Chapter 13: Excellence in Supervision is a Function of Relevant Models

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Abstract

Interrogating or analysing supervision models is important because it helps supervisors and students identify and understand the research needs and identities that drive their research actions. Supervision models are categorised into structured, unstructured, and semi-structured types. Although supervisors in South Africa have used supervision models to improve postgraduate throughput rates, they have not helped South Africa to produce one hundred doctoral graduates per one million people. Producing one hundred doctoral graduates per one million people is the South African target for 2030 as stipulated in the National Development Plan of 2030. Higher education institutions (HEIs) are expected to produce at least five thousand doctoral graduates yearly. HEIs in South Africa produce fewer than two thousand doctoral graduates per year. This course of concern motivated me to explore and analyse supervision models used by postgraduate supervisors at a HEI in South Africa. This study used the pragmatic paradigm, action research, and digital national identity framework to frame document analysis, reflective activities, observations, focus group discussions, and semi-structured interviews as the data collection methods. The study further used purposive sampling with convenience sampling to select twenty postgraduate supervisors from a HEI in South Africa. The findings indicate that the dominance of the structured and unstructured models has generated tension between them that needs to be addressed by a semi-structured model, which is capable of creating a space for digital self-reflectivity before supervision processes take place. It is for this tension that this study explored and analysed supervision models used in South Africa. A semi-structured model concentrates on actions, beliefs behind the actions, and the consequences/outcomes of supervision. This study,

therefore, recommends the application of a semi-structured model and awareness of natural forces/laws that promote natural actions, thus addressing personal and natural needs.

Keywords: Digital technology; structured; semi-structured; supervision interface; unstructured;

Introduction

Interrogating supervision models is important because it helps supervisors and students to find and understand their supervision and research needs and identities that drive their supervision actions (Khoza 2024; Zafar *et al.* 2021). Supervision takes various types of models that positively or negatively influence the performance of supervisors and students (Clegg 2008; Saidi 2024). Supervision models are categorised into structured, unstructured, and semi-structured. Structured and unstructured models dominate and result in compromising the space of a semi-structured model, which allows supervisors and students to self-reflect and critique with accountability (Abiwu 2024; Kidman *et al.* 2017). Supervision models generate certain identities for supervision, especially when they self-reflect based on a semi-structured supervision model (Castelló *et al.* 2017; Manathunga 2023; McAlpine *et al.* 2014).

Although supervisors in South Africa have used supervision models to improve postgraduate throughput rates, they have not helped South Africa to produce one hundred doctoral graduates per one million people (Cilliers & Camp 2013; Oh 2021). Producing one hundred doctoral graduates per one million people is the South African target for 2030 as stipulated in the National Development Plan of 2030. Higher education institutions (HEIs) are expected to produce at least five thousand (5000) doctoral graduates yearly (Isike & Ogunnubi 2017; Matyana & Thusi 2023). HEIs in South Africa produce fewer than two thousand doctoral graduates per year (Blom *et al.* 2023). This course of concern motivated me to explore and analyse supervision models used by postgraduate supervisors at a HEI in South Africa. This study may be useful to HEIs, supervisors, students, research/postgraduate administrators, policy developers, and other HEI stakeholders. The first contribution may begin with the participants when they begin the self-reflection process through this study.

In the process of exploring supervision models, the following research questions are addressed:

A. What supervision models do postgraduate supervisors use in supervising postgraduate students (descriptive)?

B. How do postgraduate supervisors use the supervision models (operational)?

C. Why do postgraduate supervisors use the supervision models in particular ways (philosophical)?

The structure of the chapter is as follows:
Discussions on supervision models, natural identity framework (NIF), Research Design with Methodology (pragmatic paradigm, mixed methods approach, participatory action research (PAR), purposive with convenient sampling, document review, participant observation, semi-structured interviews, reflective activities, validity, thematic analysis, ethics), findings with discussions, and conclusion with implications.

Supervision Models

A desktop or systematic review qualitative study conducted by Milne *et al.* 2008) on an approach to construct a basic supervision model produced an inductive (*unstructured*) supervision model. This study reveals that almost all supervision models are operationally driven and only address the how questions of supervision because of the lack of empirical evidence (Manathunga 2023). This study is supported by research conducted by Prasetia *et al.* 2022) on collaborative-based supervision models (unstructured), revealing that flexibility and adaptive facilitated group work to achieve research outcomes are drivers of these models. In other words, students and supervisors can have informal interaction at any time, anyhow, and anywhere if they follow unstructured models. Studies (Bäckryd 2022; Kemp *et al.* 2014; Makumane *et al.* 2022; Morgado *et al.* 2024; van Schalkwyk *et al.* 2016) argue for the use of digital technologies for interaction since the Fourth or Fifth Industrial Revolution (4/5IR) technologies are flexible and adaptive.

