STUDENT PERCEPTIONS OF A SELF-ASSESSMENT ENVIRONMENT

by

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ABSTRACT

Student perceptions of a self-assessment environment

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Formal assessment in education focuses on summative assessment in the form of grade allocation. This has limitations on the learning process for students. Formative assessment should also be incorporated into learning as an integral part as it offers many benefits. Reflective learning in the form of self-assessment is central to the process of formative assessment. Students, however, tend not to engage in the process of self-assessment. This skill can be developed by educators in an educational setting, but educators tend not to create an environment in which students can self-assess.

The study explored students' perceptions of the self-assessment process once they had been exposed to it over a period of time in a facilitated environment. This encouraged them to engage in the process and develop the skill of self-assessment.

The research method was exploratory in nature and was conducted by means of a design experiment in which students were encouraged to self-assess on three occasions during the 2012 academic year. Data was then collected from the students by means of a structured survey.

The results of this study indicated that students tended not to self-assess if not encouraged to do so. However, once given the opportunity to do so in an environment

which supported it, students were positive about the process of self-assessment. They believed that it would improve their overall academic performance and indicated that they would continue to apply self-assessment to their studies in future. This study concluded that students were positive about self-assessment and that they applied it accurately and in a meaningful manner to their studies in an environment which supported it.

OPSOMMING

Studente se persepsies van 'n selfassesseringsomgewing

deur

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Formele assessering in die onderwys is gebaseer op kollektiewe (summatiewe) assessering in die vorm van graadtoekenning. Dit het beperkings vir die leerproses van studente. Ontwikkelings (formatiewe) assessering moet ook as 'n integrerende deel van die leerproses ingesluit word omdat dit baie voordele bied. Reflektiewe leer (as 'n vorm van selfassessering) vorm 'n belangrike deel van die proses van ontwikkelings assessering vir studente. Studente is egter geneig om nie by die proses van selfassessering betrokke te raak nie. Hierdie vaardigheid kan deur opvoedkundiges in 'n onderrigomgewing ontwikkel word, maar opvoedkundiges is geneig om nie 'n omgewing te skep waarin studente kan selfassesseer nie.

Die studie het studente se persepsies van die selfassesseringsproses ondersoek nadat hulle oor 'n tydperk in 'n gefasiliteerde omgewing daaraan blootgestel is. Dit het hulle aangemoedig om by die proses betrokke te raak en om hierdie vaardigheid te ontwikkel.

Die navorsingsmetode is verkennend van aard en is deur 'n ontwerpeksperiment uitgevoer. Die eksperiment het die studente op drie geleenthede gedurende die akademiese jaar van 2012 aangemoedig om self te assesseer. Hierna het die navorser 'n gestruktureerde opname gebruik om data van die studente te versamel.

Die resultate van hierdie studie dui daarop dat studente geneig is om nie self te assesseer nie wanneer hulle nie aangemoedig word om dit te doen nie. Sodra hulle die geleentheid gekry het om dit in 'n ondersteunende omgewing te doen, was studente positief oor die selfassesseringsproses. Hulle glo dat dit hul algehele akademiese prestasie sal verbeter en hulle het aangedui dat hulle selfassessering in die toekoms op hul studies sal toepas. Hierdie studie het tot die gevolgtrekking gekom dat studente positief is oor selfassessering en dat hulle akkuraat en op 'n betekenisvolle wyse selfassessering op hul studies sal toepas in 'n ondersteunende omgewing.

Sleutelwoorde:

Selfassessering

Lewenslange leer

Reflektiewe leer

Ontwikkelings assessering

Belastingonderrig

Studente in handelsvakke / handelswetenskappe

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CHAPTER 1

INTRODUCTION

1.1   BACKGROUND

"Education is the most powerful weapon which you can use to change the world" (Mandela, 2003).

Numerous world leaders have concurred with the viewpoint that education is important. For one, John F. Kennedy (1961) is on record as saying that education is a tool for developing one's greatest skills and ultimately strengthening a nation. Barack Obama (2009) agreed when he stated that: "In a global economy where the most valuable skill you can sell is your knowledge, a good education is no longer just a pathway to opportunity – it is a pre-requisite."

