Exploring Instances of Deleuzian Rhizomatic Patterns in Student Writing and Online Interactions at an Open Distance eLearning Institution in South Africa

by

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ABSTRACT

This study aimed to explore and make visualisations of Deleuzian Rhizomatic Patterns in first-year students' writing samples of academic writing. Online interactions on *myUnisa*'s online discussion forums and the *Microsoft (MS) Teams* virtual classes of 2020 in Academic Language and Literacy in English (ENG53) were examined rhizomatically. Traditionally, academic literacy studies employ linear models of studying students' academic writing. However, recent academic literacy studies advocate that student writing be studied from multiple perspectives. One such approach is the Deleuzian Rhizomatic Approach to writing.

The Deleuzian Rhizomatic Approach to writing employs writing analytics that can be applied to the academic writing samples in terms of key themes (concordances). Therefore, in investigating linking adverbials in online interactions of students and lecturers, writing analytics were applied. Writing analytics as a part of learning analytics entails, in this case, various data related to student writing that could be computationally analysed using writing software tools. The writing samples were analysed using rhizoanalysis by means of the *AntConc, AntMover,* and *AntWordProfiler* software applications. Rhizomatic patterns in students' writing samples drawn from interactions on the 2020 ENG53 *MS Teams* virtual classroom and *myUnisa*'s ODF were visualised using social network analysis (SNA), online tools *MS Power BI* and *Gephi*. In addition, a readability index of the writing samples was assessed through the *AntWordProfiler* multiplatform tool and was visualised rhizomatically.

The student writing samples revealed sectional rhizomatic patterns in various forms, as well as visualizations of *MS Power BI* and *Gephi* which portrayed rhizomatic patterns bearing various degrees of interaction nodes between students and lecturers. Furthermore, the *AntWordProfiler* revealed that readability levels of the writing samples were comprehensible but varied rhizomatically between students.

Keywords: rhizome, rhizomatic patterns, student writing, writing analytics, academic writing models, ODeL, student interaction patterns, *myUnisa*'s online discussion forum, social network analysis, social learning network analysis, key themes, concordances, linking adverbials, *MS Teams*, *MS Power BI*, *Gephi*, *AntConc*, *AntMover*, *AntWordProfiler*, readability index

DECLARATION

I declare that the doctoral thesis: Exploring instances of Deleuzian rhizomatic patterns in student writing and online interaction at an open distance learning institution in South Africa, is my work and all sources used are acknowledged and cited accordingly.

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I further declare that this doctoral thesis has not been previously submitted at another institution for any other qualification programme.

Signature:

Date: 24 March 2022

TI Nkhobo
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DEDICATION

I dedicate this thesis to all those who made the study worthwhile: my late mother, who remains an integral part of my life, even in her absence; my father, who is my guide, confidant, and a brother. I thank him for grooming me to the man that I am and will forever cherish his teachings; my little sister and older brother whose support and love wavered not; to all my cousins, extended family members and friends who inspired me to be a better person at every turn of my growing-up path; my beautiful wife and daughter whose relentless support and love never failed; Without them, I would not have completed the study in the time that I have; To my extended family and friends, I extend heartfelt gratitude for their constant support; to all my colleagues, past and present; I express appreciation for their good cheer.

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Finally, the ENG53 first-year students whose written samples and online interactions datasets were used in the study deserve recognition and gratitude, to say the least.

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Acronyms and abbreviations

ESL: English as a second language

ODF: online discussion forum

MS: Microsoft

SNA: social network analysis

SNLA: social network learning analytics

CHAPTER 1: INTRODUCTION

1. Introduction

This chapter presents the background of this thesis. In that context, it reviews academic literacy practices applying the Deleuzian Rhizomatic Approach in academic spaces. It provides an overview of this thesis by presenting its background and rationale, situating the orientation of the thesis within a approach to student academic writing. It also outlines the purpose of the study, the research aims and objectives, as well as the research questions of the study. In addition, it describes the research methodology and research design of the study. The chapter further highlights how reliability and validity of the study were ensured. Lastly, it gives an account of the significance and limitations of the study, and presents the chapter outline of the thesis.

1.1   Background and Rationale of the Study

Students of English as a second language (ESL) who enrol at open distance e-learning (ODeL) universities have varying levels of competence in written English (Bacha, 2002: 161-177; Fernsten & Reda, 2011: 171-182). Such open distance learning institutions, like the one under study, have a mandate to accommodate students who may not be admitted to study at traditional universities, hence the openness culture such ODeL institutions espouse. Nevertheless, conventionally, many of these universities, both the traditional and ODeL institutions, base the teaching of writing on linear academic writing models. Linear academic writing approaches treat students as if they learn how to write the same way and develop their writing skills at the same pace, which is not the case, as argued in the current study. Most universities use Euro-American-Australian (EAA) models of academic writing, as these are considered universally applicable to all students, irrespective of their geographical and educational backgrounds (Lea & Street, 1998; Lillis & Turner, 2001; Lillis, 2003). However, teaching and learning academic writing in ODeL is different and as such, it seemingly presents challenges for institutions and students alike, especially for first-year ESL students (Brown, Hughes, Keppell, Hard & Smith, 2015; Robertson, 2014; Shimoni, Barrington, Wildse & Henwood, 2013). The challenge is clearly revealed in the various National Qualification

Framework levels that the first-year students would have passed their matric with and when they transfer to ODeL instituions especially in the institution under study.

Teaching writing skills in an ODeL context is challenging because of the distance between students and lecturers, as well as students' diverse educational backgrounds and competencies. In this study, samples of writing produced by first-year students were analysed to explore instances of Deleuzian rhizomatic patterns (cf. Hagood, 2009; Johnson, 2014; O'Sullivan, 2005; Smagorinsky, Augustine & Gallas, 2006), following in the footsteps of the studies. It is therefore apparent that, Higher education institutions (HEIs) need to interrogate the traditional view and its proponents who believe that student writing is deficient (Lea & Street, 1998; Wingate, 2012), and instead, embrace progressive approaches such as the rhizomatic approach as the alternative to traditional approaches. As a concept, the Rhizomatic approach to student writing advocates for fluidity and supports the process of becoming that student writing consistently undergoes. This approach is particularly desirable in ODeL institutions, to study student learning behaviours in diverse ways (Comer, Clark & Canelas, 2014; Comer & White, 2016; Erwen & Wenming, 2017; Nkhobo & Chaka, 2021). Students enrolled in higher ODeL institutions of learning are likely to exhibit different learning styles and varying ways of engaging in academic literacy. It is therefore expected of educators to bear in mind students' varied educational and cultural backgrounds. The studies referred to above show that, linear academic writing models do not acknowledge what students bring to HEIs in terms of writing. In contrast, students are expected to produce writing in line with the conventional models. Following from the foregoing observation, it could be argued that linear academic writing models do not recognise literacies students bring to HEIs. Seemingly, students are expected to model and master their academic writing in line with linear academic writing approaches.

To contribute to research in the field of academic writing in the ODeL environment, the current study explored student writing from a rhizomatic perspective following Deleuze and Guattari (1987). These scholars used the concept of a rhizome to critique authoritarian practices and hierarchical structures in academia (see Bozkurt, Honeychurch, Caines, Bali, Koutropoulos & Cormier, 2016; Cormier, 2008; Leander & Rowe, 2006; Webb, 2009). *Rhizome* is a botanical term referring to the roots of a plant growing from and into different directions (see Deleuze & Guattari, 1987). The rhizome perspective seeks to demonstrate that the writing and learning processes as observed in student behaviours is something that is not

static but dynamic. In the current study, a rhizome is conceptualised in the same manner with reference to student academic writing. It views student writing as a phenomenon that is consistently in the process of change. Therefore, instances of Deleuzian rhizomatic patterns observed in samples of students' academic writing (essays and short paragraphs) were examined according to key themes (concordances) linking adverbials and on two online platforms, namely *myUnisa*'s ODF and *MS Teams*, on which students interacted with each other or with lecturers with the aim to demonstrate the importance of the rhizomatic approach.

The value of a rhizomatic approach in student academic writing lies in its perception of student academic writing as consisting of patterns of sentences and ideas in non-linear directions. It is an approach to searching for thought patterns that manifest in student writing that are not necessarily linear in nature (see Leander & Rowe, 2006; Webb, 2009). This implies that student academic writing viewed from a rhizomatic perspective conceptualises writing as a phenomenon that grows from different focal points. In addition, it discourages the regurgitating/rehashing of academic writing models, as is the case with linear models (Amorim & Ryan, 2005; Smagorisnky, Augustine & Gallas, 2006). The perspective in contention here, advocates for individualised teaching and learning practices that HEIs should consider when assessing understanding of the subject matter presented in student academic writing. Evidently, the rhizomatic perspective moves away from the normative way of viewing or assessing student academic writing because it is unorthodox and unconventional in nature in that, while it regards student writing as messy, it also recognises the fact that it is a work in progress in the learning process.

Proponents of the view outlined above defend the "messy" nature of student writing as it is viewed in the rhizomatic approach. They argue that, while the writing appears destabilised at the beginning, it should be seen as work in progress, a process of becoming, thereby rejecting linear and hierarchical models of student writing (Amorim & Ryan, 2005: 583-586; Guerin, 2013: 146; Reardon & Sanzogni, 2005/2006; Wallin, 2010).

Considering the foregoing studies as instructive, and based on collected data, the researcher of the current study argues that as students' writing develops, rhizomatic patterns are revealed in their academic writing. Apparent in the rhizomatic patterns, are inherent fluid ways of writing in which students, especially as they operate in an ESL environment, exhibit their own understanding of the same subject matter but in different or rhizomatic ways. As

has already been alluded to, in the present study, Deleuzian rhizomatic patterns of student writing were investigated, identified, and analysed using samples drawn from the two online platforms: *myUnisa*'s ODF and *MS Teams*. Analyses were conducted using the *AntConc* (Anthony, 2020) and *AntMover* (Anthony, 2003) software applications. The writing samples' level of readability were assessed using the *AntWordProfiler* (Anthony, 2021) software application. The rhizomatic patterns of the students' writing samples in relation to key themes (concordances) and linking adverbials were visualised rhizomatically using *MS Power BI* and *Gephi*.

The current study explored instances of Deleuzian rhizomatic patterns inherent in first-year students' academic writing (in the form of short paragraphs and longer essays) and in their online interactions (on *myUnisa*'s ODF and *MS Teams*). Rhizomatic patterns in 28 students' writing samples in terms of key themes (concordances) and linking adverbials and interaction patterns of 150 students (on *myUnisa's* ODF) and 220 students (on *MS Teams*) registered for Language and Literacy in English (ENG53) at an ODeL institution in South Africa were investigated.

As pointed out in the preceding section, this study employed the rhizomatic approach of Deleuze and Guattari (1987). A rhizomatic approach to writing regards student writing concerning the same subject matter as consisting of multiple spontaneous strands which may, at times, criss-cross, thereby displaying rhizomatic patterns. Understanding writing in this way runs counter alia to conventional models of academic writing, which require student writing to be linear, orderly, and unified (cf. Clarke & Parsons, 2013; Mackness, Bell & Funes, 2016; Masny, 2013; Masny & Cole, 2009).

Approaches to student writing such as the rhizomatic process have not yet been explored at the institution in which the study was conducted. This is evident in how assessment in ENG53, the module selected for the study, is conducted. Currently, student writing in ENG53 is, as is an accepted norm, assessed using linear models of academic writing. The structural patterns of students' writing samples are, in accordance to the genre of writing expected to be the same as per the requirements of genres that are taught to first-year students.

1.2   Research Problem

The research problem is two-pronged. As outlined in the foregoing paragraphs, one aspect of the problem is the challenge that conventional linear approaches pose for ESL students when their academic writing is viewed through these traditional lenses, to the exclusion of alternative, progressive models. Student writing at most universities is assessed through dominant linear models of academic writing examples of which are academic literacies, the genre model, and the systemic functional linguistics model. These models will be dealt with and problematised in Chapter 2. In this section, it suffices to point out that these conventional models often deem the writing of ESL students as deficient, ranking below institutional standards or expectations (Maloney, 2003; Fernsten & Reda, 2011; Pineteh, 2013). Yet, ESL students' writing is considered deficient without academics recognising the deficits in these conventional models (cf. Jones, 2013; Paxton, 2007; Shabanza, 2013; Wingate, 2012). The traditional models attribute to students' writing identities fraught with linguistic deficiencies (see Jones, 2013; Shabanza, 2013). Criticism against such conventional models suggests that they do not consider the various linguistic writing structures that ESL students bring from their indigenous language backgrounds. These traditional and dominant academic writing models seldom view ESL student writing from alternative perspectives. Neither do they perceive such writing as consisting of or displaying rhizomes. Consequently, the writing knowledge that students bring to HEIs is not acknowledged.

The second prong of the research problem relates to aspects of the ODeL environment. The module under study offers its services to students from different disciplines who are studying towards different qualifications such as higher certificates, diplomas, and degrees. The module in question is a compulsory subject serving as a prerequisite for most of the courses offered at UNISA irrespective of the English results obtained at matric. Thus, students writing practices seem not to be influenced by their linguistic cultural backgrounds only, but also by other disciplines under which they are registered. As such, ENG53 students participate in online resources hosted on the *myUnisa* ODF and on other teaching and learning technologies such as *MS Teams* as required by the various disciplines. Nevertheless, their engagement patterns on *myUnisa*'s ODF have not been investigated rhizomatically to determine student online interaction patterns. The current study argues that learning practices, especially academic writing processes of the ESL students registered in the institution under study are to be viewed as different, in this case, as rhizomatic and fluid. Additionally, *MS Teams* has not yet been used in ENG53 to engage with students on any aspect related to their

learning. It was for these reasons that the current study investigated engagement patterns observed in first year ENG53 students' writing, to determine the types of engagement patterns these students display when participating on these two online platforms (150 students on *myUnisa*'s ODF) and (220 students on *MS Teams*).

1.3   Purpose of the Study

The aim of this study was to explore instances of Deleuzian rhizomatic patterns in 28 students' academic writing samples in respect of key themes (concordances), examining linking adverbials to observed rhizomatic engagement patterns in 150 ENG53 students on *myUnisa*'s ODF and 220 on *MS Teams*. Therefore, the study aimed advance the body of knowledge on student academic writing practices following the reasoning underpinning the Deleuzian Rhizomatic Approach.

1.4   Research Aims and Objectives of the Study

The main aim of this study was to explore instances of Deleuzian rhizomatic patterns in students' writing samples in terms of key themes (concordances) and linking adverbials, with a view to investigating the types of rhizomatic patterns such writing displays. Aligned to this aim was an attempt to discover the types of interaction patterns ENG53 students exhibit when they are given written tasks to do, using two online platforms: *myUnisa*'s ODF and *MS Teams*. Based on this, the study had four objectives:

a. To explore rhizomatic writing patterns that first-year ENG53 students display in their Assignments 1 and 2 according to key themes (categorised by keyword frequency, concordance, and concordance plot) and linking adverbials as identified by the *AntConc, AntMover*, and *Gephi* software applications.

b. To identify rhizomatic structural moves that first-year ENG53 students display in their Assignments 1 and 2, using the *AntMover* software application.

c. To reveal forms of engagement patterns of first year ENG53 students when interacting on *myUnisa*'s ODF and *MS Teams* in terms of message posts per activity and the frequencies of their online interactions, using *MS Power BI* and *Gephi* visuals.

d. To study the readability index of Assignment 2, as assessed by the *AntWordProfiler* software application.

In a sense, the aims and objectives of the study are subsumed in its purpose as outlined in the foregoing section. However, it can be added here that the study aimed to explore and make visualisations of Deleuzian Rhizomatic Patterns in first-year students' writing samples of academic writing. Online interactions on *myUnisa*'s online discussion forums and the *Microsoft (MS) Teams* virtual classes of 2020 in Academic Language and Literacy in English (ENG53) were examined rhizomatically. Traditionally, academic literacy studies employ linear models of studying students' academic writing. However, recent academic literacy studies advocate that student writing be studied from multiple perspectives. One such approach is the Deleuzian Rhizomatic Approach to writing.

1.5   The Research Questions

Based on the aims and objectives highlighted above, this study sought to answer the following research questions:

a.   What rhizomatic writing patterns do first-year ENG53 students display in their Assignments 1 and 2 according to key themes (categorised by keyword frequency, concordance, and concordance plot) and linking adverbials, according to the software applications *AntConc, AntMover*, and *Gephi*?

b.   What rhizomatic structural moves do first-year ENG53 students display in their Assignments 1 and 2, according to the *AntMover* software application?

c.   What forms of engagement patterns do first-year ENG53 students display when interacting on *MS Teams* and *myUnisa*'s ODF in terms of message posts per activity and the frequencies of their online interactions, using *MS Power BI* and *Gephi* visuals?

d.   What is the readability of students' Assignment 2 as assessed by the *AntWordProfiler* software application?

1.6   Research Methodology

The Deleuzian Rhizomatic Approach to writing employs writing analytics that can be applied to the academic writing samples in terms of key themes (concordances). Therefore, in investigating adverbials in online interactions of students and lecturers, writing analytics were applied. Writing analytics as a part of learning analytics entails, in this case, various data related to student writing that could be computationally analysed using writing software tools. The writing samples were analysed using rhizoanalysis by means of the *AntConc, AntMover,*

and *AntWordProfiler* software applications. Rhizomatic patterns in students' writing samples drawn from interactions on the 2020 ENG53 *MS Teams* virtual classroom and *myUnisa*'s ODF were visualised using social network analysis (SNA), online tools *MS Power BI* and *Gephi*. In addition, a readability index of the writing samples was assessed through the *AntWordProfiler* multiplatform tool and was visualised rhizomatically.

1.6.1   Research Design

This study was exploratory research (cf. Heigham & Croker, 2009: 313; Riazi, 2016: 115), because it focused mainly on exploring instances of Deleuzian rhizomatic patterns in students' writing samples and in their interactions on the designated online platforms. Riazi (2016: 115) explains that exploratory research 'is conducted when the object of the study is new and has not been studied much before'. In this case, studies that incorporate the rhizomatic perspective in the way the current study do in the South African context, especially in the higher institutions of learning are scarce. Consequently, Riazi (2016: 115) further notes that 'the need for exploratory research thus arises when our knowledge and understanding of the phenomenon … is limited'. In the breadth, Leavy (2017: 5) concurs with Riazi (2016), stating that exploratory research is appropriate for under-researched topics.

Exploratory research was appropriate for the current study, as very few studies have explored the manifestation of rhizomes in students' writing samples, especially in the institution under study.

1.6.2   Data Collection Methods

Two methods of data collection were employed, which yielded two sets of data. The first set of data was used to explore rhizomatic writing patterns in students' written samples (Assignments 1 and 2) in terms of key themes (concordances) and linking adverbials and the readability index of Assignment 2. The second data set was analysed to capture students' engagement patterns on two online platforms: *myUnisa*'s ODF and *MS Teams*.

The researcher requested 60 assignments previously completed assignments — 30 each of Assignment 1 and Assignment 2 — for Semester 2 of the year 2020, from the Assignments Department of the institution under study. A total of 28 assignments were analysed, that is

14 each of Assignment 1 and Assignment 2 (for the sake of brevity hereafter referred to as *14 Assignment 1s* and *14 Assignment 2s*).

Assignment 1 consisted of five items to which students responded in short paragraphs comprising 100 per item. For the purpose of this study, responses to two of the items were used, i.e., 'Read chapter 16 of the prescribed book (from page 224) and summarize the developmental stages of religion in your own words' and 'Compare and contrast a theocratic government with a democratic government'.

For Assignment 2, 14 random essays, 500 words in length, were identified. The 14 essays were separated into two groups, each comprising seven essays. Assignment 2 consisted of two topics from which students were required to choose one. The researcher divided the essays into Topic 1 and Topic 2. Topic 1 was worded: 'Write an essay in which you argue **for or against** a visible presence of the police in schools as one measure of curbing the scourge of violence.' Topic 2 was worded: 'Write an essay in which you discuss **three** negative effects of using drugs for mood or behaviour syndromes.'

The second part of data gathering entailed capturing students' engagement patterns as they interact on *myUnisa*'s ODF and *MS Teams* in terms of message posts per activity and the frequency of their interaction patterns (cf. Chaka & Nkhobo, 2019; Conde, Hernandez-Garcia, Garcia-Penalvo & Sein-Echaluce, 2015; Jimoyiannis, Tsiotakis & Roussinos, 2013; Saqr, Fors, Tedre & Nour, 2018; Yoo & Kim, 2014). The aforementioned studies also conducted research in view of investigating student interaction patterns on the learning management systems offered by their varied institutions of higher learning and the studies in question are dealt with in detail in the subsequent chapters.

The present study followed a mixed-methods approach (cf. Christensen et al., 2015: 385; Richards et al., 2012: 30), which comprises qualitative and quantitative data (Richards et al., 2012: 19; Riazi, 2016: 256-258), which were gathered from students' written samples and their interactions on *myUnisa*'s ODF and *MS Teams*. Qualitative data was gathered from the contents of students' written samples. Quantitative data was collected from the same written samples, but in terms of the frequencies of their concordance, concordance plot, key words, and the readability index of students' written samples. In contrast, quantitative data

was collected on the frequencies of their interaction patterns on *myUnisa*'s ODF and *MS Teams*. Ivankova and Creswell (2009: 137) maintain that:

'…mixed methods research is a research approach … for collecting, analysing, and "mixing" quantitative and qualitative data at some stage of the research process within a single study in order to understand a research problem more completely' (see also Christensen et al., 2015; Richards et al., 2012; Riazi, 2016). The researcher of the current study used mixed methods approach to show that there are rhizomatic patterns in student writing samples and as they interact on online platforms such as the ones mentioned above for teaching and learning purposes.

1.8   Strategies to Ensure Reliability and Validity

Riazi explains that validity 'refers to the best possible approximation of the truth stated in the form of an interpretation or inference put forth by evaluators or researchers' (2016: 341). To avoid issues of reliability and validity, direct or indirect methods associated with the mixed methods approach were used to decrease the probability of doubt regarding the study results. Both quantitative and qualitative methods were used to analyse the data. The current study used corpus analysis softwares such as *AntConc*, *AntMover*, and *AntWordProfiler* to assist the researcher to accurately portray rhizomatic patterns inherent in student writing samples and their interactions on *myUnisa's ODF* and *MS Teams* and to increase reliability and validity. The corpus analysis softwares are able to trace and map rhizomatic patterns in student writing and their online interactions that a human eye may not necessarily be able to plot and package rhizomatically.

The student writing samples revealed sectional rhizomatic patterns in various forms, as well as visualizations of *MS Power BI* and *Gephi* which portrayed rhizomatic patterns bearing various degrees of interaction nodes between students and lecturers. Furthermore, the *AntWordProfiler* revealed that readability levels of the writing samples were comprehensible but varied rhizomatically between students.

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1.9   Ethical Considerations

The researcher received ethical clearance from the Higher Degrees Committee of the institution under study to conduct the study in an appropriate manner. Participants were given an informed consent form to complete prior to participation in the study even though the researcher had been granted permission to request student writing samples from the Submission Department. In the same vein, he was granted permission to retrieve students' online interaction data generated on the *myUnisa's ODF* and *MS Teams*. However, the researcher made announcements on the myUnisa's 'Announcement' tab to inform the potential participants (registered for ENG53) of the current study and requested them to fill in the consent forms as distributed on *MS Teams*. Even though the researcher of the current was permitted to retrieve students' data from the Assignment Department and on myUnisa's online discussion forum and on Microsoft Teams, the researcher still informed the students about the current study. The form included information on the study and informed them that their participation was voluntary. Participants were also assured that they would remain anonymous, and that they would not suffer harm through their participation. The researcher of the current study used pseudonym for the module name. Anonymity was upheld using codes instead of participants' names. The participants were further informed that they would be allowed to withdraw from the study at any time, without negative consequences. They were also informed that the data would be used for research purposes and potential publications.

1.10   Definition of key constructs

Connectivism theory – relates to the study of interactions between individuals on a particular internet network (Siemens, 2004, 2005; Downes, 2005, 2008). In the current study, the nuances of connectivism theory are applied in the context of students' online interactions on the two online platforms, myUnisa's online discussion forums and Microsoft Teams. The

platforms require students to be connected to both platforms via a network during the communication process with their peers and lecturers in the module under study.

Social network analysis – is a concept that is used to study the behaviours of individuals on social media (Serrat, 2017). The researcher of the current study applied the social network analysis ideology to portray the rhizomatic patterns in the student writing samples and their online interactions using corpus analysis software such as *AntConc, AntMover*, and *AntWordProfiler*. In addition, he used visualization softwares such as Gephi and Microsoft Power BI to show how rhizomatic patterns in student writing samples are interconnected revealing the interconnects of their online engagements with various disciplines as previously mentioned.

Rhizomatic patterns – refers to the different mappings of patterns that are not predicted and that manifest themselves in diverse ways according to various conditions (Deleuze & Guattari, 1987). The researcher used this term to argue that student writing is fluid and is in the constructive process that is not linear but complex in nature. In addition, he used this term to critique mainstream thinking about the academic literacy and challenged the conventional ways in which academic literacy is viewed, especially in ESL students' academic writing. The use of rhizomatic writing in the context of this study was applied to argue that student writing is in constant manifestation or development.

Becoming – involves a series of continues or never-ending developments. Becoming was used in the current study to signify the never-ending development of student writing patterns in written texts or on online platforms to portray ideas that are related to the same subject matter (Deleuze, 1994). The process of becoming in the context of the current study was considered not to be static but in constant movement of development.

Nomadic/nomadism/nomads – refers to students who do not follow the binary/authoritarian way of learning but rather follow a non-restrictive pattern of learning which are not conventional in nature (Bozkurt, Honeychurch, Caines, Bali, Koutropoulos & Cormier, 2016).

Lines of flight – involves new ways of thinking about teaching and learning practices which are not hierarchal. It is intricately linked to the conceptualisation of nomads as

explained above (Mackness & Bell, 2016). Applied in the context of this study, it is likened to the writing that students produce in their written samples as well as their online interactions on both myUnisa's online discussion forums and Microsoft Teams. The researcher of the current study likens the lines of flight to the connections and disconnections inherent in student writing samples and their online interaction patterns which are not linear but fluid and in constant becoming.

Rhizoanalysis – is a method of analysis that is informed by Deleuzian and Guattarian (1987) concept of a rhizome. It is a new unconventional method of analysing data which is not restrictive, linear or authoritarian. It allows for data to be analysed from different angles, connected or disconnected as was the case in the current study.

Rhizome – is a concept/metaphor/metamorphosis that challenges the conventional/orthodox and hierarchical way of perceiving learning (Deleuze & Guattari, 1987). In the context of the current study, rhizome was used as a perspective that critics the deficit view of student writing. In addition, it was used to advocate for different patterns in student writing and their online interactions that are non-linear, becoming and in constant development that is unpredictable in nature.

Principles of rhizomatic thinking- these principles were conceptualised by Deleuze and Guattari (1987) to provide a guide on how to view and implement unbinary, non-linear, and unstructured rhizomatic thinking, for example:

Connection
"A rhizome ceaselessly establishes *connections* between semiotic chains, organizations of power, and circumstances relative to the arts, sciences, and social struggles.". In the context of the current study *the rhizome* was viewed as the continuous connections in written texts and online interactions.

A-signifying rupture
"There is a rupture in the rhizome whenever segmentary lines explode into a line of flight, but the line of flight is part of the rhizome. These lines always tie back to one another". In relation to the current study, A-signifying rupture refers to connected, disconnected, and reconnected lines of flight or ideas that are non-linear in written and online texts.

Multiplicity

"A multiplicity has neither subject nor object, only determinations, magnitudes, and dimensions that cannot increase in number without the multiplicity changing in nature (the laws of combination therefore increase in number as the multiplicity grows)." Regarding the current study, *Multiplicit*y implies exploration of rhizomatic patterns that may be distributed haphazardly without beginning nor end in written and online texts.

Heterogeneity

"…any point of a rhizome can be connected to anything other, and must be. This is vastly different from the tree or root, which plots a point, fixes an order". In accordance to this study, *Heterogeneity* means investigating rhizomatic patterns in written and online texts to explore textual sameness and unsameness.

Open distance electronic learning – This type of education involves teaching that is conducted remotely in a networked and distributed manner on different online platforms (Dron & Anderson, 2016). For instance, the institution (UNISA) under study is an *open distance electronic institution* which enrolls students from different geographical settings for different educational programmes/qualifications, for example, higher certificates, diplomas, bachelor and postgraduate degrees.

Academic literacies approach – is a model that views writing as a social phenomenon (Paxton & Frith, 2013; Street, 2010). Applied in the context of the current study, academic literacies approach showed how students engage differently in their teaching and learning practices which involve student academic writing. This is the reason the researcher of the current study used the term *rhizomatic* in student writing, to show that the students' writing about the same subject matter is varied producing different patterns even as they interact on the online platforms mentioned earlier in this study. The researcher also provided a section which detailed the way Academic Literacies Approach is viewed and applied locally and internationally.

New literacy studies (NLS) – advocates for learning through social induction (Gee, 2010; Street, 2005). In the current study, NLS is compared with other concepts of literacies such as Multiple literacies to show an understanding and difference between the two concepts

and how literacy was viewed in various stages wherein the concept of literacies evolved in the higher institution of learning spaces. Applied in the context of the current study, *NLS* revealed its application in the way students interact with one another on online platforms with their peers and lecturers as they engaged in the teaching and learning which included student academic writing. The researcher of the current study framed the concept of NLS under the traditional writing approaches to problematize the deficit view of student academic writing within the confines of conventional and orthodox ways of viewing it, as something that is one-sided and non-problematic.

Multiple literacies theory – focuses on distinct types of literacies that can be used in academic learning environments (Masny, 2009, 2010, 2011, 2015, 2016). Framed in the context of the current study, *multiple literacies theory* involves perspectives such as the rhizomatic approach to student academic writing/academic literacy in general that advocates for uniqueness, fluidity, and unconventionality in the way written samples are viewed and perceived. The researcher of the current study used multiple literacies theory to strengthen his argument that advocates for the exploration and application of rhizomatic perspective in the higher institutions of learning. The 'multipleness' invoked in the rhizomatic approach to student writing and online interactions supports the views inherent in the multiple literacies' theory. He used the multiple literacies theory to critique the views brought forth by the linear models of academic writing as mentioned previously.

Assemblage – considers that learning happens in different patterns (Deleuze & Guattari, 1987). In the context of this study, *assemblage* is likened to the rhizomatic view to student writing in that it maintains that student writing samples consist of patterns and such patterns are not predictable in each but traceable hence the rhizomatic approach to student writing and their online interactions as advanced in the current study.

AntConc – is a corpus analysis software that is used to study learning practices in the form of concordance, concordance plot, frequencies, and keywords (Anthony, 2020). This corpus analysis software was used in this study to show rhizomatic patterns inherent in student writing samples and on two online platforms; *myUnisa's ODF* and *MS Teams*. *AntConc* is used to show that student writing samples are unique and fluid even when they are tackling the same subject matter. The rhizomatic patterns were revealed in the form of concordance,

concordance plot, frequencies, and keywords which showed the different key themes inherent student writing samples and online interactions.

AntMover – is a corpus analysis tool that is used to study the way sentences are structured and constructed (Anthony, 2003). *AntMover*, again, as in the previous corpus tool software, was used to show rhizomatic structures in student writing samples at sentence level to show the different structures inherent in each sentence. The terms rhizomatic and different are used interchangeably in this study. The rhizomatic structures at sentence level entails the portrayal of the following classes as presented by the *AntMover* software:

  i.   *Announcing principal findings*
  ii. *Evaluation of research*
  iii. *Making topic generalisations*
  iv. *Announcing present research.*

AntWordProfiler – is a corpus analysis software that is used to study the readability index of written texts (Anthony, 2021). Applied in the context of the current study, *AntWordProfiler* was used to study the readability indices of the Assignment 2s that were produced by the ENG53 students.

Gephi – is a social network analysis tool that is used to visualise interactions or texts in graphical maps (Boinepelli, 2015). *Gephi* was used in the current study to visualise the rhizomatic patterns as harvested by *AntConc* and *AntMover* software applications. Further, it was used to advance the idea of fluidity and non-linearity observed in student writing samples and online interactions. This was important to critique the claim that writing can only be deemed as linear; and most importantly, to also show that writing, as it happens, is complex and unpredictable in nature.

Microsoft Power BI – is a tool that has a suite of integrated platforms: chat boards, assignments, virtual meet, and many other sub-platforms. It is used for people to meet virtually for various purposes (Buchal & Songsore, 2019). In this study, *Microsoft Power BI* was used in a similar way as *Gephi*, however, more significantly, it was used to show a different network of rhizomatic patters in student writing samples and online interactions as

produced by *AntConc, AntMover*, and *AntWordProfiler*, demonstrating the other kinds of connections in student writing samples.

Web 2.0 - Web 2.0 applications are online technologies that enable student collaboration, and can also be used for teaching and learning, for example, *Facebook*, *Twitter*, and *WhatsApp*. (Chaka, 2011). The researcher of the current study regards MS Teams as one of the technologies which falls within the cluster of *Web 2.0* applications because it has the chat function which sends instant messages to the collaborators. It is also used as a teaching and learning platform by institutions of learning. The *MS Teams* in the context of this study was also used as a platform of teaching and learning in the module under study wherein lecturers would offer live streaming sessions and interact with students using the chat function when addressing queries related to such sessions.