Digital technology is a user interface developed and used by humans to represent their truth for survival based on their unique needs of space and time (Prakash *et al.* 2021). The 4/5IR is a space and time that began at the turn of the 21st century with digitalisation and personalisation of supervision activities (Sarfraz *et al.* 2021). The digitalisation process promoted nonlinear user interfaces of supervision, while the personalisation process promoted self-reflections that help supervisors to understand the founders of the user interfaces they used with the ideologies of the founders. The 4/5IR was formed by the staggering confluence of emerging technology breakthroughs, covering wide-ranging fields such as artificial intelligence (AI), the internet of things (IoT), robotics, autonomous vehicles, nanotechnology, biotechnology, 3D printing…. . Some of the technologies have influenced supervision models with their flexibility.

For example, in 2022, Sam Altman developed a Chatbot Generative Pre-trained Transformer (ChatGPT) through OpenAI as a user interface trained on a large amount of text to produce human-like language outcomes through dialogues. Sam's ideology (identity) was that whatever knowledge we needed existed in the world database and was accessible through a relevant user interface/technology. Although ChatGPT has been used worldwide (Haman & Školník 2024; Rahman *et al.* 2023), most end users are not aware of Sam's ideology of knowledge, and the truth (circuits, pixels, etc, used to produce it) of this user interface, which they have used for their research survival needs. The majority of the end users' needs are to use ChatGPT for basic research needs (search for information) without necessarily knowing its truth/objective reality which is only known by Sam and he cannot also give the users the objective reality (he lacks this ability) except for what they can use for survival (Fields *et al.* 2018). However, unstructured models may have enough room for academic dishonesty and ambiguity of responsibilities and expectations (Blair & Guan 2021; Dinov 2020). For example, students may use AI technologies to write their research work and submit it to their supervisors as if it were their original work.

As a result, other supervisors have opted for *structured supervision models* because they prescribed specific stages of research where students' progress can be tracked against established criteria, and supervisors give feedback based on formally planned and scheduled meetings, workshops, training sessions, and/or seminars/webinars. Structured supervision models were promoted by the automation of the Third Industrial Revolution (3IR), where quantitative studies were dominating (Sarfraz *et al.* 2021). HEIs mostly

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have prescribed templates with stages to strictly use by supervisors and students when they opt/agree to follow a structured supervision model. Some common stages are research proposals with literature review, framework, research design with methodologies, and others.

Some of the digital technologies that are mostly organised and introduced to students to access research knowledge are search engines such as Google Scholar, YouTube, EndNote, Grammarly, Zoom, and others (Haleem *et al.* 2022). Google Scholar is useful in verifying information from other digital technologies, including ChatGPT. YouTube is a website for uploading, sharing, and viewing online videos invented by Steve Chen, Chad Hurley, and Jawed Karim on the 14th of February 2005. Supervisors and students (end users) can create their own YouTube accounts and upload/share online videos on their opinions to address their needs. When the videos are published, they need to be referenced when they are cited. There are various reference management digital technologies, such as EndNote.

In 1988, Rich Niles developed EndNote to assist researchers with referencing and citations, especially for structured models. It requires users to create an error-free library to produce structured results. This suggests that EndNote is driven by structured models that require users to follow specific, prescribed steps (Branch 2020; Makafane & Chere-Masopha 2021).

Another structured-driven digital technology is Grammarly because it promotes authentic English and discourages sanitised English (Kim & Kim 2021; Kristiani & Pradnyadewi 2021; Mthembu & Khoza 2024). Grammarly was developed by Max Lytvyn, Alex Shevchenko, and Dmytro Lider during their time at the International Christian University in Ukraine. They first developed My DropBox, a plagiarism-detection company that inspired the idea for Grammarly. Dmytro Lider, as a software engineer, made Grammarly available under a freemium model with the option to purchase upgraded versions. In other words, Grammarly detects both similarities and sanitised English that need to be corrected by the users. Research issues may be discussed through Video Communication Digital Technologies (VCT) such as Zoom (developed by Eric Yuan in April 2011), Skype (invented by Niklas Zennstrom, Janus Friis, and four Estonian developers to be released in August 2003), Microsoft Teams (Bill Gates decision of 14 March 2017), WhatsApp (invented by Brian Acton and Jan Koum in February 2009), etc.

Like theories as user interfaces that represent their founders' unique ideologies and needs, digital technologies do the same. The founders of digital technologies are aware of the powers of identities carried by each of those

theories/digital technologies, which shape people according to the founders' ideologies. As a result, founders of digital technologies keep reflecting on their unique experiences and need to produce and promote their unique digital technologies to be used by other people who cannot invent their own unique digital technologies. For example, Eric Yuan invented Zoom VCT while Skype was still active, and Bill Gates advocated for Microsoft Teams. At the same time, end users still actively used Zoom because they felt the VCTs did not represent their unique needs. The same was observed when Pavel Durov invented Telegram in March 2013, while WhatsApp, founded by Brian Acton and Jan Koum in February 2009, is still actively used by end users as a communication interface (Khoza 2020; Putri & Sari 2020).

