**Gordon Institute
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Factors that drive student achievement in a school-level distance education ecosystem

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ABSTRACT

Distance education service providers, parents, and tutors need to know exactly what drives learners to achieve in a distance education ecosystem so that they can create the correct enabling environment for the learners. The aims of this research were to understand what a learning ecosystem is in the context of distance education, to determine the factors that drive student achievement in a school-level distance education ecosystem, and to gain a deeper understanding of these factors. Furthermore, this research aimed to discover which of the identified factors has a greater influence on achievement when combined with another factor. This would enable service providers, parents, and tutors to create a distance education ecosystem that ensures achievement.

A qualitative, exploratory research methodology was followed to gain new insights into the different factors that drive achievement in this unexplored area of study. Twenty semi-structured in-depth interviews were conducted with six tutors, six parents, and eight learners engaged in a distance education programme. The interviews were each analysed using thematic content analysis which took approximately 2.5 hours per interview.

The concepts of learning ecosystem and student achievement were defined in the context of distance education to gain an understanding of the participants' perceptions of these concepts. To guide stakeholders when setting up or reviewing a distance education ecosystem that ensures achievement, a framework was developed to assist stakeholders in understanding the factors that drive student achievement. The four themes that emerged and were presented in the framework are: Environment and support, Learner input, Resources and content, and Practice, assessment, and feedback. This framework is important for service providers, parents, and tutors in that they will be better informed to support a distance education student to achieve well academically.

KEYWORDS

Distance education, home education, home-schooling, ecosystem, student achievement, motivation, self-determination, self-regulated learning, academic support, environment, educational resources.

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination at any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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1.1 Introduction

South Africa finds itself amid an education crisis with the quality of basic education rated 126th out of 144 countries in the World Economic Forum's 2016-2017 Global Competitiveness Report (Schwab & Sala-i-Martin, 2016). Public school education is worsening and to add to this, the growth rate of public schools between 2007 and 2013 was only 0.1 % for quartile 1-3 public schools and 1.2 % for quartile 4-5 public schools (Department of Basic Education, n.d.-a). In comparison, private schools grew by approximately 6.4 %. Distance education (also known as home education) more than doubled between 2015 and 2016 from 16 068 to 32 216 learners (Statistics South Africa, 2017). Distance education is becoming a well-recognised and significant alternative to formal schooling and is growing at a phenomenal rate (Houston & Toma, 2003; Statistics South Africa, 2017). It provides an alternative to formal schooling and the decision to make use of distance education at a school-level is a utility-maximising choice for parents. Albert Einstein, Amadeus Mozart, George Washington, and John Stuart Mills are some famous examples of learners of distance education (Houston & Toma, 2003).

There are many higher education companies in South Africa that provide distance education, but only a few providers in the basic education phases, with Impaq being the largest provider of a curriculum based on the National Curriculum Assessment Policy Statements (CAPS) in South Africa. This company makes use of blended learning by combining hard copy or electronic learning materials with guided online learning, practice, assessment, and intervention (Impaq Education, 2018).

The South African Department of Basic Education (DBE) defines home education as an alternative to public or independent schooling where parents of learners of a school-going age provide learning to their children at home (Department of Basic Education, n.d.-b). Parents procure a curriculum from service providers (businesses) and teach their children using these materials. Parents are seldom trained teachers and use materials provided by these service providers to assist them in being learning facilitators. Parents often make use of third-party tutors to assist learners with specific or all subjects, especially when they are continuously struggling to explain difficult concepts or when their family situation requires that the parent works and they cannot forgo that income (Houston & Toma, 2003).

The South African Schools Act (Department of Basic Education, n.d.-c) does not specify a minimum qualification requirement for the parent or tutor to teach a distance education curriculum, nor is a specific curriculum provider specified. This exposes the distance education market to service providers that offer varying degrees of quality, often leaving parents and tutors confused about which offerings to choose. Without having a specified format in which learning needs to occur, parents and service providers (like tutors) need to use their own judgement in setting up a learning plan and learning environment for the learner. This is substantiated by the proposed amendments to the South African Schools Act that learners who make use of home-schooling for their grade 10-12 years (known as the Further Education and Training [FET] phase) may only use private or independent service providers that are registered with one of the assessment bodies (Republic of South Africa, 2017). The only instance in which distance education is accredited at school-level is when learners write the National Senior Certificate (NSC) through one of the accredited assessment bodies like the Department of Basic Education (DBE), the Independent Examination Board (IEB), or the South African Comprehensive Assessment Institute (SACAI). These exam boards are certified by Umalusi, the council for quality assurance in general and further education and training in South Africa (Umalusi, 2018). Many South African product and service providers state that they align their curriculum to the National Curriculum Assessment Policy Statements (CAPS) structures, assuring parents and tutors with a higher degree of certainty; but this is not an accreditation.

Robinson and Aronica (2015) explain education systems as complex adaptive systems consisting of a wide range of stakeholders: from learners and parents to politicians and publishers. The learning ecosystem can be described as a type of complex adaptive system and it specifically describes the ecosystem in which learning occurs. Crosling, Nair, and Vaithilingam (2015) further explain that from a higher education perspective, an education system is supported by six societal resources that form a creative learning ecosystem. These are: institutions, incentives, integrity, intellectual capital, infra- and info-structure, and interactions. Factors that are seen as parts of the learning ecosystem such as motivation, achievement, environment, self-regulation, and technology have been researched extensively in the higher education phase, but there is limited research that defines the influence of these factors on learning during the secondary and FET (grade 10-12) phases of the schooling years (Crosling et al., 2015; Henderson, Selwyn, & Aston, 2017; Ning & Downing, 2015; Parpala, Lindblom-Ylanne, Komulainen, Litmanen, & Hirsto, 2010; Schneider & Preckel, 2017; van Egmond, Berges, Omarshah, & Benton, 2017).

Parents choose distance education for their children for many different reasons: it may be the only option due to their physical location; the available formal public education may not meet their standards; they may want to be more involved in their child's education; or the decision may be influenced by socioeconomic characteristics like religion or their financial position (Houston & Toma, 2003). For some parents, distance education is thus a viable substitute to formal schooling, but it is difficult for parents to compare the quality of a distance education alternative to school (where the quality is governed by structures, policies, and outcomes). There is limited empirical theory that defines what the quality and achievement requirements of distance education are, or what drives success in distance education at a school level (Schwab & Sala-i-Martin, 2016). There is a need to establish what the different factors that drive achievement are in this type of learning so that service providers, parents, and tutors can ensure learners' success. This research will focus on grade 12 distance education learners. It will determine which factors influence achievement in a distance education ecosystem and to what extent these factors have an influence on each other.

1.2   The Research Problem

The aim of this research was to gain a deeper understanding of the factors that drive student achievement in a school-level distance education ecosystem, as well as which factors have the greatest influence on achievement and which factors have a possible relationship with other factors. This would enable parents and service providers to be better informed when creating a learning ecosystem that ensures achievement. For both the parent and the service provider, the exact type of ecosystem that needs to be created to achieve well in distance education is not known with certainty, which is a problem for the facilitator (parent or tutor). Classroom-based learning (formal schooling) has been defined in terms of the content that needs to be covered per grade/term/week/lesson; the amount of time required for instruction; practice; assessment; remedial methods; feedback dimensions; and teaching methodologies (Hattie & Yates, 2014). There is a need for knowledge regarding what an FET phase distance education learner needs in their learning ecosystem in order to to achieve well academically, and it requires further research as there is limited literature available about the factors that drive achievement in distance education at school-level.

Many aspects of distance education have been taken from traditional school ecosystems and applied to distance education, but there are new innovative teaching tools and

methods such as gamification, intervention through targeted practice, and blended and online learning that may not have been included in a home-schooling framework (Kwak, Menezes, & Sherwood, 2015; Simoes, Redondo, & Vilas, 2013). Other factors such as self-regulation, where learners manage their own learning so that they become truly effective in their studies, and achievement motivation towards academic goals, could play a substantial role in the academic success of a learner (Bjork, Dunlosky, & Kornell, 2013; Michou, Vansteenkiste, Mourtatidis, & Lens, 2014).

This research aimed to:

1. Establish the concept of a learning ecosystem in the context of distance education.
2. Establish the major factors that drive achievement in a distance education ecosystem.
3. Establish which of the identified factors are perceived to be the most influential.
4. Determine how the factors interact or affect each other within the distance education ecosystem.

In order to assist in the development of a deeper understanding of the factors that drive achievement and the influence of each, a conceptual framework was developed from the literature that was reviewed in Chapter 2 and presented at the end of the chapter. This conceptual framework was not discussed with the participants during the interview, but assisted in the discovery of findings and new insights throughout. This framework was further developed from the analysis and finally presented in Chapter 6 in fulfilment of the research questions posed in Chapter 3.

1.3   Significance of the Research

The research problem is significant both to academia and business. It aims contribute to theory that will improve educational practice and assist parents and tutors to better equip and support distance education learners by creating learning ecosystems that drive learners to achieve well academically. This study may also lead to further research as it may uncover various impacting factors that need deeper investigation.

Distance education product and service providers will benefit from this research as they will be better equipped with empirical evidence of factors that drive achievement for their

customers. They can adjust their offering accordingly when they understand what each of the factors that drive achievement are, as they will be able to assist learners to achieve better by providing an effective learning ecosystem offering.

1.4   Scope of the Study

The study focused only on grade 12 distance education learners, parents, and tutors in South Africa, and on the factors that contribute to their specific learning ecosystem. It excluded unschooling as a learning methodology, as this is believed to have substantially different requirements from distance education. It also excluded learners with disabilities or special needs as their learning requirements tend to differ from the average, able home education learner.

1.5   Research Purpose

The purpose of this research was to determine the factors that drive achievement in a distance education ecosystem, as well as which of those have a greater influence on achievement and possible relationships with other factors. Literature on achievement in school-level distance education is limited and this study aims to contribute to the literature. This research will enable service providers, parents, and tutors to better support and enable learners to achieve well in this learning ecosystem. Parents will be able to make better decisions when choosing distance education as an education method for their children as they will know what the basic requirements are in a learning ecosystem and will therefore be able to ensure that all the factors that drive achievement are present. In the same way, teachers will be better informed to create a learning ecosystem that drives learners to achieve well academically.

In the past, distance education product and service providers made use of school-based research or feedback from customers on the current available offering to determine how learners achieve success. This often resulted in missed opportunities or products and services that did not necessarily contribute to a distance education ecosystem that enables learners to achieve. This research will inform these providers on how to serve their market, as they will be able to offer services and products that will enable learners to achieve success.

1.6   Conclusion

The research will benefit distance education learners to achieve well academically in their learning ecosystem as teachers, parents, and distance education product and service provider businesses will be better informed as to the factors that drive achievement in the learning ecosystem. It will also contribute to the academic literature about distance education in South Africa by providing insights into that which drives achievement in a distance education ecosystem. The next chapter will consist of reviewing the literature on factors that drive achievement as well as how these factors influence each other.

CHAPTER 2: Literature Review

2.1 Introduction

There are many studies about classroom-based pedagogy and learning theories available in educational literature, but they are mostly theoretical in nature and rarely guide the reader in understanding how distance education learners would benefit from it. The theory of learning and its main constructs such as learning, experiential learning, vicarious learning, inferential learning, intellectual learning, and mindfulness have been clearly defined and established as a research area that can be applied to many fields (Chandler, 2015; Parpala et al., 2010).

In higher education, there has been a shift from a traditional educator-focused teaching approach to student-focused learning (Northey, Bucic, Chylinski, & Govind, 2015), but not so much in the educational phases that come before it. Education needs to meet the new demands of the twenty-first century and teaching models need to change to engage learners (Gupta & Jain, 2017). This chapter focuses on understanding the context that learners find themselves in – explaining firstly the concept of a learning ecosystem; secondly, distance education as an education delivery type; thirdly, student achievement; and fourthly, the different factors that drive student achievement. The chapter is concluded with a conceptual framework that illustrates the factors that drive student achievement in a distance education ecosystem.

2.2 The Learning Ecosystem

In ontological terms, an ecosystem is a system that consists of a community of biotic systems within a contained space (called a physical system). In more modern terms, it is the community of living organisms in its non-living environment. Over the years, the term has been given many different definitions in a variety of contexts (Gignoux, Davies, Flint, & Zucker, 2011). When using this term in education, the learning ecosystem also contains living and non-living components such as learning material, physical infrastructure, equipment (e.g., computers and stationery), teaching pedagogies, and more complex components such as the learner, the parent, and the teacher, each of whom has different complexities that are combined into the ecosystem and contribute to the quality of the education system (Crosling et al., 2015). In a study of 113 developed and developing countries, a high correlation was found between countries with higher

education learning ecosystems and countries with high quality education systems, indicating that the learning ecosystem correlates with high quality (Crosling et al., 2015). More research is required to better understand the factors that define a distance education ecosystem as there is limited literature about the distance education ecosystem at school level.

When looking at a school learning ecosystem, the South African Schools Act defines the basic requirements as the school infrastructure (classroom, electricity, water, sanitation, library, laboratories, sport and recreational facilities, electronic connectivity, and perimeter security), learning and teaching support materials (stationery and supplies, learning materials, teaching materials and equipment, apparatus, electronic equipment, and school furniture and equipment) and educators (Department of Basic Education, n.d.-c). It is thus clear which factors are important in a school learning ecosystem. In distance education at a school level, either a parent or a contracted tutor plays the role of an educator and is referred to as the facilitator, as the person is not necessarily a formally trained teacher and the content provided needs additional guidance for the facilitator to act as the educator. When a tutor is contracted to assist the learner on behalf of the parent, the parent is still the sole responsible party for the learner's education (Department of Basic Education, n.d.-c). The role-players in the distance and school learning ecosystems differ, as well as the role that each one plays. It may thus be that the factors that are important for distance and school learning ecosystems are substantially different.

2.3   Distance Education as an Education Method

Learning has been defined as the active process through which a learner makes sense of things they come across in order to build a comprehensible and organised knowledge base for themselves. There are different teaching methods including 'student-centred', 'discovery-based', and 'inquiry-based' methods, all of which are classified as constructivist teaching methods as opposed to passive teaching methods or lecture-based learning (Baeten, Dochy, & Struyven, 2013). Distance education as a method of learning is growing in popularity in South Africa and also in developing countries as technology becomes more accessible and traditional teaching methods are being challenged with innovative ways of learning (UNESCO, 2002). In the South African context, this method of learning during grades 1 to 9 is colloquially referred to as home education and during grades 10 to 12 as distance education or distance learning. Keegan

(2002) states that the term "distance education" consists of both distance learning (maximum learner cognition) and distance teaching (delivering instruction), but colloquially, the terms distance education, home-schooling, and home education are used interchangeably. Home-schooling is most often used in the South African context. Distance education bridges the large issue of mobility by using the internet (especially multimedia and assessments) and also affords learners more flexibility to work when required and study in their free time (Bryant, Kahle, & Schafer, 2005). There are many studies discussing the reason for parents choosing distance education for their children as an alternative to public schooling, private schooling, or unschooling. Distance education is more focused on the learner's individual learning style, the learner's existing knowledge and expertise, his or her learning plan, and providing feedback and interaction in order to consider the learner's needs (Bryant et al., 2005; Houston & Toma, 2003). The reasons range from the influence of the mother's education, the state of public schools, religious preferences, and the cost of tuition.

Keegan (2002) defines the elements of distance education in higher education as the quasi-permanent separation of the teacher and learner for the period of learning, an education provider that assists with the planning and preparation of study materials and support, technical media to connect the teacher and learner (including print, audio, video, or computers), communication between the teacher and learner (both ways), and the quasi-permanent absence of a learning group for the period of learning (there may be intermittent meetings). Online learning is only a delivery method of learning and not learning in its own right. Students do not necessarily use these resources if they are not proactive about how they self-regulate their learning (Chen, Chavez, Ong, & Gunderson, 2017).

The South African Schools Acts states that a learner must attend school from the first day of school in the year the learner turns seven until the last day of school of the year that the learner turns 15. This means that it is compulsory to attend school from grade 1 to grade 9; this is referred to as basic education (Department of Basic Education, n.d.-b). A learner must thus either attend a public school or an independent school (private), or be registered at the Department of Basic Education as a home-school learner. The phase after formal basic education is known as the Further Education and Training (FET) phase and is completed by passing the National Senior Certificate (NSC) qualification at the end of grade 12. The grade 12 year is the culmination of the learner's school-going career and learners are able to give a full account of their learning experience by this year.

Even though distance education does not in its traditional definition include technology, it is becoming an enabler which has already become more entrenched into the education industry than ever imagined (Bryant et al., 2005). In a more recent study, Seaman, Allen, and Seaman (2018) describe distance education as a type of education in which one or more technologies are used to deliver education; some of these technologies being the internet, broadcasting, and physical devices such as DVDs. More and more universities are digitising their curricula and courses onto interactive learning platforms; some even publishing them for free on massive open online course (MOOC) platforms. There is an overall drive towards online learning as it is becoming more manageable and accessible than ever (Yu & Hu, 2016). In South Africa (January 2018), more than 67 % of the population owns a mobile phone and 54 % of the population have access to the internet through their phones (up from 52 % in January 2017), indicating that access to technology is increasing (Kemp, 2018). In an article by the World Economic Forum (Pota, 2015), distance education was named as one of the three things that will fix education in Africa as it opens new possibilities. An example of a group that will benefit are young girls that have had to drop out of school to run a household.

2.4   Student Achievement

Schoen (2015) explains that an individual typically has two conflicting needs in life of which one is the need to achieve and the other, the need to avoid failure (also seen as harm avoidance). These needs are both triggered during difficult situations but are in conflict with each other as an individual wants both to achieve and to avoid failure. The fear of failure sometimes becomes so strong that an individual that can perform well will avoid challenges, which may in turn limit their potential. Academic achievement is also portrayed as the result of self-regulated learning (Winne & Nesbit, 2010).

2.4.1   Attainment

There is some debate as to the difference between attainment and achievement. Attainment is the action of reaching an intended state. Specifically, in educational terms, this means to reach a level of knowledge that a learner was intended to reach. It is the fulfilment of educational purposes (McIntyre & Brown, 1978). To describe a learner's educational attainment, one has to know both the learner's abilities and knowledge, and that which learner was intended to learn. In the context of this study, achievement and attainment both refer to a learner reaching an intended goal. For the purpose of this

study, the term 'achievement' will be used as it is the preferred term for reaching academic goals (grades), whereas attainment is more often used to refer to getting an education level or not (school, university).

2.4.2 Academic achievement

Academic achievement is defined as the performance outcomes that a learner needs to reach. Meece, Andermann, and Andermann (2006) explain that there are two thinking patterns when it comes to achievement. The first is the goal theorist view, where purposeful, intentional, and directed behaviour is seen to attain a certain goal. The second is an achievement goal theorist view which focuses on goals that involve the development of competence. With the achievement goal theory, being able to judge competence is thus essential. How competence is measured in classrooms differs due to evaluation standards being used. The attainment of these outcomes indicates the extent to which the learner achieved specific goals that were the focus of activities in an instructional environment such as a school, university, or college (Schneider & Preckel, 2017); however, according to Meece et al. (2006), it is important to know which goals that environment sets.

Looking deeper into achievement goals, Meece et al. (2006) list mastery and performance as two goal orientations. The mastery goal is achieved when a learner develops their ability by mastering a new skill and success is reached when the learner derives satisfaction and self-improvement. Mastery goals are known to be associated with a positive perception of the learner's academic ability and their self-efficacy. The performance goal is achieved when a learner demonstrates higher ability related to peers, aiming to be better than them. For this goal orientation, doing better than others and the average standard creates a sense of accomplishment. Unfortunately, performance goals are associated with surface-level learning strategy and not with conceptual understanding found in deep or strategic learning approaches; however, they are positively associated with achievement outcomes.

Hattie and Yates (2014) explain that humans will exert strong efforts to perform at high levels, but only do this once they become confident enough that the goals are worth the time and effort spent, as humans are highly selective in what they pay attention to. This explains natural curiosity when there are knowledge gaps, but an averseness when the person feels that the gap is too big to close. Adding to this, an individual will engage in an achievement task more often when they expect that they could do it well (achieve it)

and that there is value in it for them (Meece et al., 2006). Winne and Nesbit (2010) confirm that when a learner has the self-concept of ability, they are more inclined to show interest which mediates achievement, but that having mastery goals and values for future enjoyment only increases interest and not necessarily achievement.

To be able to gauge levels of achievement, achievement must be measurable; one must be able to track a learner's development and the effectiveness of the learning ecosystem (Finn et al., 2014). The general factors that indicate academic achievement are knowledge gained within the educational system and grades and marks received on achievement tests. Achievement is affected not only by instruction by teachers, whether learning occurs online or offline, assessments, prior knowledge and intelligence of the learner, the learner's own learning plans, and their motivation, personality and personal context, but also by their social interactions and student-directed activity (Schneider & Preckel, 2017), which could be minimal in a distance education setting and needs to be addressed in another way.

2.4.3   Confidence and academic achievement

Confidence is measured on three levels, namely self-esteem, perceived competency, and self-efficacy. There is a high correlation between good (not elevated) self-esteem and academic achievement. Teachers play an important role in developing self-esteem, which could be a factor that drives achievement that is not cultivated in a distance education ecosystem. Learners who achieve success at school gain overall academic self-concept (perceived competency). Self-efficacy is the realistic self-assessment a person makes about their capacity to be successful in their next task. It is necessary to nurture all three of these types of confidence in the learning environment (Hattie & Yates, 2014).

2.4.4   Method of instruction and academic achievement

Hattie (2009) highlights that any additional increment of instructional method or tool has an influence on achievement even though it might not be the optimal effect and it should not be accepted that the teaching method is necessarily acceptable. Whether the method has more effect on achievement than others should rather be the measurement of success. Schneider and Preckel (2017) explain that the effectivity of courses is strongly related to the actions of the teacher (called the microstructure of instruction) which

depends greatly on how the teacher implements teaching on a micro-level (even as far as how text is displayed in presentations). By making slight updates to how the materials are presented to learners, the instructional quality can greatly be improved. This includes principles like asking open-ended questions, encouraging open dialogue, and respecting learners (Schneider & Preckel, 2017). Previous knowledge, past achievements, and the learner's strategy for learning and preparation also have a positive effect on achievement (Schneider & Preckel, 2017).

2.5 Factors that Drive Student Achievement

The various factors that could drive achievement are discussed below. Some of the factors relate specifically to school-based learning whereas others do not specify the type of learning. The sections discussed will be grouped around the learner, the environment and support, practice, assessment and feedback, and the availability of resources.

2.5.1 Learner behaviour

The learner's behaviour consists of the motivation a learner has, the self-regulated learning a learner applies, and the non-academic side of a learner's life.

2.5.1.1 Motivation

A former Secretary of Education in the United States, Terrel Bell, stated that there were three things to remember in education: "The first is motivation. The second one is motivation. The third one is motivation" (Covington, 2000). A person's behaviour is motivated either by a stimulus or to achieve a specific goal (O'Doherty, Cockburn, & Pauli, 2017). Pavlovian or classical conditioning occurs when a person learns to predict when these stimuli will occur and leverage this predication to initiate the right response or behaviour. Contrary to this type of behaviour, goal-oriented behaviour is more prospective as it can be planned. Van Egmond et al. (2017) state that goal-directed behaviour as well as intentional action and gratification delay need to be present on a psychological level to pursue an education. How and why learners become goal-oriented lie entrenched in motivation which is determined by their hierarchy of needs as defined by Maslow (1943). Motivation theory has since been developed further by Ryan and Deci (1985) and termed the self-determination theory, and they also went on to describe the

effects that rewards have on motivation (Ryan & Deci, 2000).

Self-determination theory defines that a person is intrinsically motivated because the tasks at hand are inherently interesting or enjoyable for a person to do (also for personal importance), whereas extrinsic motivation (also referred to as controlled motivation) has some expected outcome that drives the person to do the task (Baeten et al., 2013; Ryan & Deci, 2000). Student motivation is conceptualised through the self-determination theory (Baeten et al., 2013). Intrinsic motivation has been defined as an important part of education as it can lead to high-quality learning and self-directed pursuit of goals (Baeten et al., 2013; Ryan & Deci, 2000; van Egmond et al., 2017). Bryant et al. (2005) refer to self-regulation as a motivator when learners develop goals and motivate themselves to achieve those goals, and to self-efficacy when the learner believes that they can achieve the goal. When applying basic psychological needs to education, a learner has the need for autonomy (psychological freedom in learning), the need for competence (feeling that they are learning effectively), and the need for relatedness (friendships and a closeness to peers). The learner's autonomous motivation can be improved when the learning environment is structured and provides the support and involvement of a teacher (Baeten et al., 2013). A learner's intrinsic motivation in school is generally regarded as the main cause of academic achievement and has been noted to decrease towards the end of the compulsory schooling years (Weidinger, Steinmayr, & Spinath, 2017). Intrinsic or autonomous motivation can be increased if a teacher provides support, structure, and involvement in the learning environment (Baeten et al., 2013). Research about the relationship between intrinsic motivation and learners' grades in schools has increased, but there are still many open questions.

Further research shows that the motivation to learn has been identified as a predictor of learning outcomes like higher course satisfaction, increased declarative knowledge, and better performance by the learner (Garaus, Furtmuller, & Guttel, 2016). This theory may be used to determine what it is that motivates learners to engage better with a learning platform. Some studies have been conducted about learner motivations; however, they are centred specifically in higher education (Harackiewicz & Priniski, 2018).