The next section outlines the structure of the thesis.

1.11   Outline of the Thesis

Chapter 1 provides an introduction to the study, and stated the research problem, the research questions, and the research aims and objectives. In addition, it briefly highlights the research methodology, data collection methods and ethical considerations.

Chapter 2 discusses the theoretical framework of the study, including a diagram of a rhizomatic approach to student writing, through a literature review of academic writing models, principles of a rhizome, and rhizomatic teaching and learning. Web 2.0 applications, such as learning analytics, social network analysis, *Gephi*, *MS Teams*, *MS Power BI*, *AntConc*, *AntMover*, and *AntwordProfile*r are discussed in terms of ODeL teaching and learning, together with student engagement patterns and online learning

Chapter 4 explains the data analysis procedures, presentation of the results and findings.

Chapter 5 presents the discussion of the findings, together with recommendations for practice, implications, limitations, significance of the study, avenues for future research and conclusion of the study.

1.11   Conclusion

This chapter provided an overview of the study, giving its background, purpose rationale and research methodology together with the strategies employed to ensure quality research and the relevant ethical considerations. It attempted to argue that, whilst traditionally, academic literacy studies employ linear models of studying students' academic writing, they ignore existing, progressive ways of thinking about the discipline, an example of which is the Deleuzian Rhizomatic Approach.

In its endeavour, the chapter suggested that recent academic literacy studies advocating multiple perspectives and approaches should be considered. Expounding the Deleuzian Rhizomatic Approach entailed locating it in the academic literacies' ecosystems investigated in this study.

The next chapter contains a review of relevant extant literature.

CHAPTER 2: LITERATURE REVIEW

2.1   Introduction

This chapter discusses the theory that informed this study through a review of extant research in which the rhizomatic approach was expounded as an alternative perspective to the binary models of academic writing that have been applied for decades in the field of academic literacy. The rhizomatic approach was introduced by the philosophers Deleuze and Guattari (1987), as explained in Chapter 1.

In addition, this chapter presents literature on research in both learning analytics and writing analytics, providing a discussion of *Web 2.0* applications employed in analysing collected data within the rhizomatic approach in the present study. The review further explores Social Network Analysis as the main method of data analysis used in this study. This is followed by a review of *Gephi* and *MS Power BI*, two of the social network analysis software packages applied. Student engagement, Multiple Literacies theory (MLT), and the Writing Analytics software applications used in this study (*AntConc*, *AntMover*, *AntWordProfiler*) are also discussed.

2.2   Theoretical Framework

Through this lens, Deleuzian Rhizomatic Patterns (Deleuze & Guattari, 1987), this study explored instances of rhizomatic patterns in student writing within a group of first-year students enrolled for a Level 1 module, Academic Language and Literacy in English (ENG53). Consequently, the researcher found it instructive and was convinced that, student writing continuously develops unpredictably and unexpectedly as rhizomatic patterns emerged repeatedly in the data investigated. It soon became apparent that, perchance, student writing cannot be limited to linear models of academic writing. The study also drew from Connectivism, a theory conceptualised and developed in the early 2000s by Downes (2005, 2008) and Siemens (2004, 2005, 2014), which many researchers have embraced and incorporated in their studies (e.g., Crosslin, 2016; Downes, 2005, 2008; Goldie, 2016; Kop & Hill, 2008; Siemens, 2004, 2005, 2014; Tschofen & Mackness, 2012).

Considering the foregoing discussion, Downes (2005, 2008) and Siemens (2004, 2005, 2014) agree that connectivism enables learning in a network wherein information can be exchanged and distributed in the process of teaching and learning. Indeed, in the ODeL institution under study, where students use online platforms during teaching and learning, this

researcher has tracked traces of rhizomatic patterns in student writing. Therefore, it is seemed expedient to explore these rhizomatic traces suggestive of non-normative practices in ESL students at ODeL institutions to understand their non-standard learning patterns. This thesis maintains that, the non-standard learning behaviours of ESL students at institutions of higher learning, should not imply that students are not engaged in appropriate learning processes. As such, the Social Network Analysis applied in Kim & Hastak (2018), Serrat (2017) using visualisation softwares such as *Gephi* and *MS Power BI* to map students' online learning behaviours, revealed that ESL student writing is rhizomatic. In agreement with this observation are studies by Hernández-García, González-González, Zarco & Chaparro-Peláez, (2016) and Saqr, Fors, Tedre & Nouri (2018).

Informed by the studies mentioned in the foregoing discussion, the current study applied social network analysis as a construct to explore and reveal students' rhizomatic engagement patterns on *myUnisa*'s ODF and *MS Teams*. *AntConc* and *AntMover* software applications were also used to investigate rhizomatic patterns inherent in ESL students' written samples. Furthermore, learning analytics applied in Lemmens & Henn (2015) and Kitto, Shun & Gibson (2018) were replicated in this study to gain insight into ways in which students engage in writing from a rhizomatic point of view. The aforementioned studies agree that learning is a rather complex exercise which does not follow a linear process but rather a rhizomatic one. Furthermore, reviewed literature shows that writing analytics can be used successfully to investigate rhizomatic key themes linking adverbials in students' written samples. Findings of the studies mentioned previously indicate that students' adverbials manifest differently in their writing and the key themes which emerge out of their written samples are rhizomatic or simply different. This view necessitated investigation of instances of rhizomatic occurrences in students' written samples to understand how rhizomatic practices could be incorporated into the teaching and learning curriculum in the ODeL institution under study. Social network analysis using *Gephi*, learning analytics, and writing analytics as alternative approaches are preferred in this study to be explained in detail in the following sections.

Through these alternative lenses, concepts such as the rhizome, enhance vision towards a deeper understanding of first-year students' writing in rhizomatic patterns. It portrays the order in which students engage in the teaching and learning process, although the order does not follow a linear trajectory. The fluidity of rhizomatic patterns in students' written samples should inform future teaching practices higher institutions of teaching and learning, conceptualise their curriculum designs. This is the reason why, in this study, I adopted

Deleuze and Guattari's (1987) rhizomatic perspective (cf. Jacobs, 2013; Comier, 2008) when viewing student writing on online platforms and in their written samples. Figure 1, below, presents the view of student writing as a phenomenon that is continuously developing or becoming in recurring patterns. This indicates that student writing is constantly in the process of becoming as they continue producing a series of written texts (Deleuze & Quattari, 1987).
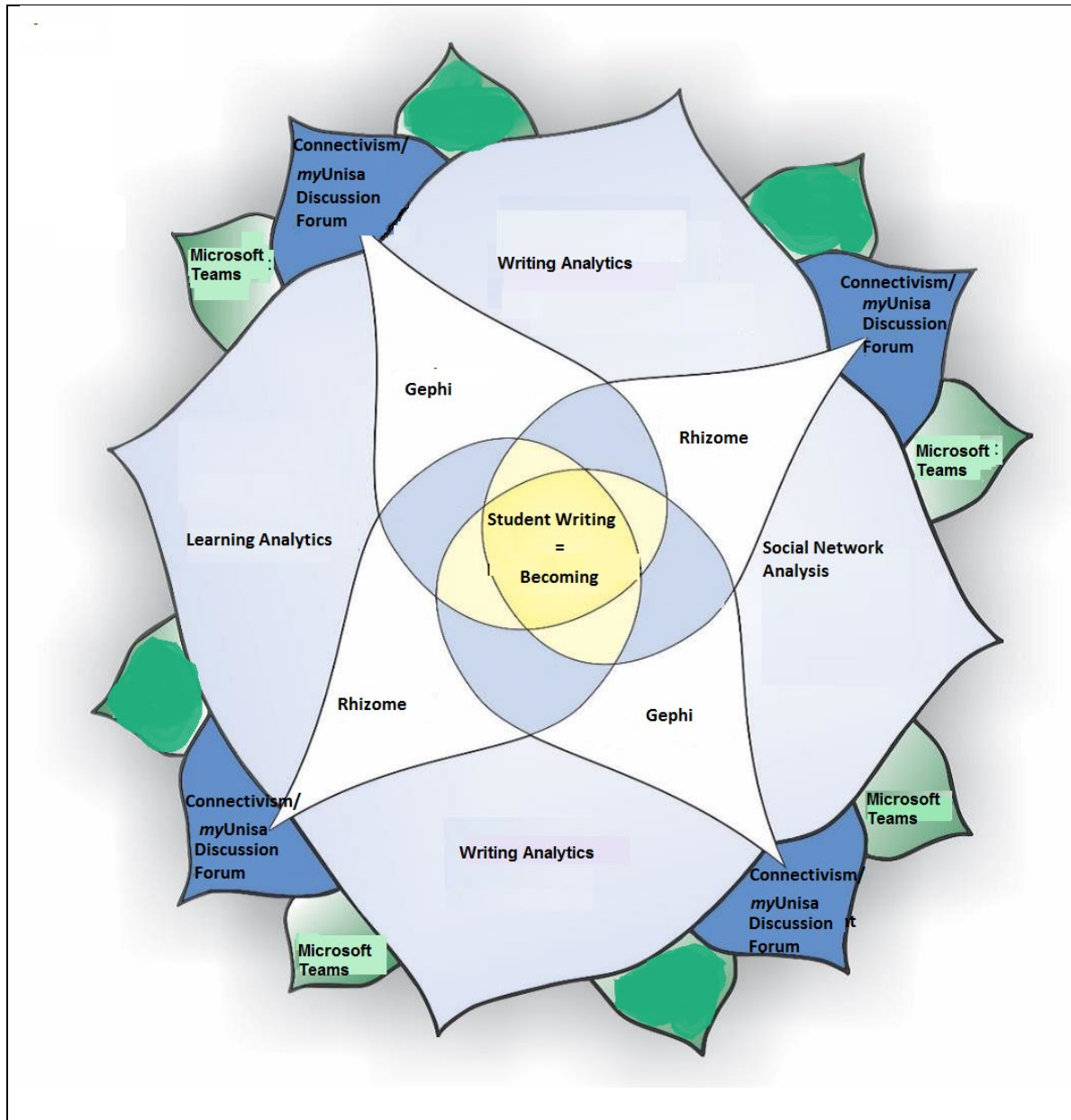
Figure 1: A Rhizomatic View of Student Writing

Most students were observed to produce written texts in a rhizomatic manner, in that they begin writing from different starting points. The writing proved to be cohesive and logical, although it might appear disjointed at times. This adopted alternative approach to.

more so because experience suggests that rhizomatic patterns and rhizomic linkages and patterns are evident in the use of online teaching and learning platforms themselves.

Figure 1 above provides a preview of how first-year students selected for the current study interacted with each other through the *myUnisa* ODF and *MS Teams*. UNISA, as an ODeL, although not yet fully and officially an online university, requires students to have internet connection to enable them to connect with each other and their lecturers on the *myUnisa* learning management system (LMS) and *MS Teams*. For this reason the study suggests that teaching and learning online is inherently rhizomatic, just like student writing, because of the rhizomatic connections the students make from one platform to the next when engaged in the process of learning. This necessitates further research into teaching and learning in this regard.

A considerable number of studies have examined models of academic writing aimed at improving students' academic writing skills (see Elshirbini Abd-ElFatah Elashri, 2013; Gee, 2010; Goodfellow, 2005; Lea & Street, 1998; Tuan, 2011). Yet, despite these studies' seeming acceptable results and application thereof, students continue to perform poorly in academic writing. One of many probable reasons is that open distance learning institutions like the one under study attract thousands of students from diverse educational and social backgrounds. On that account, students' learning behaviours differ from the normative standard of academic literacy. In the light of the foregoing, ODeL institutions of higher learning should consider multifaceted approaches to cater for diverse student cohorts, to improve learning practices.

In support of the view that much research is needed contributing to a deeper understanding of student' learning patterns, a considerable number of studies have advocated the rhizomatic perspective espoused by Deleuze and Guattari (1987) and applied in different fields of education wherein students' learning behaviours where studied with the view of understanding their learning practices towards implementing non-conventional teaching and learning standards (see Bozkurt et al., 2016; Comier, 2008; Grellier, 2013; Handsfield, 2007; Harris, 2016; Honan, 2007, 2010; Johnston, 2018; Kara, 2019; Leander & Rowe, 2006; Long, 2014; Sellers & Honan, 2007; Webb, 2009). Some of these studies are discussed in detail in the subsequent sections of this chapter. In agreement with these scholars, I contend that exploring alternative pedagogies, in this case, the concept of a rhizome, would enable practitioners to understand students' academic writing practices better.

In the following sections, I show that, although writing at university has always been taught and assessed according to traditional institutional prescripts of what constitutes 'good' student writing some scholars, for example, Deleuze and Quattari (1987), view such models as too rigid and prescriptive. In contrast, they present rhizomatic approaches maintaining that learning practices are fluid and forever changing. For a practitioner in education, the starting point would be to learn how ESL students engage in rhizomatic writing especially, in the process of unpacking the same subject matter but in diverse ways as this study maintains.

2.2.1 Deleuzian and Guattarian (1987) Rhizomatic Principles

In the following section, I explain the principles of rhizomatic thinking which were selected to interpret the discussion of findings in Chapter 5.

The two French philosophers (Deleuze & Guattari, 1987) conceptualised rhizomatic principles that they employed to critique linear, rigid and authoritarian thinking as:

Connections

In the context of the current study is viewed as the continuous *connection*s explored in the written samples of students in terms of key themes (concordance) and linking adverbials and *myUnisa's ODF* and *MS Teams*.

A-signifying rupture

Implies that rhizomes may be portrayed in the form of rhizomatic patterns that are connected, disconnected, and reconnected to the central key theme. This means that rhizomatic key themes and presentation of ideas may be disconnected and reconnected at the same or different point. This also entails the process of convergence and divergence in relation to the key themes in written samples and online interactions on *myUnisa's ODF* and *MS Teams* as highlighted above.

Multiplicity

Applied in the context of the current study, *multiplicity principle* entails exploration of rhizomatic patterns that may be distributed haphazardly. The portrayal of ideas/thoughts in written samples and *myUnisa's ODF* and *MS Teams* may be connected to one another in different variations which reconnects to the main key theme.

Heterogeneity

In relation to the current study, *heterogeneity* is involved in studying rhizomatic patterns in student writing and online interactions as specified elsewhere to highlight textual uniqueness, independence, and unsameness.

These four rhizomatic principles explained above guided the current study in supporting the rhizomatic perspective and exploration of patterns in terms of key themes and linking adverbials in written samples as well as on *myUnisa's* ODF and on *MS Teams* interactions.

2.3. Rhizomatic Writing

In this section, I present views and approaches gleaned from the literature on rhizomatic writing that I deem relevant to this study. However, the selection of books and articles reviewed was not in any way exhaustive.

2.3.1 Traditional Student Writing Approaches

Traditional student writing approaches emerged in various parts of the world, especially in Europe, North America, and Australia in response to the needs of international ESL students to assist them in their learning processes (Friedrich, 2008:4; Ganobcsik-Williams, 2006:6-10). These ESL students were deemed as deficient in their writing skills. Consequently, academic writing studies mushroomed with different approaches that would improve the writing skills of the ESL students consistent with the deficit view still dominant in the 21st century. However, debates on writing approached have continued in educational spaces considering the many unrelated and related approaches to student writing that were introduced to remedy such issues. For example, Grabe and Kaplan (1996) discussed process and product (Tribble, 1990) approaches. The scholars believed that academic writing is a process involving the drafting and revising of one's writing. On the contrary, the product

approach was not concerned with the processes involved in producing a written product. Rather, imitating a certain genre of academic writing was the focus. An example is the work of Lea and Street (2000) whose notion was that students could be taught academic writing skills by employing various models of study skills, academic socialisation, and academic literacies, which are still in the 21st century. On the one hand, the study skills model assumed that student writing could be taught by simply correcting grammatical errors, whereas the academic socialisation model was focused on inculcating a practice of imitating given sets of writings in the discipline.

On the other hand, academic literacies encompassed the views of both study skills and academic socialisation. In this approach, academic literacies viewed academic writing as a social practice, something that could be taught by members belonging to a certain discipline For example, in Europe, Goodfellow (2005), Paxton and Frith (2013), Street (2010), and Wingate (2012) employed the academic literacies approach focusing on inducting students into the kind of academic literacy practised in present day HEIs, to socialise them into academia. In North America, some scholars focused on the new literacy studies perspective (Gee, 2010; Hyland, 2015; Street, 2005). These scholars see literacy practices as practices that should involve like-minded societies or communities of practice concerned. This perspective is concerned with socialising students into the types of literacies they would be engaging in within their various communities of practice or fields of study (Lave & Wenger, 1998). The views held by these scholars is that student writing is deficient, not meeting normative standards set by HEIs.

In North America specifically, literacy studies focused on composition studies and current rhetoric (Friedrich, 2008; Ganobcsik, 2006). These studies focused on teaching students writing as practised in the various "communities of practice" relevant to the students' studies. Students were taught English because they were expected to know the language and how it is used in their specific fields of study. The remedial nature of these approaches seemed to have failed since students were unable to meet the academic literacy standards of HEIs.

The foregoing discussion demonstrates work that preceded the development of academic literacy trends referred to as 'new literacy studies' as seen in the works of Gee (2010), Street, (2005), and Hyland (2015). These scholar's views were also based on the idea of communities of practice, likened to a society with a culture of its own. In this view

socialising students to the types of literacies in which they would be engaged in their varied communities of practice was the ultimate ideal.

In Canada, some institutions of higher learning offer writing courses to international students and those who major in literary studies who are viewed as lacking the required academic literacy skills. In these contexts, according to Smith (2006) writing courses are inter-disciplinary and offered in different departments to focus on professional writing and rhetoric programs.

Despite such endeavours as discussed above, there seems to remain an unexplored gap between the way students are taught writing in their pre-university schooling and the writing requirements set by universities. Generally, students appear to fail to adapt to their new sense of "being" or their new "identities" when they enter university. This phenomenon may have a rather negative influence on students' perceptions of teaching and learning in the new environment. The current study challenges traditional views of academic writing, arguing that alternative approaches deserve consideration as shown by the rhizomatic patterns approach supported in this study despite its seeming "messy, disjointed structure" on the surface.

In Australia, as seen in Cope & Kalantzis (1996); Elshirbini Abd-ElFatah Elashri, (2013); Hyland (2015); Iwy (2016); Tuan (2011) writing studies were concerned with socialising students to the type of texts they studied in their respective fields of study. The reason was so that students could learn to emulate the model texts in their own writing. Much of this work was based on systemic functional linguistics as a theory, added to the existing socialising approach. This theory is concerned with correct use of language features for a particular communicative purpose with the relevant register (Fang, 2005; Schleppegrell, 2007; Schleppegrell & Achugar, 2003).

The approaches discussed above are still employed in various versions to teach academic literacy in HEIs in South Africa (Coleman, 2012; Paxton, 2012; Janks, 2012; Butler, 2013; Van Rooy & Coetzee-Van Rooy, 2015). Students' academic literacy abilities are still regarded as deficient in HEIs. Significantly, this thesis considers the status quo in a different light, maintaining that academic literacy practices are in the process of "becoming"; growing and re-growing in different directions in a rhizomatic manner, because they are not static but constantly moving from one perspective to another as discussed in previous sections of the literature reviewed. Therefore, the rhizomatic view, as this study suggests, contributes to

paradigms needing to shift in the teaching and learning praxis in ODeL environments with the help of the 21st century and its affordances brought forth by corpus analysis softwares such as *AntConc, AntMover*, and *AntwordProfiler* that can be incorporated in the HEIs curriculum design.

2.3.2 Multiple Literacies Theory

Multiple literacies theory (MLT), like the rhizomatic approach to teaching students writing, is post-structural in nature. Post-structuralism is based on pedagogies and theories that are transformative in nature, in that these are mostly concerned with changing the structured and conventional academic literacy practices. Masny (2009, 2010, 2011, 2015, 2016), a prominent scholar, conceptualised and advanced MLT, and conducted several studies in which MLT was applied to critique and reimagine authoritarian academic literacy practices (Masny, 2009, 2010, 2011, 2015, 2016; Masny & Waterhouse, 2011). Some of these studies drew inspiration from Deleuze and Guattari's (1987) concept of a rhizome.

Masny and Waterhouse (2011) argue that literacies underpinned by MLT undergo a process of becoming. They attribute this process of "becoming" to staggered development in literacies, multiliteracies, New Literacy Studies (NLS), new literacies, and MLT theories. The authors maintain that models of literacy are end-product driven, whereas MLT is process-driven. Masny and Waterhouse (2011) also deem MLT as having the potential to change the ecosystem of literacies. In their application of MLT, they observed that Estrella's vignettes revealed multiple writing systems, which indicated creative ways of writing as a process of becoming. Masny and Waterhouse (2011) encourage HEIs to learn from literacy practices that students apply as they engage in academic tasks. In her 2010 study, Masny highlights the need to apply MLT from a rhizome point of view. She points out that MLT advocates literacies to connect in a non-linear way. The researcher of the current study also advocates for a similar view upheld in Masny and Waterhouse (2010). The latter argues that the affordances of corpus analysis softwares such as *AntConc*, *AntMover* and *AntWordProfiler* that will shed light in the way teaching and learning ought to be conducted and understood in the 21st century, especially in large ODeL institutions akin to the one under study. The concept of learning analytics will also be crucial in assisting ODeL institutions in understanding learning behaviours of large student numbers, and enhancing understanding of the academic literacy field.

Masny and Cole (2009) discuss the need for a theoretical framework that will make sense of different literacy practices at length. Close to the envisaged theoretical framework, was one posited by Deleuze and Guattari (1987) and used in the present study for "reading the world and self". Inspired by this theory, Masny and Cole (2009) also critiqued linear thinking in praxis at HEIs regarding what constitutes literacy. As an intervention, the corpus analysis softwares employed in this study could assist institutions of higher learning in designing theoretical frameworks suitable for 21st century teaching and learning based on rhizomatic patterns traced in students' learning processes. The present researcher argues that students develop their writing skills differently, irrespective of lecturers' interventions, and that their development does not occur only within the confines of an intervention. This approach supports the idea of becoming.

According to Masny (2009), 'literacies constitute ways of becoming within the world', where, for example, a learning skill like reading is 'intensive and immanent.' Considering this view, reading should involve predictability of the reader's world and what is likely going to happen next. From this perspective, it can be inferred that, in writing, transitional expressions afford writers the opportunity to predict what is to follow in student writing, but such predictions are presented in different rhizomatic ways when showing understanding of the same subject matter. In a similar fashion, corpus analysis softwares use algorithms that could be used to understand students learning patterns of, in the case of the current study, rhizomatic students' writing patterns. Supporting this view, is Jewitt (2009) who argues that 'The classroom construction of literacy occurs through the legitimation and valuing of different kinds of texts and interactions.' A similar pertinent study (Leander and Boldt, 2013) in a significant way, critiques a related theory, the NLS's binary view of literacy. Leander and Boldt (2013) studied a ten-year-old boy named Lee who read Japanese Manga yet he was considered as a challenged student where the school failed to acknowledge or accept his non-conventional literacy practices. It seems Lee practised literacy differently in and outside of school. However, the fact that, he could read Japanese Manga, the notion that literacy practices are the same even in different contexts, was dismissed.

Leander et al. (2013) adopted Deleuze and Guattari's (1987) concept of "assemblage" in their study. As a remedial exercise, Lee was introduced to a series of interventions that would enhance his literacy practice, raising his abilities to an accepted standard, a process called "territorialisation". However, while undergoing the process of deterritorialization, Lee

applied and showcased his own way of reading the world and self. From this study, Leander et al. (2013) noted that, 'how reading is taken up in each situation is unpredictable'.

The concept of unpredictability in learning situations, is also observable in writing in that, the same subject matter can be presented or understood in different ways by different learners. This study posits that leveraging the affordances of corpus analysis softwares such as *AntConc, AntMover* and *AntWordProfiler,* were they to be considered, they can reveal patterns in student written samples that are humanly impossible otherwise because they use algorithms.

Following from the foregoing discussion, it should be noted that, Honeyford and Watt (2018) also conducted a study to investigate how four teachers applied their teaching theories and praxis teaching writing differently. A total of 30 students who participated in the study were requested to participate in interviews. Honeyford et al. (2018) mixed different stories of the participants to create multiplicities of connections. They used the challenges that occurred in their study to pave new directions in their literacy practices. In this case, the process of deterritorialization emerged, which means that they moved from the known to the unknown in the literacy practices the students showcased. The stories were connected in ways such that, teachers could navigate them, producing knowledge to show different understanding of the same subject matter. Furthermore, new ways of engaging literacy to develop new insights into learning were employed by the teachers. The innovativeness of the participants in the way they approached academic literacy brought to light distinct ways of entering student writing pedagogy.

From this ground-breaking study, Honeyford et al. (2018) recommend burrowing into new ways of teaching and learning writing, a method meant to disrupt traditional conventions thus deterritorializing or transforming the *status quo* (Masny & Cole, 2007). In the same vein, the current study advocates a technology-driven approach to academic literacy to enhance understanding of the nuances involved in the production of academic writing texts comprised of rhizomatic patterns.

The following sections discuss the tenets of rhizomatic theory with allied theories.

2.4   The Rhizomatic Perspective

The word *rhizome* is a botanical term for a horizontal plant stem located underground, from which roots grow in different directions, producing new plants (Mackness, Bell & Funes, 2016; Masny, 2013; McCannon, 2012; Nkhobo & Chaka, 2021). As a botanical concept, the rhizome is applied in teaching and learning to mimic its behaviour in its natural setting in order to enhance understanding of students' learning practices. In the following section, the concept is explored further.

2.4.1   The Rhizome

In a figurative sense, the term *rhizome* captures the process manifest in student writing. It has been observed in earlier sections that student writing is marked by fluidity meaning that it flows easily. Apparently, subject matter cognition, follows the same pattern. Seen through this lens, it can be argued that there is value in allowing student writing to develop naturally in a non-predictable manner, moving through different waves of development. In this regard, it is Masny's assertion that a fluid writing process that neither has a beginning nor an end, remains in constant development (2013). This view is espoused in the current study which sought to demonstrate that the rhizome manifests various behavioural ways as observed by Sermijn, Devlieger & Loots (2008: 6). Consistent with the leanings of this study, it can be argued that advances in online technologies, especially corpus analysis softwares which are gradually changing the rhizomatic perspective into more than just a novel concept but a thought-provoking framework capable of shifting the paradigm in academic literacy praxis. This is not a new idea. Webb (2009: 47) states that there will be need for a re-evaluation of school curricula, teaching methods, assignment designs, activities and grading. Therefore, ensuing research could enjoy a head-start with such a ground-breaking foundation already laid.

Were such research as envisaged in the foregoing paragraph to be undertaken, it would likely prove itself to be a worthy concept in challenging traditional, authoritarian, and hierarchical models. Mackness, Bell, and Funes (2016:89) and Cumming (2015: 137) are proponents of the view that in developing the rhizome concept, Deleuze and Quattari (1987) provided a fresh, much needed opposing view to traditional authoritarian and hierarchical models teaching and learning praxis. Another advocate for the rhizomatic, Wallin (2010, p. 83) has advanced arguments in defense of the rhizome as a helpful concept, in its ability to

provide students with freedom of thinking when learning. From this perspective, it is easy to see how students could begin to own their learning according to their own strengths and abilities thereby showing their rhizomatic understanding of the same subject matter. This idea is important for ODeL contexts where students own their learning of their learning exhibiting varied learning styles, As has already been alluded in previous sections, this study considers academic writing as a process of becoming which implies a rhizomatic type of process (Masny, 2013), and is always evolving in a phenomenal manner (Deleuze & Guattari, 1987). A significant observation that this study has made, is that, a rhizomatic perspective to academic literacy could be employed to demonstrate clearly that students portray the same key themes albeit in different ways to show that learning is not static as they interact on *myUnisa's* ODF and *MS Teams*.

From the foregoing discussion, it is evident that the rhizomatic approach to student writing has gained ground and that it needs the support of HEIs in ESL contexts. The 21st century teaching and learning, especially in ODeL institutions, I argue, it is algorithmic in nature. Therefore, employing rhizomatic perspectives to teaching and learning could bring new ideologies in the way curriculum programs are re-conceptualised and re-packaged in the academic literacy field. Contrary to traditional approaches, the rhizome approach promotes and accommodates the diversity of backgrounds 'engraved in students' identities. Hence, Dillon (2016: 90) sees the application of rhizomatic thinking in teaching and learning as a 'welcome break from predominant learning theories describing them as prescriptive or dogmatic in nature and which disadvantage the liberation of students' inner creativities and being in their writing and therefore, should be revisited.' Honan and Sellers (2006) argue for rhizomatic thinking and writing, maintaining that viewing writing from this perspective will encourage students not to parrot the linear, authoritarian models of writing. It is significant to apply perspectives which view academic literacy as a process that is always developing and not normative, a position advocated in the current study.

2.4.2   Teaching and Learning Rhizomatically

The rhizome as conceptualised by Deleuze and Guattari (1987) functions like MLT, supporting creativity and discarding traditional authoritarian views of teaching and learning. Lian (2011: 11) states that:

'a rhizomatic structure can be thought of as a structure which contains components where every component is connected to every other component of living, organic and potentially infinite, structure.'

This view rejects the deficit view of student writing which deem their writing as deficient but rather containing "pockets" of interconnectness to the expectations of the main subject matter even in structures and ideas that may seem disjointed. In the same vein, Honan (2007, p. 533) was able to recognise some form of creativity in his study following the rhizome, and recognised the possibilities offered by the rhizomatic open-ended approach.

The rhizomatic approach has been applied in a few studies of note, wherein it was shown that the approach has made an impact in the way academic literacy is now perceived (Grellier, 2013; Guerin, 2013; Harris, 2016; Honan & Sellers, 2006; Honan, 2007). Therefore, the rhizomatic approach should be considered a potentially successful teaching approach in ESL contexts in some way or form. For example, Guerin (2013) applied a rhizomatic teaching and learning approach to groups of doctoral students from diverse backgrounds, which allowed them to interact with each other about their studies and share information. Concerning this matter, Guerin (2013: 146) found that writing groups empowered students to grow as researchers in terms of "flexibility", "multiplicity", "collegiality", and "connection" because their learning environment was not authoritarian, but 'rhizomatic' in nature. In the same breadth, connectivity and the idea of communities formed around common interests according to a rhizome are also features of the MLT perspective, in that both perspectives are concerned with connectivity, creativity, and the process of becoming while learning (Masny, 2010, p.339; Masny, 2011: 502; Waterhouse, 2011: 288). Therefore, both perspectives are post-structuralist in nature (Deleuze & Guattari, 1987).

Contrary to the normative way of doing things, Honan (2007: 533) followed a rhizomatic approach, not the linear approach of thesis writing set by the university. Writing a thesis in this way was unique and unconventional. It is commendable that certain HEIs are flexible in their approaches to teaching and learning which accommodate students' uniqueness and unconventionality. The other study which followed almost the same approach and taught students differently, is the one conducted by Bozkurt et al. (2016) wherein they examined a connectivist rhizomatic learning environment within multiple perspectives. They conducted teaching and learning using hashtags, and students liked this approach because of how engaged they were. They found this approach to lessen the number of dropouts but

increased interactivity amongst learners. They also found that online learning encouraged more students to learn and become a learning community. The application of what students bring into HEIs lessens the anxiety that students experience, and they ultimately perform better in their studies as they would identify with the teaching and learning practices in such communities. The approach used in Bozkurt et al. (2016) is not linear but rhizomatic in nature in that it did not have a predetermined approach for teaching and learning.

2.5   Rhizomatic Literacy Practices

Studies have been conducted in recent years in the education sector in which a rhizomatic perspective was implemented to transform the binary literacy practices in teaching and learning. These studies include those of Al-Naibi, Al-Jabri, and Al-Kalbani (2018), Amorim and Ryan (2005), Cumming (2015), Dillon (2016), Handsfield (2007), Honan and Sellers (2006), Honan (2004), Honan (2009), Honeychurch, Stewart, Bali, Hogue, and Comier (2016), Johnston (2018), Long (2014), Mackness, Bell, and Funes (2016), Martin and Strom (2017), Masny (2013), Nkhobo and Chaka (2021), Sermijn, Devlieger, and Loots (2008), Wallin (2010), and Webb (2009). Webb's (2009) study paved a way for how academic writing could be taught in schools through the implementation of the rhizomatic perspective suggested by Deleuze and Guattari (1987). His study focused on introducing innovative and new ways of teaching, research, and writing. He adopted Cormier's (2008) approach of a rhizomatic teaching and learning to come up with his own teaching and learning approaches that could be used in the composition classrooms, such as preparing lesson plans and assessment, to name a few. The study is one of the few that have explicitly provided approaches that teachers could use in their classrooms to test rhizomatic teaching and learning. Webb (2009) noted that he would not dictate the way in which teachers should undergo teaching and learning, as this would be advancing the culture of hierarchal, linear and rigid literacy practices. He argues that 'models of literacy instruction have always been derived from concrete historical circumstances. He further argues that, in order for change to take place, the composition classroom should adopt a paradigm shift. This means that students should be allowed to construct their own lesson plans and writing maps. And, for academic literacy field to evolve, it needs to maximise the affordances offered by online

technologies such as the ones used in the current study to change traditional view of teaching and learning.

