

# FORMATIVE ASSESSMENT IN DOCTORAL EDUCATION

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## Abstract

The overall goal of doctoral education is to prepare the doctoral student for the summative assessment of a thesis. However the focus of doctoral education is changing to include the attainment of professional attributes or competencies of the student. This article shares information collected from thirty-eight participants from a research-intensive university in the United States on the role of postgraduate formative assessment and, in particular, feedback as an essential element underpinning doctoral education. The findings emphasise the importance of constructive engagement and feedback embedded in formative assessment in doctoral education to develop scholarly and professional attributes in addition to research knowledge and skills.

**Keywords:** doctoral pedagogy, doctoral education, formative postgraduate assessment

## 1. INTRODUCTION

Internationally, higher education institutions are under pressure to produce ever-increasing numbers of doctoral students. With this outcome in mind, the South African government has requested higher education institutions to increase yearly the targets of doctoral graduates from 1,420 in 2010 to 5,000 graduates by 2030 (NPC 2012: 319). Although economic, social and political reasons for the request are mentioned, the key reason for the bigger demand in doctoral graduates is the assumption that doctoral studies ensure work-readiness of graduates for the academic sector, the government sector and the private sector (SA 2014). Based on the argument that doctoral education provides a vehicle to prepare a thesis as outcome or product, but also adds additional personal and professional attributes to the graduate, this article adds to the postgraduate formative assessment debate by outlining the role of postgraduate formative assessment and, in particular, feedback as an essential element underpinning doctoral education.

Traditionally, the overall goal of doctoral education is to prepare the doctoral student for the summative assessment of a thesis (the term used for the end product in this article). El Gaidi (2014: 154) emphasises that most of the attention during the doctoral education process goes into the “tangible end-product of education: papers and theses.” However Thomson and Walker (2010) suggest that the focus in doctoral education is changing from a focus on the thesis as outcome to a focus on the process. An example of this changing focus is the requirement at doctoral level that a candidate has to attain objectives in three categories namely scientific knowledge, skills and attitudes.

This requirement is relevant in countries such as Sweden and the United States. In South Africa, the level descriptors on level ten, the doctoral level, outline that competencies such as problem solving, ethics and professional practice, communication and intellectual independence are required in addition to the thesis completion (SAQA2012).

To add to the above, Danby and Lee (2012) explain that the doctoral education process develops generic capabilities in the doctoral graduate, also referred to as competencies (Austin 2011). In addition, Austin (2011) defines these competencies as abilities, skills, values and understandings. When further explored, Austin (2011) indicates that these competencies prepare the student as a scholar, researcher and teacher with pedagogical expertise, interpersonal skills, professional attributes and habits, and socialisation skills (such as learning) in addition to the disciplinary knowledge and research skills. Walker (2010) indicates that the attributes include becoming employable, economically independent, a lifelong learner, and a critical thinker in addition to attaining the necessary research skills. Thus, in contrast to the tangible end product, the thesis, the attributes that are developed formatively may not be obvious to assess or measure. Furthermore, these attributes may also be linked to the personal and professional development of the individual and therefore differ for every doctoral student (Walker 2010).

Maxwell and Smyth (2011) maintain that the process to develop the thesis improves the intellectual, personal and psychological attributes of the doctoral student. For this reason, the doctoral education process should include strategies to facilitate the attainment of the required attributes or competencies. Danby and Lee (2012: 5) emphasise that a non-traditional focus is required in doctoral supervision and point to the “individual relationship between a qualified researcher and a doctoral candidate”. Highlighted by Hill (2011) is the practice of pedagogy (teaching strategies), the relationships involved in supervision, and the construction of new knowledge (epistemology). Thomson and Walker (2010: 76) emphasise the “continual becoming of a doctorate”, pointing once again to the formative process embedded in doctoral education. The questions on the knowledge outcomes of the doctoral pedagogy as well as “what kind of human being are we hoping a doctorate might form through a rich mix of knowledge, skills and disposition” are thus applicable (Walker 2010: 23). In addition, Danby and Lee (2012) refer to the enabling environment that should be created to support the development of the doctoral student.

At the doctoral level Crossouard and Pryor (2009) discuss how formative assessment can support the doctoral student's development and shape his/her perceptions. Sambrook, Stewart and Roberts (2008) argue that formative assessment and constructive criticism are usually positive and aim to improve performance.