Motivation theorists often focus on the processes that are followed by a person to explain their goal-directed activities. Motivation theories are most often used to explain learners' choice of activity, their level of engagement, and their performance in school when looking at educational research (Meece et al., 2006). In early research, motivation was often explained as drives, instincts, motives, or internal traits. In later research it leaned

towards behaviour based on the possibility of a reward. More recent research focuses on the social-cognitive processes around motivation in which the achievement goal theory is situated.

Some learners are not necessarily motivated by academic achievement. Past studies have shown that external, tangible rewards undermine self-directed motivation, as individuals choose to act on external rewards rather than on internal motivations (Garaus et al., 2016). Gamification can be used to induce motivation for non-motivational activities as rewards have been found to be successful motivators to reach or surpass a specific criterion or achievement that was fixed in advance (Frey & Gallus, 2017; Simoes et al., 2013).

2.5.1.2 Self-regulation

Self-regulation is a neurobiological function that develops from a very young age and is often used when testing for school readiness (Blair & Cybele Raver, 2015). Self-regulation is defined as a learner's ability to actively monitor and regulate his or her own learning by using a range of cognitive, metacognitive, and behavioural strategies (Ning & Downing, 2015). Achievement goals influence a learner's school achievement through variations in the quality of cognitive self-regulation as self-regulation must be taught to learners (Chen et al., 2017; Covington, 2000; Winne & Nesbit, 2010). Some self-regulating behaviours include exerting effort on a task, managing the resources available to them, organising and processing newly gathered information, and testing themselves. A learning strategy of self-regulation is goal-setting which is spurred by the motivation of a learner (Maslow, 1943). It has been found that higher academic achievers apply self-regulation learning strategies more often than learners who do not achieve as well (Ning & Downing, 2015). Students' responsibility for their own learning is increased in student-centred learning environments as their intrinsic motivation is enhanced (Baeten et al., 2013).

Learners can be classified into one of four differential self-regulated learning strategy orientations. These are competent self-regulated learners, cognitive-oriented self-regulated learners, behavioural-oriented self-regulated learners, and, lastly, minimal self-regulated learners. Compared to their peers, learners that fall in the competent profile show the highest levels of self-concept, motivation, and attitude, and the lowest levels of test anxiety (Ning & Downing, 2015). Overall, they demonstrate the best academic performance. This leads one to believe that enabling learners to monitor their progress

and evaluate themselves could lead to greater academic success. When a learner understands how the unique storage and retrieval process of the human memory works and how they can manage their own learning effectively, they can improve their self-regulation (Bjork et al., 2013). A learner's prior achievement is usually the best predictor of his or her future achievement (Desforges & Abouchaar, 2003).

Self-regulation research also highlighted a relationship between learners' perception of their learning experience and their self-regulated learning strategy orientation (Ning & Downing, 2015). When a learner is able to foster emotional intelligence, they often see improved academic performance. Emotional intelligence reduces learning anxiety which is a natural aspect of school. Anxiety interferes with cognitive performance and should therefore be kept as low as possible. Some schools have social-emotional learning (SEL) programmes to help learners improve their emotional intelligence (Wang et al., 2016).

2.5.1.3 Non-academic activities

Another aspect to consider is the participation of the learner in non-academic activities. This consists of sport, social, culture, and leisure. The developmental consequences of extra-curricular activities are the acquisition of social, physical, and intellectual skills as well as a sense of belonging to a community and having supportive social networks (Dumais, 2006; Eccles, Barber, Stone, & Hunt, 2003). There are strong links between involvement in extra-curricular activities and educational attainment in later years of life for learners. It has also been linked to increased self-concept, engagement, aspiration, and educational achievement.

2.5.2　Environment and support

This study area consists of the learning environment, the support and involvement of parents, academic support and teacher involvement, peer support and learning, and career guidance.

2.5.2.1 The learning environment

In ontological terms, an ecosystem resides in a physical space which is referred to as the environment (Gignoux et al., 2011). When comparing an ontological ecosystem to a learning system, the environment is the physical space where learning takes please,

whereas the ecosystem is the collection of all the different elements required. The learning environment and learning task are separated from each other. The physical learning environment consists of a range of physical properties of the place where teaching and learning occurs. These physical properties are the materials and tools, the attributes of the built environment (lighting conditions, thermal conditions, volume, arrangement), natural spaces, and people who are present (Choi, van Merrienboer, & Paas, 2014). For this study, the materials and tools and the people in the physical learning environment will be discussed separately from the built environment. The physical environment has an effect on learning cognitively, physiologically, and affectively. Negative effects of the physical environment should always be minimised to reduce the extraneous load on the learner. The environment should thus aim to have low noise (visual and audible), correct oxygen and temperature levels, correct luminance and colour levels, and special distance (Choi et al., 2014). A physical learning environment may not only have a positive influence on a learner, but the opposite is also relevant in that non-conducive environments can cause anxiety, diminished motivation, and a feeling of helplessness in learners which can impair their functions (Parpala et al., 2010).

A learner's approach to learning can be divided into three approaches: a surface approach (concentrating on the text itself), a deep approach (focusing more on the meaning of the text), and, lastly, a strategic approach (focusing more on the learner's level of organisation; Parpala et al., 2010). Parpala et al. (2010) found that a learner's learning approach is related to the perception the learner has of the learning environment, suggesting that the environment has a definitive influence on how the learner learns.

Learners' perception on their teaching-learning environment is measured with 6 factors: teaching for understanding, alignment, staff enthusiasm and support, interest and relevance, constructive feedback, and support from other learners. This also relates to some of the elements that lead to achievement. When a learner's perception of their learning environment is positive, it is related to a deep approach, whereas a negative perception is related to a surface approach (Parpala et al., 2010). It was noted that the term learning environment was often also described as the learning experience. Tapola and Niemivirta (2008) support the importance of the student's perceived classroom context and even makes strong causal claims about its influence on personal goals. This research conducted by both Parpala et al. (2010) and Tapola and Niemivirta pertains to undergraduate students, making it important to understand which of these factors relate to distance education too, as staff enthusiasm may play a smaller part, whereas interest

and relevance may play a more important role in motivating learners.

Winne and Nesbit (2010) argue that learning can be improved by reducing extraneous cognitive load. This can be done by removing unnecessary information for the learner, focusing the learner's attention, and keeping concepts that are related close to each other so that they are mentally integrated. They also add that reducing the class size tends to raise student achievement in a non-linear relationship; smaller classes' improved learning outcomes are strongly mediated by the sense of belonging and social and academic engagement felt by the learner.

Many studies have been conducted to investigate how environmental factors can be designed to create an environment that promotes learning. A consortium of researchers combined these studies into a set of 25 heuristics that describe the design for instruction (Winne & Nesbit, 2010). Many of the heuristics listed are defined by the curriculum provider and are automatically accepted with the choice of provider in a distance education setting. Some of them can be altered by the educator to promote learning. Table 1 lists the 25 heuristics with a brief description of each.

Table 1. Heuristics that promote learning.

#	Heuristic	Description
1	Contiguity effects	Ideas that need to be associated should be presented contiguously (together in sequence) in space and time.
2	Perceptual-motor grounding	Concepts benefit from being grounded in perceptual motor experiences, particularly at early stages of learning.
3	Dual code and multimedia effects	Materials presented in verbal, visual, and multimedia form richer representations than a single medium.
4	Testing effect	Testing enhances learning, particularly when the tests are aligned with important content.
5	Spacing effect	Spaced schedules of studying and testing produce better long-term retention than a single study session or test.
6	Exam expectations	Students benefit more from repeated testing when they expect a final exam.
7	Generation effect	Learning is enhanced when learners produce answers compared to having them recognise answers.
8	Organisation effects	Outlining, integrating, and synthesising information produces better learning than re-reading materials or other more passive strategies.
9	Coherence effect	Materials and multimedia should explicitly link related ideas and minimise distracting irrelevant material.
10	Stories and example cases	Stories and example cases tend to be remembered better than didactic facts and abstract principles.
11	Multiple examples	An understanding of an abstract concept improves with multiple and varied examples.
12	Feedback effects	Students benefit from feedback on their performance in a learning task, but the timing of the feedback depends on the task.
13	Negative suggestion effects	Learning wrong information can be reduced when feedback is immediate.
14	Desirable difficulties	Challenges make learning and retrieval effortful and thereby have positive effects on long-term retention.
15	Manageable cognitive load	The information presented to the learner should not overload working memory.
16	Segmentation principle	A complex lesson should be broken down into manageable subparts.
17	Explanation effects	Students benefit more from constructing deep, coherent explanations (mental models) of the material than memorising shallow, isolated facts.
18	Deep questions	Students benefit more from asking and answering deep questions that elicit explanations (e.g., why, why not, how, what if) than shallow questions (e.g., who, what, when, where).
19	Cognitive disequilibrium	Deep reasoning and learning are stimulated by problems that create cognitive disequilibrium, such as obstacles to goals, contradictions, conflict, and anomalies.
20	Cognitive flexibility	Cognitive flexibility improves with multiple viewpoints that link facts, skills, procedures, and deep conceptual principles.
21	Goldilocks principle	Assignments should not be too hard or too easy, but at the right level of difficulty for the student's level of skill or prior knowledge.

22	Imperfect metacognition	Students rarely have an accurate knowledge of their cognition, so their ability to calibrate their comprehension, learning, and memory should not be trusted.
23	Discovery learning	Most students have trouble discovering important principles on their own, without careful guidance, scaffolding, or materials with well-crafted affordances.
24	Self-regulated learning	Most students need training in how to self-regulate their learning and other cognitive processes.
25	Anchored learning	Learning is deeper and students are more motivated when the materials and skills are anchored in real-world problems that matter to the learner.

Note. Adapted from "The Psychology of Academic Achievement", by P. H. Winne and J. C. Nesbit, 2010, *Annual Review of Psychology, 61*, p. 656.

Some of the heuristics such as contiguity effects, the segmentation principle, and the Goldilocks principle are addressed in the specific curriculum and content used. Other heuristics such as dual code and multimedia effects, the generation effect and organisation effects can be influenced by the facilitator to improve learning.

2.5.2.2 Parental support and involvement

Desforges and Abouchaar (2003) studied the effect of different components of parental involvement on achievement in learners. They identified four components of parental involvement: parental aspirations (parents' hopes and expectations for the learner), parent-learner communication about school, the home-structure (level of discipline enforced by the parent to complete homework and study), and the parent's participation in any school-related activities. They found that parental involvement in school activities had no influence on achievement, whereas the home structure had a small negative effect on achievement. Parent-learner communication had a moderate effect and the parents' aspirations had a powerful influence on achievement. A parent's hopes and expectations for their child thus had the biggest impact on the learner's achievement. Avvisati, Gurgand, Guyon, and Maurin (2014) add that the attitude of parents and their involvement in school have an influence on educational success. This impacts the student's truancy, behaviour, work effort, conduct, and academic achievement, and builds on the psychology literature that suggests that cognitive skills are harder to change than behaviours.

Desforges and Abouchaar (2003) found that the element that is most closely associated with improved cognitive attainment in early years is parental involvement in learning activities at home. They further expand the parent's role into one of support provided by parents in education outside of schooling matters, and this form of parental involvement

is most strongly related to achievement (Desforges & Abouchaar, 2003). The presence of 'at-home' parenting is highlighted as having a significantly positive effect on learners' achievement. They also point out that one of the important forms of parental involvement is providing the learner with a secure and stable environment. They conclude their study by proposing that the achievement of learners can be enhanced if everything that is known about parenting is applied methodically. This is supported by Avvisati et al. (2014) in their study about parental involvement in schools.

The relationship between the parent and the facilitator (teacher in the school environment) is also important, especially the level of communication. Parents and teachers communicating regularly does not have an effect in itself; the effect occurs only when the content of their communication consists of school-related matters (Desforges & Abouchaar, 2003).

2.5.2.3 Academic support and teacher involvement

In distance education, the role of a teacher is often referred to as a 'facilitation' role, as a learner does not necessarily have instruction time with a teacher but is rather guided through his or her learning journey (Bryant et al., 2005). There are debates in the field of instruction science around whether learners should be left on their own to discover knowledge or whether a teacher should be involved in the learning environment to tell learners what they need to know (Lee & Anderson, 2013). It is referred to as the assistance dilemma. Lee and Anderson (2013) suggest that the contrast between the two extremes should rather be viewed as a continuum. When the learning is more difficult, the rate of learning slows down, but the long-term retention and transferability improves.

On the one end of the continuum, learners are encouraged to explore and construct knowledge from what they discovered. The approach on this side of the continuum is based on the constructivist theory of learning (Jean Piaget's work is often referenced as a basis of constructivism). Piaget (1973) explains: "To understand is to discover, or reconstruct by rediscovery, and such conditions must be complied with if in the future individuals are to be formed who are capable of production and creativity and not simply repetition" (p. 20). Discovery learning is also believed to improve the positive attitude of learners towards their learning domain. These discovery approaches do, however, still require an amount of guidance and are therefore referred to as minimal guidance compared to the other end of the continuum. By only following the discovery learning

approach, learners could miss the important principles that they were expected to learn and may waste valuable learning time by struggling on their own. It was found that discovery learning, when partnered with high levels of practice, can be effective (Lee & Anderson, 2013).

In other studies, it was found that direct instruction was more effective than discovery learning; particularly in more complex fields (Lee & Anderson, 2013). A learner's previous experience also plays a role in which instruction method is more suited to him or her. With direct instruction, learners respond well to comparisons or to using examples. They also learn better when they are given step-by-step solutions when practising problem-solving. Both discovery learning and direct instruction thus have advantages and should be combined in order to gain benefits from both. By combining discovery learning with follow-up direct instruction, better learning occurs. No evidence was provided for the notion that direct instruction needs to be verbal; instead, learning in problem-solving areas is primarily examples-based. It is therefore important to have both approaches present in learning.

Table 2. Advantages and disadvantages of providing academic instruction to a learner.

Advantages	Disadvantages
Provides correct solutions and explanations	Solution methods may be rotely learned and poorly remembered
Guides students to material to be learned	Discourages learning that goes beyond the instruction
Identifies critical features in the examples	Prevents students from testing the adequacy of their understanding
Makes time efficient by reducing floundering and irrelevant search	Processing verbal instruction can pose a comprehension burden
Reduces working memory demands created by managing problem solving	Splits attention when multiple sources of information are not integrated

Note: "Student Learning: What Has Instruction Got to Do With It?", by Hee S. Lee and John. R. Anderson, 2013, *Annual Review of Psychology, 64*, p. 464.

There is a strong correlation between course achievement and a student's perception of instruction. The three dimensions with strong links are: instructional clarity which pertains to explanation and use of examples, instructional organisation which pertains to the

effective use of class time and achieving the course objectives, and, lastly, the instructor's or teacher's expressiveness which pertains to eye contact with students and the ability of the instructor to speak with empathy (Wang, Pascarella, Nelson Laird, & Ribera, 2015). A learner will have increased learning pleasure when there is empathy between the learner and the teacher (Bryant et al., 2005).

The teacher is seen as a very important part of a learning ecosystem. Expectations set by a teacher for learning can have a positive or negative effect on a learner's performance and achievement. Expectations can be set through learning opportunities offered and the content to be covered. The effects can be categorised as sustaining expectation effects or self-fulfilling prophecy effects. Sustaining expectations are ongoing expectations to continue achieving in an established pattern, whereas the self-fulfilling prophecy effect occurs when an earlier erroneous belief is fulfilled (Rubie-Davis, Hattie, & Hamilton, 2006). The self-fulfilling prophecy effects are named according to their attributes: a positive and desirable effect as a result of high teacher expectation is called the Galatea effect, and a negative, undesirable effect due to low expectations from a teacher is called the Golem effect. The Galatea effect augments student achievement as learners achieve the high expectations that were set for them.

Another argument for why teachers' expectations have an effect on achievement is that teachers are usually very accurate in what they expect from a learner. Their accuracy limits the effects of the self-fulfilling prophecy and rather predicts achievement than cause it. Jussim and Harber (2005) explain that the accuracy and power of teachers' expectations are inversely linked: as accuracy increases, the self-fulfilling prophecy's potential decreases, and vice versa.

Baeten et al. (2013) state that instructional guidance is necessary in education, specifically with learners that are just starting their studies. When a learner's long-term memory increases, it can replace the need for instructional guidance. There is both a need for teachers to create structure and for students to study by themselves and go on a journey to understand their own role in their education. Baeten et al. explain that by improving the learning environment through better teacher support (viewing things from a learner's perspective), structure (setting clear expectations and guidelines), and involvement (showing concern and warmth), the autonomous motivation of a learner can be enhanced. This also includes using less controlling language, acknowledging the learner's feelings, and reducing the pressure associated with extrinsic rewards. In distance education, teacher-learner interaction is seldom and, therefore, additional ways

need to be researched in order to improve the learning environment.

2.5.2.4 Peer support and learning

Learners learn a lot through having to take what they understand, organise their thoughts, and explain it back to a peer. They also learn when a peer explains something to them. A learner tends first to ask a peer if they do not understand something rather than ask a teacher. Through this, learners share an experience and make learning more enjoyable. This process helps them to better organise and plan their learning activities, collaborate with peers, and learn to evaluate and give feedback. Peer learning has many outcomes of which some of the most prominent are: learning how to work with others; being able to critique one's own thinking and reflect on one's thinking; improved communication skills with regard to knowledge, understanding, and skill; and self- and peer-assessment (Boud, Cohen, & Sampson, 2013). Learners may also set higher achievement goals for themselves when they befriend peers who set a norm for them (Cohen & Sherman, 2014).

2.5.2.5 Career guidance

An important aspect of self-regulated learning is that a learner receives sufficient career guidance so that they have the ability to make the correct decisions. Shevlin and Millar (2006) explain that it is very important for learners to receive career-related information in order to make a successful career decision. By having this type of information, a learner is able to develop self-awareness and identify opportunities. Even though this is such an important aspect of learning, many teachers feel that they are unable to give the correct career guidance to their students (Schenk, Anctil, Smith, & Dahir, 2012). Career guidance needs to prepare learners for a meaningful career. In the South African school space, learners need to choose their elective subjects in their grade 9 year. These subjects are then carried throughout their grade 10-12 years and are used for applications to jobs or tertiary institutions. Learners already need career guidance at this point to assist in their decisions.

2.5.3   Practice, review, and feedback

Expert performance results mainly from accumulated deliberate practice in the form of structured activities that are specifically created to improve performance in a specific

area (Macnamara, Hambrick, & Oswald, 2014). This, too, relates to academic performance or achievement. Macnamara et al. (2014) found that 96 % of variance in performance was explained by deliberate practice.

Lindsey, Shroyer, Pashler, and Mozer (2014) highlight two areas that are interesting when considering memory and knowledge retention in the long run. Firstly, by distributing or spacing the repetition of material in class, learning can be improved, and secondly, personalising what the learner needs to review improves the effectiveness of review. This is confirmed by Winne and Nesbit (2010) as the spacing effect is listed as one of the heuristics that improves learning.

Teachers who provide challenging assignments at the right level, give relevant feedback after assessment, encourage students after the have experienced failure, and show that they have confidence in their learners' abilities to achieve their goals, provide structure in learners' environment (Baeten et al., 2013). Winne and Nesbit (2010) refer to getting the level of assessment right as the Goldilocks principle.

2.5.4   Resources

The availability of resources in a learning environment can be seen in the conventional view as books, furniture, technology, electricity, and a library (Chudgar, Chandra, Iyengar, & Shanker, 2015).

The primary factor for the use of technology is to enhance the quality of learning and teaching, but a lack of academic staff knowledge is an inhibitor to development in this area (Hart & Paucar-Caceres, 2017). Using technology leads to deeper learning, which is one of many learning-related benefits listed by learners (Henderson et al., 2017). The use of technology in education is most effective when used as a complement to classroom interaction (Schneider & Preckel, 2017). This works optimally in a blended learning environment, as a blended learning methodology of learning is more effective than classroom learning or online learning alone. Online learning should certainly not be used to compensate for a lack of teacher or facilitator training.

Very little research has been conducted about the effectiveness of using technology in the distance education environment at school level, despite the fact that online learning began outside of the core classroom (Horn & Staker, 2015). Online learning has been able to personalise learning, make learning more accessible through connectivity, and

reduce costs as learners have access to resources online, not requiring one-on-one time with a teacher (Horn & Staker, 2015).

2.6 Conclusion

From the literature, the stakeholders that form part of the ecosystem such as learners, teachers, service providers, and peers became clear. Factors that are considered part of the distance education ecosystem were also identified. It was noted how each of the stakeholders and factors in the ecosystem play a different role. Learners' confidence, self-regulation abilities, study approach, and perception of their learning environment influence how motivated they are to achieve. Involvement, structure, and support from a teacher also drive achievement, especially the teacher's role in creating confidence in the learner. Physical factors such as access to technology, interaction with peers, and study materials' presentation is also important to establish within the ecosystem. There are clear indications of close relationships between some of these factors such as self-regulation and motivation, and some factors such as confidence could play a more important role than other factors. Most of the literature on achievement is in the context of a school learning ecosystem and, therefore, achievement needs further study in the distance education ecosystem.

From the insights that were gathered in the literature study about each area, the researcher developed a conceptual framework that captures the different factors that drive achievement as seen in Figure 1. Each factor consists of subcategories. The scope of this framework is a school-level distance education ecosystem and the factors that drive achievement. The framework aims to explain what each factor is as well as its subcomponents.
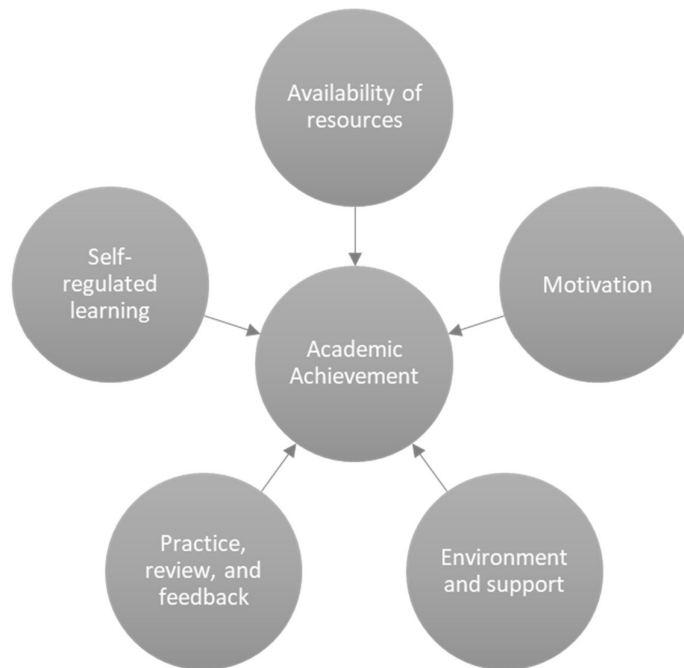
Figure 1. Conceptual framework of the factors that drive achievement in a school-based distance education ecosystem.

The availability of resources consists of the content, equipment, access to the internet, and additional resources other than the content. Motivation consists of both intrinsic and extrinsic motivation that lead a learner to want to achieve for various reasons. The environment and support consist of the physical learning environment as well as some of the stakeholders in that environment, including parents, teachers, and peers, who support and interact with the learner. Practice, assessment, and feedback give the learner the opportunity to practice the learnings through repetition, assessment at the right level, and feedback about what they can improve on. The last factor is focused on the learner and their personality traits. The learner needs to have a sense of self-regulation and efficacy to be able to successfully achieve. The aim of the research questions is to investigate whether these are indeed the most important factors that drive achievement by understanding what it is that the participants perceive.

The next chapter will present the research questions that were developed from the literature and be discussed in detail.

CHAPTER 3: Research Questions

3.1   Introduction

The literature review in Chapter 2 delved into the different aspects that contribute to the distance education ecosystem and provided some indication of the relationships between the factors that drive achievement. This study sets out to answer four very specific research questions that will each be discussed in turn in this chapter.

3.2   Research Questions

This section describes each of the research questions that this study needed to answer. The outcomes of the research will be a set of factors that drive achievement in a distance education ecosystem and will enable service providers, parents, and tutors to create learning ecosystems that drive academic achievement.

Research question 1: What does the concept of a learning ecosystem represent in the context of distance education?

Research question 1 aimed to establish the concept of a learning ecosystem specifically in the context of distance education. Distance education is well defined in the higher education space, especially when considering online learning as an integral part of it. The learning ecosystem in a formal school environment is also well researched and elements of it have been used as the foundation of distance education. There is, however, a need to know what is understood by the concept of a learning ecosystem and to explore what the major differences are between a distance learning ecosystem and a school learning ecosystem. The results were used to develop a definition of a distance education ecosystem.

Research question 2: What are the major factors that drive achievement in a distance education environment?

This research question was used to establish a list of factors that lead to achievement in distance education, specifically when considering the higher grades in secondary school. These factors all form part of the learning ecosystem. Once the concept of achievement had been defined, the factors that drive achievement as well as the factors that have the greatest influence on achievement were determined. This question confirmed the factors

that drive achievement that have previously been mentioned in the literature.

Research question 3: Which of the identified factors are perceived to be the most influential?

By identifying the influence of each of the factors, this research question built on question 2. The aim was to identify which factors have a stronger influence compared to the rest. It was expected that, through this question, the researcher would be able to establish which factors are perceived to be the most influential and be able to rank the influence of the factors.

Research question 4: How do the factors interact with or affect each other within a distance education ecosystem?

This question assisted the researcher to understand the relationship between different factors that drive achievement and whether greater insights can be derived from these relationships. It is expected that some of the factors may have a strong correlation with each other, which could ignite further research.

