Exploring Metacognitive Awareness and Metaliteracy Skills Towards Becoming a Self-Determined Postgraduate Student: A Case Study

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Abstract: Research and scholarly output are essential in the advancement of knowledge and society as a whole. In South Africa, the Council for Higher Education (CHE) requires that learning and teaching at higher education institutions (HEIs) must be informed by research done by universities. With high dropout rates these aspirations are not attainable. The question that this study addresses is: firstly, what motivates emerging researchers and postgraduate students to enrol for research and postgraduate programmes at a South African higher education institution, and secondly, what motivates them to complete their studies. Following a qualitative approach, this case study explores self-determination awareness among a group of master's students in a supervisory context. It interrogates requisite metaliteracy competencies and the core metacognitive attributes underpinning human motivation. The aim is to ascertain how students doing research could be supported and developed to become self-directed and motivated to conduct and complete quality research. The value of the study lies in adding new knowledge to an under-explored area and to propose steps to close the current gap.

Keywords: Postgraduate supervision, Metacognition, Metaliteracy, Supervision pedagogy, Online supervision

1. Introduction and Background

Higher education institutions (HEIs) in South Africa have been focusing on transforming all sectors of education since 1996, and to redress past injustices and inequalities. The general need to enhance research output numbers and quality remains an area for further research (Engelbrecht & Van Wyk, 2022; CHE, 2023). Research and scholarly output play a crucial role in the advancement of knowledge and society as a whole. Ideally, the development of a strong research culture will foster an environment conducive for academic success, where intellectual curiosity, critical thinking, and the pursuit of new knowledge can flourish. Here, the research culture of a HEI is a pivotal component in the academic maturation of its students, researchers and faculty members. However, literature continuously alludes to the challenges and complexities that particularly early researchers and postgraduate students face to develop research skills, and complete research degrees in good time. Research and knowledge generation are critical focus areas in HEIs to add new knowledge, build institutional reputation and also to contribute to national development (Sebola, 2021).

Although it was hoped that transformation of South African HEIs would have been more impactful, the Report (DHET, 2023) shares a marginal improvement of 10, 45% research output of public universities over the last decade. Authors (McKenna, 2010; Van Wyk, 2021; Sebola, 2022,) allude that epistemological injustice to higher education has not been achieved to its fullest. There are still aspects in the South African higher education ecosystem where historically negative power relationships are evident. In addition, Sebola (2021) points out that previously disadvantaged HEIs are comparatively not yet on par in research production. Some of the older research HEIs in South Africa have a long history of research output, positive student outcomes, faculty development, and the overall good standing of the institution within the national and international academic communities. Vargras, Mac-Lean and Huge (2019) contribute these achievements to institutional maturation.

As there is still much more to be achieved in the equitable development of young researchers, a starting point must be to relook what is required to attain postgraduate success. Emerging researchers must be supported by all means necessary. Should postgraduate students face disparities in background knowledge, cognitive fluencies and requisite motivators, research cultures cannot be cultivated sufficiently. The question is how could postgraduate students be supported more effectively in becoming more self-determined? The rationale of this study is to study a selected group of postgraduate students in order to understand what motivates them and to promote and support their efforts.

2. Overview of Recent Literature

Globally, studies (including Zhou, 2023; Valencia Quecano, Rincón, & Moreno, 2024) report that the dropout rate of postgraduate student remains a concern. It has a detrimental effect on the institution, the countries socioeconomic conditions and most importantly, on the students' academic success and wellbeing. Reportedly (Amani, Myeya & Mhewa, 2022) 45% of doctoral students in South Africa fail to complete their studies, while