Similarly, Johnstone (2018) investigated the literacy practices of students in the Grade 7 English classroom at the New York City Middle School in Harlem. He argued that conventional literacy practices do not promote creativity, and do not take into cognizance what students bring to HEIs. He collected data by means of observations, interviews, verbal and written conversations, artifacts, and a researcher journal. He used a rhizome perspective to study how students deviate from the normal literacy practices. As suggested in Webb's (2009) study, Johnstone (2018) maintains that students and learners are, in most cases, tested against predetermined norms and standards that do not accommodate what students/learners bring to the schooling environment. Students who possess different literacy practices are, in most cases, deemed incompetent and illiterate. Viewing literacy practices differently and from a rhizomatic point of view would enable us to leverage affordances brought forth by rhizomatic literacies whilst incorporating corpus analysis softwares to understand such literacies better.

According to Johnstone's (2018) study, the aim of Honan's (2009) study was to investigate the patterns of academic literacy emerging in four classrooms he observed. He wanted to understand the kind of digital texts used in impoverished schools for teaching and learning. Honan (2009) argued that classrooms are rhizomatic in nature, in that different and complex processes unfold in each classroom. He acknowledged that conventional academic literacy practices are hard to get rid of, even when teachers try to implement creativity in their teaching and learning praxis. Consequently, Honan (2009) recommended the use of new or post-structural pedagogies, even in the process of teaching and learning through traditional texts. The HEIs are moving towards fully online and some partly online teaching and learning practices in the wake of the Covid-19 pandemic. In a related but different context as in Leander and Boldt's (2013) study regarding outside classroom literacies used by students, Honan was aware that students used various digital texts that contributed to their learning outside school. However, such texts were not used in the classrooms to facilitate teaching and learning. Honan found that teachers could not comprehend the way in which students used "out-of-school" literacies, which calls into question teachers' teaching and learning practices as bearers and distributors of knowledge that is often linear and conventional teaching in practice.

2.6   Writing Analytics

Consistent with the aim of the current study which was to investigate rhizomatic patterns in student writing samples and rhizomatic engagements on different online platforms, i.e., *myUnisa*'s ODF and *MS Teams*, writing analytics formed a significant part of this study. This researcher studied and analysed student writing in a rhizomatic manner. Writing analytics is part of learning analytics, and comprises, in this study, various data related to student writing that could be computationally analysed using writing software tools. Writing analytics involves the process of analysing students' written texts using quantitative or qualitative data (Palmquist, 2019; Lang, 2019; Ullmann, 2017). *Writing analytics* as the subset of *learning analytics* is amplified by the corpus analysis softwares to understand written or non-written data with speed and efficiency that a human mind and an eye could not process. A considerable number of studies have been conducted using this process, and many deployed keystroking to understand and analyse student writing for different purposes in teaching and learning (Allen, Jacovina, Dascalu, Roscoe, Kent, Likens & McNamara, 2016; Ameri & Pourniksefat, 2017; Barkaoui, 2019; Benetos & Bétrancourt, 2015; Conijn, Roeser & Zaanen, 2019; Conijn, Van der Loo & Van Zaanen, 2018; Fontaine & Aldridge-Waddon, 2015; Gánem-Gutiérrez & Gilmore, 2018; Guo, Zhang, Deane & Bennett, 2019; Leijten, Van Waes, Schrijver, Bernolet & Vangehuchten, 2019; Sinharay, Zhang & Deane, 2019; Van Waes, Leijten, Pauwaert & Van Horenbeeck, 2019; Xu & Xia, 2019).

On the one hand, Guo et al. (2019) investigated the sub-group writing processes the selected participants applied as they produced written essays. A semi-Markov model was used for writing sequence. The students were requested to write an argumentative essay and perform other written tasks. Keystroke logs were used to model the writing processes of the participants on the same written task. The researchers focused on how long students paused and edited, and how long it took them to produce written texts. Guo et al. (2019) found significant writing processes amongst the chosen groups. Students with a lower socio-economic status and black students showed lower efficiency in producing texts, compared to their counterparts with a higher socio-economic status and white students. Female students, compared to their male counterparts, were more fluent, and showed advanced typing skills. They also used more complex words and spent more time producing texts and editing. This is an indication that students at HEIs should be encouraged to structure and produce their own

texts which speaks to a given subject matter and subject them into the corpus analysis software that will reveal rhizomatic patterns in students' written samples.

On the other hand, Fontaine et al. (2015) studied the writing processes of 20 second-year students at Cardiff University. The students had to produce written texts: a *Facebook* message and a short-written essay. The aim of the study was to determine if the chosen participants employed different writing processes. The participants were all first-language English speakers and had been using a keyboard for the past six years. The participants were given seven minutes to complete each task. The researchers observed that writers with high keyboard efficiency edited their texts more. The students with low keyboard efficiency were more concerned about judgement and made more changes to their writing. The students employed similar writing processes in writing a *Facebook* message as they did producing a short-written essay. The challenge for many students at higher institutions of learning especially at ODeL institution under study is that a considerable number of students lack computer literacy skills, and this add to the deficit view held by the conformist and traditionalists. This implies that some students may not have the necessary resources for out-of-school literacies that would equip them with the required skills to thrive in teaching and learning at ODeL institution such as the one employed in this study.

The use of computers programmes to study the teaching and learning practices of students was used in the Barkaoui's (2019) study in which data from earlier studies was used (Barkaoui, 2014, 2015), investigated the type of cognitive processes employed by second language (L2) writers as evidenced by their keyboard skills in relation to their pausing tendencies and their L2 proficiency as they produce written texts. Keystroke logs were used as data. The participants were given two tests of English as a foreign language (TOEFL). These were writing tasks that they had to complete using the computer. Keystroke data were gathered from 68 students who were requested to complete two written tasks. Barkaoui (2019) found that participants' overall pausing behaviour did not differ significantly across L2 proficiency and keyboard skills. Participants with significantly higher keyboard skills and L2 proficiency required less time to finish their written tasks. In addition, it was reported that higher-order transition showed longer pauses within paragraphs, and lower-order transition showed longer pauses within words. The participants paused frequently between words. Low-proficiency participants paused more than high-proficiency participants. Findings from the study could guide HEIs in terms of the time that they allocated to each student to perform

certain tuition-related tasks because it was clear that each student responded to certain tasks differently.

2.7 Related research that used corpus analysis software applications *AntConc, AntMover, AntWordProfiler*

A considerable number of studies have been conducted in which *AntConc* was used to investigate lexical bundles and/or phraseology in written tasks, and also to compare the writing patterns in the texts of native and non-native speakers of English (e.g., Çıraklı, 2019; Natsukari, 2012; Papangkorn & Phoocharoensil, 2021; Rahayu & Cahyono, 2015; Ulfa & Muthalib, 2020; Wijitsopon, 2017; Villanueva, 2015; Zhang & Pan, 2020). The following section presents scholar's views on these software applications.

2.7.1 *AntConc*

AntConc (Anthony, 2020) is a corpus analysis software that generates writing patterns in terms of concordance, concordance plot and key words. Many of the studies mentioned above did not use the concept of a rhizome as their theoretical framework, however their findings showed that students' writing consists of patterns which the current study terms as rhizomatic patterns. For example, Çıraklı (2019) investigated the writers' linguistic preferences and their use of repeated verbal cues in their written texts. He discovered that the play *come and go* revealed prevalence of proper nouns and words that referred to the human body. In addition, he found that the words *silence*, *left*, and *right* were repeated often. This implies that certain texts may contain key themes that are repeated to emphasise a certain point. Some may be used repeatedly to mean different things. This phenomenon shows that writing is indeed rhizomatic and should not be regarded as a linear process.

Another study that advances the notion of rhizomatic learning is that of Bozkurt et al. (2016), which concedes that learning in a network environment gives a springboard to rhizomatic learning practices and accommodates "nomadic learners". In the context of the current study, the use of the myUnisa's ODF and MS Teams enables students to discuss activities and tasks that may not be same as they try to understand the different activities either in their study guides or assignments. This process of engaging each other is considered rhizomatic in the context of this study.

2.7.2 *AntMover*

AntMover (Anthony, 2003) is corpus analysis software that generates structural patterns at sentence level in written samples. Most of the research conducted in which structural moves were explored using *AntMover* software application focused on the writing of abstracts for research articles (for example, Abarghooeinezhad & Simin, 2015; Bhatti, Mustafa & Azher, 2019; Benrouag, Chaibainou & Senoussi, 2019; Gustina, 2020; Mauludini & Kurniawan, 2020; Qatrunnada & Kurniawan, 2020; Zulfa, 2020). The findings of the studies mentioned above agree that written samples of students contain different structural patterns, and framed in the context of this study, rhizomatic patterns. Other studies focused on structural moves in the findings and discussion sections (for example, Alvi, Mehmood & Rasool, 2017; Lubis, 2020), whilst some focused-on introductions in research articles (for example, Pendar & Cotos, 2008) and conclusions in the research papers (for example, Zamani & Ebadi, 2016). The findings of the studies mentioned above showed that writers have different ways of presenting their findings and discussion sections (Alvi et al. 2017; Lubis et al. 2020). Similarly, Pendar et al. (2008) found that scholars presented introductions differently in their research papers. In the same vein, Zamani et al. 2016 found scholars had different ways of writing conclusions in their research papers. This implies that although there is a universal way of writing research papers for different Journals, researchers show their creative ways of presenting written information. In the current study, *AntMover* software was used to explore the kind of rhizomatic structural patterns inherent in each students' written samples as presented by the *AntMover* software application.

Most of the research conducted in the studies mentioned above did not adopt the rhizomatic perspective in the way the current study did. However, they found various writing patterns that are inherent in written samples, which the researcher of the current study argues that they are rhizomatic patterns because they are fluid and immanent in nature. In a different but similar study in terms of exploration of writing patterns, Gustina (2020) investigated the rhetorical moves and linguistic features in thesis abstracts and research article abstracts written by undergraduate students. Gustina (2020) found variations in the manner in which the undergraduate students wrote their theses and research article abstracts. Gustina (2020) further observed that Move 3, referred to as "Method", was the most prevalent move in both texts. In addition, Gustina (2020) discovered that the students who participated in the study often excluded Move 5 (Conclusion) in their written samples. Gustina (2020) further observed that no move was obligatory, except Move 1 (Introduction) and Move 3 (Method),

which reached obligatory status. This kind of a research enquiry is important because it will help HEIs to understand the ways in which students write theses and abstracts and refrain from imposing linear structural patterns that students are expected to follow. The kind of knowledge that students bring into HEIs should be considered since they are also co-creators of knowledge. This is equally important at postgraduate level wherein students are expected to show originality, uniqueness, creativity and critical thinking.

A significant number of studies (Alshalan, 2019; Bikelienė, 2017; Diamante, 2020; Dutra, Da Silva Queiroz & Alves, 2017; Karatay, 2019; Li, Dursun & Hegelheimer, 2017; Merilaine, 2015; Sabzevar, Haghverdi & Biriya, 2020; Vinčela, 2013; Youngdong, 2020) have been conducted in which the *AntConc* software application was used to reveal linking adverbials prevalent in written samples. The findings of these studies agree that students use different adverbial patterns in their writing. This idea is address in the following sections.

2.7.3   *AntConc:* linking adverbials in student writing

In Karatay's (2019) study, it was found that students tend to use linking adverbials more often in timed essays than in untimed essays. In the current study, the researcher sought to explore patterns of linking adverbials inherent in students' written samples and their frequencies of use.

Furthermore, Karatay (2019) further discovered that students used fewer linking adverbials under sequential and additive linking adverbials. For example, in Karatay's (2019) study it was revealed that the adversative linking adverbial *nevertheless* appeared with a frequency of 0.08 in timed essays, versus a frequency of 0.19 in untimed essays. In addition, Karatay (2019) found that the causal linking adverbial *consequently* scored 0.7 in timed essays, versus 0.11 in untimed essays. Dutra et al.'s (2017) study found overuse of *besides* and underuse of *also* in written samples of Brazilian students, as compared to their American counterparts who were native English speakers. This implies that the use of linking adverbials is determined by how and what kind of linking adverbials are used in the linguistic backgrounds of students, especially students who do not use English as a home language.

2.7.4   *AntWordProfiler*

AntWordProfiler (Anthony, 2021) is another corpus analysis software used to generate the readability indices of written texts. In the study conducted by Halim (2018), it was found

that students registered in the English Language and Culture Department had low lexical richness; none of them scored *0.5 types–token ratio*. Halim (2018) revealed that the students used the same vocabulary repeatedly. In similar study, Indarti (2021) found that the average of tokens produced by male versus female students differed significantly. Indarti (2021) discovered that, in the 30 essays written at the University of Bina Sarana Informatika by students registered in the English Department, female students scored lower (0.60) on type *0.5 types–token ratio* than their male counterparts (0.55). Significantly, this shows the need for HEIs to teach vocabulary in their different fields explicitly.

2.8 Web 2.0 Applications

Several studies have been conducted globally in which Web 2.0 applications were used to enhance teaching and learning (Bassett, 2012; Beach, 2012; Bräuer, 2012; Chaka, 2011; Gunn, Hearne & Sibthorpe, 2011; Lwoga, 2012; Merchant, 2009; Newland & Byles, 2014; Shin, 2014, 2018; Williams & Chinn, 2009). Web 2.0 applications are online technologies that enable student collaboration, and can also be used for teaching and learning, for example, *Facebook*, *Twitter*, and *WhatsApp*. Online technologies have infiltrated the learning space of the 20th to 21st century generation of students, and have been used widely in HEIs, especially in the open- and distance learning context. These online technologies are used to enhance teaching and learning. Merchant (2009) studied the connection between interaction, collaboration, and learning in an online ecosystem. Merchant (2009) also studied the ways in which new technologies are used both in schools and outside the school environment, and he used new literacies as a guiding pedagogy in teaching and learning. Merchant (2009) cautions that even in our implementation of Web 2.0 applications, whether they will bear fruits in the teaching and learning environment. Merchant (2009) focused on the following types of participation: the wisdom of crowds, participatory culture, sociocultural accounts of learning, and the remix metaphor.

Merchant (2009) referenced four characteristics that are inherent in the implementation of Web 2.0 applications, namely presence, modification, and user-generated content. He noted that one Web 2.0 application has enjoyed wide usage is blog technology. He found that Web 2.0 applications enabled online participation, as participants could use such applications whenever they wished encouraging collaboration and knowledge-sharing amongst participants. In addition, the applications allowed participants to solve problems together. Furthermore, Merchant (2009) suggested that in-depth analysis of Web 2.0 applications could

be used to understand the impact they may have in teaching and learning spaces, with particular focus on participation. The current study regards MS Teams as one of the Web 2.0 applications because of features that enables collaboration and chat functions that send notifications to different users. MS Teams was used as a teaching and learning platform that was leveraged in the HEI under study since the eruption of Covid-19 pandemic.

Noted also is that Bassett (2012) investigated the effectiveness of Web 2.0 applications in developing students registered for early childhood education at a college in New Zealand, as a means of remedial support in their learning endeavours. The Web 2.0 applications that were used in Bassett's (2012) study were Wikis, Blogs, and Cloudworks. One of the reasons that prompted Bassett (2012) to undertake this study was that these students were seen to be struggling with the English language because it was taught as their first language (L1). In addition to the difficulties in learning English, the students lacked preparedness for the academic requirements set by their institution. Another concern was that these students were from diverse environments, hence their respective challenges. Basset (2012) found that Web 2.0 applications were beneficial for the early childhood students registered at the college. In this regard, Basset advocates students should be encouraged to use Web 2.0 applications in their learning, as many of them proved to be competent in using these applications. the relevance of Basset's finding cannot be undermined, it should be promoted, especially at the institution under study for use in different online technologies to offer more support to the ODeL students. This would ensure that they succeed in their studies even in the face of a myriad of factors that hinder learning, an example of which is the impact of Covid 19.

Another relevant study is that of Lwonga (2012), who tested whether Web 2.0 applications could be effective in the teaching and learning of African students. The focus of the study was Tanzanian public universities. Data was collected in the year 2011 by means of semi-structured interviews and analysed using content analysis. Lwonga (2012) found that the participants were eager for the Web 2.0 applications to be introduced in their universities as this meant that teaching and learning practices would be enhanced. The use of online technologies in the teaching and learning spaces such as Facebook, Twitter, and WhatsApp to name a few resonates with students because they are exposed to such technologies, and they can easily share information and show their creativity. The use of online technologies allows teaching and learning practices that are not linear but disruptive and chaotic in a constructive manner.

Shin (2018) who shares a similar view as discussed above argues that, because social media are platforms help students carry out most of their learning, educators need to use social media to which students are exposed to better support them in their learning. For this study, Shin (2018) selected his participants at a school called Centerville Elementary School in the United States of America. The teachers used computer technologies as part of their teaching and learning. collected data from 18 Grade 6 participants (nine boys and nine girls). These students made use of iPads, Smartboard, and Elmo in learning English, with a focus on social media-based writing using Web 2.0 applications. The data collected were written tasks, Glogster postings, and field notes, from which students' interactions were closely observed and documented. Shin found that social media writing exposed the literacy practices of the students other than in-school literacy practices. In addition, the students were able to interact with each other about the given written tasks, and they collaborated and shared knowledge using the Web 2.0 applications. As a result, they were also able to confidently complete the given assignments. However, Shin (2018 :15) warns that students should not be exposed to only Web 2.0 applications but encourages teachers to offer students explicit scaffolding on how to use these new technologies and how they should use the resources at their disposal for meaning making. This is important especially for ODeL institutions in which teaching, and learning is conducted online to amplify the learning systems used in such HEIs.

2.8.1   Learning Analytics

Learning analytics is one of the functions of Web 2.0 applications, and many of the applications used to study students' behaviours in HEIs have the characteristics and features of Web 2.0 applications. According to Elias (2011: 3), learning analytics resulted from business intelligence, and was later adopted in academia to study students' behaviour during the learning process. In business, it is used to study the behaviour of consumers, to determine what products, they are mostly likely to buy. Elias's (2011) study revealed participants' buying patterns and preferences, which informed how business could be improved. In academia, analytics has been used to identify student learning processes and to improve teaching and learning. A substantial amount of research has been conducted in which researchers try to make sense of students' identities, academic literacies, and online behaviours in response to the set standards and norms of academic literacies in HEIs.

Studies that incorporated learning analytics with the view of understanding the teaching and learning behaviours of students are Bektik (2017), Clemens, Kumar, and Mitchnick (2013), Ferguson and Shum (2011), Howell, Roberts, Seaman, and Gibson (2018), Knight, Shibani, and Buckingham-Shum (2018), Knight, Shibani, Abel, Gibson, Ryan, Sutton, Wright, Lucas, Sandor, Kitto, and Liu (2020), Lonn, Aguilar, and Teasley (2015), Martin and Ndoye (2016), Olmanson, Kennett, Magnifico, McCarthey, Searsmith, Cope, and Kalantzis (2016), Whitelock, Twiner, Richardson, Field, and Pulman (2015), and Wilson, Gochyyev, and Scalise (2016). This list constitutes a considerable number of scholars who have made suggestions regarding the use of learning analytics and encouraged that it be used to observe how students engage with the teaching and learning processes. To this list are added Aljohani and Davis (2012), Elias (2011), Shum and Ferguson (2012), Siemens (2013), and Verbert, Duval, Klerkx, Govaerts, and Santos (2013).

Inference gleaned from the studies mentioned above on learning analytics is that learning analytics is a useful tool used in open and distance learning ODeL institutions to enhance engagement patterns. This idea is backed by studies of Aljohani & Davis (2012); Siemens (2013) and Verbert, Duval, Klerkx, Govaerts & Santos (2013). These studies found that learning analytics revealed traces left by students as they engage on different online platforms. Verbert et al. (2013) emphasises that learning analytics helps to identify students who are at risk of failing because of their lack of engagement and/or participation on designated online learning platforms (Siemens, 2013). Siemens (2013) asserts that learning analytics uses student information systems and learning management systems to uncover students' learning patterns and behaviours. Therefore, students who are less active on online learning platforms can be tracked and helped since they are at risk of failure for not engaging in their learning process (Shum & Ferguson, 2012). Therefore, ODeL institutions could conduct teaching using online platforms with success, meaning that students should be prepared to use such platforms for additional information and support in order to pass.

In the same research field, Knight et al. (2018) designed a natural language processing tool that could assist teachers to provide sufficient analyses and assessment of students' written tasks, namely academic writing analytics (AWA). The tool was developed in a Civil Law course at the University of Technology in Sydney for the purpose of providing effective and sufficient feedback to students. One of the reasons these researchers introduced this automated self-assessment tool was that they realised that students were challenged when they

had to self-assess their writing. Therefore, this tool designed to provide automated feedback and assessment of students' written work promised success.

A related study, that of Knight et al. (2018) used natural language processing (NLP) for rhetorical parsing in legal-essay writing. Knight et al. (2018) used NLP to display rhetorical patterns in student writing at different sentence levels. This tool promised to provide the support to students, not for summative purposes, but to provide support as well as guidance during the production of written texts. This Web 2.0 application was a collaborative effort by an academic from a law faculty, analytics researchers, a linguist, and an applications developer. Its effectiveness was first tested in the faculty of law where it was closely analysed for accuracy of the parser in detecting rhetorical structures in essay samples. At a last phase of testing the tool, 40 students were requested to upload their essays in AWA, interact with it, and provide feedback in terms of their user experiences. Knight et al. (2018) found that the tool showed some effectiveness in how it reflected students' essays, and despite challenges presented by the new tool, it was able to provide some support at a basic level.

Further contribution to the field of learning analytics has been accomplished by Martin et al. (2016) who conducted a study in which they used learning analytics to assess student learning in online courses. The aim of this study was to identify learning analytics techniques and data measures such as different types of assessments in online courses. They collected data from a preservice instructional technology course at a university in the United States of America. The study lasted 15 weeks, divided into seven modules, with each module using a different assessment type. 18 students participated in this study. Martin et al. (2016) identified and collected different sets of online assessments and data for analysis purposes. They identified common online assessment strategies, namely comprehension-type assessments, discussion boards, reflection-focused assessments, and project-based assessments. In addition, they provided different assessment types and learning analytics. They found that assessment of comprehension could be analysed by a means of quantitative analysis, that discussion boards could be analysed using social network analysis, and that reflection assessments could also be analysed using qualitative *analysis project assessment* through quantitative analysis and observation.

For r comprehension-type assessments, Martin et al. (2016) found that, students performed well in the quizzes they were given, hence they suggested that the information gathered could be used to understand the way in which students perform in a course. In

project-based assessments, they found that the teacher or instructor could make sense of how students performed in their assignments simply by studying how much time the students dedicated to the task.

In addition, Martin et al. (2016) plotted patterns of participation and continued learning to understand students' performance on certain tasks. The findings for reflection-focused assessments revealed that the words that were used more often were *students*, *children*, *educator*, and *standards*. Therefore, Martin et al. (2016) suggested that these findings should be used to study how students use certain words, concepts, common topics, and text classification. Thus, the results could be coded in order of appearance, frequency, and alphabetically. For discussion board assessments, analysis could focus on discussion topics such as common words, types, and categories of words. The participants were asked to introduce themselves on the discussion board and indicate what they thought would be the syllabus of the course. Martin et al. (2016) found that the students used words related to family more often in their introductions in response to a topic related to something or someone special to them. This means that, contrary to traditional practices of knowledge productions, students possess their own ways of responding to the same subject matter, which in the context of this study, is considered rhizomatic.

Like Knight et al.'s (2018) study, Whitelock et al. (2015), investigated the use of natural language processing analytics to provide feedback on essays written for summative purposes. They used *OpenEssayist*, which is an analytics tool that can provide analytics of learning in real time. The aim of their study was to provide an outline of the tool and determine patterns in students' assignments in their respective modules. Whitelock et al. (2015) explain that *OpenEssayist* can provide key phrase extraction and an extractive summary. The 41 participants were selected from H817 and were requested to use *OpenEssayist* for a certain period to upload their essays. The data were analysed using frequency analysis. Whitelock et al. (2015) observed that the students were generally positive about and interested in using the tool. The students used features such as keywords, highlighting main sentences, and extracting these in a summary form. Whitelock et al. (2015) found that students who used *OpenEssayist* performed better than those who did not. This implies that, the use of online technologies that offer automated feedback to students at ODeL institutions should be the mainstay because of the affordances that students and institutions can leverage from these applications. Some of these technologies can be used to guide students as they engage in different online activities. For example, students can use *AntConc* to trace whether their

written samples are on point in terms of studying the key themes emerging from their written work that relates to the subject matter under discussion. Similarly, *AntMover* software application can be used to trace the patterns emerging in relation to research-related activities; for instance, presentation of findings and generalisations to name a few. The AntWordProfiler can be used to rate the complexity of the written texts to check whether the text is readable and meets the required complexity level.

2.8.2   Social Network Analysis

Social network analysis is a tool for visualising engagement patterns of participants who are connected to a particular network (Serrat, 2017; Liu, 2011). It was used in the current study to explore online learning patterns across two online platforms, namely *myUnisa*'s ODF and *MS Teams*. The tool was used to reveal the rhizomatic patterns of students' learning behaviours on online platforms, and to indicate the development of student writing. According to Tabassum, Pereira, Fernades, and Gama (2018). The social network analysis comprises the use statistics and algorithms to visualise participants' engagement traces on different interconnected networks. Many scholars have used social network analysis in various studies to analyse network data in the teaching and learning processes (e.g., Buck, 2012; Carstens, 2013; Chaka & Nkhobo, 2019; Dashtestani, 2018; Frans, 2013; Ha & Kim, 2014; Hayes & Williams, 2016; Humphrey, 2015; Miller, 2014; Peeters, 2019; Shin, 2014; Shin, 2018; Wargo, 2017; Zappa-Hollman & Duff, 2015). The studies have contributed immensely to the scholarship of teaching and learning through the use of Web 2.0 applications using social network analysis to interpret and analyse data.

In a study conducted by Zappa-Hollman and Duff (2015), individual network of practice (INoP) was used to analyse six students' interactions. This qualitative study was longitudinal and conducted for a period of 12 months. The participants were requested to participate in interviews, writing logs, and summarising. In Zappa-Hollman and Duff's (2015) study, data analysis was done recursively. The collected data were divided into categories, themes, and patterns related to students' learning. The data were triangulated amongst the participants' interviews, writing logs, and summaries. Triangulation enabled the researchers to compare the INoPs of the participants who were in the same course. Of the six participants, the focus was narrowed down to three: Laliana, Raquel, and Isabel. Zappa-Hollman and Duff's (2015) reported that the tireless connections that Laliana maintained contributed significantly towards her social and academic life. It was observed that the connections she kept were in

Spanish, not English; yet she managed to successfully complete her English assignments. She was assisted by people who were not her classmates and not on the same English programme. In contrast, Raquel's interactions displayed more diverse nodes, giving her exposure to different cultures. Her nodes were not as strong as Laliana's, hence the affective return. Isabel's ties with her Mexican friends assisted her with academic socialisation. Her interaction with her Mexican friends showed multiple strong multiplex ties. This implies that the teaching and learning processes are networked, meaning they are unpredictable and do not follow linear trajectories because students have different ways of learning.

In the same field of research, Dashstesani's (2018) analysed students' perceptions of English for academic purposes (EAP) with respect to the use of *Facebook*, *ResearchGate*, and *LinkedIn*. The participants were students of three disciplines at a university in Tehran: namely engineering, basic sciences, and social sciences. The data were collected in the form of questionnaires and interviews. The participants had to write an English proficiency test, and those who were competent in English could participate in the study. Dashstesani (2018) wanted to clarify four aspects:

a. student attitudes towards collaborative projects on the three social network sites
b. their attitude towards the limitations of the three social network sites for collaborative purposes
c. the factors affecting them in their use of these social network sites; and
d. their preferred social network sites to undertake collaborative projects

Dashstesani (2018) found that the participants had a positive attitude towards the use of social network sites for teaching and learning, and for collaborative purposes. The students did not present many limitations other than a limited academic vocabulary and English proficiency. The factors identified were academic-related, a knowledge of English, subject content, teachers' support, and knowledge of using and accessing social network sites. The students preferred *Facebook* for academic purposes because it had features that *ResearchGate* and *LinkedIn* did not. Again, as previously mentioned, it is important to teach vocabulary explicitly and different online technologies can be used wherein students will learn such implicit knowledge on their own. For example, ODeL institutions could suggest platforms that teach vocabulary related to the fields that their students would have enrolled and submit their scores that would contribute a certain percentage to their year marks.

2.8.3   Gephi

Gephi is a software application used to visualise and interpret social networking data, and has been used in many studies to represent and visualise data in different formats (e.g., Boinepelli, 2015; Castillo de Mesa & Gómez Jacinto, 2020; Chaka & Nkhobo, 2019; Dragulescu, Bucos & Vasiu, 2015; Hernández-García, González-González, Zarco & Chaparro-Peláez, 2016; Hsiao, Lan, Kao & Li, 2017, Jordan & Weller, 2018; Maryl & Eder, 2015; McIntyre, 2015; Petro, Santos, Batista, Cabral, Pais & Costa, 2016; Saqr, Fors, Tedre & Nouri, 2018; Wright, White, Hirst & Cann, 2014). Some of the studies mentioned above used *Gephi* to represent the teaching and learning behaviours of students to show that the interconnectness in the engagements.

In the study by Hernández-García et al. (2016), *Gephi* was used to show data that is difficult to reveal using other social network learning analytic tools. Hernández-García et al. (2016) state that *Gephi* can import and export data in various formats, and that it is also easy to customize by developing NetBeans-based plug-ins (a resource used to enable the software to function or run effectively or to run a new update). This process could also be done using any learning management system. It can also be used to visualise students' data in graphs for analysis. In the current study, *Gephi* was used to visualise rhizomatic patterns of student engagement across two online platforms used for teaching and learning, *myUnisa's ODF* and *MS Teams*. Students' rhizomatic interaction patterns were visualised by means of graphic representations.

In the study conducted by Dragulescu et al. (2015), *Gephi* was used to conduct social network analysis of multiple data sets. It was also used in the study by Saqr et al. (2018) for ease of network analysis, but the students' data had to be converted into a format compatible with *Gephi*. The data were visualised, and the network was analysed quantitatively. *Gephi* is usually used to analyse and visualise data in multiple datasets. Similarly, in the current study, it was used to analyse and visualise multiple datasets gathered from the two online platforms and students' writing samples.

Hsiao et al. (2017) conducted their study at Pennsylvania State University; 14 participants who were learning Mandarin participated in the study. The researchers wanted to understand and map the way in which learners responded to virtual teaching and learning. They also wanted to understand which learning strategies each participant would utilise as they engaged in learning in virtual worlds. The participants were presented with three virtual

worlds in which they would learn Chinese words and names. The collected data were recorded in *Linden Script Language*, *PHP*, and *MySQL*. The data were further converted into formats that would be read and visualised by the visualisation tools. Hsiao et al. (2017) reported that the low-achieving and high-achieving students employed different strategies for learning. The low-achieving students clicked objects close to words they had previously learned. The high-achieving students applied strategies to learn Mandarin through the creation of clusters in the virtual world. The visualisation tools enabled the researchers to plot data to portray links between the learning paths of the students and strategies they used in each instance. The data collected were consistent, irrespective of the visualisation tool used, *R* or *Gephi*.

Similarly, Maryl and Eder (2017) applied macro-analytical methods to map Polish literary studies. The aim was to study published articles in terms of topics in the literary journal Teksty Drugie. The data were analysed according to categories of popular words, divided into literary theory, methodological approaches, history of literature, and research themes. In the visualisation, they noticed an interest in literature on cultural topics. The research papers that were published in Teksty Drugie were influenced by the politics in Poland. The use of *Gephi* enables researchers to visualise massive data sets to analyse it accurately in terms of their relatedness or connections between subjects.

Castillo de Mesa and Gómez Jacinto (2020) investigated whether *Facebook* contributed positively towards students' learning whilst studying towards a degree in social work that spanned four years. A total of 44 participants were enrolled in the Faculty of Social Studies at the University of Malaga. A social group was created on *Facebook*, wherein the participants were expected to share information and collaboratively search for information. *Gephi* was used to plot, represent, and visualize the data. Castillo de Mesa and Gómez Jacinto (2020) found that *Facebook* allowed connectedness amongst the participants, and improved their digital skills. One of the affordances of Gephi is that it can visualise and reveal connections in the data which is something that is humanly impossible. The other affordance of the software application is to show the relatedness of the data according to is subjected into such an application. Therefore, Gephi could be used in the HEIs to show the relatedness and connections of students' academic literacy practices.