Since it seems that education is of vital importance to an individual, a nation and to world change, consideration needs to be given to what *education* as a concept entails. Education is conceptualised as a three-legged process: instruction, learning and assessment (Reynolds, Livingston & Willson, 2006:2).

Assessment is viewed as one of the key drivers in education and student learning (Boud & Associates, 2010:1; Ramsden, 2003:178). The marks or grades allocated for these assessments provide a measure of how students perform in their academic studies. They, however, do not assist students to improve on their current performance and develop continual learning (Boud & Associates, 2010:2). The process of assessment can and should provide information that improves teaching and promotes learning (Reynolds *et al.*, 2006:2).

Although assessments are an integral part of learning and can have a large impact on the quality thereof, learning is not effective if the outcomes of the assessments only focus on grade allocations. Assessments should be used as an effective tool to engage students in learning (Boud & Associates, 2010:1-2). Assessments in education should not only be a measure of knowledge and academic performance. They should also be used to inform and improve students' learning on an ongoing basis (Cowie & Bell, 1999:101).

It is important for educators to encourage students to continually learn and ultimately become lifelong learners (Bourner, 2003:267; Zimmerman, 2002:66). The skill of lifelong learning is developed through reflective learning or self-assessment (Bourner, 2003:267). *Self-assessment*, in the context of this study, means when students reflect on what they have done in a formal assessment. Students will then compare what they have done in terms of what they have set out to do, and consider what they will change in future to improve and ultimately perfect their performance (Cambra-Fierro & Cambra-Berdún, 2007b:106).

Previous studies show that the benefits of self-assessment in improving students' performance and encouraging continual learning are substantial (Cambra-Fierro & Cambra-Berdún, 2007b:108; Lawson, Taylor, Thompson, Simpson, Freeman, Treleaven & Rohde, 2012:4; Papadakis, Fragoulis & Phillips, 2008:325; Zimmerman, 2002:66). It is therefore important that educators should not only develop technical skills in students but also non-technical skills such as higher-order learning (Cassidy & Weinberg, 2005:7). To achieve this, an environment which cultivates the development of these skills should be created (Cassidy, 2006:176).

1.2   RATIONALE FOR THE STUDY

Previous studies on facilitated self-assessment were completed in Australia (Langendyk, 2006:175-177; Lawson *et al.*, 2012:7) and the United States (Kruger & Dunning, 1999:1123-1131). Only one small study with 10 chemistry students was previously conducted in South Africa (Peckam & Sutherland, 2000). Previous international studies included courses in medicine (Langendyk, 2006:175-177), psychology and human development (Kruger & Dunning, 1999:1123-1131) and chemistry (Peckam & Sutherland,

2000). This study is the first of its kind in South Africa in terms of its magnitude. It is also the first of its kind internationally in terms of the fact that it focuses on students who are completing a commerce degree.

1.3   PURPOSE STATEMENT

The aim of this study was to investigate students' perception of the self-assessment process once they had been exposed to it over a period of time and in a facilitated environment.

1.4   RESEARCH OBJECTIVES

The exploratory study was guided by the following specific research objectives:

- To determine whether or not students self-assessed prior to the implementation of this study.

- To determine if students would be encouraged to apply accurate and meaningful self-assessment in an environment which supported it.

- To determine how students perceived self-assessment once they had applied it to their own written assessments over a period of time.

- To determine if students believed whether or not self-assessment was a beneficial process that would ultimately improve their overall academic performance.

- To determine if students would continue applying self-assessment in their studies in the absence of an environment that encouraged it.

1.5   IMPORTANCE AND BENEFITS OF THE STUDY

From a theoretical perspective, the study will make a valuable contribution to the existing body of knowledge on the benefits of self-assessment in the teaching and learning process. Unlike previous studies, which tended to focus on the theoretical value of self-assessment, the study looked at students' perceptions of the self-assessment process in a

practical environment which encouraged them to use it as a tool to improve their own individual learning.

From a practical perspective, the findings could assist educators at tertiary level to create an environment which encourages self-assessment by students. This, in turn, may also expose students to self-assessment in a facilitated environment and may allow them to determine if self-assessment is beneficial to their individual continual learning. It will hopefully also encourage students to utilise this highly beneficial technique in future and improve their overall academic performance as well as ultimately develop their lifelong learning skills.