3.3 Conclusion

The research questions were developed from the literature studied in Chapter 2. The research questions followed on each other and were each answered during the study to solve the problem stated in Chapter 1. The next chapter will discuss the research methodology and design choices for this study.

CHAPTER 4: Research Methodology

4.1   Introduction

The purpose of this chapter is to discuss the research methodology that was chosen for this study. The literature discussed in Chapter 2 framed the research questions that needed to be answered, and these questions were used to inform the interview guidelines. The following sections will be discussed: the research design, the population, the sampling method and size, the unit of analysis, the data collection tool and process, the analysis of the data, as well as the validity, reliability, and limitations of the study. The study made use of a qualitative, exploratory approach and the methodology, sample, and analysis reinforced the selected approach for this study.

4.2   Research Methodology and Design

This section will explain the rationale for the chosen method of research for the study. The research design can be explained as the plan that is put in place that will enable the researcher to answer the research questions (Cooper & Schindler, 2014). It consists of many elements and each element contributes to the process.

According to Saunders and Lewis (2012), explorative research aims to discover new insights, sometimes only providing tentative answers to the initial questions, which are then followed up with further research that focuses on providing more detailed information in the form of dependable answers. This study's research design was explorative in order to establish the different factors that influence the learner. This is an unexplored area of research and thus an exploratory study is warranted.

Both qualitative and quantitative techniques can be used to perform explorative research, but exploration more often relies on qualitative techniques (Cooper & Schindler, 2014; Saunders & Lewis, 2012). Qualitative data are characterised as having depth and colour through the exploration of the topic, focusing more on why particular people feel a particular way, making it complex and non-standard (Given, 2008). A qualitative methodology is interested in meaning and creates a framework for testing differences between groups (Braun & Clarke, 2013). Qualitative studies have themes, patterns, insights, and understandings as its outcome, making it a fitting research methodology to understand what the factors are that drive achievement in a school-level distance

education ecosystem (Patton, 2015). This methodology enabled the researcher to learn about new factors and form themes that can be used to describe the properties of the population. The factors that drive achievement in a school-level distance education ecosystem were not known and needed to be explored through this research.

A research philosophy influences the way in which research is conducted (Saunders & Lewis, 2012). For this research, a philosophy of interpretivism was adopted as the research was socially constructed, subjective, and value-bound (Saunders, Lewis, & Thornhill, 2009) and referred to the way humans make sense of the world. In this study, the researcher wanted to understand the perception of learners, parents, and tutors in order to determine the factors that drive achievement. The research is also phenomenological as it incorporated some philosophy and psychology aspects in focusing on how a person's behaviour is influenced by the relationship he or she has with the physical environment, objects, people, and situations (Patton, 2015).

Inductive research emphasises understanding the research context well and understanding the meaning that humans attach to events in their lives (Saunders et al., 2009). This research followed an inductive approach as specific observations led to the discovery of patterns and repeated occurrences, which were developed into general conclusions or theories about the topic during data analysis (Saunders & Lewis, 2012). This is seen as a bottom-up theory development approach rather than a top-down, deductive approach (Saunders & Lewis, 2012). The researcher aimed to understand the multiple interrelationships between the dimensions to develop a framework that defines the factors that need to be included in a distance education ecosystem (Patton, 2015).

The chosen research strategy needs to enable the researcher to answer the research questions and is thus strongly guided by the research questions and the amount of time and resources available (Saunders & Lewis, 2012). Qualitative data takes form in one of three ways: surveys (of which interviews form part), observations and fieldwork, and documents (Patton, 2015). Ary, Jacobs, Sorensen Irvine, and Walker (2014) highlight that surveys are a widely used research instrument in education and social sciences; one type of survey being interviews. This study was conducted in a single organisation, which is acceptable with exploratory research (Saunders & Lewis, 2012). The reason for using a single organisation was because the specific organisation was the largest South African provider of school-level distance education in South Africa (based on learner numbers) and that the researcher had proprietary access to the customers (Impaq Education, 2018). It also reduced the variability in the data as all the participants were

involved in grade 12 distance education.

For this research, the aim was to gain a snapshot view of the situation rather than study the changes in the situation over time, as with a longitudinal design. The research design's time horizon was thus cross-sectional, as it was only collected from participants at a single point in time (Saunders & Lewis, 2012). The benefit of using the cross-sectional design is that it allowed the researcher to complete the study within the allocated time, whereas a longitudinal study requires more time and would have been impractical in terms of the allotted time for the subject.

The rationale of the research method enabled the researcher to answer the research questions and gather insights from the exploratory study.

4.3   Population

The population of a group is defined as the complete set of group members (Saunders & Lewis, 2012). In this research study, the population consisted of all school-level distance education learners, parents of distance education learners, and tutors. The population consisted of learners that were educated by parents or by tutors (acting on behalf of the parent).

4.4   Sampling Method and Size

Sampling was used in this research as it would have been impractical and expensive to survey the entire population. By making use of sampling, the researcher had more time to design and pilot the data collection process, improving the level of detail that could be gathered (Saunders et al., 2009). There are many purposeful sampling methods to choose from, but the chosen method aimed to achieve generalisability (Braun & Clarke, 2013). Judgemental or purposive sampling is a form of non-probability sampling and is particularly used for qualitative data (Saunders & Lewis, 2012). The sampling technique that was used in this research was a non-probability technique, namely judgemental (purposive) and quota sampling. This sampling method was used for the learners, parents, and tutors.

According to Patton (2015), there are no rules for sample size in qualitative inquiry. A researcher could either aim to have in-depth knowledge from a smaller number of people

or have less depth from a larger group of people. The choice of sample size is governed by some criteria, namely: the level of certainty that the researcher has that the sample is representative of the population, the error margin that is tolerable, the type of analyses that are going to be performed on the data collected from the sample, and the size of the population from which the sample is taken (Saunders et al., 2009). The sample size is also dependent on when data saturation is reached. This means that additional data received from another interview bring no new insights. The researcher aimed to conduct semi-structured in-depth interviews with eight learners, six parents, and six tutors.

Judgemental sampling has a low likelihood of being representative of its population and is very much dependent on the choice of the sample. Judgement was first applied by selecting participants that qualified to partake. The list of possible learners was created by selecting learners in grade 12 in 2018. These were then further divided into two groups: learners that failed mid-year and learners who passed mid-year, based on a 50 % pass-rate. The two groups were referred to as "attained" and "not attained". Each list was then sorted according to the learner's age from oldest to youngest to ensure that all participants chosen were no longer minors. No differentiation was made based on the number of years the learners had been home-schooling, but the learner had to be registered as a distance education learner for the full year of the present study. Parents were selected from the list of learners that were chosen for the two lists mentioned above and were prioritised if their learner qualified. Tutors were selected from a list of tutors that were teaching grade 12 learners that were registered with Impaq. Tutors that had a good working relationship with Impaq were prioritised.

Quota sampling is used to fill important categories and can be adjusted based on what the researcher learns during the interviews (Patton, 2015). This method of sampling was applied after judgemental sampling was completed on the population, as the participants agreed to make themselves available. From the above it is confirmed that sample size is very much a judgement made by the researcher after taking all the listed factors into account. Guest, Bunce, and Johnson (2006) propose that research requiring commonalities to be highlighted from a reasonably similar population requires 12 in-depth interviews to reach saturation. Learners were seen to be heterogeneous as each of them have a unique opinion about their learning ecosystem and what motivates them, yet are grouped as their commonalities are sufficient. The focus needed to be on explaining key themes (Saunders et al., 2009).

The researcher thus conducted three semi-structured in-depth pilot interviews to test that the interview questions were inducing the expected answers. One participant in each of the three interview groups was selected for the pilot. The pilot interview results led the researcher to remove a question from the schedule and to reword one of the questions to allow for better comprehension. The tutor and learner pilot interviews were accepted and used as part of the results. The parent pilot interview was discarded due to the parent not being the primary guardian who has insights into the learner's behaviours. This parent worked full-time and could not answer the answers appropriately.

The researcher then conducted semi-structured in-depth interviews with a further seven learners, six parents, and five tutors. When saturation was reached in the data analysis, the remaining participants were not interviewed. Twenty interviews were conducted in total and produced data that were used for the analysis.

4.5   Unit of Analysis

The design of the research specifies which unit or units of analysis should be measured against its usefulness (Patton, 2015). The chosen unit of analysis for this study was the perceived individual experience of learners, parents, and tutors. This means that the focus was on what each of the individual participants perceived to experience and how the factors in the ecosystem influenced them. Every unit of analysis refers to a different kind of data collection, meaning that this study had only one unit of analysis.

4.6   Data Collection Tool

Semi-structured, non-standardised, in-depth interviews were used as the measurement instrument for this study. In-depth interviews afford the researcher the opportunity to gain considerable insights from each participant and pick up on unusual behaviours. Semi-structured in-depth interviews have open-ended questions that allow the respondent to answer the list of questions in short essay-style answers. These questions can address very specific issues and results are relatively easy to interpret. Some of the disadvantages are that the results are dependent on the interpretation of the interviewer and that this interview type does not allow for as much creative or novel explanations as unstructured conversations or observations (Zikmund, Babin, & Carr, 2009).

There are many qualitative inquiry interview approaches, each emphasising different questions and fieldwork methods. For this study, semi-structured interviews were performed to capture the lived experiences of learners, parents, and tutors (Zikmund et al., 2009).

The interview questions were developed so that they could answer each of the research questions. The research questions were developed from the literature review that was conducted in response to the problem identified in the first chapter. The table below shows how each question is mapped to a specific research question that needed to be answered. Note that not all the questions were necessarily asked and answered in the order proposed, as the interview questions were used as a guideline. The interview guideline used for each of the three groups can be found in Appendix D: Interview questionnaire.

Table 3. Research questions and interview question mapping.

Research Questions from Chapter 3	Interview Questions
Research question 1: What does the concept of a learning ecosystem represent in the context of distance education?	1. What is your understanding of the concept "learning ecosystem"? 2. What would you say are the differences between a school learning ecosystem and a distance education ecosystem?
Research question 2: What are the major factors that drive achievement in a distance education environment?	3. What do you think it means to achieve well academically? 4. What drives you/your learners to achieve? 5. What factors do you believe are important when creating an effective learning ecosystem to ensure achievement?
Research question 3: Which of the identified factors are perceived to be the most influential?	6. Of the factors that were identified, which would you say has the greatest influence on you/your learners' achievement? 7. If you were given 100 points to allocate to the identified factors that drive achievement in distance education, how will you allocate your points in order to establish a ranking of importance between the drivers/factors?
Research question 4: How do the factors interact with or affect each other within a distance education ecosystem?	8. How could these factors be combined together to have a stronger effect on achievement?

4.7   Data Collection

To prepare for the data gathering process, the researcher needed to be knowledgeable about the topic and context within which the interview took place. It added credibility to the process when the researcher supplied the participant with information relevant to the interview, as well as the list of preliminary themes, in advance (Saunders et al., 2009). The questions were a combination of open questions, probing questions, and specific questions.

A pilot interview was set up with each of the three types of participants (students, parents, and tutors) to test the interview questions, especially looking at the types of answers received and whether the flow of the interview stimulated the participant to partake. After the pilot interviews, the questions and themes were analysed and reviewed. Learnings from the pilot were used to make relevant changes to the instrument before commencing with the actual interviews. This was also used to develop a list of preliminary themes.

The interviews were conducted at the offices of Impaq, the company that provides the course material that the learners use. The location of the interview was convenient for the participants and made them feel comfortable and at ease, as small, quiet conference rooms were used to conduct the interviews.

At the start of the interview, the researcher introduced herself and explained what the outcome of the study was. The researcher explained that the interview would be audio-recorded for transcription to ensure that the answers were correctly analysed. The interviews were transcribed shortly after each interview which ensured accuracy as the themes were coded. The researcher also made notes during the interviews. The interviews lasted approximately 45 minutes and participants were not compensated for participating in the study.

4.8   Data Analysis

The researcher wanted to compare the perception of different groups with regard to the research questions and thus interviewed learners, parents, and tutors to gain a balanced perception from different stakeholders in the learning ecosystem. This allowed the researcher to test for consistency between different sources (Patton, 2015). It also promoted facilitation and generality of factors (Saunders et al., 2009). For this study's

specific methodological choices, the qualitative data were analysed using thematic content analysis by extracting constructs to make inferences from the content (Neuendorf, 2001).

Thematic content analysis is suitable for any type of qualitative data (Braun & Clarke, 2013). There are varieties of thematic analysis, namely inductive, theoretical, experiential, and constructionist, of which inductive theoretical analysis was conducted as this study was not purely shaped by existing theory, but mostly aimed to generate an analysis from the data (Braun & Clarke, 2013). Analysing the thematic content entailed the process of identifying, organising, and categorising the content of the text to provide meaningful patterns, themes, categories, and typologies (Braun & Clarke, 2013; Patton, 2015).

The first step in thematic content analysis was to transcribe the interviews (Braun & Clarke, 2013). The audio files from the interviews were transcribed by the researcher as well as an external transcriber. The transcripts were then cleaned to ensure there were no errors (Saunders et al., 2009). The transcripts were stored to protect anonymity and for easy future reference. The researcher ensured at this point that she was familiarised with the transcripts, having read them and made notes about possible areas of interest (Braun & Clarke, 2013).

The third step was to code the data across the full dataset (Braun & Clarke, 2013). Categories were developed by adding codes or labels to groups of data that had a central organising concept (Braun & Clarke, 2013; Saunders et al., 2009). The research used data analysis software (ATLAS.ti) for the processing of data. With an inductive approach, data needs to be analysed throughout the process to see which themes are emerging from the data. Themes are patterns that are identified across the different data sets, rather than from a single interview (Braun & Clarke, 2013). As data were being collected, the researcher built a conceptual framework from the findings. Testable positions were developed as relationships were discovered in the data. The specific themes were then identified and reviewed to find relationships between the identified themes, after which they were defined and named (Braun & Clarke, 2013; Saunders et al., 2009). The researcher took approximately two and a half hours to analyse each interview in full by making use of the different phases of thematic content analysis (Braun & Clarke, 2013), totalling approximately fifty hours of analysis. The analysis was further supported by making use of frequency analysis to determine the number of times an idea or thought was captured and repeated. The frequencies were ranked from most frequent to least

frequent and presented in tables.

The final step was to finalise the analysis in writing and will be presented in Chapter 5 (Braun & Clarke, 2013).

4.9   Data Biases and Trustworthiness

For a measurement instrument such as an interview to be successful, it is necessary to understand what could add to or reduce the data's legitimacy. Bias and trustworthiness are discussed below as factors that influence the study's data.

Subject selection may create a bias that reduces the validity of the data by selecting an unrepresentative sample of the population. By applying appropriate sampling methods, this can be overcome. When a participant portrays an incorrect version of the truth it is called subject bias and this reduces the reliability of the data (Saunders & Lewis, 2012). This bias was reduced by selecting different types of participants and confirming the data across different groups.

In qualitative research, it is also important for the data to be trustworthy. Anney (2014) and Lincoln and Guba (1985) list four areas of concern when establishing trustworthiness. Trustworthiness firstly consists of credibility which relates to whether the research findings that emerged from the findings were interpreted correctly by the researcher. The second element is the transferability of the findings in other contexts. The third element is dependability which refers to the stability of the findings over time. The last element is confirmability which relates to the extent to which the findings are confirmed by other researchers. These four elements were taken into consideration to ensure trustworthiness of the research process.

Taking bias and trustworthiness into account, the interview questions were developed. The researcher needed to be equipped with themes and questions to ask and then follow up the answer with a probe for additional elaboration. Interviews may vary as they may have been adjusted as insights were gathered (Saunders & Lewis, 2012). The researcher needed to encourage the respondents to share information and talk freely without being influenced by the way in which the questions were asked or manipulating where the discussion went (Zikmund et al., 2009). The researcher made use of a technique called laddering to elicit different levels of information by guiding the

respondent from attribute-level to benefit-level to motivation- or value-level distinctions.

4.10 Research Limitations

Due the qualitative nature of this research, the research is subjective and could be influenced by different biases. It therefore has limitations, of which some are known and others not (Saunders & Lewis, 2012). One type of bias could have been the researcher's bias. This was tested and managed as much as possible, but the bias may have impacted the way certain answers were interpreted or the theory was applied as the researcher was an employee of the company used for the case study. With regard to the techniques and procedures used for data collection, the method could have contained errors in the form of loaded interview questions and biased or untrue answers (Patton, 2015).

The sample size may have been a limitation of the study as adding additional respondents to the study may have had severe time frame implications for the researcher and may have influenced completion dates. The sample also only contained distance learners from a specific age group and were all customers of the same institution. Some of the interviewees were not native English speakers and could have had difficulty in formulating their answers in English. This could have caused some of the descriptions to be less accurate than those of native English-speaking interviewees.

The age of the participants was a further limitation to this study. Learners under the age of 18 are seen as minors and special ethical clearance is required to conduct research with minors. The study focused on grade 12 learners, but this group included minors that needed special permissions. The study conformed to requirements about consent, protection from harm, and privacy (Ary et al., 2014).

Another limitation was the fact that only customers from one distance education company were used to sample from. This company was the largest provider in South Africa at the time of the study but may have excluded parts of the population that were not represented by the chosen sample.

4.11 Conclusion

The methodology and design selected for this study enabled the researcher to explore new themes and gather insights from the thematic content analysis. By developing a plan for the research, the study was conducted correctly and on time. The next chapter will present the results of the analysis according to each of the research questions.

CHAPTER 5: Results

5.1   Introduction

The aim of this chapter is to present the results of the study according to the research questions that were developed in Chapter 3. It contains the findings of the analysis of the data gathered through semi-structured in-depth interviews with learners, parents, and tutors. The research questions from Chapter 3 were plotted on a consistency matrix to develop interview questions that would collectively answer the research questions. By doing so, the researcher was able to ensure consistency between the research questions to be answered, the interview questions, the reviewed literature, the selected data collection method, and the analysis of the data.

5.2   Description of the Sample

Learners, parents, and tutors were interviewed to develop well-rounded answers to the research questions. See Table 4 below for a summary of the interviews.

Table 4. Interview summary.

Type of interviewee	Number of participants	Male	Female
Tutor	6	1	5
Parent of a home-school learner	6	1	5
Home-school learners – above average	4	1	3
Home-school learners – below average	4	1	3

The learners were selected from the customer base of Impaq, the largest South African home education content provider. The sample consisted of all the grade 12 learners registered for 2018 who had been registered since 1 February 2018 or earlier. The reason for selecting this group was to purposefully select learners that have a full two terms of academic work with which to gauge their performance. The term 2 results were used to divide the learners into two group: those with a term 2 average of 50 % or above were labelled as "Above-average" and those below 50 % were labelled "Below-average". Four "above-average" learners and four "below-average" learners were selected for the interviews by making use of the judgemental sampling method. During the time that the interviews were conducted, many of the learners were preparing for their preliminary exams and were not available to meet face-to-face. A few of the interviews thus took place telephonically.

A quota of four for each of the two learner sample groups had to be reached and therefore judgemental sampling was used until the quota was reached. Of the eight learners interviewed, only one made use of a tutor centre on a regular basis; the rest were purely home-schooled. The identities of all the learners are kept confidential due to some of them still being minors. In cases where the learners were still minors, their legal guardians were present during the interviews.

The second group of interviewees was the parents of the interviewed learners. These parents were all actively involved in the home-schooling of their children. They were selected using quota sampling until the quota of six was reached out of the possible eight parents available from the learners selected.

The third group that was interviewed consisted of tutors that actively tutor learners who were making use of Impaq as a content provider. These tutors engage with home-school learners by offering additional tutoring services that vary in degrees of interaction. The tutors are all qualified teachers. The tutors were selected from the list of active tutors registered with Impaq. Impaq has a good working relationship with a group of the tutors in the greater Gauteng area. Judgemental sampling was applied to reach the quota of 6 tutor interviewees.

All of the interviewees had been making use of home-schooling for more than a year and had a good understanding of the operational workings of this education form. Their experience in the field made them appropriate interviewees for the study.

5.3   Presentation of Results

This section presents the results per research question as presented in Chapter 3, as answered by the interviewee questions on the consistency matrix (Table 3).

5.4 Results for Research Question 1

Research question 1: What does the concept of a learning ecosystem represent in the context of distance education?

Research question 1 aimed to establish the concept of a learning ecosystem specifically in the context of distance education. Distance education is well defined in the higher education space and in the formal school space, but not with specific regard to distance education. The two interview questions were posed to define a distance education learning ecosystem before looking at what the participants viewed as the differences between a distance learning ecosystem and a school learning ecosystem. In defining a learning ecosystem, it would become apparent how the participant understood the concept, which is an important step to take before asking them to identify the factors that drive achievement within this ecosystem. It also aimed to confirm whether the main factors of physical environment, teachers, parents, learners, and materials previously identified in literature would be confirmed as the factors that a learning ecosystem consists of.

5.4.1 Understanding the concept of a learning ecosystem

The first question asked in the interview was for the participant to explain what their understanding is of the concept of a learning ecosystem. As there is no formal definition of the concept as it was used in this study, the participants each contributed to defining the concept based on their various experiences as parents, learners, and tutors. Some of the answers were very specific, naming a list of factors of which it is made up, whereas other participants used the biological concept of an ecosystem to define how they saw an interplay between the environment and the factors inside the environment.

The constructs listed in Table 5 are the eight common understandings of the concept of a learning ecosystem. The highest ranked construct is that a learning ecosystem is a suitable physical environment that makes a learner feel relaxed and able to focus on learning.

In analysing the top three constructs, the general focus was on the needs of the learner and on the fact that there does not seem to be a single factor that is able to create a learning ecosystem in isolation. A learning ecosystem needs to have all the factors

present to be efficient. It also became apparent that there is no single combination of factors that would suit all learners' needs, but that the learning ecosystem should be set up according to each individual's needs. In response to highlighting a specific factor, one participant said: "you can't [highlight a specific factor], you have to have all those".

Table 5. An understanding of the concept of a learning ecosystem.

Rank	Construct	Frequency
1	It is a suited physical environment that makes learners feel relaxed and able to focus on their learning	9
2	It is built around a learner's needs	8
3	It needs to have all the different factors to be efficient in its purpose	7
4	It consists of different sources and types of knowledge	5
4	It enables a learner to flourish and be the best he or she can be	5
6	It includes the support and involvement of parents	4
6	It requires academic support as learners need individual attention	4
8	It consists of various types of technologies	2

The learning ecosystem was described by many participants as a physical environment: "I think a learning ecosystem is a place where it kind of enables you to learn. So it's obviously a place that is actually specifically enabled to learn". Another participant explained it as "a system or an area where a student would be able to do all the studying and all the learning and all the tutoring that is needed to get through the grade per subject, per year". Another said that it should be an "environment that produces that outcome of [what] a school would be". A participant also referred to the ecosystem as "your basics" and required "things like the lighting [and] the kind of posters on the wall, to make the ambience of the room more inviting and learning friendly". One learner explained: "I need to have enough space to do my work", supported by another describing it as "a space within a space".

Further descriptors of the physical environment were that the environment needs to be healthy, make the learner feel relaxed, be quiet, and be dedicated to the learner's needs. It was mentioned that if learners feel relaxed and if they like the physical space where they work, they will be more focused on learning. If a learner is relaxed, they are more likely to focus and take in deeper insights, as one participant (tutor) noted: "They [learners] are more relaxed and that means the teacher can actually convey information easier". The space needs to be dedicated, as one participant noted: "I need to be alone, because I need to concentrate". Another participant commented:

Quietness, I would say. I think the first thing is to find a room that you can concentrate, because one of the things about studying at home is you need to concentrate on your work and you need to find a way to focus on what you're learning, because there are so many distractions. So you need to create an environment where you can just shut everything off and just focus on the work and what you're learning.

The environment needs to allow the learner to flourish and reach their full potential. One participant noted that "you create an environment that they love" and another that they try to do "everything that will help to develop the child into the best person that child can be". Another participant highlighted that the learner should "have everything to your [learner's] advantage. You can study according to your specific style, need". A participant explained:

I think people learn differently, some learn better visually, some learn better by experience, others like to think something through and you need to find what works for you to have a healthy learning ecosystem out of which you can learn at your best. You need to learn from the right media, either a speaker, some people learn better by listening to someone – they are definitely going to be tutored. Others learn better by physically experiencing something and physically working for someone as learning on the job or physically doing something like doing maths or doing something practical.

The fact that the ecosystem needs to be built around the learner's needs is highlighted in this definition. Learners' needs are described as very individualistic and self-regulating in a structured manner.

In a learning ecosystem, learners must have control over their schedule by setting it up themselves, having the ability to change it as required and then having the discipline to keep to it and complete the required work. There is thus a responsibility that lies with the learner to plan how they will execute their education as explained by one participant: "the ecosystem is driven by the individual, it's the willingness to learn". A participant stated that learners "are not forced to do it [in] a specific way, a specific time, a set place". Another stated that "they can work around their activities". Some participants said that what "you need to firstly have [is] structure. You should be able to have a certain kind of thing that tells you what you have to do and when". One participant warned that they "think discipline, especially with things that you don't really want to learn" is important.

Each factor in the learning ecosystem contributes to the ecosystem. Participants listed factors such as the learner, the teacher (as academic support), past experiences, parents and other support systems, resources, technology, and content (books). It is reiterated that all the factors combined create a learning ecosystem. It was also noted that the accessibility of each of these factors has an effect on the efficiency of the ecosystem. One participant said that it has "to create opportunities where you can learn". The learning ecosystem consists of "what is provided [to] them and who teaches them and what is being taught to them". One participant added that "besides the knowledge it would also consist of experiences like co-tutors, experiments, practical experiments".