However, if digital technologies are used for *semi-structured supervision models*, they are selected and used based on the needs of both the supervisors and students. Supervisors and students first reflect on their experiences to understand their unique needs that should drive digital technologies. In other words, semi-structured supervision models may be dominated by qualities of structured, unstructured, or both models because they are based on unique individual needs.

This suggests that while end users of digital technologies or theories are not aware of the truths/objective realities of digital technologies/theories the inventors/founders/developers are aware of the powers of the identities represented by digital technologies and decide to produce their new unique ones to avoid being controlled by those represented ideologies (Prakash *et al.* 2021). However, for end users, the truth/objective reality about digital technology or theory may not be important if it helps them survive at their experience level because they may not have time to reflect on their experiences and understand their need to be aligned with such digital technology. As a result, end users are easily controlled by the ideologies of the inventors of digital technologies or theories they may not be aware of, because they may not reflect and understand their needs before they use the digital technologies.

However, a study conducted by Makumane *et al.* 2024) on decolonising educational technology argued that even if end users are closer to the truth about digital technologies, they may not always use digital technologies to achieve one hundred percent (100%) outcomes. They may not reach 100% because outcomes or consequences of human actions are naturally driven (Khoza 2023). For this reason, the outcomes/consequences of actions are naturally driven, and this study uses a natural identity framework (NIF) to frame this study.

Natural Identity Framework (NIF)

NIF (Figure 1) is underpinned by three main identities (professional, societal, and personal) and connecting concepts (formative, peer, and summative assessment) (Khoza 2024).
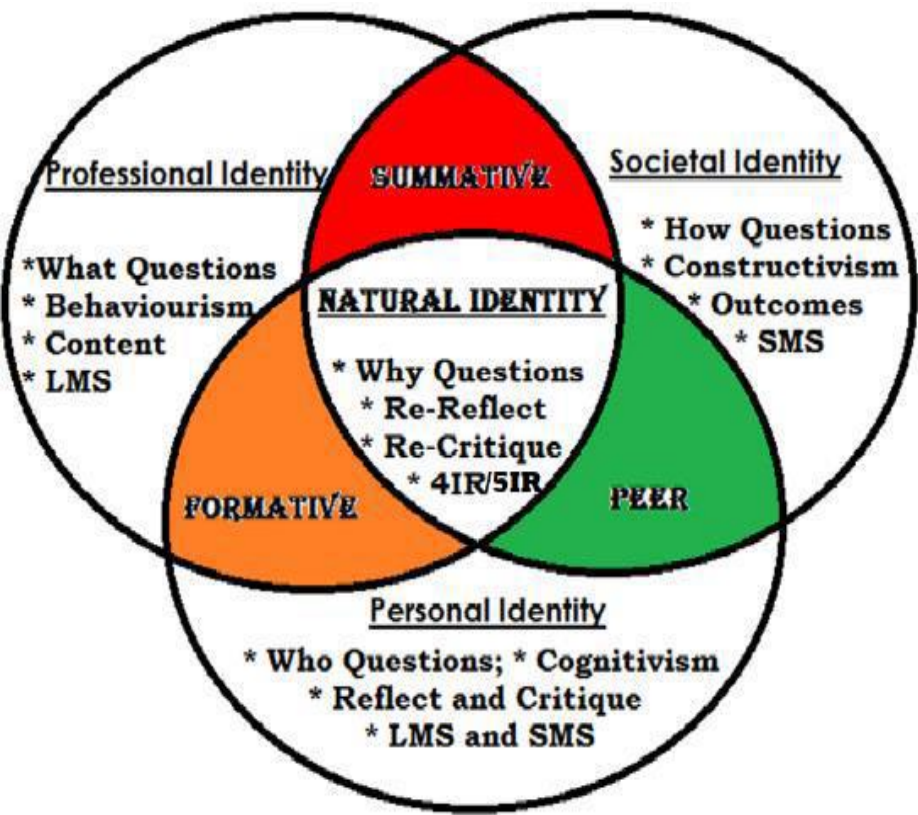

Figure 1: Natural Identity Framework (NIF) (Khoza 2023: 859)

Professional identities are the positioning of researchers who strictly follow HEI-prescribed stages/steps of conducting research. Professional identities address the 'what descriptive questions' of research through research-prescribed content, behaviour (roles, responsibilities, expectations, etc), summative assessment (assessment of learning), and resources such as the

university learning management system (LMS) and other prescribed digital technologies. Professional identities position supervisors and students within structured supervision models through their principles and summative assessment (Branch 2020; Makumane *et al.* 2024). Summative assessment is used to grade students' work to the next level and establishes what may be cognitively not be mastered by the students. It also connects professional identities with societal identities.