However, the danger is that the student could perceive such feedback as negative, in particular where factors that contribute to the complex supervisory process (such as the relationship between the supervisor and the doctoral student) are considered (Maxwell & Smyth 2011). Supervisors thus have to clarify their specific feedback approaches and clearly emphasise that the purpose of the feedback is to improve the work (Sambrook et al. 2008).

Picard, Wilkinson and Whirthensohn (2011) state that the doctoral student needs scaffolded learning opportunities and discussions to develop as a researcher. So, to create the optimal environment for formative assessment and quality feedback, Hill (2011) outlines the relevance of a structured doctoral approach with the purpose to connect with the doctoral student's prior knowledge. A practical way to clarify and illustrate the feedback process and the importance of communication at doctoral level also taking into account the different models of doctoral education is to use specific examples. One example is for the student and the supervisor to write a research paper together (El Gaidi 2014). Another example is providing guidance and feedback to the student after the student has created a poster presentation. Based on the feedback, the student may then submit a presentation for peer review. Feedback from the audience could help the student to create a manuscript ready for submission to a journal.

To assist students to drive the postgraduate formative assessment and feedback process, Frith and Martens (2008) suggest the following meaningful guidelines. Students should keep records of the conversations and discussions, clarify misunderstandings during meetings and summarise the main points of the discussion at the conclusion of each meeting so as to indicate specific outcomes and achievements attained. Students should negotiate what needs to be done for the next meeting, and should start each new meeting with a brief reflection on the previous meeting and objectives for the new meeting. It is important for students to take control of the research project right from the start (Maxwell & Smyth 2011).

The change in the focus on the outcome in doctoral education emphasises the need for different models for doctoral education (McCallin & Nayar 2012). In the United States, coursework is regarded as preliminary and preparatory work for the thesis. In South Africa, candidates who want to enter a professional career or a career in industry can attain the professional doctorate degree. This new model of doctoral education has to be designed around high levels of performance and innovation. Course work and appropriate forms of work-integrated learning may be included in addition to the 60% research component. The traditional doctoral thesis may also now consist of various peer-reviewed publishable articles and papers. Other artefacts such as creative work or public performances, related to the field of study, are also accepted at doctoral level (SA2014).

Acknowledging the various models in doctoral education, Egan et al. (2009) emphasise the current lack of a gold standard for doctoral education that exists internationally. Regardless of the doctoral education models, formative feedback remains an essential process in shaping the outcome. The variety of education models available further emphasise the innovative approaches required for formative feedback to be effective.

Based on a review of relevant literature, the purpose of this article is to add to the body of knowledge on postgraduate formative assessment. It provides a unique focus on the views of both doctoral students and postgraduate supervisors to demonstrate the role of formative assessment, particularly feedback, in the doctoral supervision process. A study that was part of a Fulbright scholarship in the United States was conducted at a research-intensive university with an established history in formative assessment. A factor such as the globalisation of higher education assists in comparing the study results with local and international literature on doctoral education. As such, the information can be transferred to institutions internationally to include South Africa.

## **2. METHODOLOGY**

A qualitative, phenomenological case study was completed to capture and explore the opinions of supervisors and doctoral students. While there are “different ideas about what a case study is” and variations in methodological approaches (Johansson 2003: 2), this approach was chosen since the current researchers had identified an issue that would permit the collection of narratives in situ (Stake 1995: xi–xii). The study being reported here was conducted at a research-intensive university in the United States and was approved by its Institutional Review Board. Supervisors and students from all the schools at the university that offered doctoral degrees were invited to participate in the case study. Further referrals of participants were continued until saturation of information was established. The inclusion criterion for a supervisor was to be involved in postgraduate research supervision, while a postgraduate student had to be a registered doctoral student.

The questions to the supervisors were: “What is your definition of doctorateness?” (Trafford & Leshem 2008: 35) and “How do you facilitate feedback?” Questions that the students responded to were: “Which skills/competencies did you gain during the process to prepare your thesis?” and “Which feedback method was used?” The information was captured electronically and verified with each participant. Data analysis and interpretation were completed according to recommendations by Denscombe (2007). With the assistance of a co-worker, content analysis was used to investigate the data for common themes. Categories and concepts were then created and grouped according to subthemes, as delineated in the results section of this article.