29% drop out within the first 2 years. Factors attributed as cause of these dropouts are reported include motivation, negative outcome expectations, low self-efficacy, lack of academic interest, problems in supervisor relationships and a lack of mentorship and support. Several South African studies (including Ungadi, 2021) raise concerns on the readiness of students to transition from honours level studies to adapt to the increased complexities of doing research on master's level. Additional concerns mentioned in recent studies include factors such as lack of postgraduate support, lack of a range of literacies, knowledge and understanding of research ethics are all mentioned as impacting the success rate (see Dawood & Van Wyk, 2021; Ungadi, 2021; Van Wyk, 2024). Ungadi (2021) postulates that supervision styles play a role in preparing and supporting postgraduate research students. He explains that an inability to write with the required academic tone and rigor, as well as searching, selecting and interpreting the literature are among challenges that postgraduate students are facing. Coupled with these barriers are inadequate knowledge and understanding of the research process itself, particularly when decisions must be made on relevant research methods, explaining the rationale of their studies, and designing their research. Research ssupervisors generally expect students to already have these skills, and finds this frustrating as students are unable to work independently and require much mentoring and reskilling. Very few studies looked at the psychological factors that motivates students in a South African context. Moreover, there is a notable paucity in South African studies on metacognition and metaliteracy as contributors to postgraduate success.

2.1 Supervisor Pedagogy and Online Supervision

The role of supervisors is instrumental to the success of postgraduate students (Amani, Myeya & Mhewa, 2022). Ungadi (2021) explains that the professional relationship between a student and the supervisor should ideally allow for sufficient time, coupled with supervisory expertise, to foster the right attitude and skills to complete studies that ideally should result in quality research output. Motivation, attitude as well as student disposition are mentioned as factors that may influence student success in producing quality research output (Amani, Myeya & Mhewa, 2022). Supervision as pedagogy plays a central role in research supervision, but supervisors seldom get formal training on what this entails. Supervisors often lament the lack of time to mentor students and to nurture acceptable social, research and intellectual skills.

2.2 Metacognition, Motivation and Self-Determination

As a basic concept in cognitive psychology, metacognition points to the responsiveness of an individual's thinking process. While a number of studies (Chugh et al., 2021; Dawood & Van Wyk, 2021; Braad et al., 2022) refer to personal readiness and related factors, not many studies explore what motivates students to remain dedicated to completing their studies. A student's success depends on their ability to self-regulate studies and learning, which in turn depends on requisite cognition. Student's cognitive processes must translate into reflection and knowledge in order to derive at the product or outcome that they signed up for. This process is metacognition and is the cornerstone of motivation (Flavell, 1979). Metacognitive strategies can ignite one's thinking and can direct to much deeper learning and improved performance, especially among learners who are struggling. Understanding and managing cognitive processes can be one of the most crucial skills that teachers can conduct students to increase their achievement

Braad et al (2022) researched how digital tools could offer support to enhance metacognition of students. They looked at embedding metacognitive support within the digital learning environment. They refer the three types of support being direct instruction, metacognitive scaffolding, and metacognitive prompting. These should assist the student to become autonomous and self-regulate studies. In a recent South African study, Pelser and Swanepoel (2022) underscore the importance of information literacy knowledge to develop metaliteracy fluency in an online teaching and learning environment.

2.2.1 Self-regulation as a subset of self-determination

Self-determined learning and its subset of self-regulation is a deliberate and planned process. It is whereby students, and in this case emerging researchers set goals for their progress and then attempt to monitor, regulate, and control their cognition, motivation, and behaviour, guided and constrained by their goals and the contextual features in the environment. The theory of self-determination is founded in the prior research done by Bandura on social cognitive theory (Bandura, 1986). Here, interactions between personal factors (such as cognitions, feelings, competencies, and skills), behavioural factors (e.g., strategy use, help-seeking actions), and environmental factors (e.g., organisational culture, work environments). Bandura (1986) calls this behaviour a triadic reciprocal causality, as these factors determine the success of the student. (Usher & Schunk, 2018). Self-regulation in the context of this study refers to the wisdom and capacity to make the best choices. Usher and

Schrunk (2018) stress that it is particularly important to regulate behaviour when there is a strong desire to do the opposite and mentions procrastination as an example. Ungadi (2021) laments that the South African schooling system does not prepare students for tertiary studies, and after completing undergraduate qualifications, this problem is still evident and causing concerns when students embark on postgraduate research.

