model of lifelong learning

Stäuble (2005: 2) adapted Garrison's (1997) model as a process model for developing lifelong learners based on SDL principles. In her model, Stäuble (2005) re-described the following dimensions in Garrison's (1997) model:

- from 'motivation' – to what she refers to as 'knowing the learner';
- from 'self-management' – to 'planning for learning';
- from 'meta-learning' - to 'understanding how to learn'; and
- from 'self-monitoring' – to 'evaluating learning'.

Stäuble's (2005: 2) 'knowing the learner' dimension targets the learner's prior knowledge, motivation and attitudes towards learning. The 'planning for learning' dimension refers to the setting of goals and objectives to meet them. The 'understanding how to learn' dimension refers to the different learning styles of learners and the different approaches used to encourage deep or meaningful learning. Finally, Stäuble's (2005) 'evaluating learning' dimension refers to the "systematic analysis of all the learner's activities, either qualitatively, quantitatively or affectively" (Stäuble, 2005: 2).

3.11. SDL in online environments

Song and Hill's (2007: 31) model considers the complexities of SDL in an online environment. Their model is based on the models of Candy (1991), Brockett and Hiemstra (1991) as well as Garrison (1997). From these three perspectives, Song and Hill derived three constructs, namely 'personal attributes' (who), process (how), and context (where). This model predates but complements Hiemstra and Brockett's (2012) updated PPC model (people, process and context). For Song and Hill (2007: 28), the construct 'personal attribute' indicates the "moral, emotional and intellectual management" of a person. The process construct refers to "learner autonomy over instruction" (Song & Hill, 2007: 28). The context construct refers to "the environment where learning takes place" (Song & Hill, 2007: 28).

Song and Hill (2007: 31) identified three additional constructs of SDL that are affected by an online learning environment, namely resources (with), strategies (which) and motivation (why). 'Resources' are both human and information resources that learners have access to further their learning. 'Strategies' are learning strategies that the learner uses in an online environment. These include, but are not limited to, learning how to communicate in writing rather than in person, whilst dealing with an asynchronous environment (see Song & Hill, 2007: 28). Song and Hill (2007) further consider motivation as an aspect of personal attributes that is influenced by the online environment. This

includes aspects such as absent presence, procrastination, or the tendency to be superficial in bulletin posts to meet the course requirements rather than to reflect deeply.

Song and Hill (2007: 31) added three important SDL concepts to their model, namely planning, monitoring and evaluating. 'Planning' refers to a feature of online learning that allows learners to plan and execute their activities at any time or place that is most convenient to them. This frees learners from restrictive timetables and venues dictated by the traditional classroom. 'Monitoring' refers to the responsibility of online learners to monitor their own learning processes, unlike the traditional classroom where the teacher can monitor their facial expressions or participation. Moreover, online learning platforms have built-in features to monitor learners' usage and coverage of information access. 'Evaluating' refers to the additional workload that teachers have in providing suitable feedback in online forums where peers discuss online questions. Surprisingly, Song and Hill (2007) do not isolate technology as one of the dimensions of online learning.

3.12. The Person, process, context (PPC) model

After 20 years of shared experience and development in the SDL literature, Hiemstra and Brockett (2012: 158–159) reconfigured their PRO model. The reason for the update was to "streamline some terminology and interrelationships among factors that over the years had become somewhat unclear" (Hiemstra & Brockett, 2012: 159). They particularly aimed to address the lack of context in the PRO model. The revised model has three elements, namely person (who), process (how) and context (where). 'Person' refers to "the characteristics of the individual, such as creativity, critical reflection, enthusiasm, life experience, life satisfaction, motivation, previous education, resilience, and self-concept" (Hiemstra & Brockett, 2012: 158). 'Process' refers to "the teaching-learning transaction, including facilitation, learning skills, learning styles, planning, organizing, and evaluating abilities, teaching styles, and technological skills" (Hiemstra & Brockett, 2012: 158). 'Context' refers to the "environmental and socio-political climate, such as culture, power, learning environment, finances, gender, learning climate, organizational policies, political milieu, race, and sexual orientation" (Hiemstra & Brockett, 2012: 158). The PPC model is not unique to SDL, as similar models have been used for many decades by business consultants and was most likely derived from Leavitt's (1965: 1144) diamond framework, namely:

- tasks – "the production of goods and services";
- actors – "refers chiefly to people …[and]…acts executed by people at some time or place";
- technology – "direct problem solving inventions like work-measurement techniques or computers"; and
- structure – "systems of communication,…authority (or other roles), and …work flow".