Throughout the comments, support from different sources are listed as a bare minimum for every learner. Some learners get more support from parents, whereas others rely on teachers or peers. As one participant put it: "I feel that everybody does need support, whether you're the smartest cookie in the jar or, the most bruised banana in the bunch". Another stated that "a learning ecosystem means having teachers around to help you get through some, a problem you're not comfortable with". With regard to academic support, one participant said that 'it's more beneficial to a learner to have it one-on-one". This is confirmed by another participant stating that it is "getting that one-on-one time, what you need with your teacher" that makes a big difference.

The concept of a learning ecosystem was thus defined from the constructs: *a learning ecosystem consists of many factors such as the learners and their needs, access to different sources of knowledge and technology, and parental and academic support, in a suitable physical environment that enables a learner to flourish and be the best they can be.*

5.4.2 The differences between a distance education ecosystem and a school learning ecosystem

The second interview question was used to determine what the participants considered to be the differences between distance learning ecosystems and school learning ecosystems, once the term learning ecosystem was defined on a more generic level. The different factors required in a school learning ecosystem are quite well defined in the literature, but specifically defining it for distance education was new. The differences would elicit new factors that could be used to further describe the distance education ecosystem.

Table 6 lists the constructs that refer to distance education when contrasted against the school environment. The 12 constructs illustrate what the participants perceived as the differences. The construct that had the highest ranking explained that distance education created a learning opportunity that suited the learners' needs, followed by enabling learners to take responsibility for their own learning. Across the top three highest ranking constructs, there was an overall theme that learners had more choice (and the responsibility that goes with it) than they would typically have in a school ecosystem.

Table 6. Differences in a distance education ecosystem compared to a school learning ecosystem.

Rank	Construct	Frequency
1	It creates a learning opportunity that suits the learners' needs	13
2	It enables learners to take responsibility for their own learning	9
3	Learners need to be more disciplined and structured as they are responsible for their progress	6
4	Learners have more one-on-one interactions with academic support, e.g., tutors	4
5	There is a greater focus on academics with less distractions	3
5	There is a strong dependency on assistance and guidance from the curriculum provider	3
7	A distance learning ecosystem and a school learning ecosystem are significantly different from each other	2
7	Distance education ecosystem class sizes are much smaller than in schools	2
7	Learners also do homework like in school	2
7	Learners need peer support and interaction	2
11	Everyday life and academics are both involved in a distance education ecosystem	1
11	Subjects with practical aspects are harder than in school due to the facilities and equipment required	1

Table 7 below shows the differences in a school learning ecosystem compared to a distance education ecosystem. The most highly ranked construct was that the school environment has less flexibility and follows a fixed, standard learning path. The constructs ranked second highest highlighted that a school offered less academic support to learners, but also indicated that learners have a greater opportunity for peer support and interaction. It was also emphasised that for some learners, this social or peer interaction could create additional pressure, which is brought on by the school learning ecosystem.

Table 7. Differences in a school learning ecosystem compared to a distance education ecosystem.

Rank	Construct	Frequency
1	It is less flexible and follows a fixed, standard learning path	6
2	Learners often do not get the individual academic support they require	4
2	There is a greater opportunity for peer support and interaction	4
2	Many learners feel pressured or that that cannot cope	4
5	It is typically noisier and busier due to the greater complexity and number of factors in the ecosystem	2
5	Non-academic activities take up a lot of time	2
7	A learner gets personal attention	1

When comparing the top construct for both views in Table 6 and Table 7, certain constructs were present in both that confirm their importance. When looking at the constructs that correlate in Table 8, it is clear that the most important differences are the focus on the individualistic vs the traditional view, the different levels of academic support, the amount of time spent on valuable academic instruction, and the size and complexity of the learning ecosystem.

The responses from the participants indicate that there are significant differences between a distance and a school ecosystem. The participants had different opinions about which extreme between the distance and school learning ecosystems was the better option.

Table 8. Highest ranking constructs in distance and school learning ecosystems.

Rank (Freq)	Construct		Construct	Rank (Freq)
1 (13)	It creates a learning opportunity that suits the learners' needs	←→	It is less flexible and follows a fixed, standard learning path	1 (6)
4 (4)	Learners have more one-on-one interactions with academic support e.g., tutors	←→	Learners often do not get the individual academic support they require	2 (4)
5 (3)	There is a greater focus on academics with less distractions	←→	Non-academic activities take up a lot of time	5 (2)
7 (2)	Distance education ecosystem class sizes are much smaller than in schools	←→	It is typically noisier and busier due to the greater complexity and number of factors in the ecosystem	5 (2)

In terms of learning opportunity, the more individualistic and personalised learning of a distance education ecosystem was preferred. One participant said that "[distance education] was the best way to actually to let my daughter get focused". Another participant felt that "a home-schooler has got the ability to achieve a lot, because they haven't got the deterrent of everything that is going on around them". One participant commented on the advantage of distance education in that "home-schooling students definitely have the ability of working harder, getting the work done". One participant said that the biggest difference is the flexibility that distance education offers. Another said that distance education could accommodate fluctuation in schedule, the tutors that were being used, and the physical place of learning. Another commented on the boundlessness of distance education by saying that "home-school is actually every place, it's not just one place, it's not a set physical address". For one participant, the reduced emotional strain in distance education made a big difference: "I would say it was easier for me".

Participants felt that the school learning ecosystem was based on a very fixed and traditional learning path that had no room for variation based on the learner's needs. The distance education ecosystem creates more opportunity for learners to decide how, when and in what way they want to learn, as they have more flexibility and take responsibility for their schedule. A participant explained that "with like a school it's kind of like the environment is always driven towards learning in a specific way". An interesting comment by a participant highlighted that:

> *[in a] school situation you might find that a kid doesn't bond with a specific teacher, which makes it difficult to excel and you know, to get the best results. Because I know, from my experience, if I didn't like a teacher, I didn't like the subject.*

A participant further said that in "school you have a rigid routine, you can't really move away from that", and another that "you don't get that [flexibility] at a normal school". It was mentioned above that learners need structure in distance education, which is expanded on through a comment by another participant, contrasting that the "school environment has lots of discipline itself".

With regard to the academic support provided in both ecosystems, there were mixed responses, but there was consensus that it differed for each ecosystem. In a distance education ecosystem, the level of academic support varies purely based on the choice

made by the learner. They can either have full-time academic assistance, ad-hoc, or none, based on their need. In distance education, it was said of academic support that it is "more beneficial to a learner to have it one-on-one in home-school". This enables more time for discussion, as mentioned by another participant: "the child has a chance to actually view their viewpoint and things can be discussed over and over again until the child has the understanding of it – whatever the tutor can convey to them". This is supported by another participant saying that "a lot more attention is given". The choice in tutor was raised by one participant saying that: "you can actually choose who you want to work with".

In a school ecosystem, the amount of academic support is determined by factors that the learner has no influence on, such as the number of learners in the class, the provided timetable determining the time available per subject, and the level of valuable teaching the allocated teacher can provide. Learners need to share the teacher's attention with others, as pointed out by a participant: "[In a] classroom there's a focus on 35 depending on the size of the classrooms". This is confirmed by another participant who stated that "the big group that teachers in schools are working with prevents them from giving individual attention to those who need it". Another interesting point mentioned by a participant is that "the learner that is able to work at a faster pace is also frustrated because they have to wait for the slower learners", as well as that "the big group that teachers in schools are working with prevents them from giving individual attention to those who need it".

The third difference is the amount of non-academic activities in a distance education ecosystem compared to a school. Due to the traditional schedule and the way a school typically works, there are many non-academic activities that take up time during a school day, for example assembly, fixed and scheduled breaks, administrative activities, and cultural and sport events. Most of the activities in a school learning ecosystem are a prerequisite and form part of the daily schedule. In a distance education ecosystem, the non-academic activities are determined purely by the learner and the facilitator. Learners have greater autonomy in scheduling their academic time and can reduce the time spent on non-academic activities. One participant stated that "I find it more easier [sic] to learn at home than at school, because at school you lose concentration much easier". Another participant explained:

> *I think normal schools, there is a lot of things – they are having sport, they are having… yes they are having media, they are having culture, and they're having*

school plays and taking part in all those different things in schools – which is wonderful, which I do agree to – but it doesn't give enough time to the academic part of it. And doing well in tennis is not going to get you through matric.

Another participant commented that being in a school "causes reduced active learning time, or contact time". This was extended by another participant saying:

the work is then not getting done: it will just be started in a class, it will be taken home for homework, where there are students who can sit until 11 o'clock at night to try and get that work achieved. And then they are going back into the same environment the next day.

Contrary to the negative association of having less non-academic time, distance education also has less social interaction than schools as a result. One participant commented that "socially it's quite difficult for him [his son] because I mean he doesn't have much friends here at home". Another pointed out that in school "he [the learner] is interacting with friends and here he is doing everything on his own".

The last difference is the variation in class size and the complexity of the ecosystem. In a distance education ecosystem, there are fewer factors present and thus also fewer learners in the ecosystem. In a school learning ecosystem, there are many more learners and teachers and thus much added complexity. This added complexity in a school learning ecosystem does have its own beneficial properties which will not be discussed, as the focus of this paper is on distance education. The distance education ecosystem contains more factors that can be controlled and determined by the learner than the school ecosystem, as there are more factors in a school learning ecosystem that neither the learner nor the parent nor the teacher have control or influence over. A participant commented that a "home-schooling ecosystem is smaller, it has less [sic] factors, it might also be a little less complex" than a school ecosystem. A distance education ecosystem's "atmosphere could be the centre but could also be a small amount of learners". A school's learning ecosystem is explained by one participant as "very busy, very noisy, very large – large amount of students". This is confirmed by another participant stating that, with regard to school, "many times this is accompanied by noise". Another comment made by a participant about the large number of learners is that "the learners then change to the next class or next period for the next subject". Another participant confirmed this:

When they're in big schools they have got to change classes first of all. They have got all that noise. If you take a period, 35 minutes for example, let's make it 35 or 40 minutes, it takes them five minutes to walk into that door, another 5 minutes to settle down at their desks and get their books out, then it takes the teacher let's say 15 minutes to explain the lesson to them – that's already 35 minutes gone.

There are thus four significant differences between a distance and a school learning ecosystem that are useful to consider when thinking about the different factors and their influence: the individualistic vs the traditional view, the different levels of academic support, the amount of time spent on valuable academic instruction, and the size and complexity of the learning ecosystem.

5.4.1 Conclusion for research question 1 results

The first research question aimed to establish the concept of a learning ecosystem in the context of distance education. When taking the differences between distance and school learning ecosystems as well as the developed definition of a learning ecosystem into account, the following definition was developed for a distance education ecosystem: *a distance education ecosystem consists of a limited number of factors such as the learner and his or her individualised needs, access to different sources of knowledge and technology, and parental and academic support, in a suitable, personalised physical environment that enables learners to flourish and be the best they can be.*

5.5   Results for Research Question 2

Research question 2: What are the major factors that drive achievement in a distance education environment?

This research question aimed to establish a list of factors that lead to student academic achievement in distance education, specifically when considering the higher grades in secondary school. These factors all form part of the learning ecosystem. Three interview questions were used to collectively answer the research question. The third interview question was used to determine how the participant understood the concept of achievement, especially with reference to academic achievement. The combined answers would define what participants understood as achieving well academically. The fourth interview question aimed to make the concept more personal and enquire what the participant felt was the cause or factor that drives achievement with reference to either themselves (for learners) or the learners they were in contact with (for parents and tutors). The fifth interview question required participants to list the factors that they believed were important when creating an effective learning ecosystem that ensures achievement. This question would determine the different items that they felt were important, which were expected to confirm the factors that were previously found in literature, e.g., motivation, achievement, and resources.

5.5.1   Understanding the concept of achievement

To better understand what participants perceived as academic achievement, the third interview question asked what the participant thinks it means to achieve well academically. The question was intended to get an understanding of what achievement means. For this study, it was important to assist participants in giving a focused answer that specifically relates to academic achievement and what it is that they would deem a satisfactory level of achievement. Table 9 shows the constructs that define the concept of achieving well academically. These are the definitions that most accurately describe achieving well academically.

The construct ranked highest describes achieving well academically as the point when someone reaches their full potential and ability. This construct's frequency is more than three times higher than the second ranked construct, indicating that a large part of the participants shared this sentiment. Overall, the theme present was that achievement is

not equal for each person and that achieving well involves a person reaching his or her own objectives.

Table 9. An understanding of the concept of achievement.

Rank	Construct	Frequency
1	Achievement is when someone reaches their full potential or ability	10
2	Achievement gives a feeling of success and enjoyment	3
3	Achievement is different for each learner and needs to be managed differently	2
3	Achievement means getting high marks	2
3	Passing is no longer a measurement of achievement	2
6	A learner's achievement is the same in a distance and school earning ecosystem	1
6	Achievement is dependent on the specific subjects	1
6	Experience has a small part in achievement	1

The top ranked construct defines achievement as the state reached when a person reaches their full potential and ability. Potential, ability, standards, goals, and success are all used as a target that is set and that then needs to be reached. One participant answered: "to achieve well academically, for me means that you work according to your ability". Another participant confirmed this: "I think that to achieve well academically is to take each subject and do the best in that subject to your ability". Yet another confirmed: "I think to achieve well, it is just to feel that you have done your best". For each learner the target is different and the journey to getting to that target is different. A participant commented:

I think it depends, because I think it obviously means meeting your standards. So obviously I feel like I have very high standards. So specifically achieving well would be like 75s or 80 %. So that's what I would perceive, but that's because of my standards. So I think achieving well on a general scale means meeting your standard.

Another participant stated:

For me, which is what I tell my children all the time, it's the best that you can do, the best within you. And don't benchmark yourself with anybody else. Do the best that you can be. If you are a C student, you do the best a C student can do. If you are a D student, you know, like that. If you happen to be an A student, well, better for you – but I believe that everybody has got a particular capacity, especially academically, and you can only stretch yourself as far as your capacity allows.

For other participants, it is their future driving them: "Well, I believe that in my case, being a student, what drives me to achieve is definitely my future" and "definitely all that motivates me, is the fact that I'm heading towards the future". A participant said: "I really want to own my own business one day, so I want to do well in school so I can get into a good university and study".

One participant noted that achievement should not be confused with success: "academically, to achieve well, doesn't necessarily mean that you will succeed". It is thus about the learning, wanting to achieve the result, and believing that there is value in it to reach it: "I feel it's not only about good marks it's about how much you learn, what info you got out". It was also mentioned that many learners can achieve above their ability and that reaching the standard may not be the point of achievement for some learners who set themselves goals that are further than what is required of them by the standard.

Some refer to achieving well as getting specific marks. This participant said: "I think what it means to achieve well academically is, I guess obviously getting the best marks you can get as an individual". For some participants, passing means achieving, whereas for others it means getting A's for all their subjects. On a higher level, for some learners achieving well means passing grade 12. Contrary to these views, some participants stated that pass rates are no longer a good measure of achievement as they have been diluted by lowering the pass rates:

> …the standards being so low when it comes to the average mark that anybody can pass and you don't really have to do a lot to pass and unfortunately that means we have learners going outside of the grade 12 not doing everything to the best of their ability.

Some use the pass rate as a line that indicates where the average learner should aim. Others feel that the pass rates need to be different for each subject, whereas others feel that it needs to be the same for all subjects.

It was mentioned that achievement in a distance education ecosystem is the same as achievement in a school learning ecosystem, as achievement is all about the learner. One participant explained:

> he [the learner] can achieve the same thing at home and at school. I mean it'd be the same thing, it wouldn't make much of a difference but obviously school he's

got exposure to more help from the teachers and here he has to do everything on his own. So he has to put hundred percent in here at home to achieve well and concentration, the discipline has to be very good at home you know. That's what's important.

Learners achieve due to different reasons such as the influence of others or purely their own drive. A participant commented about drive:

You need to have drive, motivation, vision. That's why if a learner, doesn't matter if it's a government school, basic government school or a private school or a home educated learner, if they don't have drive it doesn't matter. You can put all the resources in front of them, that will not make a difference.

Learners will achieve when they see the value in their achievement or if they enjoy the specific subject. A participant explained that "if they actually do…achieve let's say high marks, they have already set their own benchmark for that high mark, so they will always try and achieve that, but they will set their own benchmark as well".

In conclusion, most of the participants understood student achievement as the point where someone reaches their full potential and gets a feeling of success and enjoyment from it.

5.5.2   Factors that drive learners to achieve

This interview question asked participants to explain what they think drives learners to achieve. Learners answered this question regarding themselves, whereas tutor and parents answered according to what they perceived as driving the learners to achieve. This question aimed to find a list of factors that drive achievement and to confirm this with the literature. The literature pointed mainly towards internal and external motivation as a factor that drives achievement.

Table 10 contains the constructs that drive achievement. The highest-ranking construct that drives achievement is learner motivation. This is closely followed by expectations set by parents, which ranked equally with the learners' interests.

Table 10. Factors that drive achievement in distance education.

Rank	Construct	Frequency
1	Learners' motivation	4
2	Expectations from the learners' parents	3
2	Learners' interests	3
4	Learners' emotional wellbeing	2
4	Learners' vision for their future	2
6	Expectations from the school or teachers	1
6	Wanting to help others	1

The motivation construct consists of both external motivation from goals such as wanting to study a specific degree that needs high marks, and internal motivation such as proving to themselves that they can accomplish something. Some of the learners felt that by doing well, they were being good people. For others it was an aspect of their personality to compete and want to achieve. One participant said that "obviously their ambition and what they want to do and accomplish in further life" drives them to achieve. Another answered: "well for me it is self-motivation, I want to be a better person to learn more, to have a better life, not better life, just increase my knowledge on life". Another participant confirmed this: "my self-motivation is definitely a factor that drives me". One participant said that she needs to be inspired: "I think mainly like intrinsic motivation I kind of mainly from being inspired". Another wanted to complete their purpose: "she had a purpose and she wanted to complete that purpose".

The construct ranked second-highest explains the drive to achieve originating in expectations set by parents that need to be met. These learners felt obligated to reach the goals set by their parents, saying that to meet their parents' expectations are motivation enough for them. One participant explained: "well my parents are obviously motivation, I would like to please them". Some parents set too high standards and place learners under a great amount of stress to meet these goals. This participant commented: "and they would have sleepless nights, because they did not get an A, and I find there's a lot of pressure put on these kids to academically achieve very high scores". Learners seemed to be more afraid to disappoint than to aim to achieve well. This also occurred in a different way in that teachers and schools have expectations of a learner (this construct ranked sixth). One participant said:

> *To have the boundary as a parent and a teacher, it's very difficult to separate the two. Because if you as a parent are teaching your child, you are going to expect a lot more out of the child, and to have that difference…. And there are parents who are magnificent at doing it, some children thrive in that environment.*

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The other construct that also ranked second-highest is the learners' interests. This refers to whether they like and enjoy what they are doing and whether the subject matter leads to curiosity. Learners naturally spend more time and attention on activities that they like. One participant explained:

> I think it's when they're happy with the subject, and they enjoy the subject matter that they are doing. Then they achieve better, because they go beyond. They go beyond what is in the book and it creates an interest in a particular thing, and once you start enjoying a subject then you'll excel in it.

Personal interest in a subject is thus a factor that drives achievement as it invites, seizes, and retains the attention of the learner.

Two constructs share the fourth-highest ranking. The first is that learners achieve well when they are emotionally well. This means that they have their emotions under control and can focus on their learning. This participant listed it as a factor: "emotional…. I just want to think of the right word… emotional wellbeing". The second is that a learner has some vision for their future that drives them to achieve. This is usually a career that they want to pursue or a financial state that they wish to achieve. One participant explained:

> They look at that long term, what they want to do in life and what they are doing now is just a road to get to where they want to be and to focus ja on the rest of their life and not just the here and the now.

Another participant commented:

> To me it's very important because I want to go study further, I want to better myself. Studying academically is one of the most important things because it allows you to work to better yourself for the future - as well as for others, because you are one person, but you can impact so many lives and you can help so many people.

Lastly, some learners have philanthropic motives, such as wanting to help other people, that drive them to achieve. One participant commented:

What drives me… helping others. I would say it drives me to achieve is by putting myself in other positions and giving myself to develop myself for others. So it's basically I want to be a doctor, I want to help people, so I want to put my heart into my work, I want to put my passion into my work, and that is what drives me.

Whatever the factors that drive achievement in the learner, the main cause of achievement seems to be the learner setting a goal for him- or herself and having the drive to reach it.

5.5.3 Factors that ensure achievement when creating a distance learning ecosystem

This interview question aimed to reach a better understanding of the different factors required in a learning ecosystem. The participants were asked which factors they believed were important when creating an effective learning ecosystem that will ensure achievement. After determining what they understood a learning ecosystem to be, this question would require them to explain the ecosystem by listing the different factors. Table 11 contains all the constructs that were listed as important by the participants when creating an effective learning ecosystem that ensures achievement. Individuals listed a variety of factors, with some listing more than one element that was then captured in a construct, resulting in some constructs having frequencies higher than twenty.

Table 11. Factors required when creating a learning ecosystem that ensures achievement.

Rank	Construct	Frequency
1	Practice, assessment, and feedback	22
2	Learners' personal traits	21
3	Learners' motivation	20
3	Timely academic support	20
3	Assistance in learners' self-knowledge	20
6	Learning environment	19
7	Peer interaction and influence	12
8	Structure	10
9	Content	6
9	Resources	6
11	Learners' vision for their future	5
12	Non-academic activities	4
12	Basic needs of the learner	4
14	Being exposed to real-life examples	2
14	Parental support	2

The highest-ranking construct was practice, assessment, and feedback which consisted of a few sub-elements or sub-constructs that an individual may have listed. The element of practice is essential in a learning ecosystem as practice builds the confidence of the learner. One participant explained that practice

is definitely a confidence booster, more in the cases that, if you know the information and you can answer it with confidence, generally you can find yourself feeling in the sense that, I know this and especially when it comes with an assessment test.

By repeatedly doing something, the learners become confident and are better prepared for assessment. One participant commented: "[the] more you practise the better you become". Another felt that "the best way to learn maths is to practise it". Another participant explained how "once they've done the lesson during the day, they actually go home and redo it again to make sure that they fully understand it". It was also mentioned that practice leads to improvement:

Repetition, writing out, it really does work and it really has made a massive difference. I've had students that come from 30 % up to 70 % - because of the repetition and the constant pressure when it comes to that. And they actually thrive on it, they really do.

From a learner's point of view, it was mentioned that he can "repeat a lesson as many times as needed in order to understand the work better". It was further highlighted by one participant that practice in practical subjects is essential.

Assessment allows the learner to track their growth. One participant commented:

You need a mark with commentary, with feedback because that's what you really, when you really learn is when you see what you did wrong and I think that is a big, big problem with everybody at this stage, that we don't get all that necessary feedback.

By assessing learners formally and informally, they become more comfortable with testing and can monitor their progress. As they become used to testing, they become more relaxed during testing and sometimes score better. Some participants warned that over-testing also occurs and tires the learners out: "you should not over-assess a learner

as well because that just makes the learners tired because they're so focused on just tests, and going to tests constantly that they not really focused on what they've learnt".

The last element is feedback on their progress. One participant called it an "awareness of how well you are doing". A participant noted that getting immediate feedback is also essential as "kids don't want to wait".

The second-highest ranking construct is the learners' personal traits. This construct refers to the characteristics of the specific learner and how that influences him or her in a learning ecosystem. It was mentioned by a number of participants that the learners needs to make a commitment towards their education. One participant commented:

Their personal involvement; they must have a choice of where they want to be. So the ones that come here just because mom and dad want them to pass, they don't do well. The ones who actually have a goal, they go study medicine and get a 90 % average.

It seems that learners need to take responsibility and decide what they want to get out of their education. One participant said:

…they have to actually pitch up. So, if there is a schedule planned for them and they just don't feel like working or you know there's not a schedule to say you know what, you have to be here at 8 on Monday to start your work and some of them just pitch up at 10. If they don't bring their part by showing up when they need to show up and actually follow those guidelines, then we have a problem because they can't expect to perform or do well if they don't actually pitch up for the tutor session.

Another participant said that there is a need for

…something to put you in that mode, I know some people practically do school at home with bells and even school clothes, we don't have that, but just having a designated area. We actually moved out the house and did it in the garage and that worked fine for me for a while.

Learners need to decide that they want to work. A participant noted that accepting what one's abilities are and then working towards one's strengths are important, as well as

not losing focus when the pressure increases. They explained: "I think honesty in the direction, honesty with your abilities. Being honest with your abilities but not in a negative way". All of these factors can be explained as characteristics of learners in a learning ecosystem.

The third-highest ranking construct is the learners' motivation. Learners need motivation to achieve. Many participants noted that learners are more motivated when they are tasked to do things they enjoy and find interesting, such as this participant: "I think also if you're enjoying something it makes me more motivated to do it". Another said that another motivating factor is "obviously fun material". Another commented:

> *I think it's when they're happy, with the subject, and they enjoy the subject matter that they are doing. Then they achieve better, because they go beyond. They go beyond what is in the book and it creates an interest in a particular thing, and once you start enjoying a subject then you'll excel in it.*

One participant noted that a learner's level of motivation changes over time: "…vision to wherever you want to be in the future and it's going to change, but that's why it's so important". One participant commented that motivation has to come from within: "it is just something from yourself that you have to want to achieve. It is not something that you can get from someone else". Another noted that motivation comes from encouragement: "[it is] important to have someone to push them to see that they can do better". Some learners need extra support to keep them motivated because they struggle to keep themselves motivated, but will work hard with a small push.