Chaka and Nkhobo (2019) studied students' engagement patterns across three different platforms: *myUnisa*, *Moya*, and *Flipgrid*. The aim of the study was to identify the engagement

patterns of students as they carried out various tasks. The participants were selected from a group of students who were registered in the College of Education and who were part of the Matthew Goniwe teaching and learning support project. A total of 27 participants were recruited from the module ENG2601. Using *myUnisa*, Chaka et al. (2019) wanted to determine the frequency of students accessing files, which was visualised using *Gephi*. Using *Moya*, the researchers wanted to determine the students' engagement patterns as they received support from their lecturer; their engagement patterns were visualised using *Gephi*. *Flipgrid* was used to gather reflection data from students about the support they received on this platform.

Chaka et al. (2019) reported that the most frequently accessed files on *myUnisa* in Semester 1 were: the feedback letter and two past examination papers. It was found that, on the *Moya* messenger, lecturer was more involved than the students. The lecturer's probing questions were meant to assist students with the content of the module. *Flipgrid*'s engagement patterns as visualised by *Gephi* portrayed different visuals and statistics. On this platform, the students were expected to create a one-minute reflection video; only one student did, and the researcher attributed this level of uptake to the unfamiliarity of the exercise and its complexity.

The number of times in which the files were accessed implies that the learning processes of the students/participants in the Chaka et al.'s (2019) study are rhizomatic in nature because of the different frequencies in which these files were accessed thereby showing rhizomatic frequencies. The use of Gephi in the context of the current study is to visualise and show how the key themes and their frequencies identified on the *myUnisa's ODF* and *MS Teams* are interconnected in terms of their varying degrees of frequencies. The current study and the Chaka et al.'s (2019) study are interrelated because they both studied the interactive patterns inherent in students' communication as they engage each other regarding the content of a given module. However, the two studies differ in terms of the rhizomatic perspective that the current study employs in students' written samples and interactions on the *myUnisa's ODF* and *MS Teams*.

2.8.4   MS Teams

MS Teams is another emerging Web 2.0 application that has been used for teaching and learning purposes in various fields of studies (e.g., Allison & Hudson, 2020; Begel, 2019;

Benke, 2019; Martin & Tapp, 2019; Poston, Apostel & Richardson, 2020; Sharapova, 2019; Spencer, 2020; Buchal & Songsore, 2019). This tool has a suite of integrated platforms: chat boards, assignments, virtual meet, and many other sub-platforms. In addition, it has an element of cloud computing, and it can mimic real-life meetings in a virtual way. Spencer (2020) explains that using *MS Teams* enables students to use multiple platforms without the need to log into different applications. Spencer (2020) notes that it allows students to be creative. Similarly, Sharapova (2019) argues that *MS Teams* can be used for integrated language teaching activities. MS Teams is valuable in the teaching and learning spaces as it can also install plugins to read student engagement patterns and provide analysis that are humanly impossible. This platform, if harnessed accordingly in the teaching and learning spaces could contribute to the paradigm shift in terms of how academic literacy is viewed, something that is static and stagnant.

The study by Buchal et al. (2019) investigated the use of *MS Teams* in knowledge creation and sharing in Ashby's sustainability assessment method. The application was used to determine collaborative strategies that students use in their learning. Buchal et al. (2019) found that students were happy to receive and provide feedback to other students. In addition, they were comfortable to share their work with teachers and fellow students. They rated their collaborative abilities highly and recommended the usability of *MS Teams*. Online platforms such as MS Teams enables the collaborators to follow their own patterns of learning without necessarily following the preconceived schedules of learning in that students can join MS Teams when they can and engage with the provided activities.

Martin et al. (2019) used *MS Teams* to facilitate teaching and learning of a module called Language of Law. The teacher created a channel on *MS Teams*, activities for the foundation students, and assignments and other activities. The students were required to work collaboratively, in pairs or groups of four. Students had to complete quizzes, tests, reading activities, and formative assessments. Martin et al. (2019) reported that students reacted positively to the use of this application. *MS Teams* was used in the current study to host virtual presentations that were recorded, and students could access such recordings anytime.

2.9   Student Engagement- and Navigation Patterns

The aim of this study was not only to reveal rhizomatic patterns in students' writing samples, but also to reveal rhizomatic engagement patterns across two online platforms (*myUnisa*'s ODF and *MS Teams*).

Several studies investigated student engagement patterns in various fields of study for teaching and learning purposes (e.g., Balgarinao, 2015; Bozkurt et al., 2016; Chaka & Nkhobo, 2019; Estacio & Raga, 2017; Guerin, 2013; Herrington, Oliver & Reeves, 2003; Honan, 2007; Onah, Sinclair, Boyatt & Foss, 2014; Park, Kim & Song, 2014; Pawan, Paulus, Yalcin & Chang, 2003; Ratnapala, Ragel & Deegalla, 2014). Pawan et al. (2003: 137) found that student interactions were what they called 'one-way serial monologues. Herrignton et al. (2003) posit that authentic online activities benefit learners. In the case of the current study, the researcher sought to study engagement patterns in terms of the key themes as presented by the software application, *AntConc*. This would reveal the kind of topics that students engage on the two online platforms, *myUnisa's ODF* and *MS Teams*.

Similarly, Bagarinao (2015) found that undergraduate students of science, technology, and society students at an open university in the United Kingdom visited pages that would assist them to complete academic tasks. Bagarinao (2015) posits that students who visit and participate in online forums are more likely to achieve better grades. Various studies have examined students' online learning behaviour to predict their success (Park et al., 2014). These studies analysed how many times the students logged on the LMS, and which platforms they used and for how long. Park et al. (2014) suggest that prediction models and data-mining techniques should include different pedagogical characteristics in blended learning. This implies that the students are more interested in joining forums wherein formative and summative assessments are discussed.

Ratnapala et al. (2014) studied students' behaviour in the online learning environment (*Moodle*) using data mining. The study was conducted at the Faculty of Engineering in the University of Peradeniya and involved 412 engineering students. Ratnapaala et al. (2014) found that most of the students were not motivated to do self-learning. Most of the students were not interested in or motivated to access online learning platforms. Estacio et al. (2017) found it difficult to correlate students' online learning activities with their academic performance, as investigated on *Moodle*. Estacio et al.'s (2017) data were extracted from various blended learning courses at the Jose Rizal University in Semester 2 of the years 2015 and 2016. Onah et al. (2014) found that the use of online forums motivate learners to participate in such learning spaces to complete their courses. This means that students do not participate in online activities that do not contribute to good marks in relation to either formative or summative assessments.

The current study explored instances of Deleuzian rhizomatic patterns in students' writing samples and their rhizomatic interaction patterns on *myUnisa*'s ODF and *MS Teams*. Some studies have been conducted with a focus on rhizomes in students' online learning interaction (Guerin, 2013), writing theses (Honan, 2007), the use of hashtags for teaching and learning, and students' connectivity during the process of learning (Bozkurt et al., 2016). None of these studies focused on the development of rhizomatic patterns in students' writing samples at the first-year level, which is why, in the current study, the researcher employed a rhizomatic perspective to students' academic writing samples and engagement patterns on two online platforms (*myUnisa*'s ODF and *MS Teams*).

2.10   Conclusion

This chapter presented the theoretical framework that informed this study. It also provided related research that was conducted in which the rhizomatic approach was used as an alternative perspective to binary models of academic writing.

In addition, this chapter discussed research on both learning analytics and writing analytics and a discussion of Web 2.0 applications. Social network analysis as a construct and the main form of data analysis in this study was also discussed. The chapter further highlighted studies that were conducted using *Gephi* and *MS Power BI*. The chapter further provided an overview of research on student engagement, MLT, and writing analytics software applications.

The next chapter details the methodology used in the current study.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research methodology, including the design, the collection of data in various formats, the research questions, data analysis, and ethical considerations.

3.2 Research Questions

Given the main aim of this study which was to identify and examine engagement patterns of students as they carried out various learning tasks online, the following research questions were formulated:

    i.   What rhizomatic writing patterns do first-year ENG53 students display in their Assignments 1 and 2 according to key themes (categorised by keyword frequency, concordance, and concordance plot) and linking adverbials, using the *AntConc, AntMover* and *Gephi* software applications?

    ii.   What rhizomatic structural moves do first-year ENG53 students display in their Assignments 1 and 2, as presented by the *AntMover* software application?

    iii.   What is the readability of students' Assignment 2 as assessed by the *AntWordProfiler* software application?

3.3 Research Design

This study followed an exploratory research design (cf. Abbott & McKinney, 2013: 124; Heigham & Croker, 2009:313; Leavy, 2017: 5; Neuman, 2013:38; Riazi, 2016:115). Riazi (2016:115) explains that exploratory research 'is conducted when the object of the study is new and has not been studied much before', and notes that 'the need for exploratory research thus arises when our knowledge and understanding of the phenomenon … is limited'. Leavy (2017:5) also states that exploratory research is appropriate for under-researched topics.

Exploratory research was considered appropriate for the current study, as few studies have explored the manifestation of rhizomatic patterns in student writing in the way it would be done in the current study. The study followed a mixed-methods approach (Christensen et al., 2015:385; Richards et al., 2012:30) comprising the qualitative and quantitative approaches (Riazi, 2016: 256-258; Richards et al., 2012:19). The research data were gathered from short

paragraph responses, written essays, and online engagement interactions (on *myUnisa*'s ODF and *MS Teams*). Ivankova and Creswell (2009:136) maintain that:

> 'Mixed methods research is a research approach … for collecting, analysing, and mixing quantitative and qualitative data at some stage of the research process within a single study to understand a research problem more completely' (see also Christensen et al., 2015; Riazi, 2016; Richards et al., 2012).

Neuman (2013:167) describes qualitative data as 'soft data', 'words', and 'sentences', noting that this data are non-linear because of its 'cyclical' and 'iterative' nature. Bordens and Abbott (2010: 235) state that qualitative data are usually in the form of 'written records' of behaviours. Quantitative data are used for studying 'causal relationships, associations, and correlations', with the aim of achieving 'objectivity, control, and precise measurement' (Leavy, 2017: 87).

Abbott and McKinney (2013:36) regard quantitative data collection methods as involving 'comparative measures' by means of statistics 'of multitude of people'. In the present study, both qualitative and quantitative data were gathered on the rhizomatic patterns displayed in short paragraphs, written essays, and online engagement interactions as produced by a group of ENG53 students. Quantitative data were gathered from two online platforms (*myUnisa*'s ODF and *MS Teams*) in respect of students' engagement patterns. The data set consisted of message posts per activity and the frequencies of students' online interactions, as measured by *MS Power BI* and *Gephi*. The collected data were visualized in graphs to map the rhizomatic patterns in the students' short paragraphs, essays, and interactions across the above-mentioned online platforms. The students' written samples were analysed using *AntConc* and *AntMover,* and rhizomatically visualised by means of *Gephi* and *MS Power BI.*

Readability of the written tasks was rated using the readability index *AntWordProfiler* (Halim, 2018; Indarti, 2021). Studies in which readability indices were used to rate the readability level of students' written texts include those of Balyan, McCarthy and McNamara (2018), Nguyen and Litman (2018), Nigam (2017), and Xia, Kochmar, and Briscoe (2019).

3.4   Data Collection Methods

Two methods of data collection were employed, which yielded two sets of data. The first data collection method involved exploring rhizomatic writing patterns in students' written samples (in Assignments 1 and 2) and the readability index of Assignment 2, while the second data collection method entailed capturing students' engagement patterns on two online platforms: *myUnisa*'s ODF and *MS Teams*.

The researcher requested 30 Assignments 1s and 30 Assignments 2s for Semester 2 of the year 2020 from the Assignments Department of the institution under study. A total of 28 assignments were used (14 each of Assignments 1 and 2). Assignment 1 consisted of five items to which the students' responded in one short paragraph per item, with a total of 100 words per paragraph. One of the items required that the students 'Read chapter 16 of the prescribed book (from page 224) and summarize the developmental stages of religion in your own words'. The second item required that the students 'Compare and contrast a theocratic government with a democratic government'.

For Assignment 2, 14 random essays were identified. Each essay consisted of 500 words in length. The 14 essays were separated into two groups comprising seven essays each. Assignment 2 consisted of two topics from which students were required to choose one. The researcher divided the collected essay datasets into Topics 1 and 2. The title of Topic 1 was: 'Write an essay in which you argue **for or against** a visible presence of the police in schools as one measure of curbing the scourge of violence'. Topic 2 was: 'Write an essay in which you discuss **three** negative effects of using drugs for mood or behaviour syndromes.

The second data collection method entailed capturing students' engagement patterns as they interacted on the *myUnisa* ODF and *MS Teams*. These engagement patterns were investigated with respect to online presence, message posts per activity, and the frequency of their interactions (cf. Chaka & Nkhobo, 2019; Conde, Hernandez-Garcia, Garcia-Penalvo & Sein-Echaluce, 2015; Jimoyiannis, Nkhobo & Chaka, 2021; Tsiotakis & Roussinos, 2013; Saqr, Fors, Tedre & Nour, 2018; Yoo & Kim, 2014).

Fourteen assignments were converted into text files before being extracted onto *AntConc* for analysis. Each assignment consisted of a maximum of five questions that were responded to into five short paragraphs comprising 100 words each. However, the researcher of this study selected two first questions (items) in each of the 14 randomly selected

assignments. Assignment 1 was a reading comprehension assessment in which students were required to read a given passage and answer questions that followed. For the purpose of this study, one of the questions (items) that were chosen required students to "Read chapter 16 of the prescribed book (from page 224) and summarize the developmental stages of religion in your own words." The second question (item) wanted students to "Compare and contrast a theocratic government with a democratic government." Fourteen text files comprising the two first questions were uploaded onto *AntConc* to determine key themes according to keyword frequencies, concordance, and concordance plot.

The main focus of the current study was to explore rhizomatic patterns in student writing by studying students' writing samples (short paragraphs and essays) and their online interactions on *myUnisa*'s ODF and *MS Teams*.

The researcher used convenience sampling to select 28 students' writing samples and 150 first-year students who participated on the *myUnisa* ODF and 220 students on *MS Teams*. The students were registered for the ENG53 module in Semester 2 of the year 2020.

The students whose written samples were requested from the Assignment Department were informed about the study on *myUnisa's* ODF and those who showed interest to use their written samples were requested to fill in the consent form. The same students were also participating in the 2020 virtual class for the module, ENG53, and they were also requested to fill in the consent form.

3.5   Sampling Technique

The study employed convenience sampling. Chistensen et al. (2015:170) define convenience sampling as requesting people who are readily available and accessible to the researcher to participate in a study. Richards et al. (201: 332-333) note that convenience samples do not represent the wider population, as the participants are intentionally selected. Riazi (2016: 60) defines convenience sampling as a non-probable procedure wherein the researcher selects participants based on their availability or easy recruitment, rather than selecting them from a group of potential participants.

The selected first-year students were of different races, genders, and geographical regions.

3.6   Data Analysis

The students' writing samples in terms of key themes (concordances) and linking adverbials and online interactions were analysed using rhizoanalysis. A considerable number of researchers have used rhizoanalysis in different ways in their studies (Masny, 2015::4; Sherbine, 2019: 8; Sellers, 2015: 10; Bangou, 2019: 4). Thereafter, the data sets were further analysed by means of social network analysis (SNA), using corpus software applications *AntConc* and *AntMover*, and visualised using *Gephi* and *MS Power BI*. Rhizoanalysis is an analytic method named after Deleuze and Guattari's (1987) concept of a rhizome. The method departs from the traditional way of analysing data. It is not restrictive or rigid, as it allows researchers to analyse data from different angles and different entry- and exit points. Analysing data in this way allows one to depict rhizomatic patterns in data, and ultimately revealing the creative ways in which data were collected and analysed, as was the case in the current study.

One of the main foci of this study was mapping rhizomatic patterns in students' writing samples in terms of key themes (concordances) and linking adverbials and their interaction patterns on *myUnisa*'s ODF and *MS Teams*, and visualising these using *Gephi* and *MS Power BI*. Relating the idea of *becoming* to student writing as understood in this study means that students' writing is not a complete hierarchical product with fixed meanings and stable structures. As observed by scholars in support of the rhizomatic approach, it is a work in progress reflecting the act of *becoming* academic writers. This act of *becoming* consists of rhizomes which, in turn, manifest entryways, strands, and open-ended connections as students attempt to negotiate their *becoming* in their writing journey (Briggs, 2009; Downs & Wardle, 2006; Leander & Rowe, 2006).

The data set on students' rhizomatic interaction patterns was analysed using social network analysis (SNA), *Gephi*, and social learning network analytics (SLNA) (cf. Castellanos & Hoppe, 2015; Chaka & Nkhobo, 2019; Ferguson & Shum, 2012). The data were analysed according to message posts per activity and the frequency of online interactions, measured using *MS Power BI* and depicted using *Gephi* visuals. SNA examines relations, roles, ties, and network formations of either an individual or a group of individuals. The Deleuzian and Guattarian (1987) principles of rhizomatic thinking were incorporated as a guide to interpret and evaluate the findings in a rhizomatic manner; namely, connection, multiplicity, heterogeneous, and a-signifying rupture.

Ferguson and Shum (2012) argue that a form of learning facilitated by learning management systems or social media platforms (or both), in which learners, teachers, and resources have mutual connections with reference to a learning process. Such connections can be weak or strong, depending on how important or frequent they are. At the core of SNA and SLNA are student online interactions, as displayed by a given learning technology (Chaka & Nkhobo, 2019; Ferguson & Shum, 2012; cf. Haya et al., 2015; Saqr et al., 2018).

Student engagement patterns as instances of both SNA, *Gephi*, *MS Power BI*, and SLNA, encoded through message posts per activity and the frequencies of their online interactions, short paragraphs, and essays, according to *AntConc, AntMover, AntWordProfiler*, *MS Power BI*, and *Gephi* visuals, served as units of analysis for manifestation of rhizomatic patterns. These rhizomatic interaction patterns are presented as graphs and visual maps generated through *MS Power BI* and *Gephi* in Chapter 4. The readability of Assignment 2s were analysed by a means of readability index software (*AntWordProfiler*).

3.7.   Ethical Considerations

The researcher obtained permission to conduct this study from the Higher Degrees Committee. Ethical clearance was obtained from the University of South Africa (UNISA) through the Higher Degrees Committee. Permission was also granted to study first-year students registered for the ENG53 module in the Department of English Studies.

The participants who participated in this study were given voluntary consent forms to complete to retrieve their writing samples from the Assignment Department and their online interactions on *myUnisa's* ODF and MS Teams. Their anonymity was guaranteed, and they were assured that they would not be exposed to any harm, either physical or psychological. Their anonymity was upheld using codes instead of names. The participants who wanted to withdraw their participation in this study were allowed to do so, as participation was voluntary, and withdrawal did not have any negative consequences. Participants were informed that their writing samples data sets and their online interactions on *myUnisa's* ODF and MS Teams would be used for academic purposes.

3.8   Conclusion

This chapter discussed the research methodology that was used in the present study. It provided the research questions and discussed the research design and the specific data collection methods. This was followed by an overview of the sampling technique, the method data analysis, and the ethical considerations of the study.

The next chapter reports the findings.

CHAPTER 4: DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter presents the results of the rhizomatic data analysis, set out according to the research questions and objectives of this study namely, to explore instances of Deleuzian rhizomatic patterns in students' writing samples in terms of key themes (concordances) and linking adverbials, with a view to investigating the types of rhizomatic patterns such writing displays.

The overarching aim of this study was to explore rhizomatic patterns in student writing in terms of the key themes (concordances) and linking adverbials referred to above. A related phase entailed exploring student interactions on two different online tools, namely, *MS Teams* and *myUnisa*'s ODF. Student interactions were analysed using *AntConc, AntMover, MS Power BI*, and *Gephi* analytical tools. Readability of the written essays was assessed using the online analytic tool, *AntWordProfiler*.

The sought to answer the following research questions:

a. What rhizomatic writing patterns do first-year ENG53 students display in their Assignments 1 and 2 according to key themes (categorised by keyword frequency, concordance, and concordance plot) and linking adverbials, using the *AntConc, AntMover* and *Gephi* software applications?

b. What rhizomatic structural moves do first-year ENG53 students display in their Assignments 1 and 2, as presented by the *AntMover* software application?

c. What is the readability of students' Assignment 2 as assessed by the *AntWordProfiler* software application?

One of the main foci of the study was to map key themes categorised by the keywords: *frequency, concordance, concordance plot, and linking adverbials* on *MS Teams*, *myUnisa*'s *ODF*, and in written assignments in a rhizomatic manner, as analysed using the online analytic tools *AntConc, AntMover, AntWordProfiler*, *MS Power BI*, and *Gephi.*

Research Question 1: What rhizomatic writing patterns do first-year ENG53 students display in their Assignments 1 and 2 according to key themes (categorised by keywords: *frequency,*

concordance, and concordance plot) and linking adverbials as represented by the *AntConc* and *AntMover* software applications?

4.2.1 Results for Assignment 1 (short-paragraph format)

Each assignment consisted of a maximum of five items that students responded to into five short paragraphs comprising 100 words each. The researcher selected the two first items in each of the 14 assignments. Assignment 1 was a reading comprehension assessment in which students were required to read a given passage and respond to the items that followed. One item was: 'Read chapter 16 of the prescribed book (from page 224) and summarize the developmental stages of religion in your own words'. The second item was: 'Compare and contrast a theocratic government with a democratic government'. The 14 text files containing the responses to the first two items were uploaded to *AntConc*, to determine key themes according to keyword frequency, concordance, and concordance plot.

4.2.1.1 *AntConc* results for Item 1: keywords by frequency, concordance, and concordance plot

The researcher identified five rhizomatic keywords in Assignment 1, which were used to trace and map key themes in context and in relation to the requirement of each item. Rhizomatic keywords that were deemed relevant to Item 1 were: *become, cult, members, religion,* and *sect.* The rhizomatic frequencies of the chosen keywords were ranked in the order shown in Table 1.

Table 1: Keywords by frequency

Item 1 keywords as extracted from *AntConc*				
become	*cult*	*members*	*religion*	*sect*
18	23	19	25	25

Keywords by frequency

Table 1 above shows that the highest frequency was found for *religion* (25) and *sect* (25), followed closely by *cult* (23) and *become* (18). The keywords were used across all 14 Assignment 1s.

The concordance of the rhizomatic keyword *religion* was used mostly with words like *dominant, become, members*, and *stages* (**see Figure 2, below**).
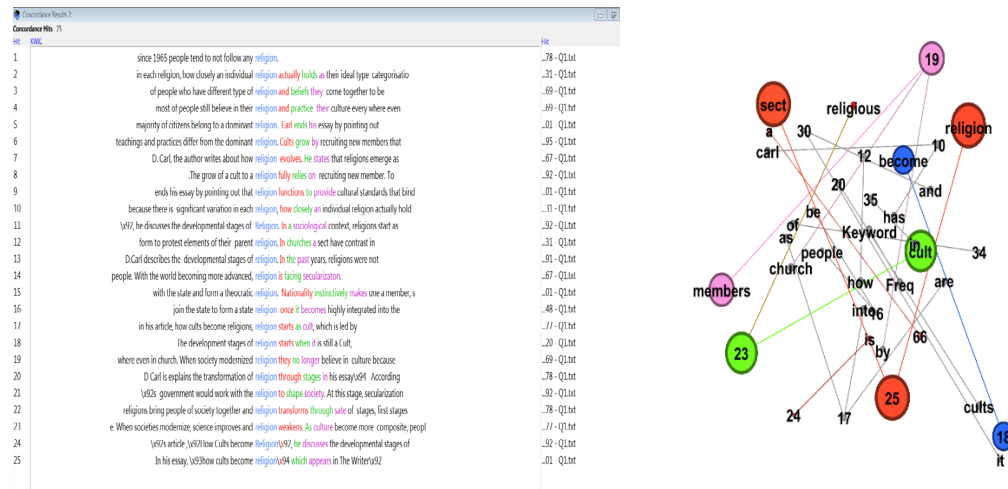

Figure 2: Religion concordance in context

The rhizomatic concordance plot shows that *religion* was used in 11 of the 14 assignments. The way the rhizomatic key theme *religion* was used in context revealed the rhizomatic way in which the key theme was used. The word was used across multiple student files, displaying rhizomatic variations in each text file. Text Files 01 and 92 shared a joint top ranking, followed closely by Text Files 78, 69, and 31. In Text File 01, *religion* was used four times in different paragraphs; in Text File 92, it was used four times and in multiple paragraphs. In Text Files, 78, 69, and 31, it was used three times each. It was evident that *religion* was used to explain how cults become a religion, and the stages/types of religion evident in interconnectivity across multiple text files.

Similarly, the rhizomatic concordance plot of the key theme *cult* illustrated that it was used in 11 assignments, spread almost identically in multiple paragraphs. It was used mostly in *Files 20* (five hits), *31* (four hits), *05*, (three hits) and *07* (three hits). Thus, *cult* was used to explain the process of becoming a religion as dependent on several followers affirming its status as a religion. **Figure 3, below**, indicates how *cult* was used in 11 assignments.

Figure 3: Cult concordance in context

Become is another rhizomatic key theme which, in a concordance plot, was used in eight different assignments, but, unlike the two key themes mentioned earlier, it was used five times in Text File 77. This was followed by Text File 67 (five hits) and Text Files 92, 79, 51, and 48 (two hits each). **See Figure 4, below.**

Figure 4: Become concordance in context

4.2.1.2 *AntMover* results for Item 1: structural moves

Research Question 2: What rhizomatic structural moves do first-year ENG53 students display in their Assignments 1 and 2 as presented by the *AntMover* software application?

The rhizomatic structural moves were analysed in 14 Assignment 1s at sentence level, using the *AntMover* software application. The researcher uploaded the 14 (Assignment 1) text files to *AntMover*. However, unlike in using *AntConc*, each assignment was processed and analysed individually. The rhizomatic patterns revealed similar connections in each student's assignment. *AntMover* results are discussed below.
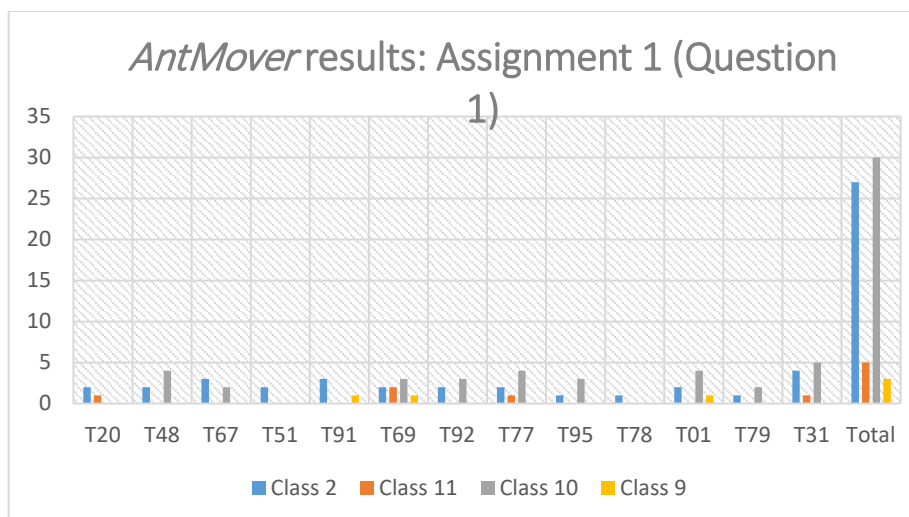
Figure 5: AntMover results: Assignment 1 (Item 1)

Figure 5 shows that Class 10 (*Announcing principal findings*) was the highest class (30 times), prevalent in 13 responses to Item 1 in Assignment 1. For instance, in Text File 31, Class 10 appeared five times, and occurred four times in Text Files 48, 77, and 01. Text Files 69, 92, and 95 followed closely, with Class 10 appearing three times in each. Class 10 did not occur at all in Text Files 20, 51, 91, and 78 (a score of zero each).

Class 2 (*Making topic generalisations*) showed the second-highest occurrence, with 27 instances overall, spread across 13 responses. Text Files 31 and 67 presented the highest occurrence (four and three respectively) of Class 2, while in Text Files 20, 48, 51, 69, 92, 77, and 01, it occurred twice in each response. The lowest occurrence of Class 2 (once) was in Text Files 95, 78, and 79.

Class 9 (*Announcing present research*) had the lowest occurrence across 13 Item-1 responses, with a total of three instances. Text Files 91, 69, and 01 showed one occurrence of Class 9. The remaining text files, Text Files 20, 48, 67, 51, 92, 77, 95, 78, 79, and 31, did not contain incidences of Class 9.

4.2.1.3 *AntConc* results for Item 1: linking adverbials

Celce-Murcia and Larsen-Freeman's framework (1998) was used to select rhizomatic linking adverbials (additives, adversatives, causals, and sequentials) in the 13 responses to Item 1. The 13 responses (one item was not answered) were uploaded on *AntConc* in separate text files, which the researcher used to trace and explore the rhizomatic manifestations of linking adverbials in each response. Two rhizomatic additive linking adverbials (*also* and

that) were used in all 13 responses to Item 1. The linking adverbial /*also*/ was used twice in Text File 69. There was no trace of the linking adverbial in any of the other text files. The rhizomatic additive linking adverbial /*that*/ appeared twice in Text Files 31 and 69.

Rhizomatic adversative linking adverbials were traced across the 13 responses, and *actually* was the only one that was mapped (in Text File 31). No evidence of the other adversative linking adverbials was found in the other text files. Four causal linking adverbials were found: *consequently, otherwise, then*, and *therefore* in some of the text files. /*Consequently*/, appeared in Text 51 only. /*Otherwise*/, was discovered in Text File 92 only. /*Then*/ was the most used linking adverbial across the 13 responses. It appeared twice in Text File 20 and once in the following text files: 92, 67, 31, 48, and 78. /*Therefore*/ was another linking adverbial that was traced only once, in Text File 51. In all 13 text files, two sequential linking adverbials were identified. The linking adverbial /*first*/ was used once in Text File 78, and /*then*/ was used once each in Text Files 20, 92, 67, 31, 48, 78, and 20.

4.2.2   *AntConc* results for Item 2: keywords frequency, concordance, and concordance plot

Five rhizomatic keywords were identified through which key themes were identified in context and according to the focus of Item 2. The rhizomatic keywords: *democratic*, *government*, *leaders*, *people*, and *theocratic* were selected from the results of keywords generated by *AntConc*. Item 2 required of students to 'Compare and contrast a theocratic government with a democratic government'. The frequencies of the selected rhizomatic keywords are shown in Table 2, below.

Table 2: Keywords by frequencies

Item 2 keywords as extracted from *AntConc*				
leaders	*theocratic*	*democratic*	*people*	*government*
16	19	20	37	57

Keywords by frequencies

Table 2 shows that the rhizomatic keywords most used in the 14 Assignment 1s for Item 2 was /*government* / (57), followed by /*people*/ (with 37 hits), and /*leaders*/ (16 hits).

The rhizomatic concordance of the keyword *government* was used in context with words like *democratic*, *form*, and *theocratic.* These words were used to compare and contrast a theocracy and a democratic government, which was the focus of Item 2. The results are shown in **Figure 6,** below.
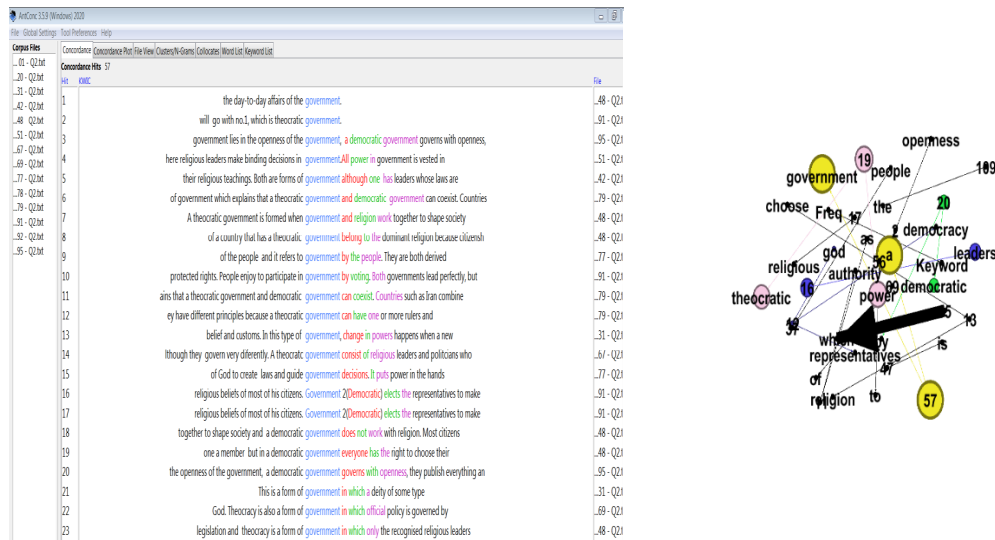
Figure 6: Government concordance in context

The rhizomatic concordance plot demonstrated that */religion/* was used in 13 Assignment 1s. However, there was a significant difference in how */government/t* was used in each assignment. In Text File 48, */government/* was used repeatedly, but mostly at the beginning of the paragraph, and it gained eight hits. In Text File 91, */government/* was used seven times, but it was used at the end of the paragraph. Text File 31 scored the highest number of hits (six), and */government/t* it was used mostly at the beginning and at the end of the paragraph. In Text Files, 51, 69, and 77, */government/* was used four times each.