Societal identities are the positioning of researchers to follow the opinions of people (societies) when conducting research. Societal identities address research's 'how operational questions' by constructing research based on everyday knowledge and achieving research outcomes (Zuma *et al.* 2022). Societal identities position supervisors and students within unstructured supervision models through their principles, peer assessment (assessment as learning), and mostly social media sites (SMS). SMSs are mostly used to facilitate research processes through peer assessment (group work) (Branch & Lee 2020). Peer assessment connects societal identities to personal identities.

Personal identities position researchers to follow people's opinions or HEI-prescribed stages/steps when conducting research. In other words, personal identities may promote structured and unstructured supervision models by using both strengths in research. Personal identities address the 'who personal questions' through reflection, critique, and formative assessment that connect them to professional identities. Personal identities concentrate on the cognitive processes of researchers. NIF argues that HEIs have used the supervision models (structured, semi-structured, and unstructured) influenced by relevant identities to improve the postgraduate student throughput rate (Khoza 2023). Still, HEIs have not achieved a 100% throughput rate. NIF concludes that the 100% throughput rate is not achievable because consequences or outcomes of individual actions are uniquely and naturally driven to address the why philosophical questions.

This suggests that while supervisors and students optimise their research actions, they should be aware that the natural forces/laws have the final say in the outcomes of the actions. This further suggests a natural identity as another that influences the supervision models that need to be interrogated. Natural identities are cognitive (conscious, subconscious, unconscious) ongoing processes/systems of reflection and critique of subconscious thoughts by the conscious mind to produce individual desirable values that assist individuals in accepting outcomes as functions of natural identities (Khoza 2023).

Research Design and Methodology

This chapter used a pragmatic paradigm that frames abductive, retroductive, or retrodictive reasoning and a mixed-methods approach (qualitative and/or quantitative). A pragmatic paradigm focuses on human actions that emerge from individual past experiences and beliefs (Morgan 2014a). The meaning of actions and beliefs is found in their outcomes, which predict future actions, beliefs, and outcomes. Human actions intrinsically, uniquely, and naturally evolve at every turn. Each human has unique needs that require self-reflection to understand one's identity for the task. This suggests multiple realities based on the unique human needs that may be accommodated by a mixed methods approach that allows both qualitative and quantitative approaches in action or one of them based on the unique needs of the situation to be addressed (Creswell & Creswell 2018). This approach is supported by participatory action research in this study, which involves planning, action, observation, and reflection stages (Cohen *et al.* 2018).

The planning stage mostly addressed the first research question (descriptive) through document review and focus group discussion. Documents that were analysed were supervisors' teaching portfolios that carry what the supervisors used for supervision, teaching, and research. Analysis was based on NIF principles. The action and observation stages addressed the second research question (operational) through participant observation. The reflection stage addressed the third research question (philosophical) through reflective activities and semi-structured interviews. The data collection methods were conducted twice, each for approximately an hour. All the data collection methods were based on the NIF principles. Only two cycles/phases of participatory action research (PAR) were performed on twenty purposively and conveniently sampled participants from a HEI in South Africa. However, only three (data saturation) of the twenty (20) narratives are reported in this study using narrative analysis, while graphs represent all the 20 participants. Pseudonyms (Supervisor 1 - 20) (Table 1) were used to represent the participants' real names to observe ethical principles (confidentiality, anonymity, voluntariness, etc).

Population

The participants consisted of three full professors, one lecturer, eleven associate professors, and five senior lecturers. Years of experience for the participants were between 8 and 22. There were 9 females and 11 males. There were 9 Africans, 1 Coloured, 7 Indians, and 3 Whites.

Table 1: List of Participants

Name	Post	Years of Experience	Gender	Race
Supervisor 1	Associate Professor	11	Female	Indian
Supervisor 2	Senior Lecturer	08	Male	White
Supervisor 3	Full Professor	22	Male	African
Supervisor 4	Associate Professor	15	Female	White
Supervisor 5	Senior Lecturer	12	Male	Coloured
Supervisor 6	Lecturer	08	Female	African
Supervisor 7	Full Professor	21	Male	Indian
Supervisor 8	Associate Professor	18	Male	African
Supervisor 9	Associate Professor	14	Female	African
Supervisor 10	Associate Professor	13	Male	African
Supervisor 11	Senior Lecturer	08	Female	African
Supervisor 12	Senior Lecturer	09	Female	African
Supervisor 13	Senior Lecturer	09	Male	Indian
Supervisor 14	Associate Professor	18	Male	African
Supervisor 15	Associate Professor	20	Male	African
Supervisor 16	Associate Professor	19	Female	Indian
Supervisor 17	Associate Professor	16	Female	Indian

Supervisor 18	Associate Professor	17	Male	Indian
Supervisor 19	Associate Professor	20	Male	Indian
Supervisor 20	Full Professor	21	Female	White

Trustworthiness was addressed in terms of confirmability (neutrality – all participants knew the purpose of the study), credibility (truth value – audit trail and tape recorder), dependability (consistency – direct quotations from the participants), and transferability (applicability – by providing sufficient details of the relevant context) (Khoza 2023).