2.3 Metaliteracy and Metacognition

Mackey and Jacobson (2011) explain the concept of metaliteracy as a pedagogical model. In later studies, Fulkerson, Ariew and Jacobson (2017) the importance of connecting information literacy teachings to pedagogical praxis has been reaffirmed. Metaliteracy develops students to become reflective and critical thinkers, and are competent and able to do research both in individually studies and in collaboration with others. Jacobson and Mackey (2016) state that metaliteracy forms the foundation of a range of literacies including visual literacy, digital literacy, and media literacy, among others. The model focuses on how students can be empowered by being reflective and informed, within a connected world using technology. Metaliteracy framework reframed traditional information literacy frameworks (ACRL, 2015) and expands to include four domains of metaliterate learning, metaliterate learner roles, and metaliterate learner characteristics.

> *"Metaliteracy challenges traditional skills-based approaches to information literacy by recognizing related literacy types and incorporating emerging technologies. Standard definitions of information literacy are insufficient for the revolutionary social technologies currently prevalent online" (Mackey and Jacobson; 2011, p.62)*

Typically, a metaliterate student will be able to form networks coupled with a level of literacy fluency to succeed in a connected world. As such, metaliteracy combines the cognitive, behavioural, procedural, and motivational, and other practices towards more context-specific and context-appropriate applications. Metaliteracy focuses on metacognition, which basically translates to thinking about thinking (Jacobson & Mackey, 2014). Where students develop the ability to reflect on their own strengths and weaknesses, and actively and collaboratively build these skills, their chances for success multiply. More importantly, students who develop metacognition and metaliteracy skills are better equipped act autonomously and to take responsibility for their own success and become self-reliant and will be able to take responsibility for their own academic growth. They have a sense of mastery and a growth mindset. Ideally, these competencies are developed where students are sufficiently challenged but also supported in a structured academic. In this environment students experience a sense of belonging, and they feel valued.

2.4 Framing a Lens to Guide This Study

This study is informed by a number of theories and frameworks. Firstly, the self-determination theory (SDT) is a broad theory of human personality and motivation concerned with how the individual interacts with, and depends on the organisational environment. SDT explains intrinsic and several types of extrinsic motivation and outlines how these motivations influence situational responses in different domains. SDT moves from the premises of the basic psychological needs of autonomy, competence, and relatedness (also known in literature as connectedness), and their necessary role in self-determined motivation, well-being, and growth. Finally, SDT describes the critical impact of the organisational, social and cultural context in either improving or hampering people's basic psychological needs, perceived sense of self-direction, performance, and well-being. SDT is a social psychology meta theory. The Self-Determination Theory argues that students and researchers need to experience a sense of autonomy, competence as well as relatedness to foster and sustain the requisite motivation to succeed (Ryan & Deci, 2000).

3. Research Methodology

Vaismoradi *et al* (2016) state that qualitative research, as a group of approaches for the collection and analysis of data, aims to provide an in-depth, socio-contextual and detailed description and interpretation of the research topic**.** It is an established research design that is used extensively in a wide variety of disciplines, particularly in the social sciences. The research design of this study is rooted in an interpretivist paradigm. The research design is naturalistic (Salkind, 2010), in this case, the current postgraduate master's students at a South African University. Interpretivist designs emphasise the analysis of qualitative data. In this study, qualitative data were collected from the participants by means of interviews and observations. This design was chosen as it allowed for consideration of the actual experience and input of the target group. Qualitative research is a form of social inquiry that targets the way that people make sense of their experiences in the world (Salkind; 2008). This research follows a cumulative case study design. A case study is a research approach that is used to generate an

in-depth, multi-faceted understanding of a complex issue in its real-life context. Case study, as a bounded system, explores a phenomenon in context by consulting using multiple data sources. In this case, an intrinsic case study design is used. Lucas (2018) describes an intrinsic case study as the action to understand the case. Here, eleven postgraduate master's students formed part of the case study. The case study sets out to identify and evaluate what motivates the students. It furthermore looks at existing skills, knowledge and practices among a group of postgraduate students. Researcher reflexivity refers to the researcher's ability to make and communicate nuanced and ethical decisions amid the complex work of generating real-world data that reflect the messiness of participants' experiences and social practices (Olmos-Vega et al, 2022). For this study a participatory approach was followed, where both the researcher and the participants were identified as reflexive participants. This required the researcher to constant evaluate and interpret collected data. The potential influence of power dynamics was managed by entering into memorandums of understanding to serve as reflexive strategy.