The theme */people/* was appeared often in the 13 responses to Item 2. Text Files 20 and 78 scored the same number of hits (eight) in the paragraphs in which */people/* was used. However, in Text File 78, */people/* was mentioned evenly across the paragraph. The use of *people* in this way portrayed that the author of Text File 78 presented a balanced response. In Text Files 42 and 91, */people/* was used three times, mid-paragraph and at the beginning respectively, which means the author established and focused the argument with an early reference to */people/.* In contrast, in Text File 91, */people/* was used in the middle and at the end of the paragraph. At the other extreme end of the spectrum, */people/* was used only once

each in Text Files 01, 48, and 51, at the beginning or end of the paragraph. **Figure 7**, below, provides a detailed account of the key findings for /*people*/.

Figure 7: People concordance in context

The rhizomatic key theme /*leaders*/ showed the lowest frequency. It was used in eight assignments, with Text File 31 scoring the highest use (four hits), followed by two text files (42 and 91) with three hits each. Text Files 48, 51, 92, and 95 showed minimal usage of the key theme /*leaders*/, with only one hit per file. In Text File 31, the word /*them* /was used in the first two paragraphs of the essay and used sparingly at the end of the essay. In Text File 42, it was used in the middle of the essay, while in Text File 91, it was used in the beginning and in the middle of the essay. In Text Files 48 and 49, it was used at the end of the essays, and in Text Files 51 and 92 it was used in the middle of the essays.   The rhizomatic concordance of the key theme /*leaders*/ in context showed that it was mostly used to explain the process by which religious leaders are voted into power. In addition, it was used in Text Files 42 and 91 to give an account of different kinds of religious leaders, and to express their abilities or powers and authority. **Figure 8,** below, shows the use of /*leaders*/.

Figure 8: /Leaders/ concordance in context

4.2.2.1 *AntMover* results for Item 2: structural moves
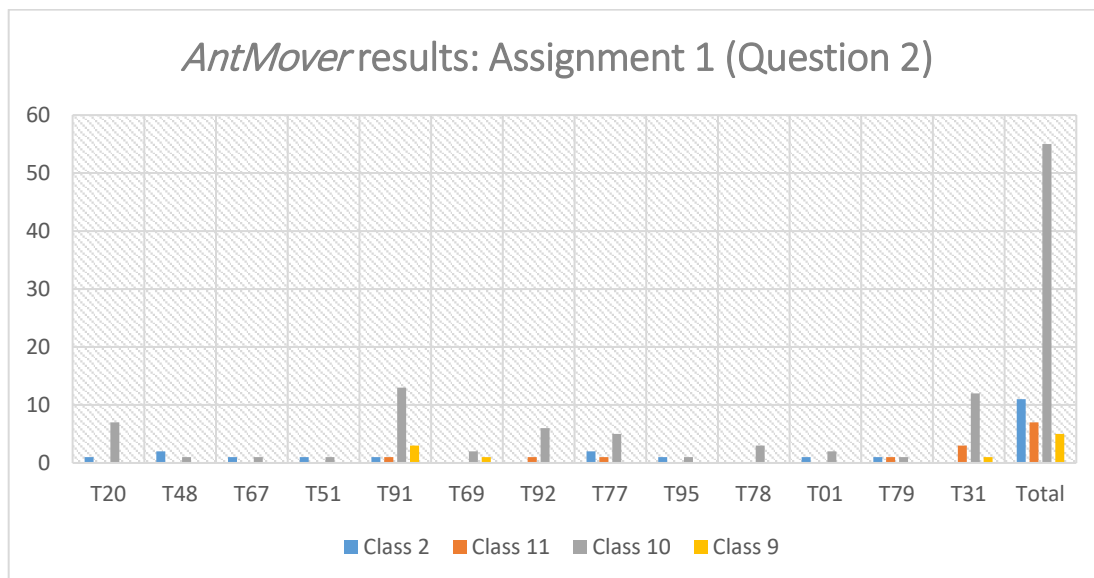
Figure 9: *AntMover* results: Assignment 1 (Item 2)

Figure 9 illustrates that Class 10 (*Announcing principal findings*) had the highest frequency (55 times) in the 13 assignments for Item 2. Two text files (91 and 31) showed frequencies of 14 and 12 respectively. Text Files 20, 92, and 77 had frequencies of seven, six, and five times respectively. The lowest frequency was in Text Files 48, 67, 51, 95, and 79, in which Class 10 appeared only once each.

Class 2 (*Making topic generalisations*) scored an overall frequency of 11 times across the 13 assignments. Two text files (48 and 77) had a frequency of 2 for Class 2. Text Files 20, 67, 51, 91, 95, 01, and 79 had a frequency of 1 each, while Text Files 69, 92, 78, and 31 showed zero use of Class 2.

Class 9 (*Announcing present research*) had the lowest frequency, having occurred five times. Text File 91 had the highest incidence of Class 9 at three times. In Text Files 69 and 31, Class 9 occurred only once. The remaining text files showed zero occurrences; these were 20, 48, 67, 51, 92, 77, 95, 78, 01, and 79.

4.2.2.2 *AntConc* results for Item 2: linking adverbials

The same process of uploading text files to *AntConc* to trace linking adverbials using Celce-Murcia and Larsen-Freeman's (1998) framework was adopted to analyse responses to Item 2. The responses revealed five rhizomatic additive linking adverbials, namely, /*also*, *for example*, *in addition*, *likewise*, and *that is*/. The additive linking adverbial /*also*/ was used once in each of the following text files: 69, 42, 31, 78, and 20. The additive linking adverbial /*for example/e* was also used once in Text Files 42 and 78. /*In addition*/ was used once in Text File 31, and /*likewise*/ featured once, in Text File 51.

The rhizomatic adversative linking adverbial *in contrast* appeared once, in Text File 51, and causal linking adverbial /*thus*/ was found once in Text Files 31 and 42. Finally, the sequential linking adverbial /*next*/ was used once, in Text File 91.

4.2.3   Results for Assignment 2 (essay format)

Each essay consisted of 500 words. The 14 essays were separated into two groups, comprising seven essays each, according to topic. Topic 1 was: 'Write an essay in which you argue **for or against** a visible presence of the police in schools as one measure of curbing the scourge of violence'. Topic 2 was: 'Write an essay in which you discuss **three** negative effects of using drugs for mood or behaviour syndromes. The first stage of analysis entailed tracing key themes as determined by the keyword frequency, using *AntConc*.

4.2.3.1 *AntConc* results for Topic 1: keywords frequency, concordance, and concordance plot

Five rhizomatic keywords were selected to trace and map key themes in context that were relevant to the focus of Topic 1. The following rhizomatic keywords were selected from a list of keywords generated by *AntConc*: /*need*, *physical*, *presence*, *violence*, and *police*//

Table 3: Keywords by frequencies

Topic 1 keywords as extracted from *AntConc*				
need	*physical*	*presence*	*violence*	*police*
14	15	15	53	39

Table 3: Keywords by frequencies

As shown in Table 3, the key theme of Topic 1, /*violence*/, had the highest number of hist at 53, followed by /*police*/ with 39 hits and *physical* and /*presence*/ with 15 hits each. The keyword /*need*/, which is related to /*physical*/ and /*presence*/, had 14 hits. **Figure 10** below, shows that the rhizomatic concordance of /*violence*/.
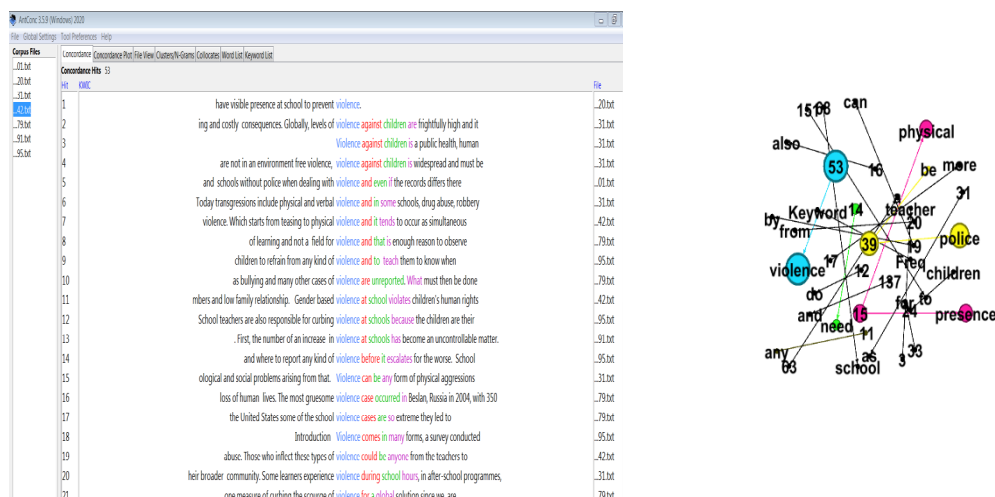
Figure 10: Violence concordance in context

Figure 10 above shows that the rhizomatic concordance of /*violence*/ was used to explain the different types of violence prevalent in schools and why it took place.

The rhizomatic concordance plot of /*violence*/ depicted was highly (16 times) used in Text File 31; it was spread consistently across the essay but reached higher density towards the conclusion. The second highest rhizomatic usage of /*violence*/ was in Text Files 42 and 79, with 11 and 10 hits respectively. In Text File 42, /*violence*/, was concentrated in the beginning paragraphs of the essay, and occurred in the middle with a similar concentration as in its previous emergence in the same text file. At the lowest end of the accumulated hits were Text Files 01 and 91, with two hits for each topic. Text File 01 used /*violence*/ twice, at the beginning and in the middle of the essay. In Text File 91, it was used twice, at the

beginning of the essay. Below, /police/ concordance in context is presented **Figure 11:**
*/Police /*concordance in context
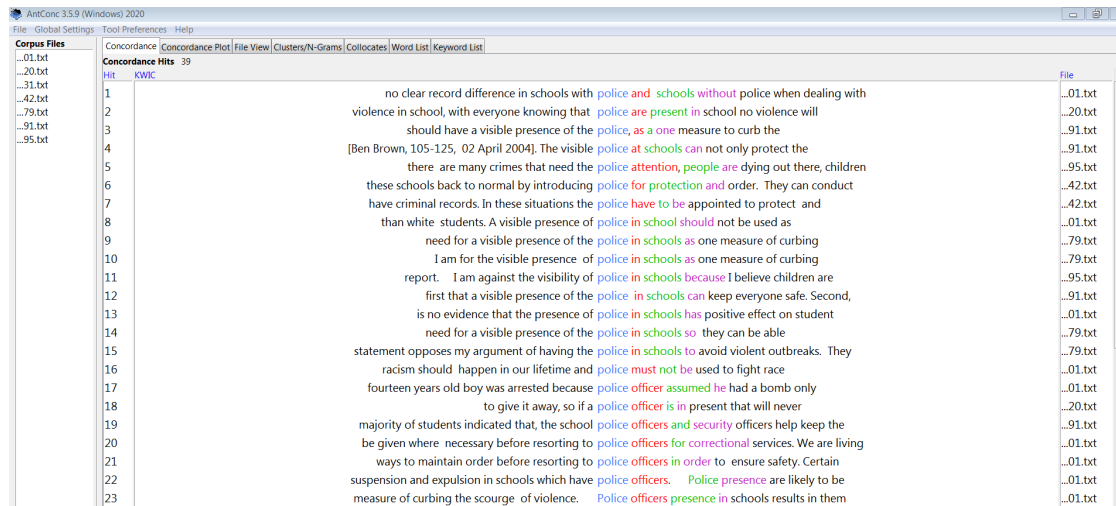
Figure 11: Police concordance in context

Figure 11 shows that the key theme */police/* was present in a considerable number of essays in which the arguments were for the presence of police in schools for the safety of learners.

The rhizomatic concordance plot */police/* was used 39 times across the seven essays on Topic 1. The rhizomatic key theme was highly used in Text File 01, with a prevalence of 16 hits spread almost equally across the essay. Other text files with high usage of */police/* were 91 (seven hits), 20 (six hits), and 79 (five hits). In Text File 91, */police/* appeared in the first and middle paragraphs of the essay, while in Text File 20, it was evident in the beginning, middle, and concluding paragraphs. In Text File 79 (five hits), it manifested in almost a similar pattern as in Text File 20. However, it was used less often in the beginning paragraphs, and more often in the closing paragraphs. In Text Files 95 and 42, */police/* had three and two hits respectively. In Text File 95, it was evident in the middle and closing paragraphs of the essay. In Text File 42, it was used once each in the opening and closing paragraphs. Below, /need/ concordance is presented.
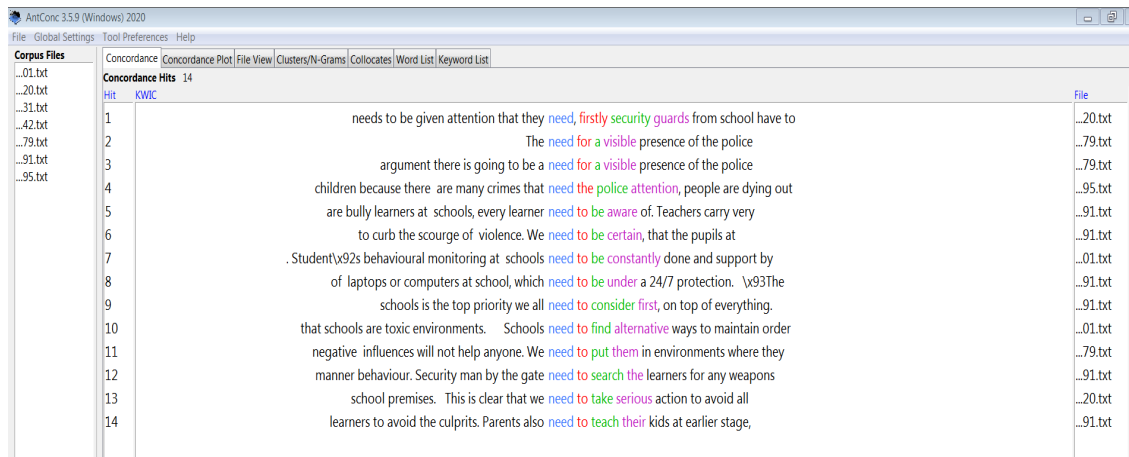
Figure 12: Need concordance in context

Figure 12 shows that the key theme /*need*/ was used in context to emphasise the importance of police officials in schools, to protect students.

The rhizomatic concordance plot of *need* appeared 14 times in the seven essays but was more prevalent in Text File 91 (six hits), in which it was found in the opening, middle, and closing paragraphs. Text Files 79 (three hits), 20 (two hits), 01 (two hits) presented marginal differences in the use of *need* in context. In contrast, /*need*/ appeared only once in Text File 95, in the closing paragraph of the essay.

4.2.3.2 *AntMover* results for Topic 1: structural moves

<u>Research Question</u> 2: What rhizomatic structural moves do first-year ENG53 students display in their Assignments 1 and 2 as presented by *AntMover* software?

The rhizomatic structural moves were also analysed of the seven essays on Topic 1, at a sentence level, using *AntMover* software. The researcher uploaded the seven essays text files to the *AntMover* software application. Each essay was analysed individually as shown below in **Figure 13.**
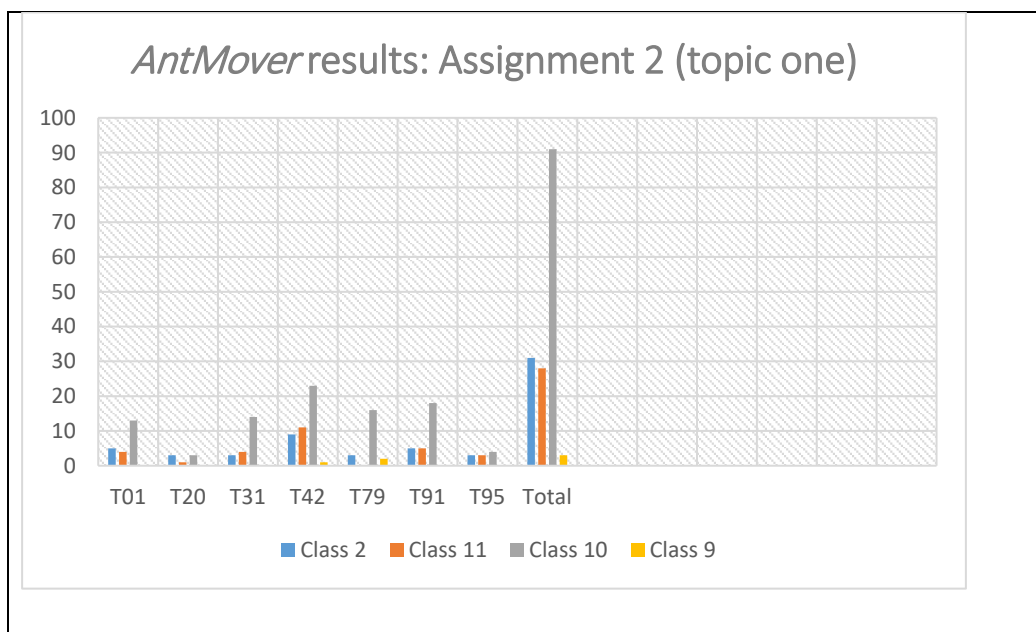
Figure 13: *AntMover* results: Assignment 2 (Topic 1**)**

Figure 13 shows that Class 10 (*Announcing principal findings*) as the highest class, occurring 91 times across the seven essays on Topic 1 for Assignment 2. In Text File 31, Class 10 appeared in 14 instances. This was followed by Text Files 91 and 79, with 18 and 16 instances respectively. The lowest incidence of Class 10 was evident in Text Files 95 and 20, in which it featured four and three times respectively.

Another class with a high incidence across the seven essays on Topic 1 was Class 2 (*Making topic generalisations*), appearing 31 times across the seven essays. The lowest use (zero) was in Text File 42, and Text Files 01 and 91 each had five occurrences. Class 2 appeared three times each in Text Files 20, 31, and 79.

Class 11 (*Evaluation of research*) had 28 occurrences across the seven essays. Text File 42 had the highest occurrence of Class 11 (11 times). Text Files 95, 01, 31, and 91 had three, four, four, and five hits respectively.

Class 9 (*Announcing present research*) showed the lowest frequency. Text File 79 showed two incidences of Class 9, while there was one occurrence in Text File 42. Class 9 not appear in the following text files: 01, 20, 31, 91, and 95.

4.2.3.3 *AntConc* results for Topic 1: linking adverbials

The researcher adopted the framework of Celce-Murcia et al. (1998) to identify the following rhizomatic linking adverbials: additives, adversatives, causals, and sequentials. All

seven essays on Topic 1 were uploaded to the *AntConc* software application for analysis. Three rhizomatic additive linking adverbials — /*also*, *for example*, and *that is*/ — were used across the seven essays on Topic 1. Linking adverbial *also* scored the highest number of hits (16). It appeared in five times in Text File 42, followed by Text Files 79 (three times), 91 (three times), 95 (twice), and 01 (twice). Linking adverbial /*also*/ was used once, in Text File 01.

The rhizomatic additive linking adverbial /*for example*/ appeared once in two text files, 95 and 91. Linking adverbial /*that is*/ was used once each in Text Files 79 and 31. Adversative linking adverbial /*instead*/ was used once in Text File 42, and /*rather*/ was used twice in Text File 42 and once in Text File 79. Two causal linking adverbials, /*result*/ and *t/hen/,* were identified in Text File 79, in which both were used once. Five rhizomatic sequential linking adverbials appeared across the seven essays, namely /*final/y*, /*first*/, /*firstly*/, /*second*/, and /*then/.* Four were used once in the text files in which they appeared: /*finally*/ (Text File 91), /*firstly*/ (Text File 20), /*second*/ (Text File 91), and/ *then*/ (Text File 79). Linking adverbial /*first*/ was used the most, with three occurrences in Text File 91.

4.2.4 *AntConc* results for Topic 2: keywords frequency, concordance, and concordance plot

Five rhizomatic keywords were selected with which to trace and map key themes in context that were relevant to the focus of Topic 1. The following rhizomatic keywords were selected from a list of keywords generated by the *AntConc* software application, namely /*cause*/, /*depression*/, /*drugs*/, /*health*/, and /*negative*/. The frequencies are discussed below.

Table 4: Keywords by frequencies

Topic 2 keywords as extracted from *AntConc*				
cause	*health*	*negative*	*depression*	*drugs*
23	23	24	37	59

Table 4: Keywords by frequencies

Table 4 shows that the keyword with the highest use, /*drugs*/, appeared 59 times. The second-highest usage was evident for /*depression*/, with 37 hits. Keyword /*negative*/ had 24

hits, /*health*/ had 23 hits, and /*cause*/ had 23 hits. Below we consider the /drugs/ concordance in context in **Figure 14.**
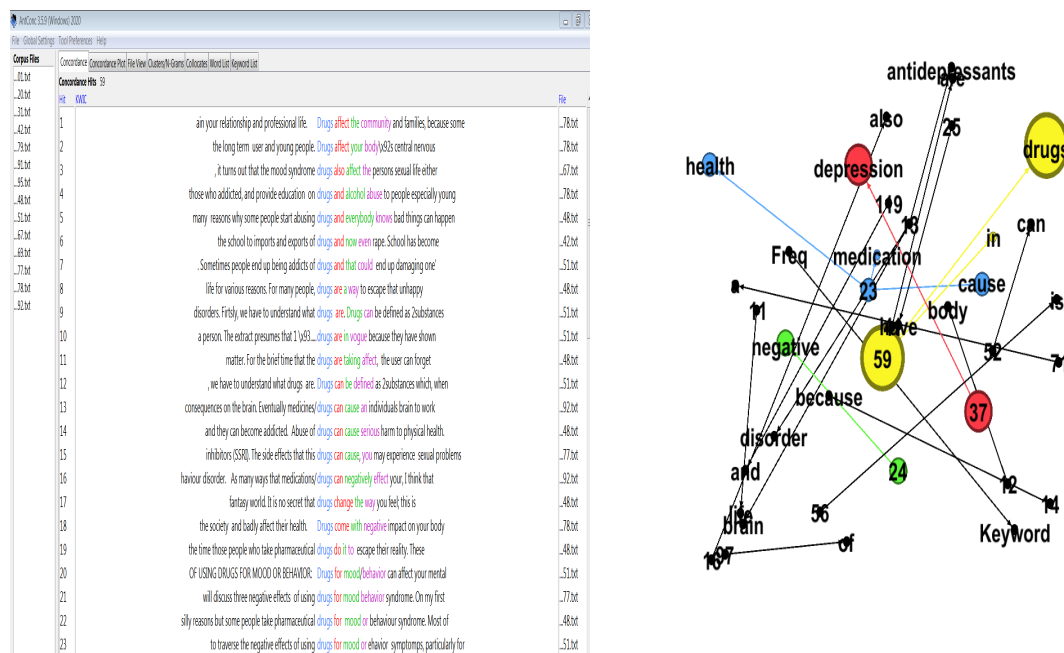
Figure 14: Drugs concordance in context (AntConc and Gephi Visualisations)

Figure 14 portrays that the concordance of /*drugs*/ in explanations of the negative effects of the use of drugs. The concordance plot of /*drugs*/ revealed that it was highly used in Text Files 78 and 48, with 15 and 13 instances respectively. In Text File 78, /*drugs*/ appeared mostly in the beginning and closing paragraphs. The second-highest usage of /*drugs*/ was evident in Text File 51, with 10 hits, which appeared in the beginning and closing paragraphs. In contrast, Text Files 79, 91, and 69 showed the lowest occurrence of /*drugs*/, used once each. In Text File 79, it was used in the opening paragraph. In Text Files 91 and 69, /*drugs*/ was used in the middle paragraph. Below is presented **Figure 15**.
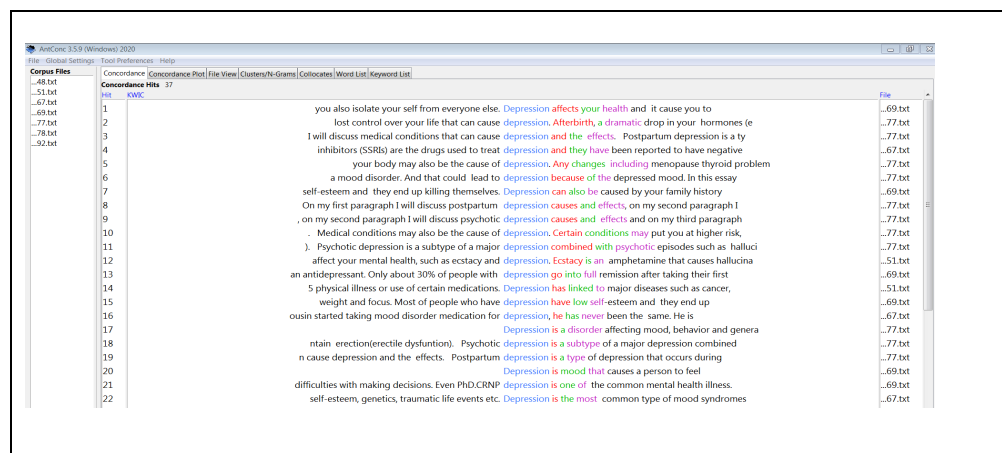
Figure 15: Depression concordance in context

In Figure 15 it is shown that the key theme /*depression*/ was used in definitions of depression in context in a number of essays. Some essays focused on the causes and negative effects of depression.

The rhizomatic concordance plot of /*depression*/ revealed that it appeared 17 times in Text File 77, with 37 hits overall, in four essays. /*Depression*/ was used densely in the opening paragraphs and scattered towards the end of the essay. Text File 69 had 12 hits, mostly in the opening and middle paragraphs of the essay. In Text File 67, /*depression*/ was used mostly in the opening paragraphs, with a total of five hits. It was used only three times in Text File 51, in middle paragraphs of the essay. **Figure 16** below presents the /cause/ concordance in context.
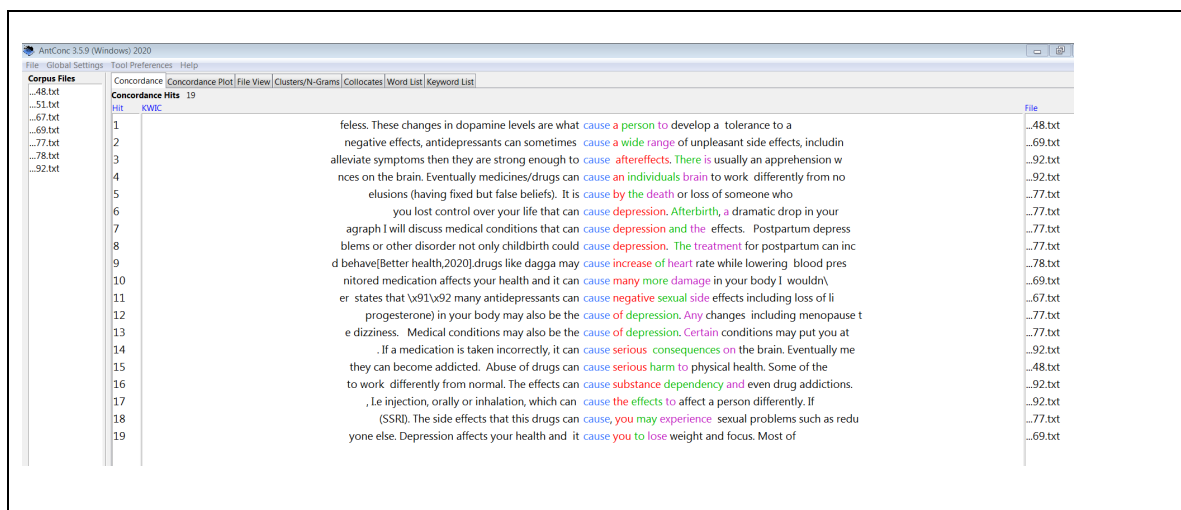
Figure 16: Cause concordance in context

Figure 16 shows that the key theme/ *cause*/ appeared in context, which attributed the use of drugs to depression and highlighted the negative effects of using drugs.

The rhizomatic concordance plot of *cause* appeared 19 times in the seven essays. It was most prominent in Text File 77, with seven hits that appeared mostly in the middle paragraphs of the essay. In Text File 92, /*cause*/ was used five times, in the opening paragraphs. Text Files 67 and 78 showed the use of /*cause*/ once in each text file, in the opening paragraphs.

4.2.4.1 *AntMover* results for Topic 2: structural moves

Research Question 2 (cont.): What rhizomatic structural moves do first-year ENG53 students display in their Assignments 1 and 2 as presented by *AntMover* software?

The rhizomatic structural moves of the seven essays on Topic 2 were also analysed at sentence level, using the *AntMover* software application. The researcher analysed each essay individually. **Figure 17** below presents the *AntMover* results.
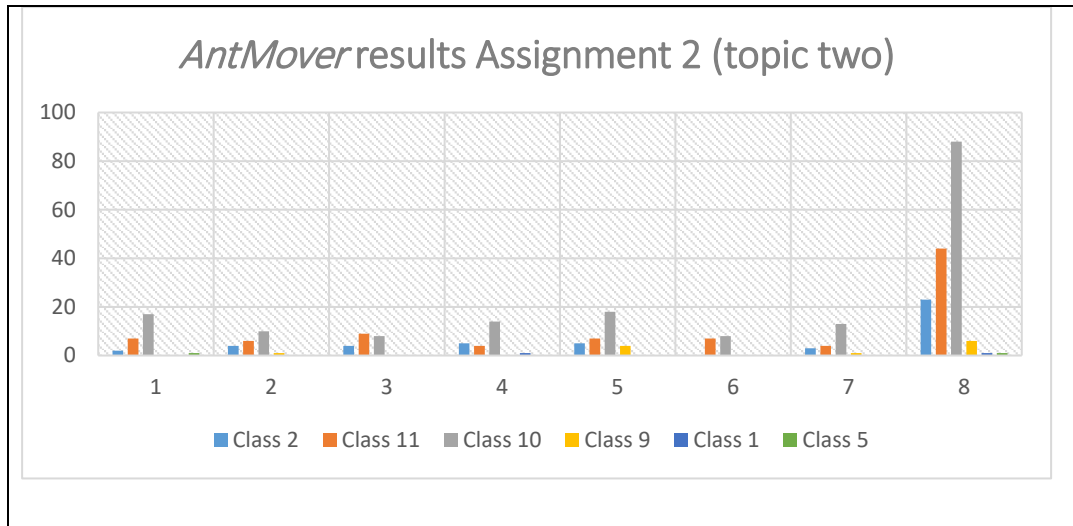
Figure 17: AntMover results: Assignment 2 (Topic 2)

Figure 17 demonstrates that Class 10 (*Announcing principal findings*) appeared as the highest class, with a frequency of 88 times across the seven essays on Topic 2 for Assignment 2. Text File 77 recorded the highest incidence of Class 10 (18 times). In Text File 48, Class 10 appeared 17 times. The lowest incidence of Class 10 was evident in Text Files 67 and 78, at eight times per text file.

Class 11 (*Evaluation of research*) also had a high number of occurrences. Class 11 appeared 44 times across all seven essays. The highest occurrence of Class 11 was in Text File 67, with nine hits. Text Files 48, 77, and 78 each had seven hits. Text Files 69 and 92 had only four hits each.

Class 2 (*Making topic generalisations*) occurred 23 times across the seven essays. Text Files 69 and 77 showed the highest incidence of Class 2, five times each. In Text Files 51, 67, and 92, Class 2 appeared four, four, and three times respectively. Text File 78 did not show any incidence of Class 2.

Class 9 (*Announcing present research*) appeared six times across the seven essays. In Text File 77, it appeared four times, and it appeared once in Text Files 51 and 92. Class 9 did not appear in Text Files 48, 67, 69, and 78.

4.2.4.2 *AntConc* results for Topic 2: linking adverbials

The framework of Celce-Murcia et al (1998) was again adopted to identify use of the rhizomatic linking adverbials /*additive*, *adversative*, *causal*, and *sequential*/. All seven essays on Topic 1 were uploaded to *AntConc* for analysis. The first set of rhizomatic additive linking adverbials /*also*/, /*for example*/, and/ *that is*/ were used across the seven essays on Topic 2. Linking adverbial /*also*/ scored the highest number of hits (16). In Text File 69, /*also*/ had seven hits, followed by Text Files 78 (three times), and 77 and 67 (twice each). The linking adverbial /*also*/ was used once in Text Files 92 and 48.

The second rhizomatic additive linking adverbial that was identified was /*for example*/, which appeared once in Text File 92. The additive linking adverbial /*that is*/ was used once in Text File 78. Four types of rhizomatic adversative linking adverbials were found, namely /*actually*/, /*despite*/, /*however*/, and /*nevertheless*/. The adversative linking adverbial /*actually*/ was used once, in Text File 48; /*despite*/ was also located once in Text File 48. /*However*/ was used once, in Text File 78, and /*nevertheless*/ was used once, in Text File 51.

Two rhizomatic causal linking adverbials, /*result*/ and /*then*/, were identified. Key words /*result*/ and /*then*/ were used once each in Text Files 67 and 92. Three forms of sequential linking adverbials appeared across the seven essays, namely/ *firs/t*, /*second*/, and /*then*/. In Text File 69, /*first*/ was used twice, and in Text Files 67 and 77 it was used once in each. Rhizomatic sequential linking adverbial /*second*/ was used once in Text Files 67 and 77. Finally, /*then*/ was used once, in Text File 92.