Findings

The results presented in Table 2 and Figure 2 came from the five research methods (document analysis, reflective activities, observations, focus group discussions, and semi-structured interviews) used in this study.

Table 2: Quantitative Results from the 5 Instruments based on the NIF principles

NIF Principles	Docu- ments	Reflec- tion	Obser- vation	FGD	Inter- views
Professional Identity	12	13	10	11	12
What	12	12	20	11	12
Positivist	11	11	4	11	11
Quantitative	11	11	4	11	11
LMS	12	12	6	12	12
Societal Identity	6	5	8	7	6
How	6	6	20	7	6
Constructivist	6	6	12	7	6

Qualitative	6	6	12	7	6
SMS	6	6	12	6	6
Personal Identity	2	2	2	2	2
Who	2	2	2	2	2
Pragmatic	2	2	4	2	3
Mixed-Method	2	2	4	2	3
AI	2	2	2	2	2
Standard Deviation	*4,09*	*4,21*	*6,07*	*3,90*	*3,94*

Figure 2: Results from the 5 Instruments based on the NIF principles

Simon Bhekumuzi Khoza
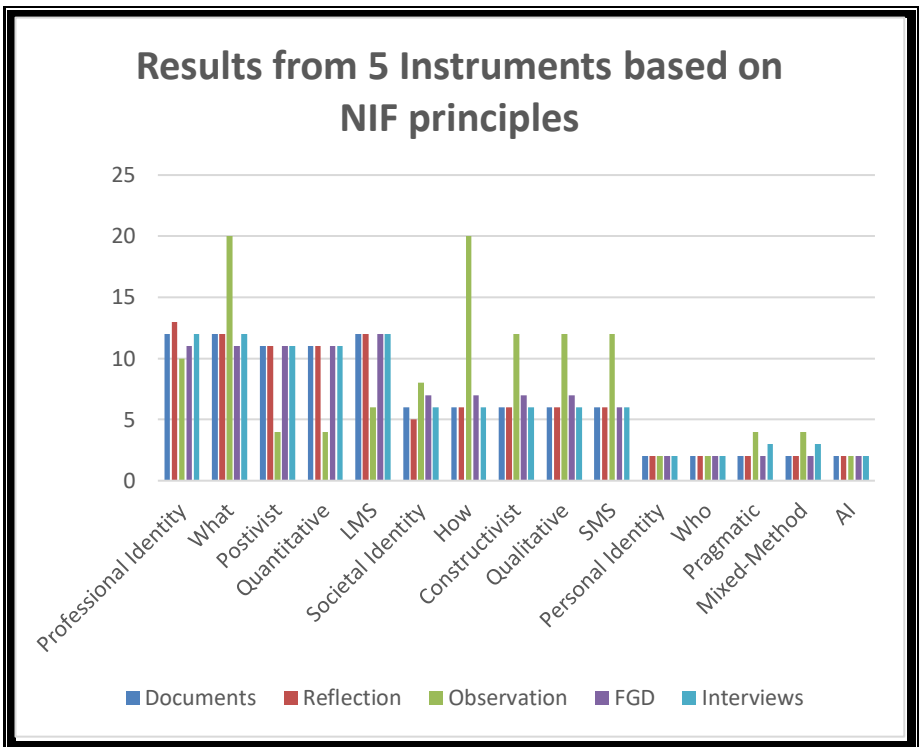
The results in Figure 2 and Table 2 reveal that the majority of the participants used a structured supervision model (professional identity of the NIF), fewer used an unstructured model (societal identity), and the least used for semi-structured model (personal identity). Both the focus group discussions and interviews have the smallest standard deviation (S) of 3.9, which suggests they were more reliable than the other methods. The observation with the largest standard deviation of 6.07 produces the least reliable results. Therefore, the quantitative results support the claims of the literature review that structured and unstructured models dominate supervision and deny a semi-structured model the opportunity to support supervisors and students with self-reflection. The qualitative findings based on the narratives of the participants also support the quantitative results.

The qualitative findings are presented in narrative form (stories), with three of the 20 supervisor narratives (Supervisor 1, 2, and 3) included. After the findings (narrative stories) presentation, four discussion themes were produced to substantiate the findings with discussions and re-contextualise them with relevant literature.