One participant commented that they are motivated by proving people wrong:

> *I don't think it's a particularly positive, but it's more extrinsic, but being able not to do something and then people are like "Oh, she can't do that" and then being able to prove them wrong. It's like one factor but it's not as big, it's not always positive.*

Some learners can be motivated with rewards: "I've got kids here who didn't do well at school at all, and the parents promised them a diving course, so there's motivation by putting a carrot in front of their nose basically".

Timely academic support also ranked third-highest and is a substantial influence in the learning ecosystem. Academic support is typically provided by a tutor in a distance education ecosystem, but peers and parents can also provide this support. The majority of participants clearly stated that distance education is not possible without some form of academic support, as this participant summarised: "One of the main things there is definitely assistance; a home-schooler cannot do anything or everything by him- or herself. No ways". Sometimes a learner requires ongoing tutor support on a regular basis, whereas at other times he or she only requires an explanation for one difficult problem. This support is often required immediately while the learning is struggling with the problem, as commented by this participant: "so I feel if you are able to have somebody that can assist academically and be accessible, that would actually alleviate most of the problems". The person providing academic support is usually also emotionally invested in the achievement of the learner: "I do care about the children because I want to see them achieve". Another commented: "I think it's also knowing the learner, you need to know the learners that's in front of you". Another commented: "so we really make a point of it, to really understand the child. We actually start to get to know the child's emotional state very quickly". They try to work around emotional issues to help the learners focus on their studies. When a tutor knows the learners personally, they know when to push a learner and when to give them some space. One participant noted: "A learner that you know will have, will always get around 70-80 % will always be the learner that you expect to have that mark or range of marks". Tutors also need to be able to adjust their style to accommodate different learning styles. This participant explained:

> So there needs to be room and understanding of these different places or different kinds of learning and parents or facilitators needs to provide the different variations of learning [to] a child whether it's a visual or verbal or practically or by reading, they must all be available for a healthy ecosystem otherwise the pupils in such an ecosystem won't learn optimally.

The last important area is around invigilators and the effect they could have on learners during examinations. Some participants mentioned that having a caring and passionate invigilator helped the learner be more relaxed during their assessment.

Learners needing assistance in getting to know themselves also ranked third-highest. A big part of this construct is the fact that learners do not receive enough guidance when making their subject choices in grade 9. They usually take the subject that they like and enjoy, but have issues with their options after school when they finally realise what they

want to do, but had not picked the right subjects. One participant explained:

I noticed they chose different subjects and they seemed to me to have chosen what they loved. And they seemed to excel in what they did, than when they were doing your generalistic [sic] subjects. I think it is more of your love and interest in your subject.

Another participant further elaborated that "they choose only the subjects that they like or dislike and ja, so at that stage they don't choose career wise". Another participant added:

It is not necessarily in the long run the right subjects for them to choose, because in every career there are subjects that you have to have, even if it's not like a main subject like Mathematics for example. If you want to become a doctor, the children don't necessarily know that they need subjects like that.

Learners need help to understand themselves better by enabling them to learn what their strengths and weaknesses are and then selecting what they want to do after school. A participant commented that

if you know your strengths and you know what your strengths and weaknesses are, and I always believe in that SWOT analysis that looks about your strengths, your weaknesses, your opportunities, and threats. You need to have an idea, something to plan.

Another explained that "home-schooling is not for everyone, but it gives you time to develop yourself so that you can be the best person you can be, and you can help so many other people, and home-schooling is for the unique cases". Some participants mentioned that they have witnessed how much more drive learners have who know what they want to do after school and who understand the value of working hard in their subjects. Learners who know their strengths and weaknesses early on will be able to adapt better, focus on their strengths, and match their strengths with opportunities. Learners also benefit greatly from aptitude tests: "I'm a firm believer of aptitude test[s], unfortunately I see that many people don't use aptitude test[s] anymore today". Career guidance is important and does not feature enough – learners seem not to know what their options are and selecting their elective subjects in grade 9 is thus an important, but highly uninformed decision. One participant commented:

I would say career guidance is one of the things and I'm talking about that doesn't matter that if you go to the public sector or in private sector, there's not enough of that. So now you sit with learners in Grade 12 or 11 and they're unsure, because now they're not doing well in a subject. It's difficult to change to another direction and only by grade 12 they realised, oh but I actually wanted to go into the opposite direction.

Some tutors expose their learners to different careers and have regular discussions about what they could do one day. This opens up learners' minds to new opportunities and makes them excited about the future. When they are excited about their future, they tend to work harder to achieve their goal.

The construct ranked sixth-highest is the physical environment in which the learning occurs. This has been noted in many of the other interview questions too. The two comments that occurred the most were that the environment needs to be comfortable in order to support learning, and that it must be quiet. A participant noted: "I would say the element would be to make the surrounding as comfortable and as quiet as possible". It was also noted that the environment should be dedicated to learning, so it should not be the learner's room or the dining room table: "so especially with home-schooling they mustn't today sit in the sitting room and then in the garden and then in their room. They must have a designated space that they do call their own study". It should also be isolated so that there are no distractions, "because a lot of the times if it's with other people they can cause distractions". Other physical aspects that were mentioned as important in a learning environment is that it needs to have good lighting and ventilation, and have learning-conducive posters and equipment.

Peer interaction and influence consist of a few aspects. The first is that peers can either have a positive or negative influence on a learner, depending on the relationship with the peer. One participant explained that "peers is a difficult one because it depends on if the learner is going to or the children are going to choose the right peers to be around". Another participant added that "[if they] choose the right peers they can be the best people to actually trigger ideas, different ways of thinking, out of the box thinking". Another aspect is the social interaction during which learners gain valuable skills. One participant explained that social interaction is "I think quite important because they need to have interaction with the peers, they cannot be isolated". Another added the aspect of "whether you're having to learn to work with others or working by yourself". The third

aspect is the learning that occurs between peers, as explained by another participant: "They learn from each other – sometimes better than what we can teach them".

Structure encompasses three main things: the timetable (schedule) that the learner needs to set up for themselves and keep to, the structure that is set by the learner but suggested by the service provider, and then the discipline of the learner to follow the plan. Having structure is key in a distance education ecosystem:

> *I feel that they should have a set timetable of how much time to spend on every single subject and to be able to reach that goal and to be able to do any tasks and assignments – if they have that structured environment.*

In a distance education ecosystem, a learner is solely responsible for their progress and there is no traditional school teacher that nudges them forward and ensures that they keep up. One participant explained that "when they do the planning they know exactly how much work is involved. So they know they don't have time to waste and time to just sit around and play around". Learners needs to set themselves short-term and long-term goals that they want to achieve and plan their schedule according to those. A participant confirmed: "Goals, to set those goals and achieve them". Some participants explained how they take the number of pages in a book and divide it according to the amount of days left, as one participant explained:

> *What I do is I take my books and then I take the last page and the first page and I subtract, and then I work out how many pages I have to do and how many days I have to do it in, and then I work out how much work I have for the month and how much pages. So say I have to do on Monday, 50 something pages in Biology.*

They use such strategies to plan and get through all the work.

The content required depends greatly on the service provider that the parent selects:

> *I would say the service provider is important that the service provider know exactly what they are doing, deliver on time, have the exam papers, quality exam papers, a high standard of exam papers. That is on the academic side I would say that is quite important to us.*

Some learners prefer electronic books and have a stronger dependence on technology, whereas other learners prefer hard copy books. This differs per person and is explained by this participant's opinion:

> *Having your subject material on computer is not good enough because they are doing very minimum amount of writing, barely any writing – only the tasks – and having your text books on computer, a lot of people it works for but all the students I have had … it doesn't work, because they get lazy and they have to come and sit and look at this computer and read this computer all the time.*

Some learners prefer to make use of a variety of content sources, rather than just one, as this participant noted: "I use a lot of different books to gain information because not all the books always give you everything you need". Another participant added: "well they cannot rely on one source, they need to have more. We have seen that over and over. They need to have a variety of books to use". Together with this, it was noted that resources like equipment for specialised subjects, stationery, furniture, technology (computer and printer), and internet access were required, of which access to the internet was mentioned most often. The internet was provided as a solution to limited access to academic support, as learners could look for answers and watch videos. The internet was also required to interact with service providers (of content) and to do research. This participant explained:

> *So it [the internet] basically does the job of a teacher. So I watch videos and extra learning materials and I try to understand the work, because there isn't always a teacher to tell me if I'm wrong or right, or if I have a question: sometimes I sit up to two hours for just one question. But I will just try to figure it out.*

The learner's vision for their future was explained as knowing what the learner wants to achieve in life and planning how he or she is going to get there. This participant explained:

> *I would say if the learner doesn't have the vision to what they want in the future or what they want to achieve, what they want to become. I'm not talking about being rich, I'm not talking about having the best house on the block, but I'm talking about the vision to what their goal is in life and what their mission statement is in life, but again that goes back to self-knowledge, self-understanding.*

Having a vision will keep them going during difficult times, as noted by another participant:

> *If they have a clearer idea (like I said they might not have 100 % idea by grade 12) but they have an idea of where they want to go, what their mission statement is in life. That will actually pull them through, I believe.*

Some participants mentioned that having an inspirational figure or a real-life example to follow, is also important. One participant said: "I think inspiration. If there's a lot of, if the environment has a lot of inspirational factors, it will become more motivated".

Non-academic activities were mentioned by a few participants as this played a very important part for them. This entailed having some activity like sport or social interactions that create a balanced life. One participant elaborated: "You need to have time to do physical exercising, time for social life as well". Another participant explained that "dance was as important to them as their actual studies. So we put in the same effort in their studies as we did for dance…it is something that they really love". Another participant added that: "A child can't just sit and sit and learn, [he] must be able to have time to also develop his creative side, to also be, have physical activities where he can get rid of energy".

The basic needs of learners need to be met. This refers to eating balanced meals, sleeping enough, being sheltered, and feeling safe. One participant elaborated on the safety of the learner: "It must be safe because there are so many threats and our economy is playing a big role and kids look at the news and they feel not very safe physically. So it must be a safe environment". Another participant explained that learners cannot give their best in class if they are undernourished: "so apart from the emotional, we also try and make sure that they also have sufficient nutrition".

In terms of the support of the parent, one participant said that, although the parents do not necessarily have the capacity to help academically, their involvement in the learner's learning is key and a non-negotiable aspect: "Mom and Dad must be involved, parents must be supporting and involved".

5.5.4 Conclusion for research question 2 results

This section aimed to explain the results of research question 2. The third interview question aimed to define academic achievement. The following definition was developed from the results: *achieving well academically is when a learner reaches his or her full potential or ability, or when he or she sets a goal and is successful in reaching it. Achievement is different for each learner and needs to be managed differently.*

The fourth and fifth interview questions aimed to answer what the factors are that drive achievement, and which factors create an effective learning ecosystem. The results were presented and discussed according to their frequency. Motivation and expectations from the learners' parents were the highest ranking constructs to drive achievement. Practice, assessment and feedback, the learner's personal traits and motivation, timely academic support, and assistance offered to a learner in gaining self-knowledge were the highest ranking constructs.

5.6   Results for Research Question 3

Research question 3: Which of the identified factors are perceived to be the most influential?

This research question takes question 2 further by identifying the influence of each of the factors. The aim of this question was to identify which factors have the greatest influence on achievement compared to the rest. It was expected that, through this question, the researcher would be able to rank the influence of the factors and understand which factors are more influential than others. The sixth research question took the factors listed in question five and requested participants to choose the factors that they believe have the greatest influence on achievement. The seventh question further probed the importance of the factors by requesting participants to rank it by making use of a points system to gauge relevance in importance.

5.6.1   Factors that have the greatest influence on achievement

This interview question aimed to identify which factor was seen as the one that has the greatest influence on achievement by participants. The participants selected their option from the list of factors found in response to question five. The question was phrased positively, asserting that there is indeed an influence on achievement. Table 12 lists the constructs that were identified from the participants in ranked order according to frequency. The highest ranking construct was resources and content. The two constructs that were ranked second-highest were learners' motivation and structure.

Table 12. Factors that have the greatest influence on achievement.

Rank	Construct	Frequency
1	Resources and content	7
2	Learners' motivation	4
2	Structure	4
4	Being exposed to real-life examples	3
4	Learners' personal traits	3
6	Peer interaction and influence	2
6	Parental support	2
8	Learning environment	1

The highest-ranking construct was access to resources and content. A participant said: "I'd definitely say content and instructions, along with academic support is very important". This includes books, tools, the service provider, and any other resources

required by the learner. Many participants felt that the selection of a service provider had a greater influence due its effect on the structure, resources, content, and academic support. One participant explained that "I would say the service provider, ja we used a different service provider in the past and made life, the school side of home-schooling very difficult because they weren't up to scratch".

The first construct of the two second-highest ranking constructs was learners' motivation. Being motivated consisted of a few specific properties of which having a goal and reaching it was the most common. One participant explained that "you can do whatever you want, if the child doesn't want to learn on his/her own… you can do the best thing, the best curriculum and everything and he/she is not going to succeed". The learner thus needs to be motivated. Inspiration was mentioned as one way of evoking motivation as learners may become more motivated when they are inspired by a specific person. When learners understand why they have to do something and they understand what the goal is, they will also be more motivated.

The second construct that was ranked second-highest was structure. Participants mentioned a few elements that they perceive as structure. One participant answered that it was a "structured, disciplined environment". Another participant added that "he [the learner] has to put hundred percent in here at home to achieve well … the discipline has to be very good at home you know. That's what's important".

The first construct of two constructs that ranked equally in fourth place is being exposed to real-life examples. One participant described this as being inspired. Another participant added to this by saying that "for example you could follow maybe a lady who also does home-schooling as a thought". Using creative examples and comparisons to make concepts more understandable was explained by this participant: "[Concepts] have to be accompanied by an example or a comparison. Creative examples are needed to constantly remind them of the abovementioned".

The second construct ranked fourth-highest was the learner's personal traits. This differs per learner and was explained by participants as having enthusiasm, positiveness about learning, and positive thoughts.

Another type of support is from peers in that learners encourage and help each other. This is the first of two constructs that ranked sixth-highest: peer interaction and influence. A participant commented: "I would say I think the social environment, acceptance of them

going as well, because the kids have got the most issues with their social environment. Well that's my experience". Teachers often have to assist learners with these problems to help them relax and focus on their learning. Some participants say that peer support has the greatest influence on achievement.

The next construct concerns learners being supported by their parents. This construct ranked equally with peer interaction and influence. Some participants included their whole family and even neighbours, not just their parents. They specifically referenced encouragement as the support that gives some direction and motivation when the learner feels unmotivated. One participant explained it as follows:

The encouragement and the tools, because you can have the tools but if you don't have the support it can lie on your desk; you wouldn't have the focus, you wouldn't have the heart or you would think ag no… you know, you wouldn't have the passion for it. So, when you have the tools and you have the encouragement it enables you to pick up the tools and actually start working with it.

The last two constructs that ranked eighth-highest were the learning environment and timely academic support. The learning environment was explained by one participant as follows: "I would say the area that I study … I can't study in [a] noisy place or that has a lot of distractions". The timely academic support construct was perceived by one participant as the greatest influence on achievement.

5.6.2   Established importance of identified factors

The seventh interview question required participants to use 100 points and allocate an importance to each of the factors they listed in question five. Higher points were to be allocated to factors of higher importance. This question not only ranked the factors in an order of perceived importance, but also helped to understand the significance of each factor relative to the other factors. Some of the participants only used 90 of their points, after which the points were reworked to 100. The participants found this question quite hard, as they had to decide which factors were more important relative to others, and also often thought of more factors which were added and then recalculated to combine into the ranking. Table 13 lists the constructs with their total points that were allocated per factor by the participants. Each of the individual responses were added together to get the total points. The factor with the highest number of points was ranked first with the remainder ranked in the same way thereafter. For the 20 interviews, there were 2000

points available to allocate, so the highest ranked factor received the highest number of points out of 2000. This can thus indicate the relative importance of the different factors.

Table 13. Established weighted importance of each identified factor.

Rank	Construct	Total points
1	Structure	330
2	Timely academic support	309
3	Learning environment	207
4	Content	187
5	Resources	172
6	Learner's personal traits	165
7	Learner's motivation	162
8	Practise, testing and feedback	104
9	Parental support and involvement	95
10	Peer interaction, influence and support	72
11	Being exposed to real-life examples	70
12	Assistance in learner's self-knowledge	55
13	Non-academic activities	42
14	Learner's vision for their future	20
15	Basic need of the learner	11
	Total Points	2000

The construct rated highest was that of structure with 330 points out of a possible 2000, ranking it first. Timely academic support ranked second and the learning environment ranked third. Some of the participants had a small number of factors that they ranked, allocating many points to a few factors, whereas others selected up to nine different factors and rated them with very specific amounts of points. This showed that some participants felt that there were only a few very important factors that drive achievement or that there are many and that the combination of them all resulted in achievement. Figure 2 illustrates the percentage of points allocated to each factor.

Structure, 17%

Timely, academic support, 15%

Resources, 9%

Learner's personal traits, 8%

Learning environment, 10%

Practise, testing and feedback, 5%

Peer interaction, influence and support, 4%

Being exposed to real life examples, 4%

Content, 9%

Learner's motivation, 8%

Parental support and involvement, 5%

Assistance in learner's self-knowled... 3%

Non-academic activities, 2%

Learner's vision f...

B... n...

Learner's vision of their future

Basic need of the learner

Figure 2. Illustration of the relevant importance of the factors that drive achievement.

None of the participants rated the factors in the same way. This again confirmed that the learning ecosystem factors are different to each learner, although the types of factors selected were the same. The selections that were made in question six about the factor that had the greatest influence on achievement often did not match the factor to which the participant allocated the highest points in this question.

A comparison was conducted between the results from question five, six, and seven. The top five ranking constructs were added to a table to compare the constructs to each other (see Table 14).

Of the constructs that were rated in the top five, motivation, timely academic support, structure, resources, and content, and learners' personal traits each featured at least twice, confirming that these factors are important in an ecosystem that ensures achievement.

Table 14. Comparison between the top five ranked constructs for interview question 5, 6, and 7.

Rank	Interview question 5: Factors when creating an effective learning ecosystem (Table 10)	Interview question 6: Factors that have the greatest influence on achievement (Table 11)	Interview question 7: Established weighted importance of each identified factor (Table 12)
1	Practice, assessment, and feedback	Resources and content	Structure
2	Learners' personal traits	Learners' motivation	Timely academic support
3	Learners' motivation	Structure	Learning environment
4	Timely academic support	Being exposed to real-life examples	Resources and content
5	Assistance in learners' self-knowledge	Learners' personal traits	Learners' personal traits

What is interesting is that motivation was listed as the third most frequently mentioned factor in a learning ecosystem in question five and the second most influential factor in question six but ranked seventh in the weighted importance ranking in question seven. This may be due to the fact that participants felt that other factors influence motivation, which in turn determines achievement. The learners' personal traits construct was among the top 5 in each of the three questions.

5.6.3 Conclusion for research question 3 results

From the interview questions, the researcher was able to determine what the participants viewed as the factor that had the greatest influence on achievement, as well as rank all the factors to determine their relative importance. The factor with the greatest influence was resources and content, followed by both being motivated to reach a goal and having structure. Of the factors that were ranked according to relevant importance, structure ranked the highest, followed by timely academic support, the learning environment, and content and resources.

5.7 Results for Research Question 4

Research question 4: How do the factors interact with or affect each other within a distance education ecosystem?

This question aimed to assist the researcher to understand the relationship between the factors that drive achievement and whether greater insights could be derived from these relationships. It was expected that some of the factors would have a strong correlation that might ignite further research. The interview question was intended to find relationships between the listed factors and determine where the relationships seem to be stronger than others.

5.7.1 The effect of combining influencing factors

The aim of interview question 8 was to understand whether there were relationships between the factors that drive achievement that would have a stronger effect on achievement when they were combined than if they were to be on their own.

Table 15. Understanding when the presence of combined factors have a stronger influence on achievement than on their own.

Rank	Combination	Frequency
1	Curriculum/Content & Parental support and involvement	2
1	Curriculum/Content & Resources	2
1	Curriculum/Content & Structure and discipline	2
1	Motivation & Timely academic support	2
1	Motivation & Vision	2
1	Parental support and involvement & Timely academic support	2
1	Practise, testing, and feedback & Timely academic support	2
1	Resources & Structure and discipline	2
1	Resources & Timely academic support	2
10	All factors need to be combined	1
10	Being exposed to real-life examples (two sub-factors required)	1
10	Being exposed to real-life examples & Learning environment	1
10	Being exposed to real-life examples & Non-academic activities	1
10	Being exposed to real-life examples & Resources	1
10	Curriculum/Content & Timely academic support	1
10	Learners need assistance in getting to know themselves & Motivation	1
10	Learners need assistance in getting to know themselves & Peer interaction, influence and support	1
10	Learners need assistance in getting to know themselves & Practise, testing, and feedback	1
10	Learners need assistance in getting to know themselves & Structure and discipline	1

10	Learners need assistance in getting to know themselves & Vision	1
10	Learners' personal traits (two sub-factors required)	1
10	Learners' personal traits & Peer interaction, influence, and support	1
10	Learners' personal traits & Resources	1
10	Learners' personal traits & Structure and discipline	1
10	Learning environment & Non-academic activities	1
10	Learning environment & Resources	1
10	Learning environment & Structure and discipline	1
10	Non-academic activities & Resources	1
10	Parental support and involvement & Structure and discipline	1
10	Practise, testing, and feedback & Structure and discipline	1
10	Motivation is required to make all factors stronger	1
10	Structure and discipline (two sub-factors required)	1
10	Structure and discipline & Timely academic support	1
10	Structure and discipline & Vision	1

It became apparent that there were some highlighted relationships between the different factors that occurred once and some twice. Table 16 presents an analysis of the factors that were mentioned as part of a relationship ranked according to the number of times the factors were part of a relationship mentioned. From this, it is possible to see that structure and discipline, resources, and timely academic support are most often referenced as factors in relationships. One of the participants mentioned that "the discipline, the environment, plus then learning materials – putting that up – and having all your resources", should be stronger combined than when occurring on their own. Another participant mentioned: "Immediate feedback and parent involvement and timetable go together". Another participant's comment confirmed this: "I would combine academic support with access. If you were able to get access this way, it would make it much easier, because then they would have ready support every time". This participant also confirms these factors: "I would say resource and teacher support. I would say both of them together, because your teacher and facilitator - this part of your resource. I believe they are resources as well".

Table 16. Occurrences of factors in relationships whose combined presence has a stronger influence on achievement.

Rank	Construct	Frequency
1	Structure and discipline	13
2	Resources	10
2	Timely academic support	10
4	Curriculum/Content	7
5	Motivation	6
6	Being exposed to real-life examples	5
6	Learners need assistance in getting to know themselves	5
6	Learners' personal traits	5
6	Parental support and involvement	5
10	Learning environment	4
10	Practise, testing, and feedback	4
10	Vision	4
13	Non-academic activities	3
14	Peer interaction, influence, and support	2
15	Basic needs of the learner	0

5.7.2 Conclusion for research question 4 results

This research question aimed to identify which factors when combined had a stronger influence on achievement. Relationships were highlighted that were mentioned more often than others and the factors that were most often part of a relationship that was stronger when combined were found to be structure and discipline, resources, and timely academic support.

5.8 Conclusion

This chapter presented the results from the eight interview questions. The constructs that emerged during the 20 in-depth semi-structured interviews with learners, parents, and tutors, and the analysis of this data, have confirmed what was previously found in literature around the concept of achievement within a learning ecosystem. Through the analysis of the results, new insights and finding were developed that will contribute to the academic understanding around the factors that drive achievement in a school-level distance education ecosystem. The next chapter will consist of a comparison of the results with existing literature, further discussion of the findings, and the presentation of a conceptual framework for factors that drive achievement in a school-based distance education ecosystem.

CHAPTER 6: Discussion of Results

6.1   Introduction

In this chapter, the findings from the research that was presented in Chapter 5 will be discussed in further detail, referencing the literature discussed in Chapter 2 and highlighting the implications of new findings in order to answer the four research questions presented in Chapter 3. The relevance of the results will be explored in this chapter by comparing it to the literature to determine whether it supports, contradicts, or extends upon the current literature. The findings of the research will add to the existing literature by forming a framework that describes the factors that drive achievement in a school-based distance education ecosystem, as there is limited research about which factors are most influential in driving achievement.

6.2   Discussion of Results for Research Question 1

Research question 1: What does the concept of a learning ecosystem represent in the context of distance education?

Research question 1 aimed to establish the concept of a learning ecosystem specifically in the context of distance education. The learning ecosystem is well defined in the higher education space and in the formal school space, but not with specific regard to distance education. Two interview questions were posed to define a distance education ecosystem. The first question determined the participants' understanding of a learning ecosystem, and the second question determined what the participants viewed as the differences between a distance and a school learning ecosystem. The findings of these questions would allow the researcher to answer research question 1.

6.2.1   Understanding the concept of a learning ecosystem

Interview question one enabled the formulation of a common understanding of the concept of a learning ecosystem. The eight constructs presented in Table 5 exhibit the participants' general understanding of the concept, where a variety of views are shared by different role players, namely learners, parents, and tutors. The data were analysed using thematic content analysis followed by a frequency analysis that highlighted the number of times a construct was mentioned. The construct that ranked first with a

frequency of nine is the understanding that a learning ecosystem is 'a suitable physical environment that makes a learner feel relaxed and able to focus on their learning', and can therefore be considered as the most common understanding of the concept. The second-highest ranking construct with a frequency of eight is that the learning ecosystem is built around a learner's needs. The third-highest ranking construct is that a learning ecosystem 'needs to have all the different factors to be efficient in its purpose'.