The revised model by Hiemstra and Brockett (2012) allows for new insights into the constructs of SDL, especially at the intersection between the three elements of people, process and context. For example, Hiemstra and Brockett (2012) suggest that the link between the socio-political environment and the individual learner holds much potential for future research. In this way, they "hope to clarify existing thinking about such learning, but to do so in ways that can help to delineate new directions for research and practice" (Hiemstra & Brockett, 2012: 159). More significantly, however, the revised PPC model (see Hiemstra & Brockett, 2012) does not consider the role of technology or online learning, especially in terms of place and time, or the availability of online or physical resources. It does cater however for technological skills under 'process' but not for the delivery of instruction in an online environment. Neither does this model cater for the content of learning, i.e. the topic, subject, lesson or knowledge competencies that are being studied.

3.13. Model of critical reflection through SDL

Wang and Cranton (2012) established a link between Mezirow's (1997) transformative learning and SDL through their revised model of critical reflection through SDL. This model illustrates the process of transformative learning of the learner's experience triggered by a disorienting dilemma. In their model, Wang and Cranton (2012) refer to Mezirow's (1991) levels of reflection. These levels indicate content reflection (what), process reflection (how) and premise reflection (why). For Mezirow (1991: 107–108), content reflection refers to "what we perceive, think, feel or act upon", process reflection refers to "how one performs the(se) functions" and premise reflection refers to "becoming aware of

why we perceive, think, feel or act as we do". The ability to reflect on these levels indicates self-directed learning. With the changed perspectives, learners can transform both their own understanding and their social situation (Wang & Cranton, 2012: 24). Although this model is contextual, Wang and Cranton (2012: 24) do not specifically refer to reflection based on context, i.e. where. In essence, however, the model can accommodate the other constructs as synthesised in Table 1. See Race (2006) for an elaboration of such a reflective model.

3.14. Model of resident SDL

Sawatsky *et al.* (2017: 3) derived a "broad theoretical model" of SDL from a grounded theory study of resident interns at a medical facility. Their model has five dimensions, namely person (who), process (how), context (where), motivation (why), and change over time (when), and was derived from the models of Brockett and Hiemstra (1991), Candy (1991), Garrison (1997) and Hiemstra and Brockett (2012). The person element "includes motivation, individual characteristics and change over time" (Sawatsky *et al.*, 2017: 5). 'Motivation' and 'time' extend across process and context. The 'context' element includes "external guidance, residency program structure, culture and barriers" (Sawatsky *et al.*, 2017: 6). The 'process' element comprises the SDL process practiced by the residents, i.e. "formulating learning objectives, using resources, applying knowledge, evaluating learning and uncovering knowledge gaps" (Sawatsky et al., 2017: 1). This process has much in keeping with the information acquisition process of Candy (2004). Time is an important component of Sawatsky *et al.'s* (2017) model, as residents indicated that they had developed over time, and that they required time for learning to take place. Motivation influences the context as well as the learning process. The value of Sawatsky *et al.'s* (2017) model is that it provided residents as well as for educators with a better understanding of the SDL process. Sawatsky *et al.* (2017) did not include the online and offline learning constructs of Candy (2004) and Song and Hill (2007).

4. DISCUSSION

A summary of the models that were reviewed is provided in Table 2 in the appendix. Table 1 provides a synthesis of these models based on the core constructs that were summarised in Table 2. Of the fourteen models that were reviewed and synthesised in Table 1:

- ten represent similar constructs (see Pratt, 1988; Brockett & Hiemstra, 1991; Garrison, 1997; Knowles *et al.*, 1998; Oswald, 2003; Stäuble, 2005; Song & Hill, 2007; Hiemstra & Brockett, 2012; Wang & Cranton, 2012; Sawatsky *et al.*, 2017);
- two represent a process of SDL (see Candy, 2004; Grow, 1991);
- one represents the domains of self-direction (Candy, 1991); and
- one represents a model of control (Long, 1988a).