Supervisor 1

I joined this university in 2013, supervising master's degree students since 2014, and co-supervising PhD students since 2018. I mostly supervise my students in groups (cohort) so that they can support one another (peer support) and encourage them to join other university cohorts organised by other supervisors, where possible more support. I have supervised 8 master's degree students and co-supervised 2 PhD students to completion. They can use any digital technology to support their studies (even Facebook, weblog, AI, etc). Even when they want to publish articles from their studies before they complete them in our local journals, I encourage them because the university needs publications. Although I give them enough freedom in doing their studies, when they have delayed their studies, they sometimes apply for a change of me as the supervisor because they compare themselves with faster students from other supervisors or drop out ….

Supervisor 2

I joined the university in 2016 as a lecturer. I started supervising and co-su-

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pervising PhD students in 2018, and master's degree students in 2016. I have graduated 25 master's students and 8 PhD students. My students only publish from their studies after they complete their research projects because I need them to strictly follow all the university research rules to finish their qualifications as licenses for their next levels of thinking. I motivate my students only to use university-prescribed digital technologies such as EndNote, Google Scholar (through university libraries), Grammar-ly, Zoom, etc., so they can easily get support from me because I am familiar with the university-prescribed technologies. As a result, they mostly complete their studies within the minimum prescribed periods. However, during the time of their studies, they mostly complain that I am too strict with my instructions and stress them, but when they are done with their studies, they enjoy my company as friends ….

Supervisor 3

I started teaching at this university in 2002, supervising master's students in 2003 and doctoral students in 2014. Before formally supervising students, I request that they write self-reflections that help them understand their experiences, beliefs, needs, and values. The self-reflections establish whether I must manage a student through a structured, unstructured, or semi-structured supervision model. After confirming the relevant supervision model for the student, I supervise the student in developing a research proposal to be defended after the student has been officially registered and signed the university supervision contract.

Full-time master's students have one year to complete their studies and two years for doctoral studies if they start to work on their studies before their formal registration. My students, whose self-reflections favour a structured supervision model, take a minimum of years to complete their studies. They take a minimum period because they strictly follow all their research projects' prescribed steps and stages.

They even invest in digital technologies that fast-track their research projects, such as Google Scholar, EndNote, YouTube, ChatGPT, Grammar-ly, Zoom, etc. When they use ChatGPT, they use it sensibly by verifying and declaring information generated from it. They submit some sections every week and discuss the feedback on the submitted sections. They publish articles or book chapters from their theses after they complete them.

My students, whose self-reflections favour an unstructured supervision

model, double the minimum period of years to complete their studies. They double the minimum period because they work with various groups of people, over and above their supervisors. In other words, they participate in other activities over and above their studies.

My students, whose self-reflections favour a semi-structured supervision model, usually take a minimum of years plus a semester or two to complete their studies. They take this period because they work according to the needs of their studies, whether structured or unstructured. I have currently supervised 30 PhD and 60 master's students to completion. I also co-authored with my PhD students to support them in understanding their scholarships more ...

Discussions of Findings

The findings confirm the three categories (unstructured, structured, and semi-structured) of supervision models presented in the literature review section and supported by the natural identity framework (NIF). Although the participants were from the same university, they experienced supervision in three ways: an unstructured supervision model for societal needs, a structured supervision model for professional needs, and a semi-structured supervision model for personal/individual needs. The findings further point to the natural-driven supervision model as another direction to be investigated to find a solution that may produce 100% outcomes of human actions.

An Unstructured Supervision Model for Societal Needs

The findings suggest that although the participants (supervisors) were unaware of specific supervision models, they used the three models (unstructured, structured, and semi-structured) according to their levels of curriculum experience proposed by Khoza and Mpungose (2022). The levels of curriculum experience are competency-based (level 1 - lowest), performance-based (level 2), pragmatic (level 3), and natural (level 4 – highest). For example, Supervisor 1 seemed to be influenced by a competency-based curriculum level that has produced a societal identity that promoted the use of an unstructured supervision model where group work is encouraged (Branch & Lee 2020; Shoba 2021). She relied heavily on the opinions of students and other supervisors, where she supervised her students '*in groups (cohort) so that they can support one another (peer support) and encourage them to join other university cohorts organised by other supervisors, where possible, more support*'. As a result of the unstructured

model, she supervised in completion of the lowest number of postgraduate students among other supervisors, although she had ten years (2014 – 2024) of supervision experience. Her supervision throughput rate seemed affected by the freedom she gave students without responsibilities or accountability. Freedom should come with responsibilities and accountability, even if it has to work within an unstructured model (Branch 2020; Kim *et al.* 2019; Waghid 2019). She believed that the university needed more publications than graduating postgraduate students. This is problematic because HEIs were developed for students more than publications (Abiwu 2024; Saidi 2024).