Qualitative data collected were analysed using reflexive thematic analysis. Data were analysed and coded. This allowed for comparison and the identification of recurring themes. It allows for observation and discussion of a real-life environment in its natural setting. Thematic analysis is a technique for analysing qualitative data that entails searching for and analysing repeating patterns in a collection of data, as well as reporting on them (Braun & Clarke 2022). It is a data representation approach that also involves interpretation in the form of resolving codes and theme creation.

3.1 Data Collection and Discussion of Findings

Students who formed part of the intrinsic case study were all successful in undergraduate and post graduate honours courses. They were enrolled for an online course master's programme, with a research mini dissertation in their second year of studies. Yet, there were two students that dropped out. In South Africa, only a small percentage of the students complete their studies in the minimum two years. Six students extended their studies. It is notable that students who ask for an extension of studies lacks motivation to finish, and generally feel discouraged. From the initial coding the following themes were identified. The themes have a strong theoretical underpinning. The initial motivation for students was to obtain a master's degree. Students reported that it may be considered for employment promotion. A smaller number indicated that they consider continuing towards doctoral studies.

- Cognition, metacognition and research-readiness

Although students gained entry into the research master's programme, they were not from the onset ready to embark on a next level of research. The transition period varied from person to person. In some instances, they took criticism or comments on their initial proposals very personal.

Thinking about their own thinking was a skill that had to be developed, and thinking about their studies, was secondary and it was only when this was discussed that the students considered the metacognition reflection of their actual research process.

- Self-directedness

Competence:

as a sense of mastery and of being able to succeed and have a growth mindset. Competence is established in an environment where optimal challenges exist, positive feedback, and growth opportunities, are supported within well-structured working environment. The belief that actions (e.g. research activities) will be impactful in shaping academic/research success must be present;

Autonomy:

In the early stages of their research, students did not feel in control, as the transition from honours to master's research were overwhelming. The process to get the research proposal approved as well as the cumbersome process to get ethics clearance added to these feelings. Students varied in the way that they mastered autonomy.

Relatedness:

Even though the supervisor and students had regular meetings, students reported that moving out of the online class environment to only sessions with the supervisor, impacted their sense of belonging negatively.

As one participant shared:

> *"I feel isolated now that we do not have classes any longer. We often discussed assignments – we had that in common – we learnt from each other, and often encouraged each other…"*

- Self-regulations

Students are encouraged to take ownership of their studies and to develop their own realistic and attainable milestones. It remains their responsibility to adhere to these milestones. Built into these written milestones are logistical issues such as getting ethics clearance for the research**.** As part of the memorandum of understanding, students were responsible to set up a range of meetings with the supervisor and had to agree to present tangible progress to the supervisor well before the meetings. This changed the behaviour to a more blended approach, and compelled students to take charge of their progress.

- Metacognition and metaliteracy

Observations of the four domains of metaliteracy namely: metacognition, cognition, affective and behavioural became evident when the student progressed and their different roles in the process transpired. It was interesting to observe how the different roles of the metaliterate research student emerged as the student progressed and became more aware of their own thought processes. They became active participants and producers of new knowledge. Once they stepped up to the role of emerging researcher their self-confidence improved. The master's programme requires that a journal article must be prepared. Students found this last step mare challenging. Only one student managed to present at a conference and publish research results.