4.2.5 *AntWordProfiler* results (Assignment 2)

Research Question 4**:** What is the readability of students' Assignment 2 as assessed by the *AntWordProfiler* software application?

In the following section, research question 2 is addressed with reference to *Table 5*.

Table 5: *AntWordProfiler* Readability Index (Topic 1)

Texts	Coverage (%)	Level 1 (%)	Level 2 (%)	Level 3 (%)	Level 0 (%)
T01	94.6	78.6	7.9	8.1	5.3
T20	93.1	78.1	9.9	5.1	6.8
T31	92.1	71.3	10.4	10.4	7.9
T42	91.6	78.9	6.1	6.6	8.3
T79	91.7	75.5	9.3	6.9	8.4
T91	95.1	81.8	8.7	4.6	5
T95	92.1	80.2	7.6	4.3	7.9
Average (%)	**92.9**	**77.8**	**8.6**	**6.6**	**7.1**

Table 5: AntWordProfiler Readability Index (Topic 1)

To answer the above-mentioned research question, the researcher used *AntWordProfiler* to gauge the levels of comprehension complexity of the 14 essays for Assignment 2. The essays were converted into text files and uploaded to *AntWordProfiler*. The essays were uploaded into two sets, those on Topic 1 and those on Topic 2. The two sets comprised seven essays each and were analysed individually against three default sets of wordlists, categorised into three levels, GSL (1000/2000) and AWL (570) developed by Paul Nation and Laurence Anthony. The average level of complexity in terms of the comprehension of essays on Topic 1 was 92.9%, which meant that all seven essays were highly comprehensible. A total of 77.8% of the essays were classified as Level 1 wordlists, 8.6% as Level 2, 6.6% as Level 3, and 7.1% as Level 0. This meant that such words did not appear in any of the three default wordlists in the *AntWordProfiler*.

Table 6: *AntWordProfiler* Readability Index (Topic 2)

Texts	Coverage (%)	Level 1 (%)	Level 2 (%)	Level 3 (%)	Level 0 (%)
T48	88.8	78.9	5.5	3.9	11.7
T51	83.2	67.7	5.5	10	16.9
T67	81.4	69.2	4.4	7.8	18.6
T69	88.3	73.3	6.4	8.6	11.6
T77	82.7	68.5	7.2	7	17.3
T78	86.9	72	8.5	6.4	13.1
T92	86.9	77.1	4.8	5	13.1
Average (%)	**85.5**	**72.4**	**6.0**	**7.0**	**14.6**

Table 6: AntWordProfiler Readability Index (Topic 2)

Regarding the essays on Topic 2, the average level of complexity in relation to the level of comprehension was 85.5%, which meant that all seven essays were comprehensible. Furthermore, 72.4% were classified as Level 1 wordlists, 6.0% as Level 2, 7.0% on Level 3, and 14.6% on Level 0.

4.2.6   Interactions on *myUnisa*'s ODF

<u>Research Question 3</u>: What engagement patterns do first-year ENG53 students display in interacting on *myUnisa*'s ODF and *MS Teams* in terms of message posts per activity and the frequencies of their online interactions, according to *MS Power BI* and *Gephi* visuals?

A forum for student queries regarding the module ENG53 was selected on *myUnisa* for Semester 2 of 2020. The researcher copied the interactions on the forum and converted these into text files, which were uploaded to *AntConc* to trace the key themes according to keywords. A total of 150 keywords generated by *AntConc* in the form of key themes were considered for analysis and visualization on *MS Power BI* and *Gephi*. Five of the key themes with the highest frequency, namely /*assignment*/, /*good*/, /*find*/, /*results*/, and multiple-choice question (*MCQ*) in the context of student queries were selected and analysed. Now we consider **Figure 18** below.
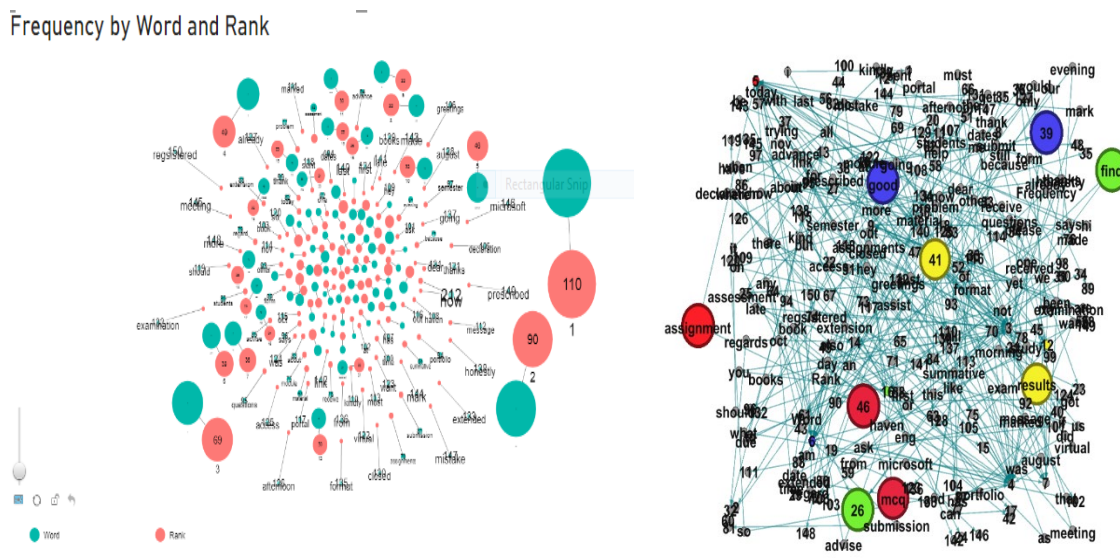
Figure 18: MS Power BI and Gephi visualizations of myUnisa's ODF interactions

Figure 18 shows that the /*assignment* /ranked fifth, with 46 hits. This was followed by /*good*/ ranked sixth, with 39 hits. Third was *find,* ranked 26th with 16 hits. Fourth was /*results*/, ranked 12th, with 12 hits, and *MCQ* was ranked 10th, with 46 hits.

4.2.7   ENG53 MS Teams Interactions

Research Question 3 (cont.): What engagement patterns do first-year ENG53 students display in interacting on *myUnisa*'s ODF and *MS Teams* in terms of message posts per activity and the frequencies of their online interactions according to *MS Power BI* and *Gephi* visuals?

The researcher extracted student–lecturer interactions in the *MS Teams* virtual classroom during Semester 2 of 2020. The interactions were downloaded into an MS Excel spreadsheet, which was subjected to *MS Power BI* and *Gephi* to visualize the interactions. Below is a screenshot of the interactions as mapped on *MS Power BI* and *Gephi*. **Figure 19**: presents MS Power BI and Gephi visualisations of ENG53 MS Teams interactions
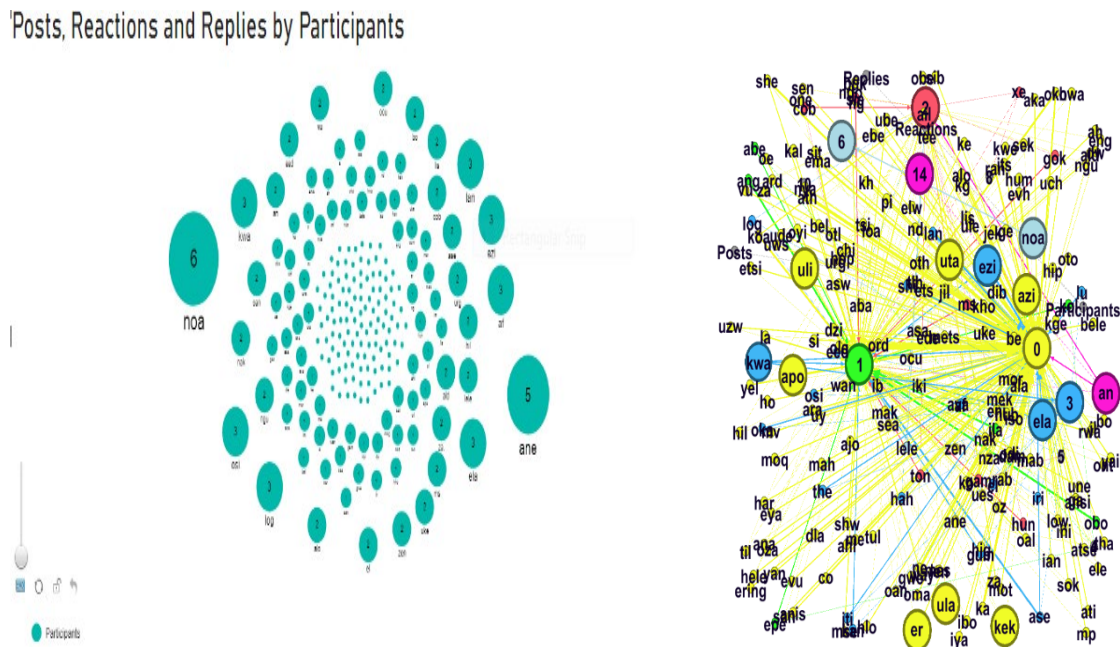
Figure 19: MS Power BI and Gephi visualisations of ENG53 MS Teams interactions

Figure 19 shows that the participant with the highest number of posts was /*noa/,* followed closely by /*ane/*, with five posts. The following participants had three posts: /*ela/*, /*ezi/*, /*kwa/*, / *lan/*, / *a/f*, and /*log/.* The lowest number of posts was one, done by participants *gwe*, *apo*, *si*, *nya,* and *iso*. Some participants did not post anything on *MS Teams,* namely /*azi/*, /*iti/,* /*eni/*, /*tul/*, and/ /*uli/.*

In terms of replies, lecturer /*an/* had the most replies to students' queries, at 14. Second highest was /*Kek/*, with 10 replies, and /*gam/* was third, with five replies. Lecturers /*ngu/,*

/uta/, ezi/, /ini/, /lis/ replied only once. Lecturer */ran/* showed five reactions, and */tlh/, /abe/,* and */kol/* gave four replies each. The second-highest frequency of reaction was for lecturers *sie, low, an*, and *xe.* The following students did not react to posts or replies */osi*, *nya*, *bo*, *ema*, and *la/.*

4.3   Conclusion

This chapter presented the results and interpretation of the rhizomatic data analysis according to the research questions and objectives of this study. The chapter reviewed the rhizomatic patterns in student writing in Assignment 1 (short paragraphs) and Assignment 2 (research-based essays), and an analysis of students' and lecturers' interactions on *MS Teams* and *myUnisa*'s ODF. Furthermore, the students' interactions were analysed using the online analytic tools *AntConc*, *AntMover*, *MS Power BI*, and *Gephi*. Lastly, the readability index of the written essays was analysed using the online analytic tool *AntWordProfiler.*

The next chapter provides a discussion of the results.

CHAPTER 5: DISCUSSION

5.1   Introduction

This chapter discusses the results presented in Chapter 4. The aim of the study was to explore instances of Deleuzian rhizomatic patterns in students' writing samples in terms of key themes (concordance) and linking adverbials. In addition, the other ai m of the study was to explore rhizomatic patterns in inherent in students' interactions on *myUnisa*'s ODF and *MS Teams*, analysed using the online analytic tools *AntConc, AntMover,* and *AntWordProfiler*, and visualised using the *MS Power BI* and *Gephi* software applications.

Moreover, the Deleuzian and Guattarian (1987) principles of rhizomatic thinking were incorporated as a guide to discuss the findings; namely:

Connections

In the context of the current study is viewed as the continuous connections explored in the written samples of students in terms of key themes (concordance) and linking adverbials and *myUnisa's ODF* and *MS Teams*.

A-signifying rupture

Implies that rhizomes may be portrayed in the form of rhizomatic patterns that are connected, disconnected, and reconnected to the central key theme. This means that rhizomatic key themes and presentation of ideas may be disconnected and reconnected at the same or different point. This also entails the process of convergence and divergence in relation to the key themes in written samples and online interactions on *myUnisa's ODF* and *MS Teams* as highlighted above.

Multiplicity

Applied in the context of the current study, multiplicity principle entails exploration of rhizomatic patterns that may be distributed haphazardly. The portrayal of ideas/thoughts in written samples and *myUnisa's ODF* and *MS Teams* may be connected to one another in different variations which reconnects to the main key theme.

Heterogeneity

In relation to current study, heterogeneity involved studying rhizomatic patterns in student writing and online interactions as specified above to highlight textual uniqueness, independence, and unsameness.

5.2   Discussion

<u>Research Question 1 read</u>: What rhizomatic writing patterns do first-year ENG53 students display in their Assignments 1 and 2 according to key themes (categorised by keyword frequency, concordance, and concordance plot) and linking adverbials as represented by the *AntConc* and *AntMover* software applications?

The results of the analyses pertaining to the first research question are discussed below.

5.2.1   *AntConc* results for Item 1

In Item 1, students were required to 'Read chapter 16 of the prescribed book (from page 224) and summarize the developmental stages of religion in your own words'. The results revealed that students used similar key themes /*become*, *cult*, *members*, *religion*, and *sect*/, but in a rhizomatic manner. The rhizomatic frequencies of the identified key themes unveiled that /*religion*/ and /*cult*/ were used differently. The highest frequency of use was evident for the key theme /*religion*/, which was used in almost the same manner in 11 assignments. However, it displayed rhizomatic variations of use in each assignment. For example, it was used highly in Text Files 01 (four times) and 92 (four times), but in different paragraphs, portraying rhizomatic patterns of usage in each text file. Below are examples of rhizomatic usage of /*religion*/ in Text Files 01 and 92:

In Text File 01

> ❖ "All religions initiate as cults."
>
> ❖ "If a church becomes amalgamated into the dominant culture it may unite with the state and form a theocratic religion."
>
> ❖ "Nationality instinctively makes one a member, so majority of citizens belong to a dominant religion."
>
> ❖ "Carl ends his essay by pointing out that religion functions to provide cultural standards that bind followers together.

> **In Text File 92**
>
> ❖ "In a sociological context, religions start as cults."
>
> ❖ "The grow of a cult to a religion fully relies on recruiting new member."
>
> ❖ "The state's government would work with the religion to shape society."

Text File 01

The theme /*religion*/ was used to explain how cults become religions, the stages, and types of religion. Both **Text Files 92 and 01** above agree that religions start as cults, and this is evident in the use of words like 'start' in Text File 92 and 'initiate' in Text File 01. In addition, Text Files 92 and 01 agree that state can control a certain religion, either to influence individuals or to advance its own beliefs. For example, Text File 01 used words like 'cultural standards', 'bind', 'dominant culture' and this implies that individuals may be expected to follow 'dominant culture' to maintain binding cultural standards. However, in Text File 01, the author refers mainly to 'dominant culture' and 'dominant religion'. In the opposite end, Text File 92 seem to be focusing more on societal issues.

The two Text Files (92 and 01) unpacked above, shows that the emerging rhizomatic patterns are connected in terms of the Deleuze and Guattarian (1987) principle of connection even though there are disconnections in certain rhizomatic thematic discussion points, but all these disconnections are inherently the same in the case of developmental stages of religion. In essence, the connections highlighted above are in constant mode of continuity about the same rhizomatic thematic points of discussion which are presented in different perspectives.

In contrast to the rhizomatic patterns relating to religion, the key theme /*cult*/ was used almost identically in different paragraphs. For instance, both **Text Files 31** and 20 below provide a similar definition of /*cult*/ and they agree that /*cult*/ requires people that are 'dedicated' in Text File 31 and in Text File 20 by using a similar word in meaning like 'committed'. Text File 31 refers to practices that are 'deviant', 'unusual' and 'unclear' whilst Text File 20 refers to 'mostly rejected' and 'cracked down' practices.

The two Text Files (20 and 31) refer to 'recruitment' processes, for example, in Text File 31 words like 'depends' on and 'recruitment' to highlight the significance of this process. In **Text File 20**, the words 'avoid' and 'attract' are used to show that cult survival is dependent on the 'recruitment' processes. In Text File 20, the author refers to the developmental stages of religion, cult being one of them. In Text File 31, the author does not mention the developmental stages of religion explicitly. Text File 20 mentions that a sect is created through the success of a cult, but this is not mentioned in Text File 31.

However, in Text File 20, 'sect' is referred to as a practice that goes against the society's norms but there is no explicit reference of that in Text File 31. The rhizomatic responses highlighted above portrays uniqueness, unsameness, independence, and heterogeneous in view of the Deleuzian and Guattarian (1987) principle of heterogeneity.

The findings of Leander and Boldt (2013) showed that Lee who was a case study practised different literacy practices which were not set out in the academic literacy practices of the school. The current study and that of Leander et. al (2013) is that the academic literacy practices were different to that of the other peers. The key theme /*cult*/ was used largely in Text Files 20 (with five hits) and 31 (with four hits). Below are examples of the rhizomatic usage of /*cult*/ in Text Files 20 and 31 below.

In Text File 20

> ❖ "The development stages of religion starts when it is still a ***cult***…"
>
> ❖ "… a ***cult*** are small new religions let by Christians with few people following it, it is mostly rejected and cracked down."
>
> ❖ "***Cults*** needs people who are committed and willing to build it, the more members are recruited then there will be growth, to avoid falling of a cult they must make sure that they attract more people."
>
> ❖ "Whenever the ***cult*** is successful and have enough members then a sect is created."
>
> ❖ "Sects still go against society's norms, the members are now better than the ***cult*** because they have better integrity, they are not likely to be persecuted by the dominating society."

Text File 20

In Text File 31

> ❖ "CULTS- this is a social group that is defined by its religions, spiritual, or philosophical beliefs, or by its common interest which are unusual in a particular personality and goal."
>
> ❖ "… a cult is a social group with socially deviant beliefs and practices, but this is often unclear."
>
> ❖ "Cult mostly requires dedicated, dynamic and patient people and depends on outsiders for recruitment of new members."
>
> ❖ "Most of the cult followers express their devotion with a level of irony when describing entertainment that falls under their realm, in that something is so bad, it is good."

Text File 31

In the Text Files above, */cult/* was used to explain the process of becoming a religion, specifying that it is dependent on several followers affirming its status as a religion. Although the writing samples demonstrated that students used similar key themes, their use of such key themes differed in each sample. This was evident in the concordance plot and rhizomatic frequencies, as well as the visualisations.

A considerable number of studies were conducted in which *AntConc* was used to investigate lexical bundles and/or phraseology in written tasks and to compare the writing patterns of native and non-native speakers of English (see Çıraklı, 2019; Natsukari, 2012; Papangkorn & Phoocharoensil, 2021; Rahayu & Cahyono, 2015; Ulfa & Muthalib, 2020; Wijitsopon, 2017; Villanueva, 2015; Zhang & Pan, 2020). However, many of these studies did not follow a rhizomatic perspective. For example, Çıraklı (2019) investigated writers' linguistic preferences and their repeated use of verbal cues. Çıraklı (2019) discovered that the play, *[come and go]* revealed the prevalence of proper nouns and words that refer to the human body. In addition, Çıraklı (2019) found that the words */silence/, /left/*, and */right/* were highly repeated.

In Zhang and Pan's (2020) study, the focus was on comparing the keywords generated by WordCloud and TF-IDF-LDA and investigate the sentiments of abstracts generated by SnowNLP and TextBlob, which were verified by *AntConc*. Zhang and Pan (2020) also investigated whether authorial interactions could be improved by self-mentions. Zhang and Pan (2020) found that the keywords generated by the software applications mentioned previously were reliable. Furthermore, according to Zhang and Pan (2020), 'The high-frequency words in combination with keywords can help us obtain the key information in the text and they may help the writer to write the keywords for the paper.' The major similarity between the studies mentioned above and the current study is that all advance the idea that there are variations in student writing, irrespective of whether the researcher takes a rhizomatic point of view. In this regard, Bozkurt et al. (2016) note that learning in a network environment gives a springboard to 'rhizomatic learning practices' and accommodates 'nomadic learners'.

5.2.2 *AntMover* results for Item 1

Research Question 2: What rhizomatic structural moves do first-year ENG53 students display in their Assignment 1 and 2 as presented by the *AntMover* software application?

The rhizomatic structural moves identified using the *AntMover* software application in the responses to Item 1 of Assignment 1 were as follows:

- *Announcing principal findings*
- *Making topic generalisations*, and
- *Announcing present research*

The results revealed that, even though the students used similar structural moves in their responses, the rhizomatic frequencies differed amongst the text files. *Announcing principal findings* (Class 10) had the highest frequency (30) in the responses to Item 1. However, it was used in rhizomatic variations in each assignment. It had the highest rhizomatic usage (four times) in Text File 48, 77, and 01. In contrast, Class 10 had the variant rhizomatic usage (three) in Text Files 69, 92, and 95. Class 10 was not used in Text Files 20, 51, 91, and 78. Below are examples of the rhizomatic usage of *Announcing principal findings* in Text Files 48, 69, and 92 below.

Text Files 48, 69, and 92

In Text File 48

- ❖ "Members of a sect become respectable to the society as the sect grows."
- ❖ "As time goes by a sect can become church."
- ❖ "A church may join the state to form a state religion once it becomes highly integrated into the dominant culture."
- ❖ "Religions lose power and importance in peoples lives as societies modernise."

In Text File 69

- ❖ "It can also be referred as system of religious beliefs."
- ❖ "Sect can also be involved into church."
- ❖ "On my e is when we talk about a place where people communicate with god spiritually."

In Text File 92

- ❖ "In a sociological context, religions start as cults. The grow of a cult to a religion fully relies on recruiting new member."
- ❖ "The state's government would work with the religion to shape society."
- ❖ At this stage, secularization becomes inevitable due to the increase of complex civilization that follows after a society modernizes."

Text Files 48, 69, and 92

In the two Text Files above (48 and 69), there is an agreement that sect can be integrated into a church. Both Text Files (48 and 69) present their findings differently. Text File 48 refers to sect becoming respectable once it gains popularity. Text File 69 does not refer to the previous findings but rather mentions what sect comprises, for instance, "system of religious beliefs" which Text File 48 does not make reference. Both Text Files (48 and 69) do not explicitly refer to the developmental stages of religion because some of the information presented contradicts the developmental stages of religion. These two Text Files (48 and 69) seem to be connecting in certain points when referring to sect and church. The two Text Files (48 and 69) are not clearly referring to cult as being one of the developmental stages of religion as texts 01, 92, 31, and 20 did. Both Text File 48 and 92 refer to growth but presents different views. Text File 92 deduce that the survival of sect relies on "recruitment" processes. On the other end of the spectrum, Text File 48 refers to the respectable status that sect enjoys once it grows in a society. Text Files 48 and 92 agree that the government might eventually join a certain or popular church to rule the state. Text File 92 refers to the process of secularization as opposed to Text File 48 and 69. The commonality of the presented texts above is what Deleuze and Guattari (1987) term a-signifying rupture because of the emerging rhizomatic thematic patterns which are constantly changing which do not refer to the developmental stages of religion. All these texts present differing views about the developmental stages of religion. The findings presented seem to be counteracting each other. It is not clear what are the main findings in the texts in contention. The principle of *a-signifying rupture* accommodates rhetorical views which do not have a clear beginning nor end, and this was evident in the Text Files above because of the different disconnections and reconnections about the same rhizomatic key themes which were highlighted in their responses.

The practices mentioned above fall within the confine of what Deleuze and Guattari (1987) term the process of territorialisation and deterritorialization as adopted in the study conducted by Leander et al. (2013) whose findings indicated that Lee was constantly moving between the known literacy practices to the self-literacy practices which connected to the school literacy practices. This kind of literacy practices rhizomatic and becoming because of the uniqueness and creativity that such students possess. Like the findings mentioned above although in different contexts, (Alvi et al. 2017; Lubis et al. 2020) found that writers portrayed different ways of framing and structuring their findings and discussions. In the same note, Pendar et al. (2008) discovered that scholars structured their introductions differently in their

research papers. In the same vein, Zamani et al. 2016 found scholars presented their conclusions differently in research papers. The findings above imply that even there is a structured way of structuring research papers or write, or in the context of their current study, writers have their own different and unique of packaging their ideas in any written document that is not always the same as the set structural templates. So, the ideas mentioned above advances and support the notion of rhizomes inherent in writing as being a complex process, unpredictable, different, and fluid as argued in the current study.

The results showed that Class 9 (*Announcing present research*) had the lowest frequency in the responses to Item 1. Text Files 01 and 69 below announced present research similarly. The two Text Files (01 and 69) refer to the writer as being the source of present research on how *cult* becomes religion. In fact, the two Text Files refer to the title of the essay as it being the present research. In terms of Deleuze and Guattari's (1987) principle of connections, the two Text Files presented information that is interrelated and interconnected. The findings presented above under Class 9 (*Announcing present research)* proves that in the multiplicities of presenting ideas, there are in certain similarities in the manner the writers package their thoughts. This means that even though writing is a complex and unpredictable phenomenon, there are in certain points of convergence in the manner writers present their ideas and structure their thoughts. Leander et al. (2013) concurs that literacy practices concerning "how reading is taken up in each situation is unpredictable." Class 9 was used in three rhizomatic instances in all the responses. The results showed that it was used once in Text Files 91, 69, and 01. Below are examples of the rhizomatic usage in Text Files 69 and 01.

Text Files 69 and 01: *Announcing present research*

❖ "In this essay "How Cults Become Religions", which appears in The writer's world, John D . Carl describes the developmental stages of religion."

❖ In Text File 69:

❖ "John D. Carl describes in his article how cult became religions."

❖ In Text File 01:

❖ "In his essay, "how cults become religion" which appears in The Writer's World, John D. Carl discusses how religious institutions evolve."

Text Files 69 and 01: Announcing present research

In Text Files 20, 48, and 67, there were no (zero) rhizomatic patterns of Class 9. The rhizomatic patterns in student writing in relation to Class 9 demonstrated that some students did not support their essays with current research. This means that students have different ways of announcing presenting research which does not conform to the traditional and authoritarian ways of announcing present research. In the findings highlighted above, the students seem to be relying on their lived experiences to deliberate the findings of present research.

Most of the research conducted in which rhizomatic structural moves were explored using *AntMover* software application focused on the abstracts of research articles (for example, Abarghooeinezhad & Simin, 2015; Bhatti, Mustafa & Azher, 2019; Benrouag, Chaibainou & Senoussi, 2019; Gustina, 2020; Mauludini & Kurniawan, 2020; Qatrunnada & Kurniawan, 2020; Zulfa, 2020). Other research focused on structural moves in the findings and discussion sections (for example, Alvi, Mehmood, & Rasool, 2017; Lubis, 2020), whilst others focused on introductions in research articles (Pendar & Cotos, 2008) and the conclusions in research papers (Zamani & Ebadi, 2016). Most of the studies did not adopt the rhizomatic perspective in way which was done in the current study. However, those researchers, too, argue for variant writing patterns inherent in written samples.

Gustina's (2020) study investigated the rhetorical moves and linguistic features in thesis abstracts and research articles' abstracts written by undergraduate students. Gustina (2020) found variations in the way the undergraduate students wrote their theses and research article abstracts. Gustina (2020) further observed that Move 3 (*Method*) was the most prevalent and was used in both written samples. Gustina (2020) discovered that the students who participated in the study often excluded Move 5 (*Conclusion*) in their written samples. In addition, Gustina's (2020) study found that no move was obligatory, except Move 1 (*Introduction*) and Move 3 (*Method*). Alvi et al. (2017) studied structural moves of sub-genre prevalent in the discussion section of Pakistani research scholars' doctoral theses in education, economics, geography, sociology, statistics, and psychology. Alvi et al. (2017) found that no structural move was obligatory. Two moves (Move 3: *Findings* and Move 9: *Recommendations*) both had a high frequency, 66%. This was followed by Move 6 (*Explanation*), at 60%, and Move 5 (*Previous research*) and Move 8 (*Limitation*), at 56%. The lowest frequency was recorded for Move 4 (*Unexpected outcome*), at 30%.

5.2.3 *AntConc* results for Item 1: linking adverbials

The results indicated the rhizomatic mapping and manifestation of linking adverbials across the responses to Item 1. It was revealed that two additive linking adverbials (*also* and *that*) were used twice. *Also* was used twice in Text File 69 and *that* was used twice in Text Files 31 and 69. For example, there were two additive linking adverbials in Text File 69. The additive linking adverbial "also" was used to mention what sect can be, for instance, it can "also be referred to as a system of religious beliefs." This kind of a rhizomatic pattern can be associated with the Deleuzian and Guattarian (1987) principle of multiplicity because of the different ways the additive linking adverbials mentioned above can be used which is not static but in constant shift in function to relate the same thematic points of views. According to Masny (2009), 'literacies constitute ways of becoming with the world', and that reading is 'intensive and immanent.' The findings indicate that linking adverbials are used to perform the different functions of linking ideas and sentences together but in a rhizomatic manner. Below are examples of rhizomatic usage of the two additive linking adverbials /*also*/ and /*that*/ in Text Files 69, 31, and 69.

In Text File 69: /*also/* and /*that*/

> ❖ "It can also be referred as system of religious beliefs. Cult became sect when group of people who have different type of religion and beliefs they come together to be come together as one union."
>
> ❖ "Sect can also be involved into church. On my e is when we talk about a place where people communicate with God spiritually."

Text File 69: /*also/* and /*that*/

Four causal linking adverbials /*consequently*, *otherwise*, *then*, and *therefore*/ were identified. /*Then*/ produced the most rhizomatic frequencies (twice) in Text File 20, and, in Text Files 92, 67, and 31, it was used once. Similarly, identical rhizomatic patterns were also discovered; for example, /*therefore*/ was mapped once in Text File 51, and /*firs/t*/ was also discovered once, in Text File 78. The results showed that students used additive and causal linking adverbials more than other types of linking adverbials.

Below are examples of rhizomatic usage of causal linking adverbials /*then/, /therefore/, /first* / in Text Files 20, 51, and 78

> ***Then* in Text File 20** "Cults needs people who are committed and willing to build it, the more members are recruited then there will be growth, to avoid falling of a cult they must make sure that they attract more people."

In Text File 20, causal linking adverbial the was used to signify the becoming nature (in other words, growth) of Cult which is reliant on recruitment processes.

Therefore in Text File 51

> "They are easily consolidated into society better than cult members, and sect members are amalgamated and therefore unlikely to be mistreated by the influential society."

In Text File 51, therefore is used to highlight the amalgamation process that enable sect members to unlikely experience maltreatment.

First in Text File 78

> "According to Emile Durkheim religions bring people of society together and religion transforms through sate of stages, first stages is cult which needs to work hard to charm and recruits people in the society because if it fails it will be rejected by the community…"

In Text File 78 above, *first* is used to indicate the becoming stages of religion which is tantamount to cult being at the forefront of the stages of religion. The use of linking adverbials is considered as portraying the principle of multiplicity (Deleuze & Guattari, 1987) because of the way in which they were used to highlight different thematic points of discussions that are unrelated which do not have beginning nor end. The findings presented above indicates that there are different ways in which writing systems are used in different contexts (Masny et al, 2011). These writing processes are not static but in a constant process of becoming which is indefinite as evidenced in the how linking adverbials were portrayed as having unique rhizomatic patterns in each Text File mentioned above.

A significant number of other related studies have been conducted in which the *AntConc* software application was used to reveal linking adverbials prevalent in written samples (e.g., Alshalan, 2019; Bikelienė, 2017; Diamante, 2020; Dutra, Da Silva Queiroz & Alves, 2017; Karatay, 2019; Li, Dursun & Hegelheimer, 2017; Merilaine, 2015; Sabzevar, Haghverdi &

Biriya, 2020; Vinčela, 2013; Youngdong, 2020). Karatay's (2019) study found that students tend to use linking adverbials more often in timed essays than in untimed essays. Karatay (2019) further discovered that the students used fewer linking adverbials than sequential and additive linking adverbials. For example, the adversative linking adverbial *nevertheless* appeared with the frequency of 0.08 in timed versus 0.19 in untimed essays. In addition, Karatay (2019) found that the causal linking adverbial *consequently* scored 0.7 in timed versus 0.11 in untimed essays.

5.2.4 *AntConc* results: Assignment 1 (Item 2)

In item 2, students were required to 'Compare and contrast a theocratic government with a democratic government'. The results revealed that the students used identical key themes /*leaders*/, /*theocratic*/, /*democratic*/, /*people*/e, and /*government*/ in their responses to Item 2. Their use of the key themes were rhizomatic in each response; for example, /*government*/ had the highest number of hits (57), while /*leader*/s had the lowest (16). The word /*government*/ was used mostly at the beginning of the paragraphs and showed eight hits. In Text File 91, /*government*/t was used seven times, but at the end of the paragraph. Text File 31 was another text file that scored a high number of hits (6), and /*government*/ was used mostly at the beginning and end of the paragraph. In Text Files, 51, 69, and 77, /*government* /was used four times each.