1.6 DELIMITATIONS AND ASSUMPTIONS

1.6.1 Delimitations

The following delimitations applied to this exploratory study:

- The target population included in this study consisted of third-year undergraduate commerce students who were registered for a specific taxation module at the University of Pretoria. Different results may have been obtained if another target population was used.

- The effect of self-assessment on students' actual academic performance was not considered in this study. Instead, the students' perceptions in terms of their increased or decreased academic performance were considered. These perceptions may be different from the actual outcomes. The actual effect may be considered as further research.

- The design experiment was conducted over three assessments, which were written in the same course module and carried the same weighting for the students' final marks. Topics covered in each assessment related to new work, which had not been tested before. However, each assessment was based on a different topic. This might have affected the outcome of students' perceptions as certain topics might have been perceived to be harder than others. Different results might have been obtained if different topics were assessed over different assessments.

1.6.2 Assumptions

The study was based on the following assumptions:

- The new assessment loose page sets, which were used in the design experiment together with the self-assessment assignment, did in fact encourage students to self-assess.

- Students will be willing to self-assess if they are given an incentive in the form of additional marks to complete the self-assessment.

- All students self-assess in the same way by remarking or grading their own work and reflecting on what they have done.

1.7 SUMMARY

This chapter discussed the importance of education. It then focused on assessment, which is one of the key drivers of the education process. More specifically, it focused on self-assessment and provided the background and rationale for the study. The research objectives were stated and the importance of the study was explained. Key terms were defined and the delimitation and assumptions of the study were listed and explained.

Chapter 2 contains a literature review, which looks more closely at what it means to self-assess, the importance of self-assessment and what skills are required to do so. It also focuses on measuring self-assessment and how accurately students will perform this task. Finally, it looks at how educators can create an environment which promotes self-assessment.

In Chapter 3, the research design and methodology, sample size, sampling method, method of data collection, data analysis and ethics of the study are discussed. In Chapter 4, the results are analysed and in Chapter 5, a conclusion is drawn about the study.

CHAPTER 2

LITERATURE REVIEW

2.1   INTRODUCTION

Chapter 1 discussed the importance of education and the fact that assessment forms one of the key aspects of education. The focus was specifically on self-assessment and how this can promote lifelong learning.

The purpose of this chapter is to look at the theoretical aspects of self-assessment. It defines *self-assessment*, describes what the educational theories are that support self-assessment and also investigates the importance of self-assessment. It also looks at the skills required to self-assess, how self-assessment can be measured and how accurately self-assessment can be measured. Finally, this chapter looks at how an environment of self-assessment can be created and promoted. The literature review supports the importance of the study and assists in formulating a research methodology to ensure that the research objectives are met.

2.2   DEFINING SELF-ASSESSMENT

2.2.1   General meaning

Self-assessment happens when responsible and self-controlled students compare their results with the objectives initially set out and plan to, in future, perfect what they have done right and change what they have done wrong (Cambra-Fierro & Cambra-Berdún, 2007b:106). It entails the ability to monitor personal learning and performance and therefore involves self-awareness at the highest level (Cassidy, 2006:170).

Self-assessment is a form of reflective learning and as Bourner (2003:270) states: "Reflective learning is not what happens to the student, it is what the student does with what has happened." It is an active, rather than a passive form of learning where

something more is required from the student (Bourner, 2003:270). Students are involved in self-assessment when they take full responsibility for evaluating their own understanding in the learning process (Langendyk, 2006:173).

In the next section, the focus is on the educational theories which underpin self-assessment, namely formative and summative assessment as well as the constructivist theory of learning. These theories form the basis of reflective learning in the form of self-assessment.

2.2.2 Formative assessment and summative assessment

When students self-assess, they are involved in formative and summative assessment (Donham, 2010:24).

Assessment in an educational environment has a large number of uses and benefits. The most widely used benefit of assessment is monitoring students and assigning grades in order to communicate the progress of a student to various stakeholders. This is known as summative assessment. However, assessment can provide even more valuable information which can promote learning for students. This is achieved through formative assessment, which involves activities to provide students with feedback in order for them to learn from the process. (Reynolds *et al.*, 2006:15-16.) Therefore, assessment which enhances teaching and learning is known as *formative assessment* (Cowie & Bell, 1999:101).