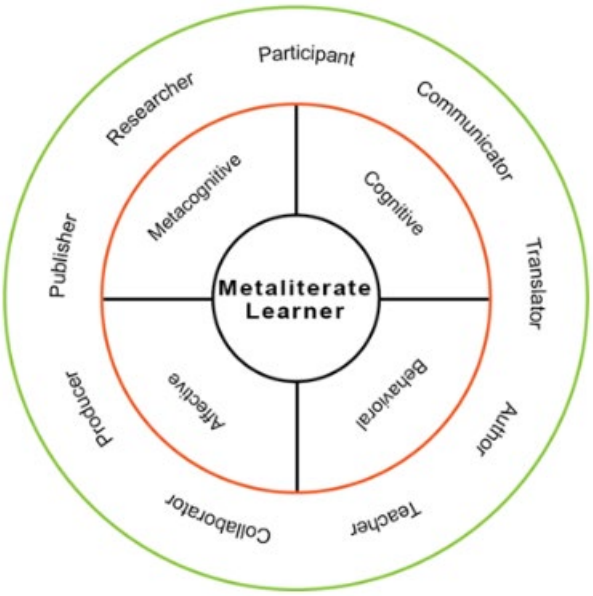

Figure 1: The Metaliteracy Domains (Mackey, T & Jacobson, T.E. 2014).

- Research ethics, research- and eResearch literacy

The rigour and seriousness of the research ethics clearance process often overwhelmed and demotivated some students The participants did not have requisite research literacy skills in the beginning, and these were developed throughout the research process, either by self-study or by realising that they needed to attend workshops. Even though the coursework master's included research methodology modules, the application of this knowledge on a chosen topic proved to be complex. A fair amount of revision of research design principles had to be repeated by the supervisor.

- Advanced reading, writing and literacy skills

With English as a second language students, most students struggled with academic writing. While some (3 student) tried to use academic acumen and words that they found in readings, most started their first draft with conversational language and tone. Students were encouraged to read critically and were mentored to be more

analytical in synthesizing sources. Some students used digital writing tools, that retracted from the opportunity to deeply engage with their content.

- Sociotechnical and socioeconomic factors

Although support services for emerging researchers are offered at the HEI in this study, being distant online students, was one of the reasons that these services were not utilized in full. Most of the students did not have the technical skills to make use of digital technology and tools to assist their research process. Four students made used of online referencing tools. In addition, students experienced a number of socioeconomic problems such as research funding issues. A shortage of funds was a factor of dropouts. Sociotechnical problems included

- Supervision pedagogy

This study found that students need a more vested commitment from the supervisor, and indications are that students benefit from a pedagogical and motivational approach supervision approach in addition to discipline and research competencies. This is in line with the findings of Amani, Myeya and Mhewa, (2022). Two South African studies, another intrinsic case study by Okeke-Uzodike, (2021) and a systematic literature review by Costa (2019) reported the lack of current praxis of supervisor skills and further corroborated the importance of knowledge of supervisor pedagogy towards postgraduate success and research scholarship output. There is a need to better prepare postgraduate supervisors to understand what motivates students to complete their studies.

4. Conclusion and Recommendations

This study explored the level of metacognitive awareness among 11 individual postgraduate master's students enrolled at a school of IT. The students were supervised and observed over a period of 14 months. Metacognitive awareness had to be cultivated through the mentoring in addition to postgraduate supervision. Students varied in their ability to respond and become self-regulated and self-determined. Although there were still two students that did not complete their studies, most responded positively to being exposed to the principles of metacognition and metaliteracy.

The recommendation is that supervisors should be more aware of the affordances of metacognition and metaliteracy, and build this into their supervision praxis. Supervisors must cultivate metaliterate students to become self-determined. The findings of this study are similar to the study of Filipovic and Jovanovic (2016), who found that postgraduate research must not merely focus completing a dissertation, but that students must reflect on the roles they have academically and in the broader community as part of metacognitive empowerment. It stands to reason that HEIs must support both supervisors and students by looking at supervisor capacity and workload. Metacognitive strategies should be cultivated earlier in studies to improve the readiness of students enrolling for postgraduate research programmes.

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