Verbatim extracts from the responses by the supervisors and students were used selectively to emphasise the perceptions of the participants in terms of the information presented. To facilitate reference to individual responses, the supervisors' responses were labelled S1–23 and doctoral students' responses, D1–15.

Twenty-three supervisors from 10 schools and 15 doctoral students from six schools at the university were interviewed over a period of two months. Most of the supervisors had several years of experience in research supervision. The students were at different stages of their doctoral studies, either in the process of preparing for the qualifying examination, writing the thesis or awaiting the final defence of the thesis.

### **3. FINDINGS AND DISCUSSION**

In the following section, the themes that emerged from the findings are presented.

#### **3.1 The attributes**

The attributes acquired during the doctoral education process identified by both the supervisors and the students were grouped into four categories: research skills, scholarly and professional attributes, ethical values and general attributes. The researchers acknowledge that overlap might have been present in the grouping of these attributes. For that reason, the themes were aligned based on the principles of graduate and professional learning that captured the knowledge, skills and abilities demonstrated by doctoral students at the participating university.

##### **3.1.1 Research knowledge and skills**

The supervisors reported that they expected students to know how to develop research projects and that students would be familiar with the research process. They wanted students to be passionate about research and well versed in recent literature, and students had to be able to engage critically with the literature to build sound arguments. It was expected that the students would exhibit the ability to translate their research into practice. In this regard, Botha (2010) recommends that a doctoral student should have the ability to defend and interpret judgements.

The response of supervisor S18 was:

*Like an onion with layers, doctorally prepared [...] deep and broad understanding of the field, engage with the literature, ask and answer a question [...], create new knowledge and understand the knowledge how it is situated how it fits into their field [...]*

The students indicated that the process to prepare the thesis assisted them to become independent in research and in command of the research process. They reported mastering the skills of doing a literature search, critically reading articles and publications, and collecting and analysing data. Wisker, Robinson and Shacham (2007) specify the relevance in developing the research skills of students to become well-rounded researchers. The students also referred to competence in scientific writing and being able to publish in academic journals and books.

The response of doctoral student D1 was:

*Learned about writing scientifically, communicating and critical reading, read what is important about the research studies and be critical and figure out how the information will be helpful for the project. It has been a journey – I can see the improvement and my better ability to critique the literature, what it says and how it can be included in my research.*

### 3.1.2 Scholarly and professional attributes

Supervisors expected students to have a broad and deep understanding of their professional field, to develop professional and intellectual curiosity and enquiry, and to be visionary and passionate about the profession at the completion of the doctoral degree. Students need to be lifelong learners with the ability to reflect, to be generous and willing to share knowledge, to publish and disseminate research, and to contribute to the scholarship of knowledge in the professional field, globally and locally. Frick, Albertyn and Rutgers (2010) emphasise that supervisors should assist in developing students as independent and critical thinkers with a scholarly voice. Students' professional identity and open-mindedness also need to be facilitated (Maxwell & Smyth 2011). Wisker et al. (2007) point out additional skills such as time management and problem solving as part of the overall expectations of what doctoral students should master.

The response of supervisor S12 was:

*... a creative scholar who is motivated, passionate about the profession with a clear vision of what you want to achieve in the academic environment. There are always more questions to ask and to answer.*

The participating students believed that being a doctoral student would assure better professional and career opportunities. They were in the process of becoming lifelong learners who enjoy learning and the learning environment. They had opportunities to attend conferences (national and international), participate in scholarly discussions and interact with peers and colleagues from the same or different fields. Candy (2000) emphasises the responsibility of the university to develop the student as lifelong learner through doctoral pedagogy, formative assessment and constructive feedback.

The response of doctoral student D4 was:

*I thought that the doctoral will “label” me as an expert – but now I do not care about it so much – the more you know the more you realise how little you know – becoming a lifelong learner and that is exciting for me. There is just so much to know – I do not think I will ever know it all. I love learning and the learning environment.*

### 3.1.3 Ethical values

Supervisors participating in the study reported that they expect honesty, sincerity, truthfulness, professionalism, integrity and ethical behaviour in a doctoral graduate. The participating students maintained that the ability to create a positive working environment was instilled through the doctoral process:

- they had learned to be respectful to people who provide feedback on their research;
- they had developed respect for the academic environment and developed an appreciation for those who publish; and
- they had learned to act more professionally, to work ethically and to be dedicated, honest and sincere.