Self-assessment assists the process of formative assessment. It offers a way for students to review their work and identify how they can improve going forward (Donham, 2010:24).

2.2.3 Constructivist theory of learning

The basic concept of the constructivist view of learning is that learning is an active, adaptive process during which knowledge is built or constructed by the student (Yilmaz, 2008:167). When students construct their own knowledge, they engage in meaningful learning (Cambra-Fierro & Cambra-Berdún, 2007b:108).

To achieve a constructivist approach, students and educators need to be actively engaged in the learning process (Lawson *et al.*, 2012:6). This can be achieved through self-regulated learning and self-assessment (Langendyk, 2006:173), both of which have associated benefits within the learning process.

2.3   IMPORTANCE AND BENEFITS OF SELF-ASSESSMENT

Self-assessment can contribute to improving a student's performance if it is applied critically and responsibly (Cambra-Fierro & Cambra-Berdún, 2007b:108).

Students who self-assess are aware of their strengths and weaknesses and this allows them to learn in a proactive way. This, in turn, gives students self-satisfaction and the motivation to continue improving their method or way of learning. This adaptive learning method will develop the skill of lifelong learning, which is essential in an ever-changing environment in the workplace. A self-regulated student is also more likely to succeed academically. (Zimmerman, 2002:66.) This academic success is attributed to the fact that students who can make good judgement of their work will also know how to improve their work (Lawson *et al.*, 2012:4).

Students who are self-regulated are likely to be successful in their academic achievements and generally more optimistic about their future (Zimmerman, 2002:66). In order for students to be self-regulated, they need the ability to assess themselves in order to identify what they know or do not know about a topic (Langendyk, 2006:173).

Summative assessment by nature is a passive process and allows educators only to assess the final product which the student submits. There is no insight into the thought processes that caused the student to arrive at the final product. Only the students themselves can assess this and therefore know how they interpreted the information which was given to them. It is therefore critical that students engage in formative assessment through self-assessment. They will then be able to take ownership and be responsible for their own learning. (Donham, 2010:15.)

Self-assessment is a process that promotes self-learning rather than grade allocation (Lawson *et al.*, 2012:4). Although it is true that students will always have to be graded on assessments in order to provide details of their progress and performance to various stakeholders, assessment can also be used more effectively as a tool for students to understand what they know and do not know. Self-assessment provides economical and educational benefits and it is therefore important that it is used more widely by educators as a teaching tool. It is not always necessary for academic staff to give feedback. Students will often learn more by assessing themselves or through the process of peer assessment. This also emphasises the co-operation of students to their own learning process. (Ramsden, 2003:177-189.)

More often than not students receive their marked assessments back from their educators and are only interested in the grade they received. They do not self-assess or reflect on what they have done right or wrong in the assessment, they simply move on. The student then misses out on using the assessment as a powerful tool and learning opportunity. This learning opportunity is one of the most important reasons for assessment in education. Self-assessment allows students to look back at what they have done, consider what they are currently doing and develop a plan going forward based on what they have learnt. (Donham, 2010:15.)

Self-assessment also acts as an early-warning system for students who under-perform. It effectively moderates students' expectations, which are often unrealistically high. (Peckham & Sutherland, 2000:77.) It is important for students to know the results of their activities to determine how they are doing and how they should adjust their approach accordingly. Self-assessment allows students to know continually and immediately what their results are. (Cambra-Fierro & Cambra-Berdún, 2007b:110.)

Through self-assessment, students can assess their progress, identify their weaknesses, their confidence can be re-enforced and they will be encouraged to continue learning. This is achieved through action, reflection and critical thinking. (Papadakis *et al.*, 2008:325.)

Relevant technology, current economic conditions and certain social aspects of the business world are continuously changing and it is therefore crucial that commerce

students need to develop the skill of lifelong learning. This continual skill of learning how to learn is achieved by developing reflective learning in students. (Bourner, 2003:267.) With the increasing demand to be flexible in the workplace, students need to develop the skill to think for themselves. They need to be able to interact in an active and critical way in order for them to solve problems. It is therefore fundamental to encourage students to self-assess and reflect. (Cambra-Fierro & Cambra-Berdún, 2007a:37.)