Grow's (1991) model represents the stages of SDL, Long's (1988a), the tension between pedagogical and psychological control, and Candy's (2004) model, a knowledge acquisition cycle in online learning. For the purposes of this review, these last four models are not discussed further as they represent only a partial aspect of a comprehensive model for SDL.

Of the ten similar models, six models (the PRO model, SDL in online environments, PPC model, three-factor SDL model, the model of critical reflection through SDL, and the model of resident SDL) incorporate the common constructs of person (who), process (how) and context (where and when). These three constructs (person, process and context) are used by eight of these models and as discussed in detail above. These three constructs, therefore, represent the core constructs of SDL, without which a theory or model cannot be called SDL. The discussion below starts with additional insights into the above-mentioned three constructs and then moves on to the other constructs that were synthesised. The detail of this synthesis is contained in Table 1.

Table 1. Constructs of self-directed learning

Number	Model	Citation	Person	Process	Context	Purpose	Strategy	Subject	Resources	Time
1	Andragogy v s. pedagogy	Pratt (1988)	Confidence	Competence		Motivation	Dependence or independence			
2	Contextual model for SDL	Long (1988a)	Personality	Social	Contextual		Pedagogical control	Situational		
3	Staged self-directed elarning model (SSDL)	Grow (1991)	Teacher, learner				Stages of SDL			
4	Domains of self-direction	Candy (1991)	Personal autonomy	Learner control		Independent pursuit	Manage own learning			
5	PRO model	Brockett & Hiemstra (1991)	Personal orientation	Process orientation	Social context	Personal responsibility	Self-direction			
6	Dimensions of SDL	Garrison (1997)	Self-monitoring (cognitive responsibility)			Motivation (entering task)	Self-management (task control)			
7	Andragogy i n practice	Knowles, Holton & Swanson (1998)	Individual differences		Situational differences	Goals an d purposes (Individual, institutional, societal)		Subject matter differences		
8	Three-factor SDL model	Oswald (2003)	Cognitive control	Skill w ith S DL (process)	Contextual control	Motivation, willingness to direct one 's learning	Support, collaboration	Skill w ith content	Opportunity	

Number	Model	Citation	Person	Process	Context	Purpose	Strategy	Subject	Resources	Time
9	SDL in a digital age	Candy (2004)		*How* learners engage with online learning						
10	Model of lifelong learning	Stäuble (2005)	Knowing the learner	Understanding *how* to learn		Evaluating learning	Planning for learning			
11	SDL in online environments	Song & Hill (2007)	Personal	Process	Context	Motivation	Strategies		Resources	
12	PPC model	Hiemstra & Brockett (2012)	Person	Process	Context		Self-direction			
13	Model of critical reflection through SDL	Wang & Cranton (2012)	Learner's experience	Process		Premise	Critical reflection	Content	Disorienting dilemma	Learner changed
14	Model of resident SDL	Sawatsky et al. (2017)	Person	Process	Context	Motivation				Change over time
15	Elements of circumstances	Aristotle as cited in (Sloan, 2010: 240).	Who	How	Where	Why	Which	What	With	When

The 'person' construct (who) is represented in the ten cited models, either as person, personal, personality, individual, knowing the learner, learner experience, cognitive or psychological control, personal autonomy or personal orientation. See Table 1 under the 'person' column for a summary of these factors. Knowles *et al.* (2015) use Jonassen and Grabowski's (1993) study to identify a list of factors that can be taken into consideration when evaluating a person's orientation to learning, i.e. cognition, personality and prior knowledge or education. Demographics, as well as a number of related factors and variables that are currently evaluated under the SDLRS (Guglielmino, 1978), are also important for the 'person' construct.

The majority of the models include the 'process' construct, except for the SSDL, the 'dimensions of SDL' and the 'andragogy in practice' models. The process construct (how) is referred to as a process that explores either 'how students engage with learning', 'understanding how to learn', 'process orientation' or 'skill with the SDL process' (see Table 1). There are many alternative perspectives in education in terms of the learning processes with which students engage, such as self-regulated learning (Pintrich, 1995), experiential learning (Kolb, 1984), or reflective practice (Schön, 1987). The challenge in the application of the integrated model developed for this study was to identify and select a parsimonious set of factors and variables that comprise the 'process' construct. The 'process' construct therefore refers to *how* learning occurs.