This suggests that students and supervisors should be aware of their research responsibilities with accountability if they need to be closer to the truth/objective reality of achieving 100% outcomes, since it is unknown and probably unknowable (Fields *et al.* 2018; Prakash *et al.* 2021). It becomes unknown and probably unknowable because the societies that define the truth are unable to prescribe it to the students. It becomes the responsibility of the supervisors and students to search for the truth as defined by those societies. Although Supervisor 1 had a low throughput rate, she exposed her students to various perspectives through social media sites, peer assessments, and other supervisors. The projects were good if they all aimed to acquire socialisation skills (Al-Malah *et al.* 2023; Alevizou *et al.* 2021). However, this may only motivate students whose project needs to address societal needs and promote societal identities because it may be based on the supervisors' beliefs about the importance of other people's opinions (Shoba & Khoza 2022). It is normal to have dropouts and students who demand/request to change supervisor if the supervision process is too flexible and mainly addresses the 'how operational questions' of research (Blair & Guan 2021; Branch & Lee 2020).

Beliefs tend to condition students and think that through people's opinions, they may acquire supernatural powers that may do the job for them without doing it for themselves (Cohen & Billig 2021). This may work against students advancing their professions by addressing professional needs that need evidence of a structured supervision model (Fernández-Batanero *et al.* 2021).

A Structured Supervision Model for Professional Needs

Supervisor 2 seemed to be influenced by a performance-based curriculum level that has produced a professional identity that promoted a structured supervision model where prescribed stages and research steps are demanded (Makumane & Mpungose 2022). He seemed to heavily rely on the HEI professional prescribed

research rules since he students '… *to strictly follow all the university research rules to finish their qualifications as licenses for their next levels of thinking. ...only use university-prescribed digital technologies* …'. He perceived supervision as a system of producing qualifications that serve as licenses for students to move to the next level. While this may be good for HEIs' throughput rate and students who need to advance their professions, it may affect students who mainly need to acquire socialisation skills as part of their qualifications. These may be mostly students affected by stress in his supervision system.

However, a structured supervision model is capable of giving enough foundation for investing in specific resources that speed up the process of conducting research when students are drilled with those resources (van den Akker *et al.* 2012). For example, if students use EndNote for referencing and references, they only concentrate on the content of what they are writing because EndNote helps them with clean citations and a list of references. When they use EndNote, they learn how to download references from search engines (such as Google Scholar) to their libraries to save time when they cite. Digital technologies like EndNote train students to concentrate on one issue (step) and properly finish it before they move to the next issue (step) because if step one is not properly done before the next, the system produces errors. If references in the EndNote library are not properly formatted, cited references show technical errors that need to be corrected in the library. In other words, students must concentrate on the proper input to produce proper output within a structured supervision model.

Although digital technologies support students to finish certain parts of their research projects faster and pass the qualifications, they are still used by the students as user interfaces for student survival because none of them help them to achieve 100% marks in their projects. However, evidence from Supervisor 2 responses suggests that structured supervision models may produce more students than unstructured models because he produced 33 postgraduate students within 8 years. According to Khoza and Mpungose (2022), this is just level two of dealing with a curriculum where students should be supported to graduate to a pragmatic curriculum level that helps them find and understand their unique research personal needs, values, and identities.

A Semi-structured Supervision Model for Personal/ Individual Needs

The findings from Supervisor 3 revealed that the semi-structured supervision

model, which is capable of assisting students in understanding their unique research personal needs, values, and identities through self-reflection and critique with countability (Budden 2017; Morgan 2014b; Waghid 2019; Zuma *et al.* 2022). The findings suggest that he used the results of students' self-reflections to establish relevant, unique supervision models for each student. He seemed aware of supervision models and their strengths, which must be aligned with each student's needs. His years of supervision experience suggest that supervisors should work long periods to understand the importance of students' self-reflections. Self-reflection and critique with accountability assist students in selecting and using the most suitable resources based on their needs, values, and identities (Ai 2017; AlDahdouh 2018; Alevizou *et al.* 2021). In turn, students come closer to the truth about the resources they use that may help them avoid stress caused by the pressure of not finishing their studies on time or not aligned with the relevant supervision model (Anderson & Rivera Vargas 2020; Blair & Guan 2021). However, even at this pragmatic level (Morgan 2014b), there is still no conclusive evidence that any model can go beyond being user interfaces for survival and producing the truth about supervision so that supervisors and students achieve 100% outcomes all the time. The inability of supervisors and students to achieve 100% outcomes all the time, even after optimising their actions, may confirm that outcomes are naturally driven (Makumane *et al.* 2024; Morgan 2014a; Prakash *et al.* 2021).