Each of the aspects that were mentioned in the understandings are supported by the collective definition of Baeten et al. (2013), Crosling et al. (2015), Parpala et al. (2010), and Winne and Nesbit (2010), who agree that a learning ecosystem consists of many different factors which, when combined, create an effective learning ecosystem that is focused on the learners' needs, specifically their physical environment. When reviewing the constructs, it can be seen, firstly, that there is a common understanding that a learning ecosystem consists of many different factors and, secondly, that the factors are of varying importance to each participant.

Crosling et al. (2015) state that learning ecosystem contains components such as learning material, physical infrastructure, equipment (e.g., computers and stationery), teaching pedagogies, as well as the learner, parent, and teacher, who all have different complexities. These complexities are combined into the ecosystem and contribute to the quality of the education system. This supports the notion that the learning ecosystem is made up of many different parts that differ in complexity. Additionally, a learning ecosystem contains different sources of knowledge and types of technologies which allow for a learner to flourish. Learners mentioned that having a variety of sources is a benefit. This is a finding that can be implemented into the provision of learning materials, as service providers now know that learners prefer a variety of sources over a single source because it enables them to gain a better understanding of the learning material.

To many participants, an ecosystem was closely related to the learning environment and they felt that the ecosystem was the environment. These participants elaborated more on the environment and what they deemed a suitable environment for learning. They described the specific learning space where a learner sits, what they present on the walls, whether it was a quiet and dedicated learning space with no distractions, and that it needed good lighting and ventilation. The importance of the learner's environment is highlighted by Parpala et al. (2010), as a learner's perception of their learning environment has a definitive influence on how he or she learns. If the environment is set up in a way that enables learning, it should form an important part of the learning

ecosystem. The environment of the learner was most frequently mentioned by participants when they explained the learning ecosystem, thus supporting the literature concerning the learning environment. Parents and tutors can therefore accommodate this requirement by ensuring that the learning environment is set up correctly, as it plays an important role for the learner. It should be noted that the learning environment must not be the learner's room or a communal space in the house like a dining room. It must be a dedicated area that a learner can use at any time, which is quiet, has good ventilation and lighting, and has no disturbances. It was also noted that adding posters or other materials to the walls will make the environment more visually stimulating for the learner and contribute to a better learning environment.

There is a shift from the traditional educator-focused teaching approach to a student-focused approach, but it is slower to occur in school-level education than in tertiary education (Gupta & Jain, 2017; Northey et al., 2015). Creating a learning environment that centres around the learner's needs is becoming more important. The second-highest ranking construct agrees with this as it describes a learning ecosystem as being built around the learner's needs. It is easier to allow learners to explore in their learning and discover the ways in which they learn best in a distance education ecosystem than in a school ecosystem, as the learner has the opportunity to try out different things. Facilitators need to allow learners to try out new things and discover the best suited methods for them to learn by. Another construct that was mentioned is that a learning ecosystem allows a learner to flourish and be the best they can be. By setting up the learning ecosystem for achievement, learners will be able to succeed.

The parents' role to support the learner in their education outside of schooling matters forms part of the construct of parental involvement that is most strongly related to achievement (Desforges & Abouchaar, 2003). It was also pointed out that one of the important forms of parental involvement is providing the learner with a secure and stable environment, and that the parents' hopes and expectations for their child have the biggest impact on the learner's achievement. Avvisati et al. (2014) and Desforges and Abouchaar (2003) further explain that parents' attitude and involvement in the learning activities in the home is closely related to achievement. The involvement of parents was ranked as important as the requirement for academic support. The construct thus supports the literature which suggests that parental involvement is key in the learning ecosystem. The support provided by the parent is not specifically academic, but rather occurs in the form of encouragement and creating a learning ecosystem for the learner to achieve in. Parents need to purposefully get involved in their child's education journey

and give the learner the comfort of knowing that their parents are available when they need them and that they offer their full support.

Parpala et al. (2010) list constructive feedback and staff enthusiasm and support as some of the factors that measure a learner's perception of their learning environment. Baeten et al. (2013) further add that by improving the learning environment through better teacher support (viewing things from a learner's perspective), structure (clear expectations and guidelines), and involvement (showing concern and warmth), the autonomous motivation of a learner can be enhanced. The other sixth-highest ranked construct, namely that a learner requires academic support, supports this and describes that a learning ecosystem requires academic support as learners need individual attention. Parents must be aware of this when considering distance education as an alternative to formal schooling as additional costs may be expended to provide the academic support a learner needs, which is normally included in school fees.

Technology is listed as a resource that enhances the quality of learning and teaching (Chudgar et al., 2015; Hart & Paucar-Caceres, 2017). Technology is most effective when used in conjunction with classroom interaction, but also removes the requirement of one-on-one time with a teacher (Horn & Staker, 2015; Schneider & Preckel, 2017). The technology construct, which ranked eighth highest during the analysis, thus supports the literature and is a very important part of the learning ecosystem. Technology does not replace existing forms of learning, but enriches the learning experience by making more sources of information (access to internet) and more forms of information (electronic content, videos, interactive lessons, tests, and quizzes) available to the learner.

6.2.2 The differences between a distance education ecosystem and a school learning ecosystem

The second interview question asked the participants to explain the differences between a distance learning ecosystem and a school learning ecosystem. This question took the explanation of the concept of a learning ecosystem further by pointing out the differences between a distance learning ecosystem and a school learning ecosystem and answered the research question by defining a learning ecosystem in the context of distance education. Most participants explained the differences by pointing out a property of one of the two learning ecosystems compared to the other. The distance education ecosystem compared to the school learning ecosystem was presented in Table 6 and the school learning ecosystem compared to the distance education ecosystem was

presented in Table 7. The top corresponding constructs that were found in both tables were then presented in Table 8. From the comparison, four areas were identified that describe the major differences between a distance and a school learning ecosystem: the individualistic vs the traditional view, the different levels of academic support, the amount of time spent on valuable academic instruction, and the size and complexity of the learning ecosystem.

When considering the differences in a distance education ecosystem when compared to a school learning ecosystem, the top-ranked construct was that the distance education ecosystem creates a learning opportunity that suits the needs of the learner. This supports the literature by Northey et al. (2015), Houston and Toma (2003), and Bryant et al. (2005) that states that distance education is centred around the learners' needs and does this by catering to their previous knowledge and expertise and their learning styles. Compared to school learning where a teacher needs to consider all the learners' needs, distance education is more focused on the individual learner's needs. The second-highest ranking construct was that learners take responsibility for their learning. This supports the literature by Covington (2000), Ning and Downing (2015), and Winne and Nesbit (2010) that highlights self-regulation as learners' ability to regulate their own learning by way of a learning strategy. The third-ranked construct is the fact that a home-schooled learner is more disciplined and structured as they are responsible for their progress. This also relates to self-regulation and the ability to plan schedules. Distance education thus speaks to the individual learners and their needs and the responsibility that is taken by learners, including the discipline and structure they create. It was found that most participants agree that individualised learning is key in distance education.

Another interesting construct was the strong reliance on the service provider that supplies resources and content. Keegan (2002) names it as an element, but it came across as a more important factor during the interviews. Some participants also highlighted that distance education is not ideal for subjects that have practical elements and that service providers need to consider this when deciding to offer a subject. The service providers play an important role in advising the parents about their options and the best way in which the parent can enable their child to achieve. Parents require professional advice from the service provider.

When looking at the differences in a school learning ecosystem when compared to a distance education ecosystem, the highest ranking construct was the reduced flexibility and fixed, standard learning path in a school learning ecosystem. The second-highest

ranking construct was that learners do not get the individual academic support they require in a distance education ecosystem. Both of these constructs are discussed with the findings in the next section. The third-highest ranking construct was that a learner had a greater opportunity to interact and receive support form peers at school. This supports the literature by Boud et al. (2013) and Cohen and Sherman (2014) which explains the benefits of peer learning, peer teaching, and goal-setting, and their influence on the development of skills such as reflection, articulation, and giving and receiving feedback. Some participants indicated that learners feel more pressure in a school learning ecosystem and that they struggle to cope. Some learners will be able to address this by developing their emotional intelligence (Wang et al., 2016). Other learners will flourish in a distance education ecosystem where there are less learners and teachers in the ecosystem. For many learners, this is a major reason for choosing distance education, as the stress associated with school can trigger anxiety and worsen existing conditions. Learners with learning difficulties such as dyslexia, dyscalculia, dysgraphia, or physical impairments such as deafness or blindness to varying degrees, can slow down their own pace with distance education to accommodate the difficulty and complete their studies as it suits them.

When comparing the differences in a school learning ecosystem to a distance education ecosystem, the reduced flexibility and more fixed, standard learning path ranked the highest. This supports the literature by Baeten et al. (2013) and Ning and Downing (2015) who assert that distance education affords the learner more flexibility to work when they want to and in the learning style they prefer. The learning style of the learner can also be better addressed in distance education. Participants placed a high value on the ability to determine their own schedule and have flexibility. The learners also feel more empowered and in control of their education when they need to plan their schedules and can move it around as it suits them.

The highest ranking construct of distance education compared to school learning (presented in Table 6) was that a distance education ecosystem creates a learning opportunity that suits the learners' needs. The highest ranking construct of the difference in a school learning ecosystem when compared to a distance education ecosystem (presented in Table 7) was that a school learning ecosystem is less flexible and follows a standard learning path. When identifying which high-ranking constructs are present in both lists (Table 8), it was confirmed that there is a difference in the level of flexibility and personalisation between a distance and school learning ecosystem. This supports the literature by Baeten et al. (2013) and Ning and Downing (2015) regarding the needs of

the learner and self-regulation. Learners will feel more in control of their learning and take on more responsibility when they can personalise it according to their schedules and have the flexibility to move it around. This is more feasible in a distance education ecosystem than in a school learning ecosystem and is a substantial difference between the two learning ecosystems.

The second-highest ranking construct in both distance learning and school learning environments is that learners have more one-on-one interaction with academic support like a tutor in a distance education ecosystem than in a school learning ecosystem. This extends upon the literature, because the literature describes distance education as a situation where a learner is physically removed from the teacher, with less contact, but it does not specify the level of engagement with the teacher (Bryant, Kahle, & Schafer, 2005). This insight may, together with the finding by Lee and Anderson (2013) that academic support or guidance by a teacher should support both the discovery learning and direct instruction approaches, indicate that learners need on-demand academic help when they require direct instruction. Learners in a distance education ecosystem need some form of academic support, but the amount of time required with a teacher may be more than in a school learning ecosystem.

The third-highest ranking construct when comparing a distance learning and school learning ecosystem is the shift in focus between the two ecosystems. The distance education ecosystem is more focused on academics, whereas a school learning environment has non-academic activities like class administration and physically moving between classes that use up some of the intended academic time. This supports the literature by Winne and Nesbit (2010) in which they argue that learning can be improved by reducing extraneous cognitive load. This can be done by removing unnecessary information for the learner, focusing the learner's attention, and keeping things that are related to each other close to each other so that they are mentally integrated. The distance education ecosystem is an easier ecosystem to change and improve in order to be more productive.

The last construct that ranked high when comparing a distance learning and school learning ecosystem was the fact that a distance education ecosystem is smaller (class size) than a school learning ecosystem. A school learning ecosystem was described as noisier and more complex. When examining the definition of a distance education ecosystem by Keegan (2002), it consists of the learner, the parent, the service provider, and the communication that occurs. Winne and Nesbit (2010) add that a reduction in

class size tends to improve learners' achievement in a non-linear relationship, but so do learners' academic and social interactions and feelings of belonging. The school learning ecosystem consists of school infrastructure, learning and teaching materials, educators, and learners (Department of Basic Education, n.d.-c). The school learning ecosystem also contains many more of each element, as there are many learners and teachers, across a larger physical environment. The findings support the literature in that a distance learning and school learning ecosystem are different in their size and complexity, and the size and complexity is an important difference between the two learning ecosystems.

6.2.3 Conclusive findings for research question 1

Through defining a learning ecosystem, it became apparent what the participants understood the concept to be before asking them to identify the factors that drive achievement within this ecosystem. This question aimed to confirm whether the main factors of physical environment, teachers, parents, learners, and materials previously identified in literature would be confirmed as the factors that make up a learning ecosystem (Bryant et al., 2005; Crosling et al., 2015; Department of Basic Education, n.d.-c; Keegan, 2002; Seaman et al., 2018).

The research findings concluded that a learning ecosystem in the context of distance education means different things to different participants. A common understanding was established for a learning ecosystem and expanded on to specifically define the learning ecosystem in the context of distance education. It was determined that there are four major differences between a distance learning and a school learning ecosystem: the individualistic vs the traditional view, the different levels of academic support, the amount of time spent on valuable academic instruction, and the size and complexity of the learning ecosystem. The finding that a distance education ecosystem needs one-on-one academic support is a new finding, as the typical definition of a distance education environment describes the learner as physically removed from the educator, but this finding explains that the learner may still need academic support in person. The way in which the learner requires academic support is more on-demand and question-specific rather than instructional in nature.

The distance education ecosystem was defined as follows: *a distance education ecosystem consists of a limited number of factors such as the learner and his or her individualised needs, access to different sources of knowledge and technology, and parental and academic support, in a suitable, personalised physical environment that enables learners to flourish and be the best they can be.*

The data from the interview questions allowed the researcher to ascertain that the distance education ecosystem consists of the documented constructs and that there are clear differences between the two learning ecosystems.

6.3   Discussion of Results for Research Question 2

Research question 2: What are the major factors that drive achievement in a distance education environment?

The second research question aimed to establish the major factors that drive achievement in a distance education ecosystem. Interview questions three, four, and five were aimed at answering research question 2. The third interview question was used to determine what the participant understood as achievement and to develop a definition based on the findings. The researcher wanted to investigate whether participants understood it in the same way as defined in the literature (Meece et al., 2006; Schneider & Preckel, 2017; Schoen, 2015), and add to the definition with new findings. The concept of achievement discussed in this paper specifically referred to student achievement. The combined answers would define what the participants understood as achieving well academically. The fourth interview question aimed to make the concept more personal and enquire what the participant deemed the cause or factor that drives achievement with reference to either themselves (for the learner) or the learners they were in contact with (for parents and tutors). The fifth interview question required the participant to list the factors that they believed to be important when creating an effective learning ecosystem that ensures achievement. Responses to this question should confirm some of the factors that are believed to have an influence on student achievement that were previously found in literature, such as motivation, achievement, and resources, and also add new ones that have not been as prominent in the literature on student achievement.

6.3.1   Understanding the concept of student achievement

In order to arrive at a better understanding of what the participants perceived as achieving well academically, they were asked to explain to the interviewer what they thought it meant. An overall definition emerged from the data in Table 9 that achievement is when someone reaches their full potential or ability, this definition being ranked first with a frequency of 10. Schneider and Preckel (2017) define achievement as reaching the outcomes set in a specific environment. Schoen (2015) refers to achievement as performing well in a difficult situation by avoiding failure. Meece et al. (2006) go a step further, noting that mastery goals, rather than performance goals, are associated with positive perceptions of academic achievement.

Participants related their understanding of student achievement more to the performance of the individual learner, referred to by Meece et al. (2006) as performance goals. This differed from the literature in that the literature does not directly relate achievement to the learner's academic ability, but rather focused on the type of goal that was to be achieved. Performance goals are related to achieving well compared to their peers and the learners' ability to perform, rather than aiming to improve their skills as with mastery goals. The ranking of this construct could indicate that the participants are more performance-goal-oriented than mastery-goal-oriented, focusing more on the mark or outcome than on the process of learning. This could relate to the value the learner places on understanding the content compared to just completing and finishing the work required. Service providers should consider whether the content used for mastery is relevant enough to keep learners' attention.

The second-highest ranking construct with a frequency of three was that achievement gives a feeling of success and enjoyment. This supports the literature in both the mastery and performance goal orientations (Meece et al., 2006), but if the learner's ability is lower than that of their peers, they typically will not gain any satisfaction from performance goals as they will not be able to outperform their peers. This indicates that the ability of the learner determines whether they can be successful in a performance goal orientation. In a mastery orientation, the learner would feel successful as they can feel satisfaction from learning a new skill. It is thus better to aim to have a mastery orientation in a learning environment, as there is a higher chance of success for all learners.

Finn et al. (2014) and Meece et al. (2006) explain that measuring competence in an achievement goal orientation is difficult as a range of evaluation standards are used to assess achievement. Performance goals are positively associated with achievement outcomes and thus aiming to achieve a certain score compared to the class does result in achievement. The third-highest ranking construct was that achievement meant getting high marks. Participants listed getting A- or B-symbols as sufficient achievement. This finding supports the literature about the performance approach to achievement (Meece et al., 2006). One interesting point to note is the fact that the definition of achievement is the same in a distance and school learning ecosystem. However, the way in which a learner is equipped and motivated to reach this achievement is being studied since the ecosystems for the two differ substantially, as discussed in the results for research question 1. Participants also highlighted that pass rates are not a good measurement of achievement as they are too easy or too low. Some said that the pass rate didn't leave much to aspire to, or that pass rates should be different for each subject as the subjects

differ in difficulty. There were various opinions about pass rates from the participants.

Although a range of constructs emerged in the data analysis, a definition was developed around what the participants understood when asked what is means to achieve well academically.

As a result of the study, student achievement was defined as: *the point at which a learner reaches his or her full potential or ability and feels success and enjoyment after doing so. This point differs for each learner.*

6.3.2   Factors that drive learners to achieve

This interview question aimed to make the definition of achievement more personal by determining what participants felt drives achievement. The highest-ranked construct in Table 10 was that learner motivation drives achievement. O'Doherty et al. (2017) explain that a person's behaviour is either motivated by a stimulus or by the desire to achieve a goal. This is further explained by Ryan and Deci (2000) in the self-determination theory. The self-determination theory is expanded by Baeten et al. (2013) who assert that a person is intrinsically motivated because the tasks at hand are inherently interesting, enjoyable for a person to do, or of personal importance to them, whereas extrinsic motivation (also referred to as controlled motivation) has some expected outcome that drives the person to do the task. The finding that motivation drives achievement thus supports the literature about achievement as a concept, but also extends upon it by confirming that this also applies to distance education. It highlights that strong motivation is cardinal for a distance learner to achieve and that it will be harder for a distance learner to achieve if they have limited or no motivation as they are not in an environment where teachers, peers, and a school system can carry them through the process.

There were two constructs that both ranked second-highest. The first construct was that expectations from the learners' parents drive achievement. A bit further down on the rankings, expectations from the school and teachers were also ranked as a factor that drives achievement. This supports the literature by Desforges and Abouchaar (2003) and Avvisati et al. (2014) that states that parental aspirations are one of four components of parental involvement that have a powerful influence on achievement. Parental aspirations are the hopes and expectations that a parent has for their learners. From all three of these parties, low expectations can result in the opposite effect in that learners attempt to turn the situation around by proving to themselves that they can perform better

than everyone expected. This supports the literature by Rubie-Davis et al. (2006) that divides teacher expectations into sustaining expectations and the self-fulfilling prophecy. Golem effects (negative and undesirable) are a result of low expectations that impedes learner achievement. Galatea effects (positive and desirable) are the result of high expectations and add to the achievement of the student. This finding draws attention to the value of relationships with other role-players in the learner's ecosystem. A learner needs support and involvement from parents, teachers, and peers. These relationships need to be positive, reassuring, and inspiring, as learners will aim for more if they feel that it is expected of them.

Winne and Nesbit (2010) state that when a learner has the self-concept of ability, they are more inclined to show interest which mediates achievement, but that having mastery goals and values for future enjoyment only increases interest and not necessarily achievement. The second construct that ranked second-highest was learners' interests. This construct explains how learners' interests, what they like and enjoy, and what makes them curious, influence their achievement. Literature states that interest does not necessarily improve achievement. The findings of this study highlight that learners are driven to achieve when their interests are piqued. The findings of this study therefore do not support the literature, as the findings base achievement on the presence of enjoyment, likeability, and curiosity, which differs from the literature. This finding thus encourages educators to make use of content and learning methods that pique the learners' interest, generate curiosity, and are enjoyable to the learner. This will improve their mastery goals as they will be interested in the process of learning and spend more time on the content than if they were not interested.

Two constructs ranked equally as the fourth-highest ranking constructs. The first factor that drives achievement is the emotional wellbeing of the learner. Wang et al. (2015) explain that learner anxiety increases stress at school and can be reduced with increased emotional intelligence. The findings from the interview data support the literature, as emotional intelligence and the overall emotional wellbeing of the learner will enable them to deal with their learning anxiety and perform better. In a distance education environment, a learner has less emotional strain and can thrive better if their emotional intelligence has been fully developed. In creating an enabling environment for the learner that reduces anxiety and stress, a learner is benefited.

Van Egmond et al. (2017) state that goal-directed behaviour, intentional action, and gratification delay need to be present on a psychological level to pursue an education.

When a learner has a clear goal for their future, they can take intentional action to achieve it. The opposite also rings true in that when a learner does not have a clear goal to work towards, not reaching it becomes highly likely. The second fourth-highest ranking construct was learners' vision for their future, which supports the literature by van Egmond et al. (2017) stating that goals need to be set in order for a learner to have a vision. Learners who have goals are more likely to reach them than learners who have no goals. It is important that parents and teachers help learners to think about their future and assist them in developing a plan for their future so that they have a long-term vision of where they want to be at the next phase of their lives.

The last construct that emerged was learners' need to help other people. Learners who are preparing for careers that they perceive to have the purpose of helping people, such as medical doctors, feel that by working hard and achieving, they are preparing for their careers through which they can help people. This construct also links in with learners' vision for their future. Learners could have different reasons for pursuing certain careers, but both of these constructs highlight the fact that if a learner understands that they need to achieve now in preparation for their future, they are driven to achieve.

6.3.3 Factors that ensure achievement when creating a distance learning ecosystem

The aim of this interview question was to gather insights from the participants about their view on the factors that they deem important when creating an effective learning ecosystem that ensures achievement. This question evoked a multitude of different factors that the participants highlighted which were presented in Table 11. A total of 14 constructs were developed from 173 codes. The top five constructs made up 60 % of the codes. The factors mentioned by the participants were set up in such a way that they could be used in the third research question to determine which factors have the greatest influence on achievement and also to rank the factors relative to each other.

The highest-ranked construct was practice, assessment, and feedback. This construct was raised as a factor by the majority of participants (with a frequency of 22). Macnamara et al. (2014) found that 96 % of variance in performance was explained by deliberate practice, making practice a tool that improves results greatly. Lindsey et al. (2014) also state that repetition of class material can improve learning. Baeten et al. (2013) add that by having assessments at the right difficulty level and receiving feedback on the assessments timeously assist in creating an effective learning ecosystem. Feedback

needs to be fast and helpful in the sense that the learner can see where they went wrong and practise those parts until they improve. This also helps learners to self-assess and, typically, learners learn better when they have tried something, gotten it wrong, and then get it right. This literature is supported by the study as the majority of participants noted that practice, assessment, and feedback were required. It was highlighted that over-testing is a problem and that the balance between studying a concept, practising the concept, and then being tested on the concept needs to be well managed. Adding enough of these elements into the learning process will have a positive effect on learners' achievement.

A student's responsibility for their own learning is increased in student-centred learning environments as their intrinsic motivation is enhanced (Baeten et al., 2013). Together with this, a competent self-regulated learner showed (compared to their peers) the highest levels of self-concept, motivation, and attitude, and the least amount of test anxiety (Ning & Downing, 2015). Delving deeper, self-regulation research also highlighted a relationship between learners' perception of their learning experience and their self-regulated learning strategy orientation (Ning & Downing, 2015). Thus, when a learner is able to foster emotional intelligence, they often see improved academic performance (Wang et al., 2016). The second-highest ranking construct was the learners' personal traits, with a frequency of 21. This construct refers to the characteristics of a specific learner and how that influences the learner in a learning ecosystem. It was mentioned by a number of participants that the learner needs to make a commitment towards their education. The findings thus support the literature in that the learner's personal traits, specifically their commitment towards their education and their responsibility towards it, are factors in the learning ecosystem. How learners react to social pressure as well as how they interact with people of different ages and demographics add to their personality traits. If learners are aware of their personal traits and where they need to develop, they can improve themselves where necessary. An interesting point mentioned by the participants is the fact that learners need to be honest about their abilities and focus on the areas where they can excel.

The third-highest ranking position was shared by three constructs that all had a frequency of 20. Learners' motivation, timely academic support, and assistance for the learner to grow in their self-knowledge were all mentioned an equal number of times by the participants and will be discussed below.

Bryant et al. (2005) refer to self-regulation as a motivator when learners develop goals and motivate themselves to achieve those goals, and self-efficacy as a motivator when learners believe that they can achieve the goal. One of the third-highest ranking constructs was learners' motivation, with a frequency of 20. Motivation consists of both intrinsic and extrinsic motivation which could be different for each learner. Learners who don't have the intrinsic motivation to achieve can be motivated with extrinsic rewards, but this is shown to undermine their intrinsic motivation (Garaus et al., 2016). Intrinsic motivation used to be explained by the drive, instincts, or behaviour of the learner, but has recently been better defined as the behaviour towards a reward. For learners, having a goal that is rewarding when it is achieved is key. It is valuable to assist learners in setting short, medium, and long-term goals for themselves. Once they have achieved small goals, they will gain confidence and become more likely to achieve their goals in future.