Below are rhizomatic usage of /*government*/ in Text Files, 91, 31, and 51:

In Text File 91: /*government*/

> ❖ "Theocratic and Democratic governments are both leaders of different countries in the world. In the next memo, I am comparing their duties."
> ❖ "Although both **governments** have the proper leadership skills, Government 1 /*Theocratic*/ has the qualities that will make him a great leader for the country. His leadership skills are political authority held by religions leaders."
> ❖ "/*Democratic*/ elects the representatives to make decisions for the people who elected them."

In Text File 31

> ❖ "This is a form of government in which a deity of some type is recognized as the supreme ruling authority, giving divine guidance to human intermediaries that manage daily affairs of the government."
>
> ❖ "This form of government is based on a certain religion or belief system. The word "theos" means God."
>
> ❖ "In this type of government, change in powers happens when a new leader is chosen by God or his spiritual representatives on earth and this is called a religious choice."

Text Files 91 and 31 above agree that democratic and theocratic are both governments. On the one hand, Text File 91 mentions that theocratic leader should possess great leadership qualities which is not the case in Text File 31. Text File 91 states that theocratic leaders are often political leaders who are tasked with the leadership responsibilities. On the other hand, Text File 31 states that deity or God or goddess is often conferred with supreme ruling authority and is tasked with providing divine guidance. In same text file, 31, theocratic leader is tasked with managing the government. In Text File 91, democratic government is regarded as having representatives who make decisions for the people. It is clear that both Text Files (91 and 31) the duties and responsibilities of theocratic and democratic governments are not compared point by point. There are different ways which the democratic and theocratic government governments are compared. The rhizomatic patterns portrayed above signifies the heterogeneousness inherent in the responses highlighted in the different Text Files above. The definitions of democratic and theocratic governments and its responsibilities reveals unsameness when compared to each other as informed by the Deleuzian and Guattarian (1987) principle of heterogeneous. The findings presented above showed that there are multiplicities of arranging ideas which moves from the territorialization to deterritorialization which shows the breaking points or fragments in the process of packaging one's thoughts. The argument is backed by the findings of scholars who agree that the writing process is informed by "flexibility", "multiplicity" and "connection" amongst the writers which shows their rhizomatic writing practices (Honeyford et al., 2018; Guerin, 2013) which are different and not linear but complex in nature.

In Text File 51

> ❖ "On the surface, it appears all government representatives are elected into office by the people. The grand Ayatolah in Iran is a case in point where religious leaders make binding decisions in government."
>
> ❖ "All power in government is vested in the hands of one supreme leader in office. In contrast, in a Democracy like the USA, a government is voted in and out of power through the ballot. Minority opinion is safeguarded and valued."

The focus of Text File 51 above is on democratic responsibilities of democratic governments as opposed to the two Text Files above (91 and 31) which mainly highlighted the duties and responsibilities of theocratic government mainly. The point of convergence or connection in the two Text Files (91 and 51) above is on the election of leader and their responsibilities.

On the other end of the spectrum, *leaders* had the lowest frequency of key themes that presented rhizomatic variance of usage in each response. Its rhizomatic frequencies showed that it was used in eight responses; in Text File 31, it was used four times, and in Text Files 42 and 91, it was used three times. It appeared once in Text Files 48, 51, 92, and 95. In Text File 31, it was used rhizomatically in the first two paragraphs of the essay and used sparingly at the end of the essay. In Text File 42, it was used in the supporting paragraphs of the essay, and in Text File 91, it appeared in the opening paragraph and in the supporting paragraph of the essay.

Below are examples of rhizomatic usage of *leaders* in Text Files 31, 42, and 95.

In Text File 31

> ❖ "The word "theos" means God. In theocracy the number of leaders can vary but these spiritual leaders are seen as representatives as of God."
>
> ❖ "Typically, a theocracy either views its one god or its many spiritual representatives as the leadership."
>
> ❖ "In this type of leadership there can be many leaders. Some of the democracies have an elected president and elected representatives while others simply just elect a body of representatives and no president."

In Text File 42

> ❖ Religious leaders such as Priest, Monks, Pastors, etc. They have authority in religious and non-religious matters."

In Text File 95

> ❖ "A theocratic government is not open to the public about their governing, their decisions are made to please the leaders and society has no view in the governing."

Text Files 31 and 42 above are interconnected in a sense that they both specify the theocratic leaders and what they viewed as, for example, in Text File 31, theocratic leaders are regarded as representatives of God spelled in small and capital letters. Whereas in Text File 42, theocratic leaders are referred to as religious leaders which is not the case in Text File 31. Text File 42 specifies religious leaders as Priest, Monks, and Pastors. However, Text File 42 specifically highlights the roles of religious leaders as they are referred to in this text, but

in Text File 31, the receptibilities of spiritual leaders are not mentioned, so the two text files shows in this case a point of divergence even though they began with related connections as mentioned in the beginning of this paragraph. The rhizomatic patterns presented above are related to the principle of a-signifying rupture (Deleuze & Guattari, 1987) because of the constant connection and disconnections in different thematic points of discussions. This in agreement with scholars who posit that academic literacy practices are different and complex (Honan, 2009), learning is networked which adds to the complexity and unpredictable nature of academic literacies especially for "nomadic learners" (Bozkurt et al., 2016).

Some of the studies that used the *AntConc* software application did not conduct their research from a rhizomatic point of view; however, most of the results revealed different writing patterns in the written samples of students. For example, Villanueva's (2015) study explored lexical bundles or phrases apparent in written essays by Filipino students. The results revealed that 31 lexical bundles were retrieved from the academic corpus. Three-word lexical bundles were prevalent, and one four-word lexical bundle was identified. It was discovered that some of the bundles were unusual and obscure. Ulfa and Muthalib's (2020) study of three-word and four-word lexical bundles used by Syiah Kuala University students in their written essays yielded similar results. Again, three-word lexical bundles were more prevalent than four-word lexical bundles. Mackness et al.'s (2016) findings corroborate the argument made in the current study that students learn in different ways, evident in their rhizomatic writing.

5.2.5 *AntMover* results for Item 2

Research Question 2: What rhizomatic structural moves do first-year ENG53 students display in their Assignment 1 and 2 as presented by the *AntMover* software application?

The following rhizomatic structural moves identified by the *AntMover* software application in the analysis of the responses to Item 2 of Assignment 1:

1. Announcing principal findings.
2. Making topic generalisations and
3. Announcing present research

The results showed that the students used the same structural moves, but in a rhizomatic manner, in their responses. Class 10 (*Announcing principal findings*) had the highest frequency at 55 times in the 13 responses. Class 10 appeared 14 times in Text File 91 and 12 times in Text File 31.

Below are examples of the rhizomatic usage of *Announcing principal findings* in Text Files 91 and 31

In Text File 91

- ❖ "In the next memo, I am comparing their duties."
- ❖ "Although both governments have the proper leadership skills, Government 1 */Theocratic/* has the qualities that will make him a great leader for the country"
- ❖ "His leadership skills are political authority held by religions leaders."
- ❖ "His authority is based on the religious beliefs of most of his citizens."
- ❖ "Government 2 */Democratic/* elects the representatives to make decisions for the people who elected them."

In Text File 31

- ❖ "This is a form of government in which a deity of some type is recognized as the supreme ruling authority, giving divine guidance to human intermediaries that manage daily affairs of the government."
- ❖ "This form of government is based on a certain religion or belief system."
- ❖ "The word " theos " means god."
- ❖ "In theocracy the number of leaders can vary but these spiritual leaders are seen as representatives as of God."
- ❖ "Typically, a theocracy either views its one god or its many spiritual representatives as the leadership.

The announcement of principal findings in both Text Files 91 and 31 above are disconnected ad unrelated. The principal findings are not presented in traditional sense wherein there would be reference to explicit sources informing the findings of the research under study. However, the results of Text File 31 are implicit and does not make clear reference to other studies. The approach in the way the principal findings are provided in the

two text files are based on common belief or knowledge of the topic under study. There are no points of convergence or connections but rather disconnected points which shows diversifying findings. The principal findings is evident of Deleuzian and Guattarian (1987) principle of multiplicity because of the manner in which the findings were presented without any comparison to the past and present findings regarding the same thematic point of discussion. The findings presented above corroborates with the findings of Knight et al.'s (2018) which discovered different rhetorical patterns in student writing.

Class 9 (*Announcing present research*) had the lowest frequency. It appeared five times across the 13 responses to Item 2. It appeared three times in Text File 91 and once in Text Files 69 and 31. It did not appear in Text Files 20, 48, 67, and 51.

Below are examples of the rhizomatic usage of /*Announcing present research*/ in Text Files 91, 31, and 69:

In Text File 91: /*Announcing present research*/

> ❖ "Theocratic and Democratic governments are both leaders of different countries in the world."
> ❖ "They present divine power."

In Text File 31

> ❖ "In this type of government, change in powers happens when a new leader is chosen by God or his spiritual representatives on earth and this is called a religious choice."

In Text File 69

> ❖ "A theocracy is an essentially self-known religion government that claims to represent God and all his holy laws. A democracy is a form of government where the population are eligible citizens governing themselves through elected representatives; this means democratic."

The three Text Files above highlights present research in multiple ways which are disconnected but within theocratic governments' theme. Text File 69 refers to and defines democracy as opposed to Text Files 31 and 69. Both Text Files refer to Theocracy as a kind of government that is God-led. In Text File 31, The election process of leaders in a theocratic government is God-driven or through spiritual representatives. Text File 69 provides a brought definition of what theocracy is, and like Text File 31, it is classified as the representation of God through government. The difference between the two Text Files is that one is focused on the election process and the other one is concerned with providing a brought definition of theocracy. Therefore, the way the present research was presented is heterogeneous (Deleuze & Guattari, 1987) because they are unrelated and different. The rhizomatic perspective to academic literacy is informed by the notion of difference as portrayed in the rhizomatic findings highlighted above.

Bhatti et al. (2019) found that 'there was no significant difference between the linguistics and literature abstracts at the macro level while the differences lie at the macro level.' At macro level, Bhatti et al. (2019) discovered that most (nine) of the abstracts started with *Announcing present research*, followed by eight abstracts that started with *Making topic generalisations*.

Class 2 (*Making topic generalisations*) appeared 11 times across the 13 assignments. Two text files (48 and 77) had a frequency of 2 for Class 2. Text Files 20, 67, 51, 91, 95, 01, and 79 had a frequency of 1 each, while Text Files 69, 92, 78, and 31 showed zero use of Class 2.

Below are examples of the rhizomatic usage /*Making topic generalisations/* in Text Files 48, 20, and 67.

In Text File 48: /*Making topic generalisations/*

> ❖ "A theocratic government is formed when government and religion work together to shape society and a democratic government does not work with religion."

> ❖ "Most citizens of a country that has a theocratic government belong to the dominant religion because citizenship automatically makes one a member but in a democratic government everyone has the right to choose their religion."

In Text File 20: /*Making topic generalisations*/

> ❖ "Theocratic government is a government that is working together with a certain religion to shape the society, the power lies with the government , people are not treated equally , people can't make any changes , in order for nations to develop and improve , they must recognize when change is necessary , Theocratic governments cannot do this because they believe that whatever religious doctrine they follow , is the only truth and law."

In Text File 67

> ❖ "A theocratic government consist of religious leaders and politicians who use a doctrine to govern its people and gives them little to no freedom of choice when it comes to their beliefs; whereas in a democratic government the people are free to choose what they believe in and what religion they want to follow and the public gets to choose who they want their leaders to be, through elections."

The three Text Files (48, 20 and 67) above are interconnected and interrelated in terms of how they make topic generalisations in relation to the key theme of the given essay. The findings above relates to the Deleuzian and Guattarian (1987) principle of connection as evidenced in the way the rhizomatic key themes are connected to one another. For example, Text Files 48 and 67 mentions that theocratic government is in essence oppressive whereas the democratic government is not. Certain parts of the three Text Files above show connections in terms of the presentation of information but differs or disconnects slightly with Text File 20. In Text File 20 seem to be focusing largely on the definition and the roles of theocracy in a theocratic government to the exclusion of democratic government. The advances in online technologies offers affordances in terms of understanding and studying datasets through the lens of learning analytics by incorporating corpus analysis software tools such as the one's used in the current study. Corpus analysis software tools were also used in

various studies which found that student writing patterns are different at various levels as per the findings in the current study (for example, Abarghooeinezhad & Simin, 2015; Bhatti, Mustafa & Azher, 2019; Benrouag, Chaibainou & Senoussi, 2019; Gustina, 2020; Mauludini & Kurniawan, 2020; Qatrunnada & Kurniawan, 2020; Zulfa, 2020). The corpus analysis software applications enable researchers to make connections and disconnections inherent in student learning behaviours, in the context of the current study, rhizomatic patterns in written student samples.

5.2.6 *AntConc* results for Item 2: linking adverbials

The results revealed rhizomatic patterns in the use of additive linking adverbials /*also*/, /*for example*/, /*in addition*/, /*likewise*/, and /*that*/ is in the 13 responses to Item 2. All the adverbials were used rhizomatically in each of the text files in which they appeared. However, the use of linking adverbials in each Text File differs significantly and some types of linking adverbials were used more than others whilst none of them were used in other Text Files. This implies that the writers of the Text Files do not know when to use linking adverbials, or they prefer not to use them at all. The findings demonstrated that additive linking adverbials were used more often than the other types of linking adverbials. For example, additive linking adverbials *also* was used once in Text Files 69, 42, 31, 78, and 20, and /*for example*/ appeared in Text Files 42 and 78. /*In addition*/ was also used once, in Text File 31, and *likewise* was used once in Text File 51.

Below are examples of linking adverbials (*also, in addition,* and likewise) used in a rhizomatic manner in Text Files 78 and 51:

In Text File 78: /*Also*/

> ❖ "Example of democratic country is South Africa, people have the right to practice any religion or gander that's why gay people are equality represent and you can also marry any one regardless of gender, tradition or race."

The additive linking adverbial /*also*/ was used differently in Text File 69 compared to Text File 78. In both Text Files it was used to add another information to two disconnected thematic points of discussions. In Text File 69, the writer used /*also*/ to refer to religious systems. In Text File 78, it was used for a similar function, which was to add information but

to a different thematic point of discussion. In Text File 78, /*also*/ was used to provide another example to highlight what democratic signifies in a South African context.

Another adversative linking adverbials identified in the responses to Item 2 was

/*in contrast*/, which was used once, in **Text File 51**. Below is an example of the adversative linking adverbial /*in contrast*/ used rhizomatically in.

Text File 51: /*in contrast*/

> ❖ "In contrast, in a Democracy like the USA, a government is voted in and out of power through the ballot."

The causal linking adverbial /*thus*/ was also used once each in Text Files 31 and 42. Below are examples of the causal linking adverbial /*thus*/) used rhizomatically in **Text File 31 and 42:**

In Text File 31: /*thus*/

> ❖ "Here in democratic government, its people that rule it who thus have right to vote which gives people the power."

In Text File 42: /*thus*/

> ❖ "Thus, resulting in no freedom of speech and expression, if one had to question the acts they will be severally dealt with, as it is equivalent to questioning God himself. There aren't trails for those who commit crime and violence their punishment is based on their religious teachings."

Lastly, the sequential linking adverbial /*next*/ was used once, in **Text File 91**.

Below is an example of a sequential linking adverbial in Text File 91

Text File 91: /*next*/

> ❖ "In the *next* memo, I am comparing their duties. To have a better ruled country, I had to choose the best one."

The use of the linking adverbials mentioned above is rhizomatic or different. The linking adverbials signifies the principle of multiplicity because they were used to link ideas rhizomatically in different thematic points of discussions which are unrelated and do not have beginning nor end (Deleuze & Guattari, 1987). The study by Sabzevar et al. (2020) found that there were differences in the way native English speakers and Iranian English as foreign language (EFL) students made use of stance adverbs in their written essays. Sabzevar et al.'s (2020) study also found that both groups of students used epistemic adverbs, but with different frequencies. The findings highlighted above corroborates with the findings in following studies which concur that students use linking adverbials differently in their written samples, for example (Li, Dursun & Hegelheimer, 2017; Merilaine, 2015; Vinčela, 2013; Youngdong, 2020).

5.2.7 *AntConc* results for Topic 1: keywords frequency, concordance, and concordance plot

The present study sought to reveal rhizomatic patterns in students' essays on two topics. For Topic 1, the students were required to 'Write an essay in which you argue for or against a visible presence of the police in schools as one measure of curbing the scourge of violence'. Topic 2 required of students to 'Write an essay in which you discuss three negative effects of using drugs for mood or behaviour 'syndromes.

The results revealed similar but rhizomatic usage of key themes /*abuse, behaviour*, *bullying*, and *violence*/ that were prevalent in the written essays on Topic 1. The results showed that the key theme /*violence*/ was used in all the essays, with 53 hits. The key theme was used rhizomatically, in that its use showed different frequencies amongst the text files. /*Violence*/ showed high frequency of usage (16 times) in Text File 31. In Text Files 42 and 79, additional rhizomatic patterns were discovered, in that /*violence*/ was used 11 and 10 times respectively in these text files. In contrast, /*violence*/ was used twice each in Text Files 01 and 91. In context, /*violence*/ was used to explain the different types of violence prevalent in schools and why it took place. Below are examples of rhizomatic usage of in Text Files 31, 79, and 91.

In Text File 31: /*violence*/

- ❖ "*Violence* against children is a public health, human rights and social problem with potentially devastating and costly consequences."

- ❖ "Globally, levels of *violence* against children are frightfully high and it is estimated that up to 1 billion children aged 2-17 years have experienced physical sexual or emotional violence in schools."

- ❖ -"Children spend more time in the care of adults in schools and other places of learning than they do anywhere else outside of their homes, because of that *violence* that occurs at schools, the matter should be investigated for physical, psychological and social problems arising from that."

- ❖ *Violence* can be any form of physical aggressions with intention to *hurt [corporal punishment and physical bullying]* by adults and other children."

In Text File 79: /*violence*/

- ❖ "The need for a visible presence of the police in schools as one measure of curbing the scourge of *violence*."

- ❖ -"Research shows school *violence* in South Africa has been escalating, not only is it affecting pupils but also between educators and pupils."

- ❖ "According to the Education Union of South Africa (EUSA) 50 teachers are attacked by learners in schools a month, Simelane (2019) conducted research concluding that learner-on-teacher *violence* in the schools of the country includes, but is not limited to, slapping of teachers."

- ❖ "This essay will argue the causes and effects of school *violence* in South Africa and why I am for the visible presence."

In Text File 91: /*violence*/

- ❖ "All the schools should have a visible presence of the police, as a one measure to curb the scourge of *violence*."

> ❖ "We need to be certain, that the pupils at schools are safe. First, the number of an increase in *violence* at schools has become an uncontrollable matter."

The three Text Files above (79, 91, and 31) present differing views concerning the causes and effects of school violence in a South African context. All the responses in the three Text Files show that students present or discuss the same thematic point of discussions in different ways, but which are not related to the topic. For example, Text File 79 and 31 refer to literature to support its views on school violence. Text Files 79 and 91 agree that visibility of police in school premises will decrease the scourge of violence. Text Files 31 and 91 highlights the consequences of school violence. For instance, the writer mentions that violence will have "devastating and costly consequences" whilst Text File 91 refers to school violence as an "uncontrollable matter" which may add to "devastating consequences" as mentioned in Text File 31. In brought sense, Text File 31 provides a definition of what it considers as, for example, "…any form of physical aggressions…". Furthermore, Text File 31 provides a recommendation in the form of conducting investigations. The Deleuzian and Guattarian (1987) principle is engraved in the rhizomatic patterns presented above is multiplicity because of the haphazard nature the patterns seem to arrange themselves in response to the given topic. The presentation of ideas may be connected to one another in different variations which reconnects to the main key theme as highlighted in the previous findings of the current study. This finding corroborates with the conception that rhizomes are not static but can generate multiple connections (see Mackness, Bell & Funes, 2016; Masny, 2013; McCannon, 2012; Nkhobo & Chaka, 2021). In addition, some of the thematic points of discussion are off-topic. However, there are mostly some rhizomatic responses which are connected in certain instances because they are interconnected and interrelated in their views as highlighted above.

/Need/ had the lowest rhizomatic usage in the essays on Topic 1. The results showed that it was used to emphasise the importance of police officials in schools to protect students. */Need/* appeared 14 times in the seven essays on Topic 1. It was used six times in Text File 91, twice in Text File 20, and once in Text File 01. Lastly, there was one rhizomatic instance of */need/*, in Text File 95.

Below are examples of rhizomatic usage of /*need*/ in Text Files 91, 20, and 01.

In Text File 91: /*need*/

> ❖ " We *need to* be certain, that the pupils at schools are safe."
>
> ❖ "Learners today are technologically advanced, the use of laptops or computers at school, which *need* to be under a 24/7 protection."
>
> ❖ "There are bully learners at schools, every learner *need* to be aware of."

In Text File 20: /*need*/

> ❖ "Children needs to be given attention that they *need*, firstly security guards from school have to make sure that no child go to school with any dorm of a weapon, they can use the metal detector to determine whether they have any weapons with them or not, police officers will be there to monitor everything."
>
> ❖ This is clear that we *need* to take serious action to avoid all this violence in schools and make sure to punish anyone who is violent in school and that will lead by example to everyone who thought they will be violent in school."

In Text File 01: /*need*/

> ❖ "Schools *need* to find alternative ways to maintain order before resorting to police officers in order to ensure safety."

The two Text Files above (20 and 91) are interconnected on the thematic point of discussion relating to the monitoring of learners either as they enter school premises or monitoring their online activities to block any form of violent behaviours. In addition, both Text Files 20 and 91 recommend that bullies should be punished (Text File 20) and exposed (Text File 91). The two text Files (20 and 91) are connected in terms of their views and resolutions to violence in schools. In contrast, Text File 01 shares an opposing view in relation to how violence should be managed. Text File 01 suggest that schools should be responsible for curbing violent acts in schools before involving the police. The rhizomatic patterns highlighted above, are, in the context of the current study, a-signifying rupture in Deleuzian

and Guattarian (1987) perspective. In relation to the view presented in Text File 01, which is not related to those presented in Text Files 20 and 91. Scholars like Dillon (2016) views rhizomatic conception of academic literacies as a 'welcome break from predominant learning theories describing them as prescriptive or dogmatic in nature and which disadvantage the liberation of students'. Presenting the information this way is also heterogeneous in view of the rhizomatic patterns inherent in the Text Files discussed. According to Deleuze and Guattari (1987), 'A rhizome may be broken, shattered at a given spot, but it will start up again on one of its old lines, or on new lines.' This is related to the principle of a-signifying rupture because the views presented above are disconnected and reconnected at any given point. This view is supported by Masny (2013) who maintains that academic writing is constantly in the process of becoming, and in continuous phases of development that is complex (Deleuze & Guattari, 1987).

In Papangkorn and Phoocharoensil's (2021) study, it was revealed that native English speakers and Thai students made use of different metadiscourse markers and engagement bundles, evidenced by different frequencies. For instance, Papangkorn and Phoocharoensil (2021) found that, even though native speakers of English had fewer engagement bundles, there was greater variety than their Thai counterparts' writing, which had more engagement bundles but with fewer variations.

5.2.8 *AntMover* results for Topic 1: structural moves

<u>Research Question</u> 2: What rhizomatic structural moves do first-year ENG53 students display in their Assignment 1 and 2 as presented by the *AntMover* software application?

AntMover software application revealed the following classes in the essays on Topic 1:

1. Class 10: *Announcing principal findings*
2. Class 2: *Making topic generalisations*
3. Class 11: *Evaluation of research*, and
4. Class 9: *Announcing present research*

Most of the essays on Topic 1 revealed similar rhizomatic usage of structural moves. *Announcing principal findings* had the highest frequency of 91 rhizomatic uses across the assignments. In Text File 31, *Announcing principal findings* was used 14 times. In contrast, Text Files 95 and 20 showed the lowest frequency of Class 10, four and three times

respectively. There were few instances of Class 9 in the assignments on Topic 1. Class 9 appeared once in Text File 42. No rhizomatic patterns were found in Text files 01, 20, 31, 91, and 95.

Below are examples of the rhizomatic usage of /*Announcing principal findings*/ in Text Files 31, and 95:

In Text File 31: /*Announcing principal findings*/

> ❖ "Violence can be any form of physical aggressions with intention to hurt [corporal punishment and physical bullying] by adults and other children."
>
> ❖ "Corporal punishment is any punishment in which physical force is used and that is intended to cause some degree of pain or discomfort, it often used to punish poor academic performance or to correct misbehaviour."
>
> ❖ "Psychological violence includes verbal and emotional abuse: isolating, rejecting, ignoring, insults and spreading rumours, making up lies , humiliation and threats."
>
> ❖ "Psychological punishments are not physical but humiliate, scare or ridicule a child or adolescent and sexual violence includes intimidation of a sexual nature."
>
> ❖ "Schools cannot fulfil their role as places of learning and socialization if children are not in an environment free violence, violence against children is widespread and must be addressed to improve children's health and well – being."

In Text File 95: /*Announcing principal findings*/

> ❖ "Republic of Congo, 26 attacks on schools in South Sudan, 67 attacks in Syria and 20 attacks in Yemen, according to the report."
>
> ❖ "I am against the visibility of police in schools because I believe children are born without any hatreds, grudges, and no forms of bad feelings against anyone."
>
> ❖ "I don't think police should be available in schools to prevent violence in school children because there are many crimes that need the police attention , people are dying out there , children and women are abused and worse nowadays there are internet based crimes and more."

The two Text Files above (31 and 95) present different principal findings. Text File 31 largely provides common definitions of violence, corporal punishment, and psychological violence/punishment without explicitly referencing other findings. In contrast, Text File 95 reports findings in other African contexts such as Sudan, Syria, Yemen and Congo. Text File 31 presents the writer's views regarding the presence of police in schools without linking them to any other findings or related literature. The principal findings presented in Text Files 31 and 95 above are different as related in the Deleuzian and Guattarian (1987) heterogenous principle because of the thematic patterns that are unsameness despite discussing the same topic. This is particularly true in a sense that rhizomes are conceptualised as possessing the ability to manifest in different ways (see Sermijn, Devlieger & Loots, 2008).

Another class with a high incidence across the seven essays on Topic 1 was Class 2 (*Making topic generalisations*), appearing 31 times across the seven essays. The lowest use (zero) was in Text File 42, and Text Files 01 and 91 each had five occurrences. Class 2 appeared three times each in Text Files 20, 31, and 79.

Below are examples of the rhizomatic usage of /*Making Topic generalisations*/ in Text Files 01, and 91.

In Text File 01: /*Making Topic generalisations*/

> ❖ "Schools are meant to be a positive learning environment where students should feel safe to be at."
> ❖ "It has been found that their presence has resulted in more arrests, suspensions and criminalization of students especially those coming from poor background (Godfredson 2020)."
> ❖ "People from poor background where majority is black students were victimised and more likely to be arrested or suspended (Howard 2016).

In Text File 91: /*Making Topic generalisations*/

> ❖ "All the schools should have a visible presence of the police, as a one measure to curb the scourge of violence."
>
> ❖ "Second, it is argued that to be under a police protection can protect everyone and everything at school."
>
> ❖ "There are bully learners at schools, every learner need to be aware of."

Text Files 01 and 91 above make topic generalisations in different ways. Text File 01 made topic generalisations and backed them up with in-text references to strengthen their argument. It mainly focused on the negative effects of police presence in schools such as "criminalization" of students and "victimization" of black students. Text File 91 presented different views which are not related with the views in Text File 01. In addition, Text File 91 is of the view that police presence will eradicate violence, and everyone will be protected. On the other hand, Text File 91 did not back backup the claims with any sources. The rhizomatic patterns portrayed above are related to the principle of multiplicity (Deleuze & Guattari, 1987) because of the different patterns in which the topic generalisations have been presented that is not the same in all the Text Files. The adoption of rhizomatic perspective in academic literacies enables creativity and uniqueness and this was corroborated in Honan (2007) study in which he employed the rhizomatic perspective in writing his thesis differently and this enabled him to show creativity and uniqueness.

Class 11 (*Evaluation of research*) had 28 occurrences across the seven essays. Text File 42 had the highest occurrence of Class 11 (11 times). Text Files 95, 01, 31, and 91 had three, four, four, and five hits respectively.

Below are examples of the rhizomatic usage of */Evaluation of Research/* in Text Files 42, and 31:

In Text File 42: */Evaluation of Research/*

> ❖ "Certain individuals now have criminal records."
> ❖ "The most common are gender violence; students being bullied for money; couples' violence (students who are dating have arguments and it gets out of control)."

> ❖ "If the school had taken more control over the students this would not have happened now students want to take control of the school to show they are strong and unstoppable."

In Text File 31: */Evaluation of Research/*

> ❖ "Children spend more time in the care of adults in schools and other places of learning than they do anywhere else outside of their homes, because of that violence that occurs at schools, the matter should be investigated for physical, psychological and social problems arising from that."
>
> ❖ "Teaching is different from what it used to be, years ago the main disciplinary problems were running in halls, talking out of turn and chewing a gum."
>
> ❖ "Today transgressions include physical and verbal violence and in some schools, drug abuse, robbery, and murder."

Text Files 42 and 31 above evaluated research differently. Text File 42 focuses on the consequences of school violence and attributes it to poor management of schools. On the other side, Text File 31 compares the old and current system of education. In addition, Text File 31 seem to be implying that the old system of education was better. On the other end, Text File 42 recommends investigation of problems that students bring with to school. Both text Files (31 and 42) responded to the same subject matter in different and unrelated ways. Therefore, the rhizomatic patterns presented above signifies the Deleuzian and Guattarian (1987) principle of a-signifying rupture because the way the patterns appear is constantly disconnected. Martin et al. (2016) recommend future research that would analyse the way students use words, concepts, common topics, and text classification which is almost related to what the current study aimed to do. Martin et al. (2016) suggests the coding of results in order of appearance, frequency, and alphabetically. The difference between what Martin et al. 2016) suggested and the current study lies in its exploration of rhizomatic patterns in terms of key themes (concordance) and the use of linking adverbials in written samples which were analysed using corpus analysis softwares such as *AntConc, AntMover,* and *AntWordProfiler.* In addition, the other element that is missing from that of Martin et al.'s (2016) study compared to the current study is the investigation of rhizomatic patterns in students' online interactions on *myUnisa's* ODF and MS Teams and their visualisations using *Gephi* and *MS*

Power BI software tools. In the study conducted by Qatrunnada et al. (2020), it was found that there were 1 027 rhetorical moves in Sinta levels, with Move 3 showing the highest frequency. In addition, Qatrunnada et al. (2020) noted that the moves that were used were different and varied across the journals that were used in their study.

5.2.9 *AntConc* results for Topic 1: linking adverbials

The results illustrated the rhizomatic patterns of three additive linking adverbials */also*, *for example*, and *that is/* that were identified across the essays on Topic 1. */Also/* manifested the highest rhizomatic usage across the essays, with 16 hits. It appeared in five times in Text File 42, followed by Text Files 79 (three times), 91 (three times), 95 (twice), and 01 (twice). Linking adverbial *also* was used once, in Text File 01.

The rhizomatic additive linking adverbial */for example/* appeared once in two text files, 95 and 91. Additive linking adverbial */that is/* was used once each in Text Files 79 and 31.

Below are examples of rhizomatic usage of additive linking adverbials */also/* in Text Files 42, 79, 01.

In Text File 42: */Also/*

❖ February 1996 in Moses Lake Washington a learner in one of the high schools fired his gun and killed his math teacher. There were *also* cases where students that also got shot."

❖ "It *also* negatively impacts school performance and can lead to dropping out from school especially when the school environment is not perceived as safe for learners.

❖ It can *also* be teasing or taunting
"."

In Text File 79: */Also/*

❖ "Research shows school violence in South Africa has been escalating, not only is it affecting pupils but *also* between educators and pupils."

❖ "What must then be done students who are not only threatening their fellow students but *also* their educators?

In Text File 01: */Also/*

> ❖ "It has also triggered the racism concern as the research proved that black students are more likely to be arrested than white students."

In addition, two adversative linking adverbials were identified, namely */instead/* and */rather/.* In Text File 42, */instead/* was used once;/ *rathe/r* was used twice in Text File 42 and once in Text File 79. Below are examples of rhizomatic usage of adversative linking adverbials */instead/* and */rather/* in Text Files 42 and 79:

In Text File 42: */Rather/*

> ❖ "Instead of coming together and building a better future them self's, they *rather* teas or taunt other which seems to be the new trend."
> ❖ "Which starts from teasing to physical violence, and it tends to occur as simultaneous behaviour the *rather* it happening as an isolated incident."

In Text File 79: */Rather/*

> ❖ "They would *rather* send them to get help in therapy to rehabilitate than to have them punished by the law."

Two causal linking adverbials, */result/* and /*then/,* were identified in Text File 79, in which both were used once. For example:

In Text File 79: */Result/*

> ❖ "Many students tend to be negatively affected by this, they become depressed and lose focus during lessons and as a *result* it affects their academic work."

In Text File 79: */Then/*

> ❖ "What must then be done students who are not only threatening their fellow students but also their educators?"

Five rhizomatic sequential linking adverbials appeared across the seven essays, namely */finally, first, firstly, second,* and *then/*. Four were used once in the text files in which they appeared: */finally/* (Text File 91), */firstly/* (Text File 20), */second/* (Text File 91), and */then/* (Text File 79).