A Natural-driven Identity Supervision Model

Supervisors have tried to optimise the use of structured, semi-structured, and unstructured supervision models, but they are still lagging in their targets. For example, in South Africa, HEI supervisors are unable to produce 5000 doctoral graduates yearly to have 100 doctoral graduates per 1 million people (Matyana & Thusi 2023; Oh 2021). Perhaps supervisors and students should be aware of the sources of what they define as quality education and negotiate it with other relevant identities that influence their actions (McAlpine *et al.* 2014). For example, if they strongly define their activities within professional identities, they may be too knowledgeable about their societal activities and lose their societal benefits. This may mean they are suffering from their success of working professionally while leaving their societies and families behind. However, the key to their joyful lives may be their understanding of their unique identities, which may help them optimise their research actions and naturally accept the outcomes of their actions as they are. This may be achieved through

ongoing self-reflections and critique with accountability (Czerniewicz 2018). Although this may also still be a user interface for survival, it may be closer to the truth about their lives and be able to self-actualise through their research projects (Fields *et al.* 2018; Khoza 2024).

Concluding with Implications

The literature review, frameworks, and findings confirm that the three dominant supervision models are unstructured (societal identity), structured (professional identity), and semi-structured (personal identity) that produce a Natural Driven Supervision Model (NDSM) (Figure 3).
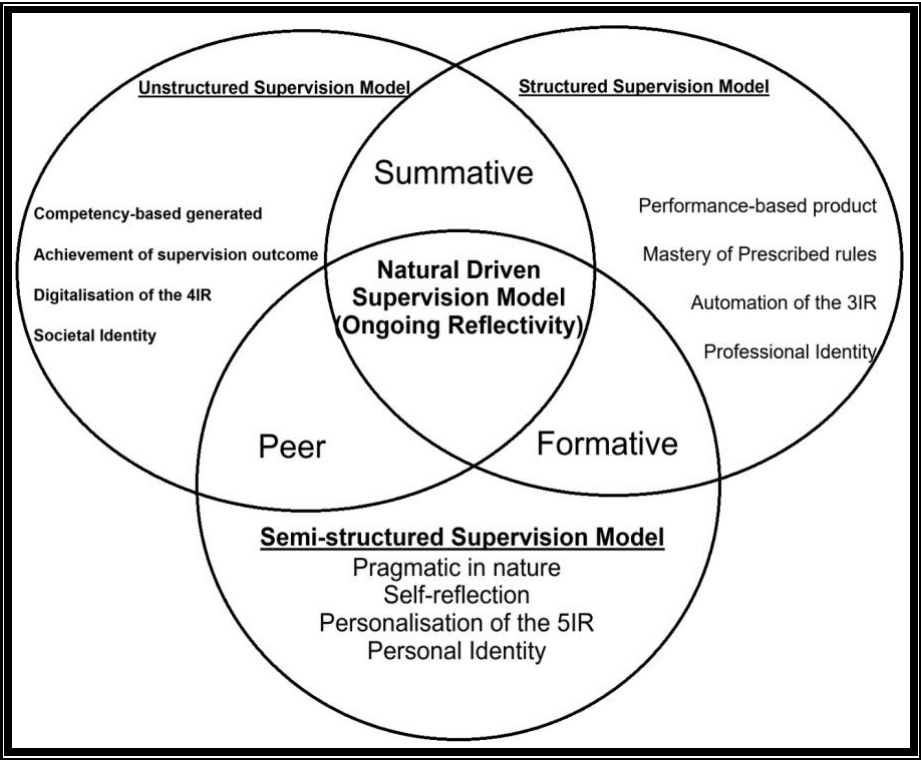

Figure 3: Natural Driven Supervision Model (NDSM)

Unstructured supervision suggests that supervisors' knowledge is generated from a competency-based curriculum, which is about the achievement of outcomes based on the needs of their societies (societal identity). The digitalisation of the 4IR has also contributed to nonlinear processes of using digital technologies (user interfaces) to support the achievement of outcomes through peer activities.

Structured supervision is a product of a performance-based curriculum, which is about mastery of what is prescribed as knowledge of a system (professional identity). The automation of the 3IR has contributed to linear systems of using digital technologies (user interfaces) to support the mastery of prescribed knowledge through summative activities or evaluation.

Semi-structured supervision is pragmatic in nature because it promotes self-reflection as the beginning of supervision processes/systems. The personalisation of the 5IR has contributed to self-reflection and critique with account-ability of using digital technologies (user interfaces) to come closer to the truth of user interfaces and their founders' ideologies that drive the user interfaces through formative activities or evaluation.

However, their limitation in producing 100% outcomes all the time has created a natural-driven supervision model (NDSM) as a contribution to this chapter that needs further interrogation since human outcomes are naturally driven even after humans have optimised their actions to control the outcomes.

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