Baeten et al. (2013) state that a learner's autonomous motivation can be improved when the learning environment provides the support and involvement of a teacher. Another third-highest ranked construct was timely academic support, also with a frequency of 20. This construct pertains to the availability of academic help at times when the learner needs it. In the distance education ecosystem, learners do not have access to a teacher for long periods as is the case in a school learning ecosystem. It is therefore important to enable learners to ask a teacher or parent questions about a topic they struggle with or have some way to escalate a question when their immediate support is not sufficient. Learners mostly study the content on their own, but when they need help, they tend to need it immediately. Having an on-demand tutor available to see in person or ask questions to through some form of technology will enable the learner to achieve. It is therefore a valuable element of the distance education ecosystem.

Learners need assistance in career guidance. Schenk et al. (2012) state the importance of guidance and how it needs to be an important part of the learning journey. Assistance in self-knowledge was also ranked third and consists of two main areas: learners knowing their strengths and weaknesses by making use of tests and different resources, and their ability to choose the correct elective subjects to set them up for post-school success. There is limited literature about the effect of career guidance at the point in learners' schooling career where they need to select their elective subjects in grade 9. The findings thus suggest that by assisting learners with career guidance and possibly aptitude tests, they will be able to achieve better, because they would have selected subjects that are aligned with their abilities and personality. This new finding highlights

the importance of career guidance at a much earlier age than currently performed in schools. Service providers and parents should assist learners with tests and career expos from the start of the grade 9 year so that the learners are better equipped to decide on their elective subjects towards the end of grade 9.

Parpala et al. (2010) found that learners' learning approach is related to their perception of their learning environment, implying that the environment has a definitive influence on how the learner learns. Choi et al. (2014) add that the physical learning environment influences the learner's ability to achieve. Aspects like lighting, ventilation, temperature, spatial distance, and noise have an influence on the learner. The sixth-highest ranking construct with a frequency of 19 was the learning environment, which many of the participants referred to as the physical space in which learning takes place. Participants highlighted the following aspects: the room must be dedicated to the learner's academic studies and should thus not be the learner's room or a dining room; the space needs to be quiet with no disturbances; the space must be well-ventilated and have good lighting; and the space should be comfortable and make the learner feel safe. These findings support the literature by Parpala et al. (2010) and Choi et al. (2014). The physical learning environment consists of many elements that collectively contribute either positively or negatively to the learner's ability to achieve. These different aspects should be considered when setting up a learning environment for a distance learner.

Boud et al. (2013) highlight the importance of peer learning and peer teaching and that learners gain valuable skills such as collaboration, communication, planning, feedback, and critical thinking through this process. The seventh-highest construct with a frequency of 12 was the influence of and interaction with peers. The findings thus support the literature and confirm that peers can have an influence on achievement. Participants noted that peer influence can either be positive or negative, as it depends on the type of relationship between the peers. When bullying or bad influence is transferred during peer learning, the opposite of achievement occurs, and the peer interaction and influence are negative. It is therefore key for parents and tutors to be aware of these relationships and monitor the effect they have on a learner.

Baeten et al. (2013) explain that the learner's autonomous motivation can be increased when the learning environment is structured. The eight-highest ranking construct with a frequency of 10 was structure, and supports the literature claiming that structure is important in a learning environment. Structure as a construct contained three elements that were grouped together: structure, schedule, and discipline, of which all three were

the responsibility of the learner. The participants confirmed that when a learner sets up their own schedule, structures their daily work around that, and applies the discipline to achieve each day's goal, the learner is able to achieve more and feels that they have control of their education. It is therefore important for the parent or tutor to teach the learner about structure and how to establish it in their learning environment. As the learner becomes more proficient at structuring, they can move towards being trusted to manage their own time and schedule.

The ninth-highest ranking position is shared by two constructs: content and resources. It is interesting that these two constructs ranked equally with a frequency of 6, as they both consist of learning supplies. The content refers specifically to the curriculum provided by a service provider such as Impaq. The resources consist of equipment, technology (including internet access), and any additional materials that the learner requires. A comment made by many of the participants is that learners prefer a variety of sources to work from as they are able to cross-reference facts and gain a better understanding from different sources. Chudgar et al. (2015) list technology, books, and equipment as resources in the learning ecosystem and both Hart and Paucar-Caceres (2017) and Schneider & Preckel (2017) confirm that the use of technology enhances the quality of learning, especially when used in conjunction with classroom interaction. There is limited research about the use of technology in school-level distance education, even though there is ample research about the use of technology at the tertiary level.

When a learner has a clear goal for their future, he or she is better able to take intentional action to achieve it. When learners do not have a clear goal that they are working towards, it is more likely that they will not achieve it. Van Egmond et al. (2017) state that goal-directed behaviour, intentional action, and gratification delay need to be present on a psychological level to pursue an education. The eleventh-highest ranking construct was the learners' vision for their future, which supports the literature by van Egmond et al. (2017) stating that goals need to be set so that learners have a vision. This also relates to the learner knowing their strengths and weaknesses and then being guided towards a career.

The twelfth ranking position was shared by non-academic activities and the basic needs of the learner. It is fitting that these two constructs ranked equally, as the non-academic activities describe the activities that learners do besides academic work to have balanced life. Their basic needs are not part of their academic work, but are a basic requirement for them to be able to engage academically. Maslow (1943) lists the basic human needs

that must be fulfilled before proper learning can take place as physiological needs (food, water, warmth, and rest) and safety needs (security and safety). Eccles et al. (2003) add that there are strong links between the involvement of learners in extra-curricular activities and educational attainment in later years of life. Non-academic activities have also been linked to increased self-concept, engagement, aspiration, and educational achievement. The findings thus support the literature. Participants listed activities such sport, socialising, and taking part in the family business as non-academic activities. They found this additional form of work very stimulating and enjoyed learning in a practical manner about the things they were learning theoretically in their studies. Some participants also noted that by having interactions with different people of different ages, their social skills increased, which supports the literature by Eccles et al. (2003) stating that extracurricular activities teach learners how to deal with challenges and develop a social network. By engaging with people outside of their everyday studies, learners see different people's points of view and opinions, which helps them form theirs. In the context of this study, it is important for learners to have and use opportunities for this type of engagement as they do not automatically get the level of engagement they would typically get in a school learning ecosystem. By seeing an inspirational person reach their goal or achieve success, some participants feel more inspired to set goals for themselves and achieve them. Some learners mentioned sport stars or family members that inspire them to achieve. When a learner sees a real-life example of someone who achieves, it becomes more realistic to them and they feel like it is more possible to achieve.

Real-life examples were ranked equally with parent support in the fourteenth position with a frequency of 2. Learners find it easier to understand concepts when they can relate it to an example in their lives. Teachers and parents can make use of current affairs, issues that relate to something the learner is experiencing, or very practical examples to assist the learners in making the concept more concrete. Some of the content that is used in the prescribed curriculum is dated and can cause a learner to lose interest. It is therefore crucial for the teacher or parent to make content interesting and relevant to the learner.

Desforges and Abouchaar (2003) found that parental involvement is closely associated with better cognitive attainment and that the parents' role in providing support outside of schooling is strongly related to achievement. The attitude of parents and their involvement in school also have an influence on educational success and impact the student's truancy, behaviour, work effort, conduct, and academic achievement (Avvisati

et al., 2014). The findings thus support the literature that the parents' involvement is key.

6.3.4 Conclusive findings for research question 2

The research findings concluded that achievement means something very different to each participant, as a range of different constructs were developed through the data analysis. The concept of achievement was established as: *the point at which a learner reaches his or her full potential or ability and feels success and enjoyment after doing so. This point differs for each learner.* It was found that achievement is defined similarly in both distance and school learning ecosystems.

The factors that participants perceived as the factors that drive achievement in distance education were compared against the literature: the constructs supported the existing literature and some new findings emerged among the constructs. The top three rankings were shared by five constructs, which were: the motivation of the learner; the expectations from the learner's parents; the learner's emotional wellbeing; the learner's vision for his or her future; and what the learner likes or enjoys doing. It was found that motivation also drives achievement in a distance education ecosystem.

The factors that participants perceived as important when creating an effective learning ecosystem were compared with the literature and new findings emerged. These constructs also aligned with the constructs developed from the perception the factors that drive achievement. There was a total of fifteen constructs, and five constructs made up the top three rankings: practice, assessment, and feedback; the learner's personal traits; the learner's motivation; timely academic support; and assistance in the learner's development of self-knowledge. The value of the relationships between the learner and other role-players in the distance education ecosystem such as parents, peers, and teachers was highlighted. Another finding was the importance of career guidance at an earlier age than it is currently being performed in schools to help learners make better elective subject selection decisions. It was also found that learners will most likely achieve better in subjects that they like and find interesting as they will spend more time engaging with the content and doing additional research.

Three of the interview questions (questions three to five) were used to answer research question 2. Research question 2 aimed to determine what the major factors are that drive achievement in a distance education ecosystem. The following factors were identified as the major drivers of achievement and are displayed in Figure 3 below as themes that group similar constructs together.
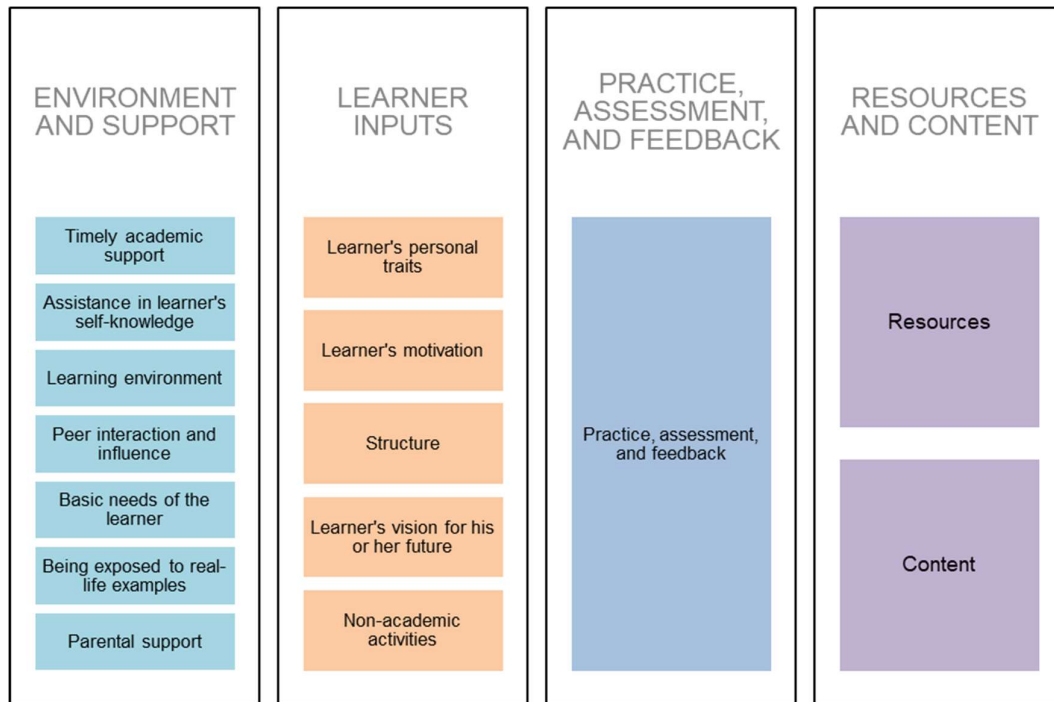
Figure 3. Major factors that drive achievement in a distance education ecosystem.

These factors relate to the initial factors that were identified in the literature. The factors are grouped from most frequently mentioned on the left to less frequently mentioned towards the right, with the factors in 'Environment and support' being mentioned more often than in 'Resources and Content'.

6.4 Discussion of Results for Research Question 3

Research question 3: Which of the identified factors are perceived to be the most influential?

In research question 2, the major factors that drive achievement in a distance education ecosystem were established. This research question further builds on the findings in research question 2 by identifying the influence of each of the factors. The aim of this question was to identify which factors have the greatest influence on achievement compared to the rest, which enabled the researcher to rank the perceived influence of the factors compared to others. The sixth research question used the factors listed in question five and requested the participant to choose the factors that they believed to have the greatest influence on achievement. The seventh question further built on the enquiry by requesting the participant to rank the importance of each factor by making use of a points system to gauge the relevant importance of the factors against each other.

6.4.1 Factors that have the greatest influence on achievement

This interview question asked the participants to think of their answers in question five and then select which of the factors they perceived as the most influential on learners' achievement. There were nine constructs in total that took all the participants' views into account. These were presented in Table 12.

The highest-ranked construct was resources and content. Chudgar et al. (2015) state that books, technology, and other equipment is required in a learning environment. The variety of resources available to the learner aids them in their learning and the availability of internet access allows for the learner to be less dependent of a facilitator (Seaman et al., 2018). Some of the participants elaborated on what they use the internet for, and it is becoming more of a necessity than ever expected (Bryant et al., 2005). Learners make use of resources to find information that a teacher would typically be able to provide them with in a school learning ecosystem. The availability of and access to a variety of resources and content thus have a great influence on achievement, especially in the distance education ecosystem where a learner is more independent.

The second-highest ranking construct, together with structure, was learner motivation. This construct ranked third in interview question five. Across the questions it is thus confirmed that motivation is an important factor. The motivation of the learner is based on the motivation theory which was further developed into the self-determination theory by Ryan and Deci (1985). It states that a person is intrinsically motivated to do something because they believe that the task at hand is interesting or enjoyable, whereas extrinsic motivation is led by the person expecting some outcome (Baeten et al., 2013). Further research has also shown that having the motivation to learn is a predictor of learning outcomes such as higher course satisfaction, increased declarative knowledge, and better performance (Garaus et al., 2016). Whether the learner is motivated intrinsically or extrinsically, motivation is a definite factor that drives achievement and an important part of the distance education ecosystem. The findings thus support the literature and confirm that the learner's motivation is an appropriate factor to define as an influential factor that drives achievement in a distance education ecosystem.

The second construct that ranked second-highest was structure. This relates to a learner creating their own schedule and taking responsibility to execute it and achieve their goals, with the help of a parent or tutor. The creation of structure is guided by the service provider, the parent, and the tutor, but the learner needs to be involved in setting up the structure so that they feel included and agree with the structure. Parents and tutors need to then assist the learner in abiding by the structure that was agreed upon. Baeten et al. (2013) explain that by improving the learning environment through creating structure, the autonomous motivation of learners can be enhanced. When learners feel that they are in control of their learning, know what they need to do, and understand what is expected of them, they will achieve better. The findings support the literature and highlight that accountability is developed in the learner.

Another influential construct that ranked fourth-highest with another construct was being exposed to real-life examples, as learners are able to link a concept to something they understand the context of. This is also a form of learning strategy in that learners look to discover examples that they can apply the learning to (Ning & Downing, 2015). This finding also introduced the concept of creative examples where teachers make use of unconventional ways to explain concepts. This extends the current literature by applying a wider range of contexts than is traditionally used.

The second construct that ranked fourth-highest was learners' personal traits, referring to learners' positive attitude and enthusiasm. The positive attitude of a learner relates to

the self-regulation of the learner who decides what his or her goal is and continues to achieve that goal by following a learning strategy (Ning & Downing, 2015; van Egmond et al., 2017). Both constructs support the literature concerning the use of examples and learners' personal traits as factors that influence achievement.

Peer support allows for learners to collaborate as well as to teach each other and learn from each other. Boud et al. (2013) explain that peers share experiences and learning becomes more enjoyable. Parental support and involvement have a great influence on a learner's success, and when parents are involved in outside-of-school matters, learners tend to achieve better (Avvisati et al., 2014; Desforges & Abouchaar, 2003). The findings regarding peer and parental support support the literature and confirm that these factors greatly influence the achievement of learners.

Figure 4 below highlights which of the factors in research question 2 were identified as the most influential. These are marked in colour and bolded outlines.
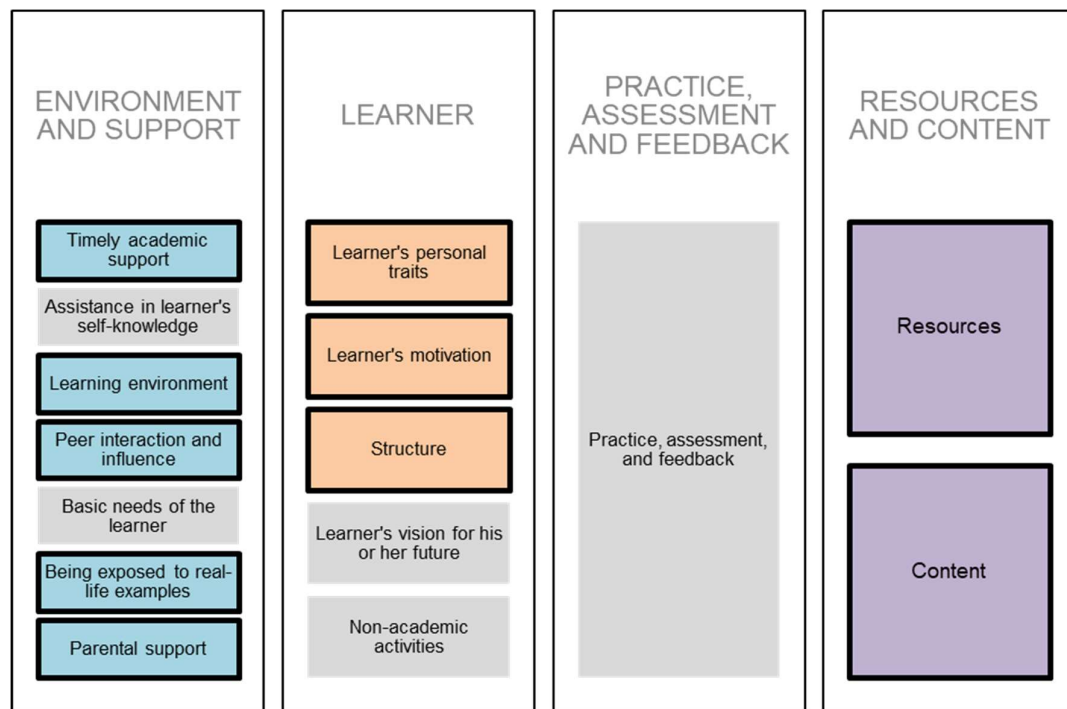

Figure 4. Factors with the greatest influence on achievement.

6.4.2 Established importance of identified factors

The aim of this interview question was to determine the relative importance of each mentioned factor. The ranking in Table 10 is based on the frequency of constructs identified in the data analysis. The same constructs were used for the relative ranking and it was interesting to see that the relative importance ranking differed from the ranking based on frequency. Participants were given 100 points to rank their listed factors and the results were presented in Table 13 and Figure 2.

In the ranking of relative relationships to each other, structure was the construct with the highest points. Structure was ranked eighth according to the frequency ranking. In the second place was timely academic support, which ranked third together with learner motivation and assisting learners in gaining self-knowledge in the frequency ranking. The construct with the third-highest score was the learning environment, which ranked sixth in the frequency ranking. The differences between the frequency ranking and the relative relationship scoring indicates that when participants had to decide how they would score the specific factors when comparing them to the other factors, they often changed what they saw as the factor with the greatest influence. Eleven of the twenty participants gave the highest number of points to the same factor that they selected when asked what the factor with the greatest influence was.

Using the relative percentage of the construct compared to the rest for both rankings, the summated rankings have been listed in Table 17.

Table 17. Combined ranking of the factors that drive achievement.

Rank	Construct	Total score (%)
1	Timely academic support	13.5
2	Structure	11.1
3	Learning environment	10.7
4	Learner's personal traits	10.2
5	Learner's motivation	9.8
6	Practice, assessment and feedback	9.0
7	Assistance in learner's self-knowledge	7.2
8	Content	6.4
9	Resources	6.0
10	Peer interaction, influence, and support	5.3
11	Parental support and involvement	3.0
12	Being exposed to real-life examples	2.3
13	Non-academic activities	2.2
14	Learner's vision for his or her future	1.9
15	Basic needs of the learner	1.4

The combined ranking shows the aggregated perception of the participants. The constructs were elevated into the themes presented in Figure 3 so that similar constructs are grouped together. Figure 5 presents the constructs raised up into themes with their contribution to the influence on achievement shown in percentage. From the chart, it can be seen that the largest contributor is the environment and support, followed by the learner's input, after which content and resources follow, and practice, feedback, and assessment are last.
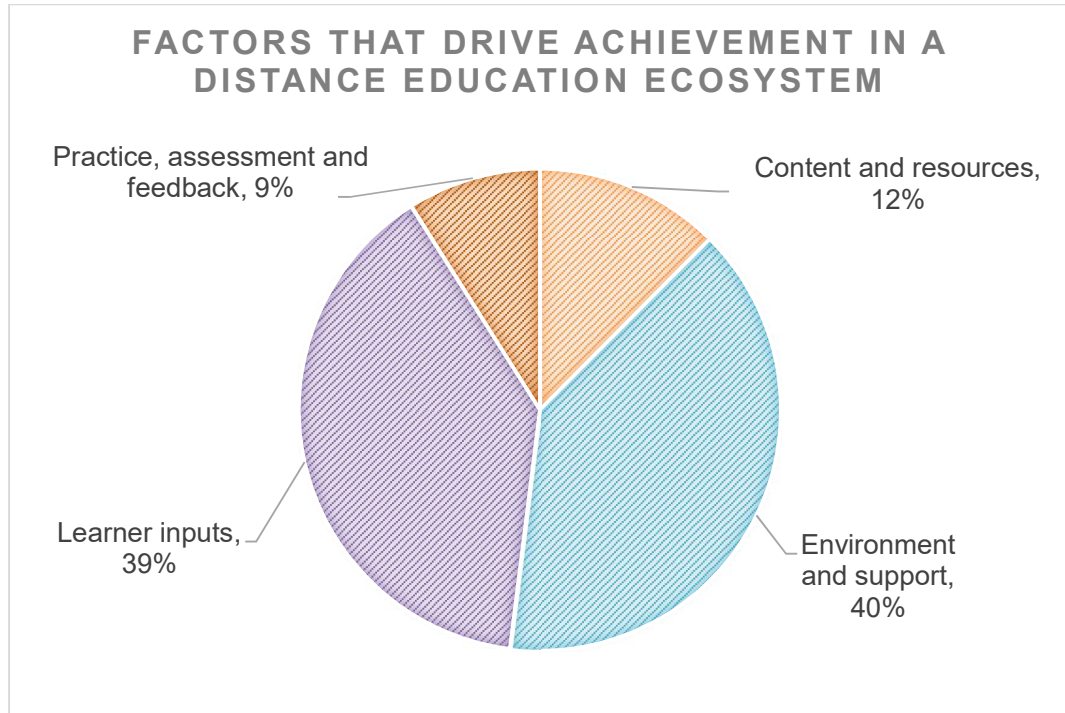
Figure 5. Factors that drive achievement.

6.4.3 Conclusive findings for research question 3

The aim of research question 3 was to determine which of the identified factors that drive achievement were seen to be the most influential. Interview question six determined which of the factors were perceived as the single most influential factor. It was determined that the motivation of the learner to achieve a goal was the most influential factor, followed by peer and parental support, a positive attitude and creative examples, and a structured, disciplined environment in the second place. The last-ranked construct was resources and content. The constructs supported the literature and confirmed which factors had the greatest influence.

The seventh interview question aimed to determine the relative importance of the factors mentioned in interview question five by making use of points to score their importance compared to other factors. The construct with the highest number of points was structure and discipline, followed by timely academic support, and then the learning environment. The two sets of rankings (Table 11 and Table 13) were combined into a weighted rating to present the overall ranking. The ranked constructs were then rolled up into their themes which were presented in Figure 3, and presented in a chart to show the most influential factors according to their theme. It was found that the largest influencer is the environment and support, followed by the learner's input, after which content and resources follow, and then practice, feedback, and assessment are last. When comparing the number of times a factor was mentioned by participants to the importance placed on the factor based on the allocated points, there was a clear difference between the two types of questions. The next research question aimed to determine whether there are any relationships that need to be highlighted between the factors.

6.5 Discussion of Results for Research Question 4

Research question 4: How do the factors interact with or affect each other within a distance education ecosystem?

The last research question aimed to assist the researcher in determining whether there were relationships among the factors that needed to be highlighted. It was expected that some of the factors would present a strong association that might ignite further research.

6.5.1 The effect of combining influencing factors

Interview question eight asked the participants to reference their answers from question five and give an indication of any factors that they feel would have a stronger influence if they were combined. The results were presented in Table 16 and show that the majority of participants highlighted at least one relationship between two factors.

The data were analysed by counting each unique relationship between two specific factors. Some of the relationships were only mentioned once and some were mentioned twice. No relationship was mentioned more than twice. There were thus three tiers of relationships between specific factors: no relationship (0), a relationship mentioned once (1), and a relationship mentioned twice (2). The factor relationships that were mentioned twice were:

- Curriculum/Content & Parental support and involvement
- Curriculum/Content & Resources
- Curriculum/Content & Structure and discipline
- Motivation & Timely academic support
- Motivation & Vision
- Parental support and involvement & Timely academic support
- Practise, testing, and feedback & Timely academic support
- Resources & Structure and discipline
- Resources & Timely academic support

The occurrence of a construct in a relationship was also analysed and presented in Table 16. These individual constructs that formed part of a relationship were elevated up to their theme and are presented in Table 18. In instances where the same theme is

repeated, this means that one of the subcategories of the theme needs to be combined with another subcategory in the theme (i.e., Learner & Learner). The majority of the relationships that were mentioned consists of factors that are part of the learner's behaviours. This indicates that when more than one of the learner's behaviours that influence achievement are present, it will have a stronger effect on achievement than only one type of learner behaviour. In the same way, when the learner's behaviours that are required and the content and resources are both present, or when the learner's behaviours and the needed environment and support are both present, the combination of constructs will have a stronger influence on achievement than only one construct.