Initially, andragogy and SDL were criticised for their lack of applicability across contexts (Song & Hill, 2007). In 2012, Hiemstra and Brockett updated their model to include context. Six of the models include the 'context' construct, namely the PRO model, the 3-factor SDL model, the andragogy in practice model, SDL in online environments, the PPC model and the model of resident SDL. The terms that are used by these models to refer to context are 'context', 'contextual control', 'social context' or 'situational differences' as summarised in Table 1. Pratt (1988) was the first to acknowledge that learners' self-direction is context-dependent, a concept he refers to as situational. He emphasised that different approaches are needed depending on the situation, the learner's needs, and the educator's desire for collaboration. Despite this acknowledgement of the importance of context, he was concerned that "we still lack a clear picture of how and when educators decide to use – or not use – collaborative methods, and with what effect" (Pratt, 1988: 164). The 'context' construct can therefore be represented by the place (where) learning occurs; however, in practice it is not possible to isolate place from the other contextual factor of time (when).

Interestingly, nine of the models incorporate a 'purpose' (why) construct, whether it is referred to as 'goals', 'motivation', 'independent pursuit', 'personal responsibility', 'premise', 'willingness to direct learning' or 'evaluating learning' (see Table 1). 'Purpose' represents the learner's need to know (Knowles, Holton & Swanson, 2005). For Knowles *et al.* (2015: 80), 'purpose' and its related term 'goals' fit into three general categories, namely individual, institutional and societal. The reason why 'purpose' might not be included as a separate element in the PPC model is that it is included under the 'person' element. For Knowles *et al.* (1998: 81), "goals and purposes are conceptually separate from the core andragogical assumptions" and "it is vitally important that they be analysed alongside the core principles". Considering how important purpose is to the concept of SDL and to education as a whole, it may justify being classified as a separate construct. 'Purpose' answers the question 'why' learning is important.

The next most frequently used concept across seven of the models is that of 'strategy'. 'Strategy' is related to the approach that learners take in managing their own learning. In terms of the existing models as summarised in Table 1, 'strategy' can be referred to as 'dependence or independence', 'stages of SDL', 'self-direction'', self-management', 'planning for learning', and also 'strategies'. In the case of Stäuble (2005), 'strategy' includes the planning for learning within which an educator may engage. For Song and Hill (2007), 'strategy' refers to the learning strategies that learners follow. Song and Hill (2007) recognise that online environments require different learning strategies from those used in traditional classrooms. Knowles et. al (1998) recognises that different types of subject matter, different situations or group learning all require different strategies. These occur at a micro level where local situations may foster greater self-directedness; for example, learners in an online environment may require a different approach than during face-to-face teaching, or at a macro level, different strategies are required to cater for societal influences. 'Strategy' in the integrated model refers to the approach or theories used for learning and was grouped under the 'which' construct (see Table 1).

'Resources' was used as a construct in the model of Song and Hill (2007) and by Oswald (2003: 26) under 'context' in terms of "those components of the learning environment over which the learner has control such as resources, peers, and other external factors". Song and Hill (2017) distinguish between human resources and information resources. Human resources comprise peers, instructors and other experts who assist and influence the learners' learning. Information resources refer to accessing information on line as well as evaluating the quality of such sources. This places considerable emphasis on the learners' information literacy skills, i.e. their ability to locate and evaluate the validity and reliability of sources. The tools, technologies and apps that could enhance SDL in this way also needs to be considered under the 'resource' construct. In the integrated model, resources are the tools, information sources, funding, and social support *with* which learning occurs.

Surprisingly, only the andragogy in practice model, the critical reflection model and the three-factor SDL model include the 'content' construct either as subject, knowledge, content reflection or skill (see Table 1). Knowles *et al.* (1998: 83) recognise that "not all subject matter can be taught or learned in the same way". This is an interesting finding, considering that education in a specific discipline, field or subject is one of the primary purposes of education. It is currently well known that a person's level of self-directedness depends on the subject or content. Pratt (1988) recognises the learner's need for information by providing the required support, but does not take into account 'instruction' as a separate construct in his model. Sawatsky *et al.* (2017) isolated the 'knowledge acquisition' cycle under their 'process' construct, but did not separate the specific subject matter as the focus. In the integrated model, the subject refers to *what* is learned.