Below are examples of sequential linking adverbials in Text Files 91, and 20:

In Text File 91:*/Finally/*

> ❖ "Finally, this essay concludes by arguing that in times like this, safety is the top priority for everyone."

In Text File 20: */Firstly/*

> ❖   "Children needs to be given attention that they need, firstly security guards from school have to make sure that no child go to school with any dorm of a weapon, they can use the metal detector to determine whether they have any weapons with them or not, police officers will be there to monitor everything."

In Text File 91: */Second/*

> "*Second,* it is argued that to be under a police protection can protect everyone and everything at school."

Linking adverbial */first/* was used the most, with three occurrences in Text File 91. For example:

> ❖ "First, the number of an increase in violence at schools has become an uncontrollable matter."

The additive linking adverbial */also/* was used to add information about the same subject matter, for instance, "also" in all the Text Files 42, 79, and 01 was used link different thematic points of discussion. In Text File 42, it was used to add information that highlighted the

negative consequences of violence in schools, for instance, "*…students that also get shot."* In the same Text File (42), it was used to add that violence disrupts schools' performance. In Text File 79, it was used to highlight violence amongst educators and students. Whereas in Text File 01, it highlighted that violence is largely experienced by black students more than other races. Adversative linking adverbial, rather, was used to indicate that instead of solving violence-related incidents, students are likely to tease and taunt each other. /*Rather/* was used differently in Text File 79, instead of punishment, perpetrators would be rehabilitated. Causal linking adverbial /*result/* as used in Text File 79 to highlight the negative consequences of violence that it may lead to poor academic performance. Sequential linking adverbial, firstly, second, for example and finally was used to provide information in a chronological order. The findings revealed that the additive linking adverbials were used most often, followed by adversative and sequential linking adverbials. The researcher of the current study considers the use of linking adverbials as containing the elements of Deleuzian and Guattarian (1987) principle of multiplicity because of the use of different linking adverbials in each Text File as shown above to connect ideas that may at times connect, disconnect, and reconnect. Some linking adverbials were used more than others, for example, one sequential linking adverbial, *first*, showed the highest rhizomatic usages (three times). Bikelienė's (2017) study found that *then* appeared in one in four files (23% and 25% respectively).

5.2.10 *AntConc* results for Topic 2: keywords frequency, concordance, and concordance plot

The results indicate that the students used similar key themes (*drugs*, *depression*, *negative*, *health*, and *cause*), but in a rhizomatic manner in their essays on Topic 2. According to the results, the key theme that had the highest rhizomatic usage was *drugs*, with 59 hits. It was used mostly to explain the negative effects of the use of drugs, and it was used most in Text Files 78 and 48, with 15 and 13 rhizomatic instances respectively. In Text Files 79, 91, and 69, *drugs* was used once.

Below are examples of rhizomatic usage of *drugs* in Text Files 78, 48, and 69:

In Text File 78:/*Drugs/*

> ❖ "Nowadays you cannot drive or walk on street of our township without seeing people using drugs in public, you can ask yourself if the police does operate in that area."

- ❖ "Parks and soccer fields are used for smoking zones and place of selling drugs, that is why I am surprised to see young people addicted from drugs."
- ❖ "it seems like community and police service are losing the this battle because nothing much is done about this crisis and police are no longer arresting the people using the drugs in the corners, while the drug seller are having concrete relation with the law enforcer, make it hard for them to enforce."
- ❖ "Drug addiction is not a hallmark of moral failure, it is a complex disease that deserves long-term, extensive treatment, just like any other chronic condition."
- ❖ "People who have not struggled with substance abuse may find it difficult to understand why anyone would start using. There are many reasons why some people start abusing drugs and everybody knows bad things can happen to drug users."
- ❖ -"A lot of people use drugs for their own silly reasons but some people take pharmaceutical drugs for mood or behaviour syndrome."

In Text File 69: *Drugs*

"Through depression you can end up drinking alcohol and using drugs."

The key theme *depression* 17 times in Text File 77, 12 times in Text File 69, and five times in Text File 67. Below are examples of rhizomatic usage of *depression* in Text Files 77, 69, and 67.

Text Files 48 and 69 share similar views in relation to drug use. The two Text Files (48 and 69) cites different causes of drug use. So, the two Text Files (48 and 69) are inter-related in terms of the similar thematic point of discussion that is presented. However, Text File 48 recommends that drug users be treated extensively as opposed to Text File 78 which does not recommends treatment but imprisonment for drug users. Therefore, the Text Files above illustrates the Deleuzian and Guattarian (1987) principle of a-signifying rupture because of some of the Text Files connect, disconnect, and reconnect in a continuous manner.

In Text File 77: */Depression/*

> ❖ "*Depression* is a disorder affecting mood, behaviour and general outlooks."
>
> ❖ "That's normal but when it starts to have impact on your daily activities, you may suffer from a mood disorder. And that could lead to *depression* because of the depressed mood."
>
> ❖ "On my first paragraph I will discuss postpartum *depression* causes and effects, on my second paragraph I will discuss psychotic depression causes and effects and on my third paragraph I will discuss medical conditions that can cause depression and the effects."

In Text File 69: */Depression/*

> ❖ "*Depression* is mood that causes a person to feel discouraged, lonely and sad."
>
> ❖ "*Depression* affects your health and it cause you to lose weight and focus."
>
> ❖ "Most people who have *depression* have low self-esteem and they end up killing themselves."

In Text File 67: */Depression/*

> ❖ "Ever since my cousin started taking mood disorder medication for *depression*, he has never been the same."
>
> ❖ "*Depression* is the most common type of mood syndromes that most people get diagnosed with."
>
> ❖ "Patients rated the likelihood that *depression* was caused by psychogenic causes (ongoing stressors and childhood adversity) and biogenetic causes (chemical imbalances and genetic problems)" - (Deacon, 2013)."

All the three Text Files above (77, 69, and 67) provides a similar definition of depression. Text Files 67 and 77 cite the mood disorder as one of the causes of depression. Text File 69 is different to the two Text Files (77 and 67) in that it highlights the negative consequences of depression such as weight loss, low self-esteem, and the likelihood of one

committing suicide. Most of the text files mentioned above are regarded as having the elements of the Deleuzian and Guattarian (1987) principle of connection in that they portray similar ideas which supersedes those that are not related.

/Cause/ was used to note the causes and consequences of drug use. *Cause* showed a rhizomatic frequency of 19 times across the essays on Topic 2. It was used seven times in Text File 77, five times in Text File 92, and once in Text Files 67 and 78. Below are examples of rhizomatic usage of *cause* in Text Files 77, 92, and 78:

In Text File 77: */Cause/*

> ❖ "During pregnancy when you feel less attractive or feel that you lost control over your life that can cause depression."
>
> ❖ "Afterbirth, a dramatic drop in your hormones (estrogen and progesterone) in your body may also be the cause of depression."

In Text File 92: */Cause/*

> ❖ "If medications are strong enough to alleviate symptoms then they are strong enough to cause aftereffects."
>
> ❖ "There are also many ways that people can take these medicines, I.e. injection, orally or inhalation, which can cause the effects to affect a person differently."
>
> ❖ "If a medication is taken incorrectly, it can cause serious consequences on the brain."

Text Files 92 and 77 use the key theme *cause* differently in that it focuses on different viewpoints. For example, Text File 77 attributes depression to pregnancy. In addition, the drop in hormones might also cause depression. In contrast, Text File 92 is concerned with the medication being the cause of the negative aftereffects. The Text Files above show the Deleuzian and Guattarian (1987) principle of a-signifying rupture because of the presentation of ideas and thoughts that are not related. Furthermore, it attributes the wrong medication dosage might affect the brain. Similarly, in the study conducted by Wijitsopon (2017), it was found that the keywords *some*, *many*, and *every* were amongst the top 25 function keywords in argumentative written samples by Thai students, compared to their native English speaker

counterparts. In view of the Deleuzian and Guattarian (1987) concept of lines of flight, ideas may disconnect and reconnects differently as was the case in the current study. This is in accordance with the results of the present study, which showed the different usages of the similar key themes to advance different ideas and thoughts.

5.2.11 *AntMover* results for Topic 2: structural moves

Research Question 2: What rhizomatic structural moves do first-year ENG53 students display in their Assignment 1 and 2 as presented by the *AntMover* software application?

The *AntMover* software application identified that the following classes in the essays on Topic 2:

1. Class 10: :*Announcing principal findings*
2. Class 11: *Evaluation of research*
3. Class 2: *Making topic generalisations* and
4. Class 9: *Announcing present research*

The results showed that the students used similar classes, but in a rhizomatic manner. Class 10, with 88 occurrences, had the highest frequency. In Text File 77, Class 10 appeared 18 times. The lowest rhizomatic instances were in Text Files 67 and 78, with eight instances each. The Text Files 67, 78, and 77 announce principal findings in different patterns. The three Text Files mentioned previously announce principal findings without referencing the findings from other studies, instead they present lived experiences as the principal findings. Each Text File announce its own principal findings from a differing point of view. Announcing principal findings in this way signifies the Deleuzian and Guattarian (1987) principle of a-signifying rupture because of the differences identified. Text File 67 is mainly focused on the negative side effects of drug use. Text File 78 is more concerned about the wide usage of drugs by the youth. Text File 77 provides a definition of depression and attributes depression to pregnancy. Below are examples of rhizomatic instances of /*Announcing principal findings*/ (Class 10) in Text File 77, 67, and 78.

In Text File 77: /*Announcing principal findings*/

> ❖ "You may feel on top today, you may feel down tomorrow, loose interest in activities or feeling sad."

> ❖ "Postpartum depression is a type of depression that occurs during pregnancy or after delivery."
>
> ❖ "It can happen few days or even months after childbirth."
>
> ❖ "Afterbirth, a dramatic drop in your hormones (estrogen and progesterone) in your body may also be the cause of depression."

In Text File 67: /*Announcing principal findings*/

> ❖ "What I want to examine in this essay are the negative side effects of using mood / behaviour syndrome drugs."
>
> ❖ "These negative side effects from mood / behaviour syndrome drugs have worse consequences in people's lives."

In Text File 78: /*Announcing principal findings*/

> ❖ "Nowadays you cannot drive or walk on street of our township without seeing people using drugs in public, you can ask yourself if the police do operate in that area."
>
> ❖ "Parks and soccer fields are used for smoking zones and place of selling drugs, that is why I am surprised to see young people addicted from drugs."
>
> ❖ "My problem is that drugs is killing the future of our young brothers and sisters in the society and badly affect their health."

Class 9 /*Announcing present research*/ showed minimal rhizomatic patterns (six times across the essays on Topic 2). It was used four times in Text File 77, and once in Text Files 51 and 92. No rhizomes were found in Text Files 48, 67, 69, and 78. The announcement of present research is made differently. Text File 51 makes recommendations to alleviate depression such as consulting a "specialist". Text File 92 highlights the negative effects of taking drugs. Text File 77 share one thematic point of discussion with Text File 51 which relates to the preventative measures against depression. Text File 77 associates medical conditions with being the major source of depression. In view of the Deleuzian and Guattarian (1987) principle of a-signifying rupture, the findings showed ideas that are unrelated.

Below are examples of rhizomatic instances of /*Announcing present research/* (Class 9) in Text Files 77, 51, and 92:

In Text File 77: /*Announcing present research/*

> ❖ "Medical conditions may also be the cause of depression."
>
> ❖ "Your health provider might prescribe antidepressants, antianxiety or antipsychotic medications for you."

In Text File 51: /*Announcing present research/*

> ❖ "We need help mentally, physically and spiritually, so speaking to a professional or a specialist would be the best."

In Text File 92: /*Announcing present research/*

> "For some, their effects are negative."

The highest occurrence of <u>Class 11</u> /*Evaluation of research/* was in Text File 67, with nine hits. Text Files 48, 77, and 78 each had seven hits. Text Files 69 and 92 had only four hits each. Below are examples of rhizomatic instances of *Evaluation of research* (Class 11) in Text Files 67, 48, and 92:

In Text File 67: /*Evaluation of research/*

> ❖ "There is a variety of causes for mood disorders, they may occur from substance abuse, high levels of stress, brain functions, low self - esteem, genetics, traumatic life events etc."
>
> ❖ "Patients rated the likelihood that depression was caused by psychogenic causes (ongoing stressors and childhood adversity) and biogenetic causes (chemical imbalances and genetic problems) '' - (Deacon, 2013)."
>
> ❖ "The first negative side effect is ineffectiveness; this is when the antidepressant drug does not fulfil its purpose."
>
> ❖ "The second negative side effect of these antidepressants is that adult patients experience sexual problems, it turns out that the mood syndrome drugs also affect the persons sexual life either mentally or physically or in some cases, both ways."

In Text File 48: /*Evaluation of research*/

> ❖ "They can feel a little braver, stronger, a little smarter, more beautiful or more important."
> ❖ "It is no secret that drugs change the way you feel; this is why they are so attractive to young people despite their dangers."
> ❖ Pharmaceutical remedies might help one escape their reality, but they can become addictive and drug addiction is such a difficult disease to overcome because drug abuse actually changes the brain."
> ❖ "Drugs produce a sensation of pleasure because of how they act in the brain."

In Text File 92: /*Evaluation of research*/

> ❖ "Its vitally important that when getting treatment, you tell your doctor all the information they ask for, correctly, i.e. all your medications / vitamins you are currently one, your allergies to medications."
> ❖ "When taking mood stabilizers, they generally have great advantages such as reducing symptoms of mania and stabilize mood swings and even prevent relapses yet not everyone receives these symptoms."

Text Files 67, 48 and 92 above are concerned about the causes and the after-effects of drugs. The three Text Files above signify the Deleuzian and Guattarian (1987) principle of connection because they are all interrelated and interconnected because they focused on the after-effects of using drugs such as relieving stress and for pleasure. This is evident in the use of phrases such "stabilize mood swings" in Text File 92; "change the way you feel" in Text File 48" and this shows that users of drugs use drugs to boost their mental state of being. Similarly, Text File 67, highlights the reasons why users take drugs, and this is evident in the use of words such as low self-esteem, trauma and stress in general. Text File 67 used in-text citations to evaluate research by linking it with the lived experiences to highlight similarities regarding the reasons why people use drugs. In contrast, Text Files 48 and 92 mainly focuses on lived experiences regarding the common knowledge of why people use drugs as their evaluation of research.

Class 2 /*Making topic generalisations*/ appeared five times each in Text Files 69 and 77. In Text Files 51 (four times) and 92 (three times). The three Text Files (69, 51, and 92) below make topic generalisations similarly. Text File 69 highlights the effects of depression. Text File 51 is focused on the need for professional or self-medication. Text File 92 highlights the after-effects of using drugs. The ideas presented in the Text Files above are connected as espoused by the Deleuzian and Guattarian (1987) principle of connection which is focused on the sameness and interrelatedness of ideas presented in written text. The findings of the current study were similar to that of Mauludini et al. (2020) who found that Move 4 (*Introduction, Purpose, Method, Product*) was highly used in dissertation abstracts of English and Indonesian data groups. In addition, Mauludini et al. (2020) reported that there were no significant differences between the two groups.

Below are examples of rhizomatic instances of /*Making topic generalisations*/ (Class 2) in Text Files 69, 51, and 92:

In Text File 69: /*Making topic generalisations*/

> ❖ "Depression is mood that causes a person to feel discouraged, lonely and sad.
> ❖ *"It also changes your behaviour because you also isolate yourself from everyone else."*
> ❖ "Most people who have depression have low self - esteem and they end up killing themselves."

In Text Files 51: /*Making topic generalisations*/

> ❖ The above extract holds up the notion that says medicating ourselves is a good thing to do because it helps regulate a person."
> ❖ "The extract presumes that 1 "…drugs are in vogue because they have shown themselves spectacularly effective …"
> ❖ "Various genetic, biological, environmental, and other factors have been associated with mood disorder."

In Text File 92: /*Making topic generalisations*/

> ❖ "If medications are strong enough to alleviate symptoms, then they are strong enough to cause aftereffects."
>
> ❖ "Each drug will have a different reaction accordingly to which drug it is."

5.2.12 *AntConc* results for Topic 2: linking adverbials

The present study found that additive linking adverbials were used more often than other types of linking adverbials. Three additive linking adverbials were used, namely /*also/*, /*for* /*example/*, and /*that is/*. /*Also/* showed 16 rhizomatic instances in essays on Topic 2. It was used seven times in Text File 69, in Text File 78 (three times), in Text Files 77 and 67 (two times each) and once in Text Files 92 and 48. /*For example/* was used once in Text File 92. *That is* had one rhizomatic instance, in Text File 78. Below are examples of additive linking adverbials /*also, for example,* and *that is*/ used in a rhizomatic manner (in Text Files 69, 78, 77, and 92:

In Text File 69: */Also/*

> ❖ "It also changes your behaviour because you *also* isolate yourself from everyone else."
>
> ❖ "Depression can *also* be caused by your family history or someone you truly trust."
>
> ❖ "It can also affect your heart resulting in heart attack, it can *also* affect your brain when it comes to remembering things and have difficulties with making decisions."
>
> ❖ "Its technically a mental disorder but it *also* physical health and wellbeing."

In Text File 78: */Also/*

> ❖ drugs like dagga may cause increase of heart rate while lowering blood pressure and that make you feel relaxed and happy, however can *also* lead to lethargy, anxiety, paranoia, and psychosis."

❖ - "Drug use can *also* result in long-term health outcomes that include: harm to organs systems in your body, such as your throat, stomach ,lungs. liver, pancreas, heart, brain, nervous system [Better health,2020]."

In Text File 77: */Also/*

❖ "Afterbirth, a dramatic drop in your hormones (estrogen and progesterone) in your body may *also* be the cause of depression."

❖ "Medical conditions may *also* be the cause of depression."

In Text File 92

❖ "Long term use of drugs has some serious effects on your health."

In Text File 92: */For example/*

❖ Some medications have effects on internal organs, *for example* Lithium can be harmful to one's kidneys if a high dosage is taken."

In Text File 78: */That is/*

❖ "Parks and soccer fields are used for smoking zones and place of selling drugs, *that is* why I am surprised to see young people addicted from drugs."

Four types of adversatives linking adverbials */actually, despite, however,* and *nevertheless/* presented in a rhizomatic manner across the essays on Topic 2. All the adversative linking adverbials were used once in Text Files 48, 78, and 51. For example:

In Text File 48: */Actually; Despite /*

❖ "Pharmaceutical remedies might help one escape their reality, but they can become addictive and drug addiction is such a difficult disease to overcome because drug abuse *actually* changes the brain."

❖ "It is no secret that drugs change the way you feel; this is why they are so attractive to young people *despite* their dangers."

In Text File 78: */However/*

❖ "Drugs like dagga may cause increase of heart rate while lowering blood pressure and that can make you feel relaxed and happy, *however it* can also lead to lethargy, anxiety, paranoia, and psychosis."

In Text File 51:*/Nevertheless/*

❖ "This clearly shows that the extracts support the use of drugs nevertheless, my essay is going to traverse the negative effects of using drugs for mood or behavior symptoms, particularly for people who deficit disorders."

Two causal linking adverbials, */result and then/* were identified, which manifested various rhizomatic patterns. */Result/* and */then/* were used once in Text Files 67 and 92. For example:

In Text File 67:*/ Result/*

> ❖ "Ineffectiveness is a negative side effect as this *results* in patients stopping their treatment in the early stages of their antidepression therapy and that would leave the problem untreated and sometimes make it worse."

In Text File 92: */Then/*

> "If medications are strong enough to alleviate symptoms, *then* they are strong enough to cause aftereffects."

Furthermore, the essays presented three sequential linking adverbials, namely, */first, second*, and *then/*. All the linking adverbials were used once in Text Files 67, 77, and 92. For example:

In Text File 67: */First/*

> ❖ "The *first* negative side effect is ineffectiveness; this is when the antidepressant drug does not fulfil its purpose."

in Text File 77: */Second/*

> ❖ "On my first paragraph I will discuss postpartum depression causes and effects, on my second paragraph I will discuss psychotic depression causes and effects and on my third paragraph I will discuss medical conditions that can cause depression and the effects."

In Text File 92: */Then/*

> ❖ "If medications are strong enough to alleviate symptoms then they are strong enough to cause aftereffects."

The linking adverbials in the current study were used to connect ideas but in different ways and this signify the element of the Deleuzian and Guattarian (1987) principle of multiplicities as portrayed in this study. The additive linking adverbials were used more than the other types of linking adverbials and this corroborates with the findings of the other studies conducted which focused on the use of linking adverbials in written texts. Similarly, Youngdong (2020) found that Korean Master's students used five additive, two adversative, two causal, and one sequential linking adverbial in their written samples. In contrast, Dutra et al. (2017) found overuse of /*beside/s* and underuse of /*also/* in the written samples of Brazilian students, compared to their American English native speaker counterparts.

5.2.13 *AntWordProfiler* results

Research Question 4: What is the readability index of Assignment 2 as assessed by the *AntWordProfiler* software application?

The essays on Topic 1 had an average complexity level of 92.9%, which indicated that all the essays were comprehensible and easy to read. A total of 77.8% of the essays were categorised under Level 1 wordlists, whilst 7.1% fell under Level 0, which meant that the essays did not fall under any of the wordlists that were used. Essays on Topic 2 recorded a different rhizomatic readability comprehension average (85.5%). The average meant that all the essays on Topic 2 were also comprehensible and readable. A total of 72.4% were categorised under Level 1 wordlists, and 14.6% were not classified under any of the wordlists. Halim (2018) found that students registered in the English Language and Culture Department had low lexical richness, because none scored 0.5 in the type–token ratio. Halim (2018) revealed that the students used the same vocabulary repeatedly. In another similar study, Indarti (2021) found that the average of tokens produced by male versus female students differed significantly. Indarti (2021) discovered that, in the 30 essays written by University of Bina Sarana Informatika students registered in the English Department, female students scored lower (0.60) type and type–token ratio, compared to their male counterparts' 0.55.

The next section discusses the results for Research Question 3.

Research Question 3: What engagement patterns do first-year ENG53 students display in interacting on *myUnisa*'s ODF and *MS Teams* in terms of message posts per activity and the frequencies of their online interactions according to *MS Power BI* and *Gephi* visuals?

5.2.14 Interpretation of *myUnisa* ODF interactions

The students' interactions showed rhizomatic key themes, for example, /*assignment*, *good*, *find*, *results*, *and MCQ*/, in the process of posting queries on the *myUnisa* ODF. The results revealed that students queried /*assignment*/ (with 46 hits), and it was ranked the highest (sixth) of all the key theme that presented. In addition, /*results*/ ranked 12th, with 12 rhizomatic instances across the submitted queries. Siemens (2013) advises employing learning analytics concept would enable scholars to explore the academic literacy behaviours of students on learning management system of higher learning institutions. Chaka and Nkhobo' s (2019) study found that a lecturer was more active than the students, as he was the one asking questions meant to guide students to the correct answers. In contrast, Ratnapala et al. (2014) Ratnapaala et al. (2014) found that most of the students were not motivated to do self-learning on Moodle. Bagarinao' s (2015) study found that students portrayed different patterns in their online interactions. Estacio et al. (2017) found that students engaged in different online interactions. A study conducted by Zappa-Hollman and Duff (2015) discovered that the connections and interactions had using social media contributed positively towards her academic progress. Similarly, Bagarinao (2015) found that undergraduate students of science, technology, and society students at an open university in the United Kingdom visited pages that would assist them to complete academic tasks. This finding corroborates with the findings of the current study in that students were more concerned about assignments and the results because they contributed towards their final marks. The findings of the current study signify the Deleuzian and Guattarian (1987) principle of a-signifying rupture because of the different queries that were not related.

5.2.15 Interpretation of MS Teams interactions

The results showed that the participants with the highest rhizomatic posts were *noa* and *ane*, with six and five posts respectively. Microsoft Teams in the current study was used for teaching and learning purposes especially for hosting virtual sessions. Similarly, Sharapova (2019) posits that *MS Teams* can be used for teaching and learning purposes. Participants *gwe*, *apo*, *si*, *nya*, and *iso* had a rhizomatic frequency of one post. Participants /*azi*, *iti*, *eni*, *tul*, and *uli*/ did not post anything on *MS Teams*. Lecturer /*an*/ replied 14 times to students' posts, and /*kek*/ replied 10 times. In the same vein, in Martin et al.'s (2019) study, they found students reacted positively towards the use the Microsoft Teams. Participants /*ngu*, *uta*, *ezi*, *ini*, and

lis/ replied once*, /ran/* posted five reactions, and participants /*osi, nya, bo, ema*, and *la/* did not post any reactions. Onah, Sinclair, Boyatt, and Foss (2014) discovered that the use of online forums encouraged students to participate in such forums and contributed to their academic success. The study by Buchal et al. (2019) also recorded positive reactions by students in their use of *MS Teams* for teaching and learning purposes, and most of them had few difficulties making use of the online platform. Park et al. (2014) advocates for the use of prediction and data-mining strategies in the blended learning curriculum. The use of corpus analysis software will enable teachers to explore key themes in students' written sample and they also be used to analyse massive datasets. This can be integrated in the syllabus of the ODeL especially in the module under study to explore key themes, sentence structures and transitional expressions in student writing.

5.3   Recommendations Emanating from the Current Study

In view of the interpretation and discussion of results, recommendations are presented in the following section.

Online student writing analysis software applications such as *AntConc, AntMover*, and *AntWordProfiler* should be used in various modules to enable students to explore rhizomatic patterns in their own writing samples. The use of these analysis tools will not only enable students to trace patterns in their writing but could enable them to critique and assess their own writing patterns in line with a given topic or points of discussion. Institutions of higher learning should also adopt such student writing software applications, to enable them to understand how their students write and study their writing patterns. In addition, the adoption of such writing tools will also enable institutions of higher learning to introduce rhizomatic perspectives in their own programmes for student writing.

The *AntConc* software application should be used to study other aspects of student writing, whilst the *AntMover* software application should be used to study patterns inherent in students' written samples, in order to determine how students, introduce, support, and close their arguments. Most importantly, student writing should not be viewed from a deficit perspective, only but also from a rhizomatic perspective, using the above-mentioned tools. Students could be assessed using the same tools that reveal rhizomatic patterns in their written samples. Furthermore, institutions of higher learning and students alike could assess other

aspects of academic writing, such as features of academic language, by mapping rhizomatic patterns in their writing.

5.4   Implications of the study

The findings of this study cannot be generalised, due to the small sample size. The rhizomatic patterns may not appear in the same way if explored using other online writing tools. In terms of assessment, rhizomatic patterns that are discovered will have to be assessed using appropriate rhizomatic pattern rubrics. Adopting a rhizomatic perspective in teaching and learning would require the recalibrating of conventional methods of teaching and learning. Implementing a rhizomatic approach to teaching and learning in institutions of learning may not be easy, because of the existing mainstream writing approaches having been used and researched extensively for many years, some of which view student writing from a deficit perspective (Lea & Street, 1998; Wingate, 2012).

Introducing online writing tools in the teaching and learning of writing may not be realistic and workable for students who are located in deep rural areas without reliable resources in the form of network coverage and digital devices. In addition, the use of such online analytic tools would be disadvantageous for students who do not possess the required computer skills to use the tools effectively. Lastly, it is possible that some of the participants in this study did not have the necessary skills to use the *myUnisa* ODF and *MS Teams* effectively.

5.5   Limitations of the Study

The researcher employed the convenience sampling technique to select 60 students' writing samples, of which only 28 were deemed relevant and usable. This study also explored the students' interaction patterns on the *myUnisa* ODF and *MS Teams*. While the convenience sampling technique was espoused by a few scholars (e.g., Chistensen et al., 2015:170; Richards et al., 2012:332-333; Riazi, 2016:60), the small size of the sample prevents generalisability of the results. Time available to conduct the study was another limitation. Despite these limitations, this study contributes to the body of knowledge on student writing through the application of a rhizomatic perspective.

5.6   Significance of the study

The significance of this study lies in the use of a rhizomatic perspective. It thus provides a different perspective to student writing, one which is not consistent with conventional linear models of academic writing. Specifically, the significance of this study lies in the contribution it intends making to the area of learning analytics, and especially to writing analytics as it relates to the module ENG53, which is offered by the Department of English Studies at the university under study.

5.7   Recommendations for future research

The rhizomatic patterns of student writing should also be explored by means of other corpus analysis software applications, such *Wmatrix* and *WordSmith*, amongst others. In order to yield generalisable results, a larger sample of participants and texts could be studied in future research, and researchers could also conduct longitudinal studies across more modules and departments. Researchers could also study other academic language features in students' written essays. Researchers could also explore how students use tools employed in this study to analyse rhizomatic patterns in their writing, for example, how they formulate and support their arguments. In addition, further research should be conducted to explore reference styles of students, as well as how they introduce and conclude their essays.

5.8   Conclusion

Corpus analysis is gaining traction, and online tools are increasingly used to study patterns in students' writing. These tools should not be used only for research purposes. However, should form part of programmes to enhance student writing, as alternative approaches to teaching academic writing in higher institutions of learning. This study revealed that, even though students use similar key themes in their writing samples, they used these in various rhizomatic ways and patterns. Their online interaction patterns were also found to be rhizomatic, in that they engaged on various issues on online platforms with various rhizomatic frequencies. Structural moves in students' written samples presented variant rhizomatic patterns. Moreover, the rhizomatic patterns in students' written samples and their online interactions revealed rhizomatic visualisations on both the *MS Power BI* and *Gephi* software applications.

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6. Appendices

6.1 Appendix A: University of South Africa Approved Ethical Clearance Certificate

UNISA | university of south africa

RESEARCH PERMISSION SUB-COMMITTEE (RPSC) OF THE SENATE RESEARCH, INNOVATION, POSTGRADUATE DEGREES AND COMMERCIALISATION COMMITTEE (SRIPCC)

2 April 2020

Decision: Research Permission Approval from 2 April 2020 until 31 December 2020.	Ref #: 2020_RPC_009 Mr. Tlatso Ishmael Nkhobo Student #: 59141654 Staff #: N/A

Principal Investigator:
    Mr. Tlatso Ishmael Nkhobo
    Department of English Studies
    School of Arts
    College of Human Sciences
    nkhobti@unisa.ac.za; 012 429 8332, 078 191 8455

Supervisor: Prof Chaka Chaka, chakacp@unisa.ac.za; 012 429 3477

      Exploring instances of Deleuzian Rhizomatic patterns in student writing and online interaction at an Open Distance e-Learning institution in South African.

Your application regarding permission to conduct research involving UNISA employees, students and data in respect of the above study has been received and was considered by the Research Permission Committee (RPC) of the UNISA Senate, Research, Innovation, Postgraduate Degrees and Commercialisation Committee (SRIPCC) on 26 March 2020.

It is my pleasure to inform you that permission has been granted for the study. You may:

1. Recruit 100 students registered for ENG1503 in this study by means of MyUnisa.

2. Request the student participants to write 2 essays (one discursive and the other expository) of about 600 words and submit them via the J-Router. The same students may also be asked to give short answers of about 192 words on 3 activities done on 3 online platforms: MyUnisa discussion forum, WhatsApp and Padlet.

3. Analyse the students' online presence with respect to their online presence patterns in

Open Rubric

terms of dates and times of logins, message posts per activity, time spent on an activity, and the frequency of engaging in an activity on three online platforms.

4. In order to observe the stipulations of the Protection of Personal Information Act No. 4 of 2013, the committee cannot grant the researcher permission to gain access to the participants' personal information as requested in the application. Instead, the committee recommends that the researcher should request this information directly from the participants and make this information part of the data collection instrument.

You are requested to submit a report of the study to the Research Permission Subcommittee (RPSC@unisa.ac.za) within 3 months of completion of the study.

The personal information made available to the researcher(s)/gatekeeper(s) will only be used for the advancement of this research project as indicated and for the purpose as described in this permission letter. The researcher(s)/gatekeeper(s) must take all appropriate precautionary measures to protect the personal information given to him/her/them in good faith and it must not be passed on to third parties. The dissemination of research instruments through the use of electronic mail should strictly be through blind copying, so as to protect the participants' right of privacy. The researcher hereby indemnifies UNISA from any claim or action arising from or due to the researcher's breach of his/her information protection obligations.

Note:

*The reference number **2020_RPC_009** should be clearly indicated on all forms of communication with the intended research participants and the Research Permission Subcommittee.*

We would like to wish you well in your research undertaking.

Kind regards,

Dr Retha Visagie – Deputy Chairperson
Email: visagrg@unisa.ac.za, Tel: (012) 429-2478

_____

Prof Lessing Labuschagne – Chairperson
Email: llabus@unisa.ac.za, Tel: (012) 429-6368

6.2 Consent form

CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the written essays, short paragraphs on the *my*Unisa's discussion forum, and Microsoft Teams and the occurrence of rhizomatic patterns revealed in the engagement or interaction patterns on the above online platforms during the discussion of short paragraph activities

I have received a signed copy of the informed consent agreement.

Participant Name & Surname………………………………………… (please print)

Participant Signature…………………………………………..Date…………………

Researcher's Name & Surname……………………………………(please print)

Researcher's signature…………………………………………..Date…………………