The responses of doctoral students D2, D4, D5 and D8 referred to being ethical, truthful and professional toward and with faculty, students and colleagues.

### 3.1.4 General attributes

The supervisors and doctoral students reported that communication and intellectual and social skills were developed and evident in the process. For example, several of the participants mentioned the ability to present information confidently in a professional environment (i.e. read a paper at a conference). Students reported that skills such as the ability to think critically, create new knowledge, and review literature critically were developed and strengthened. Attributes such as creativity, self-discipline, resilience and endurance were noted. Students reported an increased ability to solve problems, to reflect deeply on information received, and to focus their thinking. They learned how to work independently and how to reflect on the importance of time management, flexibility, life balance and maintaining a sense of humour.

The response of doctoral student D10 was:

*Endurance – the ability to withstand disappointment and criticism and being able to carry on (resilience) and to work independently*

Since the participating doctoral students were exposed to the research process, it was expected that research knowledge and skills would be identified as attributes developed during the doctoral education process. The fact that scholarly and professional attributes, ethical values and general attributes were indicated aligns favourably with the doctoral and professional learning at the university where the case study was completed. Halse and Malfroy (2010) show that scholarly expertise can develop from one's engagement in activities such as research, writing and publication as well as by contributing to the debate in the discipline. Aligned with the argument of Maxwell and Smyth (2011), one of the supervisor participants mentioned that two different products were being produced in the process of formative assessment, namely the thesis as end product and the abilities of the doctoral student.

The response of supervisor S8 was:

*... two products – one is the person with communication and writing skills – the street smart professional. The other product is their paper – the universal currency that is peer-reviewed.*

### **3.2 Feedback and formative assessment**

Two themes emerged from the data collected in this section: methods used for feedback to the student and suggestions for engaging the student in formative assessment and feedback. Supervisors were of the opinion that when giving feedback, different methods are valid at different stages of the work. Students noted the relevance of receiving feedback with a variety of methods used.

The response of doctoral student D8 was:

*At different stages I prefer different interactions – now I need electronic, but in the quantitative analysis part of the study I will prefer face-to-face meetings and feedback – it will be easier to ask questions and ask for direction.*

The supervisors used both face-to-face and electronic feedback. The advantage of face-to-face discussions is that it allowed critical discussions with students, particularly in the initial stages of the project. Supervisors mentioned that during these discussions, they could identify when a student was “lost”. Feedback methods also included rubrics, feedback grids and discussion groups. These are innovative methods to structure and scaffold the feedback to the student. Regular meetings and ongoing communication were essential in communicating clear expectations and continually reminding the student about these expectations.

Face-to-face meetings guided the student to self-assess progress, challenged the student to think, engaged the student in critical discussions, pushed the student to think logically, and created an opportunity to always ask another question.

Supervisors S16 and S22 mentioned that by doing so, “aha moments” were created. One participant (S22) indicated the importance of pressurising the student to summarise the research question(s) and methodology in an “elevator speech” to capture the essence of the research project in 30 seconds. To encourage critical thinking and problem solving, the supervisor should engage and challenge the doctoral student in open dialogue, coaching conversations and discussions (Wisker et al. 2007). Frick et al. (2010: 76) support the use of the Socratic Method to encourage the student to think critically about the research question, to learn independent thinking and to develop a scholarly voice. Maritz and Jooste (2011: 975) promote coaching conversations that are focused conversations in which the student has to ask critical and probing questions so as to stimulate and develop the student's reflexivity. Hill (2011: 165) indicates that “substantive conversations” should include subject matter, critical questioning, sharing new ideas and the construction of new knowledge. These conversations and discussions help the student to create meaning of the work and to connect ideas with the literature and collected data (Wisker & Robinson 2009). The importance of encouraging constructive discussions is evident from supervisor feedback.

The response of supervisor S13 was:

*I am sometimes controversial in discussing issues with the students but the students need to be encouraged to make up their minds and form opinions.*

Supervisors emphasised constructive formative feedback, ongoing communication of expectations, and providing guidance and support to the student by chunking (scaffolding) the work into manageable sections. As such, Wisker (2010) emphasises the scaffold approach to help the student to manage tasks and the use of constructive teaching practices to share and reflect on ideas and theories with the student, discuss data analysis and concepts using “doctorateness” language.