'Time' is also an important construct in SDL, as learners knowledge and approach as well as their related skills, abilities and confidence in learning on their own change over time (Sawatsky *et al.*, 2017). Another temporal aspect recognised by Sawatsky *et al*. (2017) is the limit to the amount of time that learners have for SDL as a result of competing demands. Learners need to develop a balance between practice and SDL. Song and Hill (2007) also considered time an important construct in online environments as learners are able to direct their learning efforts at times that suit them. Time is related to the *when* element.

Some insights from the the previous representation of the core constructs or dimensions of SDL are that both educators and learners have varying degrees of control (or self-direction) in terms of any of the dimensions, and that they are inter-related. For example, in a formal learning environment, learners may not have much control over the broad education processes, but they always have control over their own learning processes. In terms of context, learners' choice of institution and major subjects limit them to the kind of learning environment that they will encounter; yet, they have the freedom to choose how to respond to such environments. Likewise, educators may vary their strategy in teaching a particular course even if the content is kept constant. Available time and resources will further affect the pace and depth with which learners will engage with the learning material, and the educator needs to cater for such variances across institutions, degrees and contexts.

As an extension to the synthesis of these models, the Elements of Circumstances by Aristotle (EN Aristotle, n.d., 1313a15–20) was used to particularise the constructs:

> the *who*, the *what*, around what place [*where*] or in which time [*when*] something happens, and sometimes *with* what, such as an instrument, for the sake of what [*why*], such as saving a life [*which*], and the *how*, such as gently or violently… And it seems that the most important circumstances are those just listed, including the '*why*' (Aristotle as cited in Sloan, 2010: 239-240).

These elements are contemporarily known as the five W's and H (see Wikipedia, "Five W's", n.d.) and are widely used in the field of learning, educational planning and curriculum design (Revans, 1980; Schubert, 1986; Harb, Durrant & Terry, 1993; King, 1993; Marsick & Maltbia, 2006; McCarthy & McCarthy, 2006; Race, 2006; Lattuca & Stark, 2011). These elements formed the basis of latter practices of casuistry in terms of case-based reasoning (Jonsen & Toulmin, 1988), by Race (2006) in his reflective framework, and by Mezirow (1991) as part of a reflective framework for transformative learning. Lastly, these elements are used by Wang and Cranton (2012: 24) in their model for critical reflection through SDL, and are therefore ideally suited as a framework for informing the theoretical constructs of SDL.

From this process, eight major constructs of SDL have been synthesised and classified according to Aristotle's elements of circumstances (see Sloan, 2010: 240), namely person (who), process (how), context (place or where), purpose (why), content (what), resources (with), strategy (which) and time (when). These parsimonious and mutually exclusive constructs allowed for the development of an integrated model of SDL that may assist in providing an improved understanding of the conceptual constructs of SDL. From such an integrated model, one may identify gaps or topics for further research; particularly research on identifying the core factors and variables that belong to these constructs, as well as evaluating the theoretical relationships between them. For example, Knowles (1975: 18) definition can be represented in terms of these constructs:

> [A] *process* [how] in which individuals [who] take the initiative, with or without the help of others [with], in diagnosing their learning needs [what], formulating learning goals [why], identifying human and material resources for learning [with], choosing and implementing appropriate learning strategies [which], and evaluating learning outcomes [why].

In this definition, it becomes easy to spot potential gaps such as context (where and when) when evaluated in terms of these constructs. Related research such as the domains of invitational theory (people, places, processes, programmes and policies) by Purkey and Novak (1992) and the capability approach (see Wells, n.d.; Sen, 1987; Van der Walt, 2016) may shed further light on the application of such a model across contexts. Future research should evaluate the relationships between these constructs and graphically depict an appropriate conceptual model for use by scholars. In addition, the philosophical roots of Aristotle's theory of responsibility (see Cooper, 2013) in terms of voluntary and involuntary action and Aristotle's concomitant elements of circumstances (Aristotle, n.d. EN) should be explored as a possible foundation for this integrated SDL model.