From the wide range of relationships that were mentioned with no clear indication of repeated relationships, it was determined that each of the four themed factors needs to be present to create a learning ecosystem that drives achievement.

Table 18: The relationships between themes on the influence on achievement

Rank	Combination of factors	Frequency
1	Learner & Learner	13
2	Content and resources & Learner	8
2	Learner & Environment and support	8
4	Content and resources & Environment and support	5
5	Content and resources & Content and resources	2
5	Environment and support & Environment and support	2
5	Learner & Practise, testing and feedback	2
5	Practise, testing and feedback & Environment and support	2
9	All factors should be combined	1

The highest-ranked relationships between themes are between the subcategories in the Learner theme. This means that combining the elements in the Learner theme should have an influence on the achievement. The different factors in the Learner theme are:

- The learner's personal traits
- The learner's motivation
- Structure
- The learner's vision for his or her future
- Non-academic activities

This finding means that the probability of achievement is higher when two or more of the factors within the Learner theme are present as they will have a stronger influence when they are combined than on their own. Motivation, together with a learner's vision for his or her future, are seen as important factors to drive achievement (Baeten et al., 2013;

van Egmond et al., 2017).

The second-highest ranking position is shared by two theme relationships: Resources and Content with Learner, and Learner with Environment and support. The two relationships indicate that learners who have access to the resources and content they need, as well as the environment and support they require, will have a better probability of achievement due to the stronger influence by the factors. Desforges and Abouchaar (2003) also highlight that the relationship between the parents and the facilitator is important, especially with regard to the level of communication.

The third-highest ranked relationship is the stronger influence on achievement when both Content and resources, and Environment and support are combined. This relationship, as well as the relationships mentioned above, lead to the conclusion that there is a dependency of the learner both on resources and content, and on the environment and support.

The findings in this research question touches upon the literature by Crosling et al. (2015) explaining that a learning ecosystem has different complexities and that each contribute to the quality of the learning ecosystem in its own way. It also supports research by Keegan (2002) stating that a distance education ecosystem consists of the learner, the teacher, a service provider, materials, support and technology.

6.5.2   Conclusive findings for research question 4

This research question aimed to determine whether there were specific relationships that, when combined, would have a stronger relationship of achievement. From the analysis, it was found that on a construct level there was either no relationship, or a relationship was mentioned once, or a relationship was mentioned twice. When grouping the constructs into themes, it was determined that the Learner theme is stronger when both Content and resources and Environment and support are present. The relationship between these three themes was highlighted as being stronger when all three are present. This finding is important due to the influence these themes have on the distance education ecosystem. It supports the literature by Parpala et al. (2010) and Tapola and Niemivirta (2008) that learners' perception of their learning environment has a strong influence on their achievement ability. When all these themes are combined, they create a stronger influence on achievement. It gives preference to some themes over others,

such as the fact that when these three are present in a learning ecosystem, they have a stronger influence on achievement than the single themes would have on their own.

6.6   Conclusion

This chapter aimed to discuss the results from Chapter 5 in detail and compare the findings to the literature discussed in Chapter 2. The research questions were answered by using the data gathered from eight interview questions. The findings supported the majority of the literature and the researcher was able to answer the research questions. The next chapter will conclude the study by discussing the framework that was originally developed from the literature in Chapter 2 and the findings from Chapter 5 and 6.

CHAPTER 7: Conclusion

7.1   Introduction

Literature suggests that there are many factors that drive student achievement, but there is limited research about the influence these factors have on student achievement in the context of distance education at a school level. This study aimed to determine the factors that drive achievement, specifically in a distance education ecosystem, as well as the influence these factors have on each other. The study was successful in determining what these factors are as well as the relationships between the different factors. This would enable service providers, parents, and teachers to better set up distance education ecosystems for learners to achieve well academically. The findings that emerged from the analysis were used to develop a framework that defines the different factors that drive achievement and their relationships with each other.

The aim of this chapter is to further explain framework for the factors that drive achievement by comparing the framework proposed in Chapter 2 to the one that was developed from the findings in Chapter 5 and discussed in Chapter 6. Using the findings and the framework as a foundation, the implications for business are discussed, after which the limitations of the study and possible future research areas are discussed.

7.2   Research Findings

This research aimed to determine the factors that drive achievement in a school-level distance education ecosystem as defined in Chapter 1, and was successful in the endeavour. The research questions are concluded below by defining the concepts that were explored and then explaining each of the themes and subcategories of the framework.

7.2.1 Definitions

Research question 1 aimed to establish the concept of a learning ecosystem in the context of distance education. The distance education ecosystem was defined as follows:

A distance education ecosystem consists of a limited number of factors such as the learner and his or her individualised needs, access to different sources of knowledge and technology, and parental and academic support, in a suitable, personalised physical environment that enables learners to flourish and be the best they can be.

To answer research question 2, a definition of student achievement was developed to understand what the participants perceived this concept to be:

Student achievement is the point at which a learner reaches their full potential or ability and feels success and enjoyment after doing so. This point differs for each learner.

7.2.2 Factors that drive achievement

Research question 2 aimed to determine the major factors that drive achievement in a distance education ecosystem and research question 3 determined what the perceived influence of these factors were. Research question 4 aimed to determine whether there was a relationship between the factors and what the interaction or effect of these relationships was. The analysis led to the emergence of 15 factors that drive achievement in a distance education ecosystem. The 15 factors were grouped into four themes that are considered to be the main drivers of student achievement in a school-level distance education ecosystem. Table 19 presents the themes with their contributions to influencing achievement.

Table 19. Contributions of themes as drivers of achievement.

Rank	Theme	Contribution (%)
1	Environment and support	40
2	Learner	39
2	Content and resources	12
4	Practice, assessment, and feedback	9

Each of the four themes are explained below and are concluded at the end as the complete framework is brought together.

## 7.2.2.1　Environment and support provided to the learner

The theme that had the greatest influence on student achievement was the Environment and support theme. This theme contributed to 40 % of the influence on achievement and consists of seven subcategories (constructs) that are each explained in Table 20.

Table 20. Environment and support as a driver of student achievement.

Construct	Explanation
Timely academic support	Academic support is necessary for distance education students to achieve. The learners do not need full-time instruction but require access to academic support on demand.
Assistance in learner's self-knowledge	Learners need help to learn about their strengths and weaknesses. They then need guidance to investigate career options and develop a career path to which they can align their subject choices.
Learning environment	The physical learning environment needs to be set up correctly for learners to achieve. The learning area needs to be a quiet, dedicated space that has good lighting and ventilation and no distractions. The space should not be the learner's room or an area that is used for other functions too.
Peer interaction and influence	Peers play an important role in teaching and learning. Peer teaching develops the learner's ability to communicate and tell stories. Peer learning allows learners to give and receive feedback. Peer interaction develops collaboration skills. Negative peer influence can have the opposite effect.
Basic needs of the learner	The basic needs of the learner must be satisfied. Learners need good nutrition and shelter, and they must feel safe and feel that they are loved and cared for.
Being exposed to real-life examples	Learning is improved when real-life examples are available for learners to apply what they have learnt to something real.
Parental support	Learners need the support of their parents. This refers to emotional support, specifically, and that learners need encouragement and involvement from their parents in order to achieve.

The environment in which learning occurs and the different people in the learner's environment plays an influential role in their ability to achieve.

7.2.2.2 The learner's input to achieve
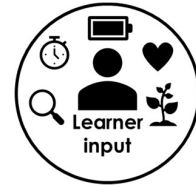
The theme of learner input has the second-largest influence on student achievement, contributing to 39 % of the influence on achievement. This theme consists of five subcategories or constructs that are each explained in Table 21.

Table 21. Learner input as a driver of student achievement.

Construct	Explanation
Learner's personal traits	The characteristics of a learner play an important part in their drive to achieve. The learner's enthusiasm and level of positivity or positive attitude needs to be high to achieve.
Learner's motivation	Self-motivation to achieve needs to be present. This can either be intrinsic or extrinsic, but it is imperative for a distance education student to have self-motivation.
Structure	The learner needs to set up and adhere to a schedule. The ability to be flexible and move around items in their schedule gives the learner control over his or her education. A facilitator needs to make sure the schedule is adhered to. The structure may also be provided by the service provider.
Learner's vision for their future	The learner needs to know why he or she wants to achieve. When the learner has a purpose for achievement, they find it more attractive to achieve.
Non-academic activities	Learners need to take part in non-academic activities to be physically active and socialise. Through this, learners develop good competitive skills and life skills.

Learner input is an important influencer and the learner therefore needs to be willing to contribute to achieve.

7.2.2.3 Access to resources and content

Resources and content have the third-largest influence on achievement in a distance education ecosystem. This theme contributed to 12 % of the influence on achievement and is explained in Table 22 below.

Table 22. Resources and content as a driver of achievement.

Construct	Explanation
Resources	Resources refer to the different tools available to a learner such as technology and the internet through which they have access to search for and consume more information than they can get from their service provider. Having a variety of sources of information is important to learners. The use of technology and the internet is growing rapidly and becoming more of a requirement than a supplementary element.
Content	Content refers to the materials provided by a service provider. The

| | selection of a service provider is a significant decision for parents and learners as they depend on the advice, guidance, and quality standards that the service provider gives. |

It is thus important for a learner to have access to resources and content in the distance education ecosystem.

7.2.2.4   Sufficient practice, assessment, and feedback

The last theme is practice, assessment, and feedback, the fourth-largest influencer. This theme consists of three areas that were grouped together as one construct throughout due to the strong relationship between the three parts. This theme contributed to 9 % of the influence on achievement and is further explained in Table 23 below.

Table 23. Practice, assessment, and feedback as a driver of achievement.

Construct	Explanation
Practice	Practice refers to allowing learners to repeat their understanding of a concept over and over until they understand the process. This helps them to grow their confidence in the subject content and understand the different steps of the process, not just the answers.
Assessment	Assessment is formal testing such as quizzes and tests that allows for a learner to test their progress. Learners should not be over-assessed, but a wide variety of practice and assessment opportunities should be made optional for learners to complete if they have the need. This also trains them for their formal assessments, as a significant part of assessment consists of keeping calm, managing their time, and answering their questions in a way that the marker can easily understand.
Feedback	Feedback allows learners to grow in their understanding and know exactly which part of the process they did not understand. By attempting to identify where they went wrong and then applying their new knowledge, learners are able to achieve more.

Practice, assessment, and feedback have a significant influence on achievement in the distance education ecosystem.

7.2.2.5   The Drivers of Achievement Framework

The framework presented in Figure 6 below illustrates the four different themes that drive achievement in a distance education ecosystem, along with the subcategories of each theme. Each of these themes have a different level of influence on achievement.
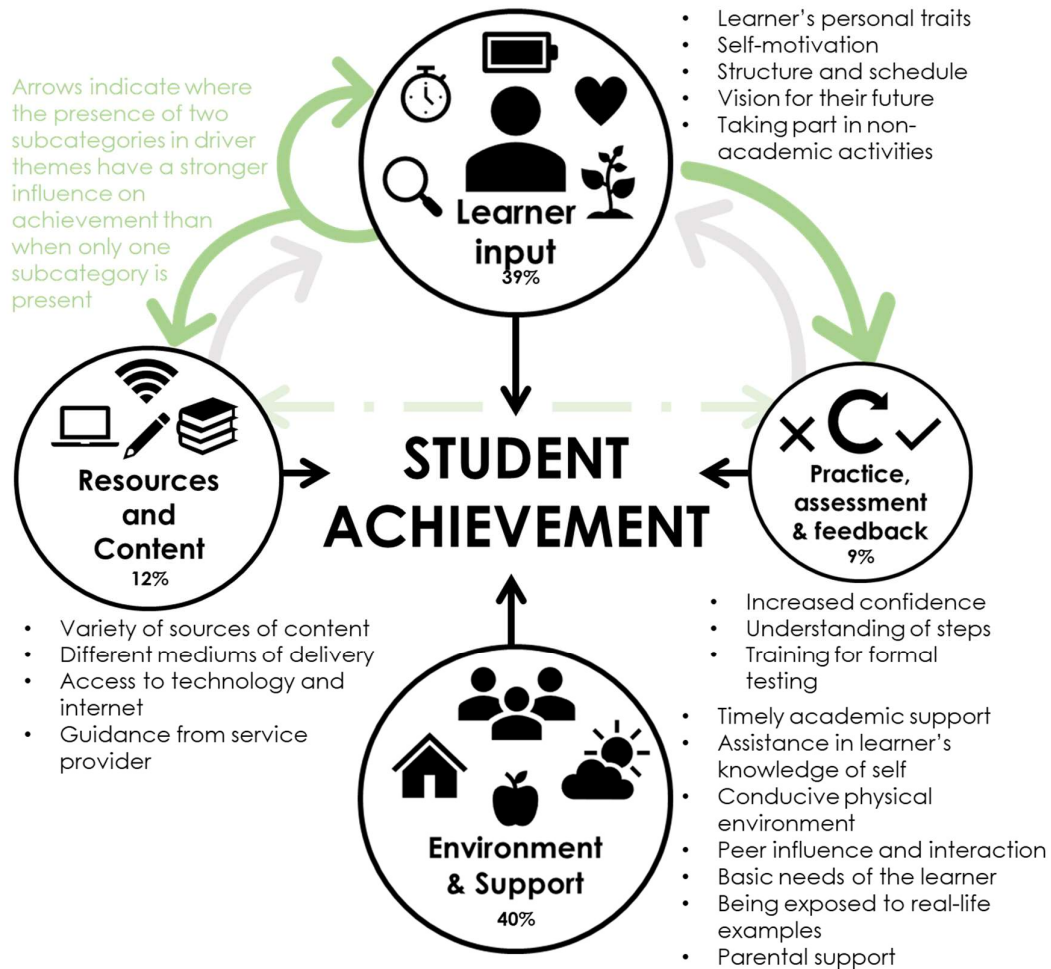

Figure 6. Framework of the factors that drive student achievement in a school-level distance education ecosystem.

This framework should be used to establish an effective distance education ecosystem and to maintain the learning ecosystem for a distance education student to achieve well academically. The different levels of influence can be used to prioritise the focus of implementation.

The arrows indicate where a stronger influence is caused by the presence of more than one subcategory. The relationship that has the strongest influence on achievement when both are present is when more than one of the Learner input subcategories are present. This means that by having more than one of the listed Learner input bullets in Figure 6 present, a stronger influence on achievement is possible than when only a single subcategory is present. There are two relationships that have the second-strongest influence when combined. The first is when both Resources and content and Learner input are present. The second is when both Practice, assessment, and feedback and Learner input are present. The relationship with the third-strongest influence is when both Resources and content and Practice, assessment, and feedback are present. It becomes evident that having the different themes present has a greater influence than having only some of the themes present. This suggests that all the themes need to be present in the distance education ecosystem to drive achievement to the maximum level.

7.2.3 Summary of the framework

The proposed framework gives the reader the ability to set up a distance education ecosystem in such a way that student achievement is driven. By using the framework and ensuring that the environment and support, learner input, resources and content, and practice, assessment, and feedback are present, the learner will be able to achieve to their full ability. This framework aims to assist service providers, parents, and tutors to be better informed in the provision of distance education at a school level.

7.3 Implications and Recommendations for Business

The research questions presented in Chapter 3 aimed to understand the distance education ecosystem, student achievement in the distance education, the factors that drive achievement, and the influence of each of those factors. From the interviews that were conducted and the analysis performed on the data, a framework was developed that could be used to structure a distance education ecosystem in a manner that will drive learners to achieve. This gives service providers a better understanding of what their offerings must consist of and what they should aim to provide to the customer. It also gives parents and tutors clear guidelines for setting up this ecosystem for their learners. It is therefore recommended that service providers, parents, and tutors use the framework to determine what they need to provide the learner with.

Service providers need to offer a variety of resources and content sources to learners. Learners in this study highlighted the importance of being able to cross-check their understandings between different sources. Due to the influence of practice, assessment, and feedback on achievement, service providers can make use of the opportunity to supply learners with ample practice and assessment materials and opportunities so that they can improve through practice and achieve better.

Parents can refer to the framework to guide them in setting up the physical environment for their distance education learners. The framework guides them in setting up the physical environment to drive achievement. This includes the learning area, the resources, and the technology required. Learners also need academic, parental, and peer support. Parents can assist their children by connecting to a tutor or registering the learner at a tutor centre. It was found that parents do not always account for the additional expense of tutors when considering distance education as a school alternative. Parents need to be present in the student's learning journey. Parents also need to guide their children to manage a balanced lifestyle by spending enough time on academic work, but also being social and taking part in extracurricular activities where they can learn social skills.

Tutors or academic support providers need to be available for learners when they need their inputs. Tutors need to be able to guide learners in their studies.

An area that needs further development is career development and guidance in the early school years. Distance learners do not get enough guidance regarding their future and need help to understand what their career options are. If they get assistance in the form of counselling, information, and exposure sessions, they will be better equipped to choose their elective subjects and be more focused on their future. This could also include formal job-shadowing and internships during holidays.

7.4   Limitations of the Research

Due the qualitative nature of this research, the research is subjective and could be influenced by different biases. This study therefore has limitations, of which some are known and others not (Saunders & Lewis, 2012). One type of bias could have been the researcher's bias. This was tested and managed as much as possible, but her bias may have impacted the way certain answers were interpreted or theory was applied as the

researcher was an employee of the company used for the case study.

With regard to the techniques and procedures used for data collection, the method could have contained errors in the form of loaded interview questions and biased or untrue answers (Patton, 2015).

The small sample size may have been a limitation to the study, but adding additional respondents may have had severe time frame implications for the researcher and may have influenced completion dates. The sample also only contained distance learners from a specific age group who were all customers of the same institution. Some of the interviewees were not native English-speakers and might have experienced difficulty formulating their answers in English. This could have caused some of the descriptions to be less accurate than those of native English-speaking interviewees.

There were also limitations in this study due to the age of the participants. Learners under the age of 18 are seen as minors and special ethical clearance is required. The study focused on grade 12 learners, but this group included minors that needed special permissions. The study conformed to requirements about consent, protection from harm, and privacy (Ary et al., 2014). Learners may have been limited in the depth of their feedback due to inexperience and lack of self-awareness due to their age.

Another limitation was the fact that only customers from one distance education company were used as the population to sample from. This company was the largest provider in South Africa at the time of the study but may have excluded parts of the population that were not represented by the chosen sample. Generalisability may also not be possible across the population, as the data may have been highly localised (Patton, 2015).

7.5   Suggestions for Future Research

The following four recommendations for future research would be valuable for this research area:
- The researcher segmented the learners that were interviewed into two groups – those that achieve above and those that achieve below the average, to ensure that the sample was balanced between high and low achievers. An analysis can be performed on the results from the two groups. It would be valuable to review the interview data segmented into the two groups in order to study the differences

in perception between the two groups of learners regarding the specific study areas.

- One of the findings of the study indicated that learners need more career guidance earlier in their high school years to help them to make more purposeful decisions when selecting their elective subjects in grade 9. It will be valuable to see what the impact of a career guidance intervention is on learners when studying their achievement in grade 12 and their level of certainty of what they want to do after school.

- Technology emerged as a vital part of the distance education ecosystem, but the degree to which it adds value in a distance education ecosystem needs further research. It will be valuable to understand the effect that technology has as a supplementary tool for distance education students who make use of technology rather than a tutor to determine the value it has in the distance education ecosystem.

- A finding of the study was the importance of practice to achievement. It will be valuable to understand what the ratio of practice time compared to formal assessment needs to be to achieve. It was found that over-testing tires learners out. There is limited research about this ratio in a distance education ecosystem.

7.6   Conclusion

This research has provided new insights into the factors that drive achievement in a school-level distance education ecosystem. Literature contains many factors that drive achievement for learners in schools and in tertiary education, but there is limited evidence of a framework that describes the ideal learning ecosystem that drives student achievement in school-level distance education. This research aimed to contribute to the literature by determining what these factors are and which of them had a greater influence on achievement. The twenty interviews that were conducted with parents, learners, and tutors provided a clear understanding of the factors that drive student achievement and led to the development of the student achievement framework that defines the learning ecosystem for a distance learner to achieve well academically.

The study defined a learning ecosystem in the context of distance education and determined that student achievement is perceived to be the same in both a distance

learning and a school learning ecosystem. It was however determined that distance learning and school learning ecosystems differ substantially and that the factors that drive achievement in a distance learning ecosystem are unique. Fifteen constructs emerged from the data analysis as factors that drive achievement, and these were elevated into four themes that each need to be present in the distance learning ecosystem to ensure achievement:

- The environment and support provided to the learner
- Learner's inputs to achieve
- Access to resources and content
- Sufficient practice, assessment, and feedback

This study contributes to literature through empirical research that provides valuable insights into the understanding of the concept of a distance education ecosystem, achievement in distance education, as well as the factors that drive student achievement in a school-level distance education ecosystem.

The research aspires to contribute to the education management industry by providing insights to parents, tutors, and service providers which will enable them to create a learning ecosystem that ensures achievement. The framework suggests the factors that need to be considered when creating an effective learning ecosystem for a distance education student.

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9. APPENDICES

Appendix A: Invitation to Participate in Research Study

Dear XXX

I'm conducting research as part of my MBA. The aim of the research is to better understand the drivers of achievement in school-level home-schooling, specifically looking at grade 12 learners who are home-schooled. I would like to interview both you and your daughter/son for my research. It should take about 30 minutes per interview. Would you be available for this? I have 8 questions that we'll discuss.

Please find attached a letter from our CEO to confirm that FutureLearn has given me consent to conduct the study. I have also attached the consent letter from GIBS that I'd like for you to complete during the interview.

The research questions I aim to answer through this process of interviews are as follows:
1. Establish the concept of a learning ecosystem in the context of distance education.
2. Establish what are the major factors that drive achievement in a distance education environment.
3. Of the identified factors that drive achievement, which are perceived to be the most impactful?
4. How do the factors interact or affect each other within a distance education ecosystem?

If you agree to the interview, would it be possible to conduct the interview's at Impaq's office on XXX? Your inputs will be greatly valued.

Should you have any questions, you can also contact me on 072 141 7217.

King regards,

Eloise Nolte

Appendix B: Consent forms (FutureLearn)

10 July 2018

To Whom It May Concern

CONSENT TO CONDUCT RESEARCH AT FUTURELEARN

Dear sir/madam

This letter serves as approval that Eloise Nolte may conduct research at FutureLearn for her research project as partial fulfilment of the MBA degree at Gordon Insitutte of Business Science (GIBS).

All customer-specific or company-specific information must remain confidential.

Yours sincerely

Stefan Botha
Chief Executive Officer: FutureLearn Group

Appendix C: Consent forms (GIBS)

**Gordon Institute
of Business Science**
University of Pretoria

**INFORMED CONSENT TO PARTICIPATE IN RESEARCH PROJECT TO BE
CONDUCTED AT FUTURELEARN**

Researcher: Eloise Nolte, MBA student at the Gordon's Institute of Business Science,
University of Pretoria

**Title of the project Driving achievement in a school-level distance education
ecosystem.**

Purpose of the study: The purpose of this research is to determine the drivers of
achievement in a distance education ecosystem, as well as which ones have a greater
influence on achievement and possibly a relationship with another driver. This area is
not well researched in South Africa at a school level and will contribute to the study area.
This research will enable teachers, parents and business to better support and enable
learners to achieve excellence in this learning ecosystem.

What the study entails: You will be asked to attend an interview at FutureLearn's office
that will take approximately one hour to complete. The interviews will be conducted by
the researcher. Interview responses will be anonymous and only used for this study.

Please take note of the following:
- You may withdraw at any time during the study.
- Your name will not be used in any report based on the study and will not be
  identifiable from the survey results.
- You may request a copy of the questionnaire if you so desire.

If you need further information, you are welcome to contact us on:

Eloise Nolte	Hayley Pearson
eloise.nolte@futurelearn.co.za	pearsonh@gibs.co.za
072 141 7217	011 777 4180

Agreement:

I have read the project description above and volunteer to participate in the study.

Name and surname:	
Contact phone or email:	
Signature:	
Date:	

_____Nolte_____

E Nolte (Researcher)

_____H. Pearson_____

H Pearson (Research supervisor)

Appendix D: Interview questionnaire

Name of participant: _____ Date: _____
Type of participant: _____ Start Time: _____
Age of learner (if applicable): _____ End Time: _____

1. Introduction/ Purpose of the research
2. Details about the interview
3. Consent

Question 1:

What is your understanding of the concept learning ecosystem?

Question 2:

What would you say are the differences between a school learning ecosystem and a distance education ecosystem?

Question 3:

What drives you/your learners to achieve?

Question 4:

What do you consider as important when thinking of yourself/your learners in a distance education ecosystem?

Question 5:

Of the factors that were identified, which would you say has the greatest influence on you/your learners' achievement?

Question 6:

If you were given 100 points to allocate to the identified factors that drive achievement in distance education, how will you allocate your points in order to establish a ranking of importance between the drivers?

Question 7:

Are the drivers of achievement more effective in isolation or when combined with other factors?

Question 8:

How would are these factors combined or pulled together so that they can have this effect?

Appendix E: Ethical Clearance Letter

Gordon Institute of Business Science
University of Pretoria

Dear Eloise

Please be advised that your application for Ethical Clearance has been approved.

You are therefore allowed to continue collecting your data.

Please note that approval is granted based on the methodology and research instruments provided in the application. If there is any deviation change or addition to the research method or tools, a supplementary application for approval must be obtained

We wish you everything of the best for the rest of the project.

Kind Regards

GIBS MBA Research Ethical Clearance Committee