The response of supervisor S22 was:

*I explain to the student how I will be commenting on the work and why I do it in a specific way – helping them to develop skills and to develop personally [...] very explicit in why I use the specific method and why I ask them to do things in a specific way. My comments are informative [...] so my comments will be informative and constructive. I give constructive feedback – so I give them “how to” feedback.*

The students who participated in the case study valued the feedback from their supervisors. Students also indicated that they valued face-to-face meetings with their supervisor more than e-mail messages because during feedback meetings, the students were in a position to capture the verbal and non-verbal communication of the supervisor. The students indicated that they were confident in asking and re-asking for clarifications on uncertainties in the feedback.



The students also mentioned that, although they respected the busy schedules of their supervisors, they had the confidence to send requests for feedback or to schedule meetings to discuss the feedback.

Crossouard and Pryor (2009) emphasise that, although e-mail communication is convenient, it has challenges that can lead to misunderstandings. In addition to feedback from supervisors in the study, Wisker (2010: 233) supports formative feedback methods in such a way as to create those “aha moments”. It was noted that feedback discussions with students need to challenge students “to cross conceptual thresholds” (Wisker & Robinson 2009: 235) and also to probe students into more creative and critical levels of thinking. Furthermore, students need to engage in self-assessment and step back to reflect on what is important (Wisker 2010). Maritz and Jooste (2011) questioned students on the debriefing and coaching conversations to emphasise how this strategy has stimulated their learning and provided support to them. Starfield (2010) quotes the feedback provided by two students indicating how complex their doctoral journey was, but how much they gained academically, growing as a person, as a researcher; and being able to contribute as scholars to the academic environment.

#### **4. CONCLUSION**

The purpose of the qualitative study presented in this article was to provide evidence for the role of constructive feedback and formative assessment embedded in doctoral education. The literature on doctoral pedagogy indicates that the development of a trusting relationship between the postgraduate supervisor and the student is essential for optimal formative assessment to occur (Waghid & Davids 2013). It is in this environment that the student is challenged to think, reflect, debate and solve problems to create new knowledge. It is also in this environment that the student can construct meaning of the work, understand the relationship of theory and practice, and develop as a professional, a scholar, a researcher and a lifelong learner. The student also develops personal attributes and skills such as resilience, communication skills and problem solving. Although differences in the doctoral education and assessment models exist, the thesis is the product that is usually assessed and which overlooks the attributes developed in the student. Collectively, the feedback provided by the supervisors and the student participants in the case study was well aligned with the overall purpose of doctoral education to not only prepare a thesis successfully but also to create an individual with the personal attributes necessary to become a scholar and professional.

The findings of this case study emphasise the importance of constructive engagement, interaction and feedback embedded in formative assessment in doctoral education. Both the supervisor and the student have responsibilities and both should be active participants to create the optimal learning environment.

Even if the doctoral journey is different for each student, the students who participated in the case study mentioned that they gained research skills and developed important personal attributes during the preparation of their theses. The supervisors' feedback reiterated the above findings. Although the supervisors and students acknowledged the convenience of e-mail communication for providing feedback, the first choice was face-to-face discussions. Both the supervisors and the students were aware of the possible sources of misunderstanding associated with e-mail communication. The participation of supervisors and doctoral students from a variety of schools in the project allowed for trans-disciplinary interpretation of the results. Although not part of the case study, the supervisors mentioned that it was not only the students who were shaped and polished. Supervisors acknowledged that during the doctoral process for each student, they also learned relevant lessons and value was added to their own knowledge base. Bitzer, Trafford and Leshem (2013) as well as Wisker (2010) emphasise these aspects as part of the doctoral education process.

Based on the findings of this study, supervisors should acknowledge the role of feedback to facilitate formative assessment. Supervisors and doctoral students should reflect often on the development of the attributes of the student as part of the epistemology and methodology in doctoral education. To facilitate reflection, the student should ideally record these attributes in a reflection journal.

Further research using a wider community of doctoral students and supervisors is recommended to verify these results. Of particular interest may be replicating this study with international supervisors and students. Additionally, the oral presentation (viva or defence) of the doctoral thesis should be considered standard practice to assess the attributes of the doctoral process.

Postgraduate formative assessment and constructive feedback embedded in doctoral education are essential elements to develop the thesis. However, the role of postgraduate formative assessment and constructive feedback in knowledge construction and the development of unique and personal attributes of the doctoral student need to be emphasised.

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