5. CONCLUSION

A broad search of the literature has revealed numerous models that refer to the core constructs of SDL. Due to the proliferation of such models over the past 40 years, it has become difficult to choose an appropriate model to apply in practice. This appears to have resulted in the use of the most dominant model and not necessarily the most comprehensive or representative model. These models require consolidation and evaluation in terms of their common constructs and theoretical basis. The study on which this article reports addressed the gap by reviewing fourteen of the most frequently used models and synthesising the core constructs that are central to the principles of SDL. This was achieved by reconciling similar concepts across ten of the models and highlighting significant differences compared to the other four. In conclusion, this proposed integrated model categorises the core constructs about which there is general agreement in the SDL literature. Each of these constructs requires further research to identify those particular sets of factors and variables that belong to them. Further research is also required to explore the theoretical and philosophical roots of such a model. Future research should also examine the practical application of such an integrative model in diverse contexts.

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APPENDICES

Table 2. Summary of SDL models and their constructs

No.	Model	Citation	Constructs
1	Andragogy vs. pedagogy	Pratt (1988)	Teacher dimensions: s upport, d irection. Learner quadrants: dep endency, c onfidence (knows w hat), competence (knows how), commitment (knows why)
2	Contextual m odel f or SDL	(Long, 1988a)	Psychological versus pedagogical control. Contextual, personality, social, situational
3	Staged self-directed learning model (SSDL)	(Grow, 1991)	Teacher: aut hority (coach), m otivator (guide), f acilitator (participates), c onsultant (delegator). F our learner stages: dependent, interested, involved and self-directed
4	Domains of s elf-direction	(Candy, 1991)	Personal a utonomy, willingness and ability to m anage one's o verall learning endeavours, i ndependent p ursuit of l earning without f ormal i nstitutional s upport or affiliation, and learner control of instruction
5	PRO model	(Brockett & Hiemstra, 1991: 25)	Personal responsibility orientation (why), process orientation (how), per sonal or ientation (who), s elf-direction (what), social context (where and when)
6	Dimensions of SDL	(Garrison, 1997: 22)	Self-management (task control) (how), self-monitoring (cognitive responsibility) (what), motivation (entering and task) (why)
7	Andragogy in practice	(Knowles, Holton & Swanson, 1998)	Goals and purposes for learning (individual, institutional, societal), i ndividual and s ituational d ifferences (individual, s ituational, s ubject matter), adul t principles (learners' ne ed t o k now, s elf-concept, pr ior ex perience, readiness t o l earn, or ientation t o learning, m otivation to learn)
8	Three-factor SDL model	(Oswald, 2003)	Learning situation (where), learner's attributes (who), components of learning (how)
9	SDL in digital age	(Candy, 2004)	Engaging w ith online l earning; l ocating i nformation and resources; evaluating the quality of digital resources; assimilating i nformation; r econceptualising understandings; and networking
10	Model of lifelong learning	(Stäuble, 2005)	Knowing the learner (who), planning for learning (what), understanding how t o learn (how), e valuating l earning (why)
11	SDL i n on line environments	(Song & H ill, 2007)	Personal (who), pr ocess (how), c ontext (where and when), r esources (with), s trategies (which), m otivation (why)
12	Person pr ocess c ontext (PPC) model	(Hiemstra & Brockett, 2012)	Person (who), process (how), context (where and when), self-direction (why)
13	Model of c ritical reflection through SDL	(Wang & Cranton, 2012)	Learner's experience (who), disorienting dilemma (with), content (what), pr ocess (how), premise (why), c ritical reflection (which), learner changed (when)
14	Model of resident SDL	(Sawatsky *et al.*, 2017)	Person (who), pr ocess (how), context (where), motivation (why), change over time (when)
15	Elements of circumstance	(Aristotle, Ethica Nicomachea, 1313a15–20)	"(1) t he Who, (2) t he What, (3) around what pl ace (Where) or (4) in which time something happens (When), and s ometimes (5) w ith what, s uch as an instrument (With), (6) for the s ake of w hat (Why), (7) such as saving a life (Which), and (8) the (How), such as gently or violently … A nd it s eems t hat t he m ost important c ircumstances ar e t hose j ust l isted, i ncluding the 'Why'" (Aristotle as cited in Sloan, 2010: 240).