Self-assessment is fundamental to self-directed learning and is essential for professionals in the workplace who need to maintain their competence (Ward, Gruppen & Regehr, 2002:64). Students need to develop the ability to make sound judgements about their own work in order for them to become effective lifelong learners and practitioners. This sound judgement includes the ability to think critically and make judgements independently with confidence. Educators in higher education must be responsible for encouraging this development among students. (Boud & Associates, 2010:1-2.)

2.4   SKILLS REQUIRED TO SELF-ASSESS

Now that the importance of self-assessment has been explored, it is essential to determine what skills are required in a practical sense for a student to self-assess.

Metacognitive awareness is an essential skill to self-assess and self-regulate (Cassidy, 2006:170; Zimmerman, 2002:65). *Metacognition* is defined in the Oxford Dictionary (Stevenson, 2010:1112) as the "awareness and understanding of one's own thought processes".

Incompetent or low-achieving students lack these skills of metacognition and self-monitoring, which are necessary for them to know and measure how they are performing. However, students can be trained to accurately self-assess by improving their logical skills. (Kruger & Dunning, 1999:1121-1130.) For example, Zimmerman (2002:65) believes that students should be aware of their own strengths and weaknesses and that they should be able to strategically take corrective action. This self-regulation is not achieved by pure mental ability or academic skill; it is achieved when students transform their mental ability into an academic skill (Zimmerman, 2002:65). Therefore, the active involvement of

students is vitally important to the self-assessment process being successful (Pappadakis *et al.*, 2008:326).

Cassidy (2006:174-175) argues that the specific learning style of a student is also key to self-assessment. Deep strategic learners will be better equipped to self-assess than apathetic students.

The behaviour of self-assessment will become second nature to students if implemented regularly. It engages metacognition and reflection while reviewing one's own performance based on specific criteria which have been internalised by that individual. These habits will enable student to be independent lifelong learners and can be developed by their educators. (Donham, 2010:14-15.)

Commitment and willingness are the key attributes which students need to possess in order for them to develop the skill of self-assessment (Cambra-Fierro & Cambra-Berdún, 2007b:104). In this study, it was investigated whether students had this commitment and willingness and whether they self-assessed independently without encouragement from their educators. The study then also looked at whether this commitment and willingness increased when an environment that encouraged it was created.

2.5 MEASURING SELF-ASSESSMENT

Now that the importance of self-assessment and the skills necessary for students to self-assess have been established, it needs to be determined if it is important and possible to measure the quality of any self-assessment which might be carried out by a student.

It is vitally important to measure and give feedback to students on their reflective self-assessment. If this feedback is not received, the reflective learning is likely to be neglected. Although it is true that the assessment of reflective learning is subjective, assessing the actual process of the learning is not. (Bourner, 2003:268-270.)

It is hard to measure and evaluate how well a student has self-assessed and reflected. It is highly subjective to measure and only the person who has done the reflecting can evaluate

how much has been learnt and how meaningful the process has been (Bourner, 2003:268; Cambra-Fierro & Cambra-Berdún, 2007a:38;). Therefore, this study explored the perceptions of students who themselves had done the reflecting after they had been exposed to an environment of self-assessment.

2.6 ACCURACY OF STUDENT SELF-ASSESSMENT

It is clear from the above that it is important for the students themselves to measure their self-assessment and determine how meaningful it was. This can only be done by the students being honest about their weaknesses and failures in the self-assessment process. Thomas Jefferson, the third president of the United States, summed it up well when he said: "The wise know their weakness too well to assume infallibility; and he who knows most, knows best how little he knows" (Carruth & Erlich, 1988:256).

Kruger and Dunning (1999:1123-1131) carried out a study in the United States with four different sets of undergraduate psychology and human development students. The students completed a written assessment and then were asked to assess their perceived performance. Results for all four groups of students showed that incompetent or low-achieving students overestimated their skills and abilities. They lacked the skill of metacognition which would have enabled them to determine how poorly they had performed, and therefore they held an inflated view of their performance and ability.

In a similar study carried out by Langendyk (2006:175-177) in Australia, third-year medical students were asked to self-assess their own written assessments based on model answers and detailed marking criteria. They were then also required to mark a fellow student's assessment. Thereafter, the assessments were formally marked by their educators. The results of the study showed that low-achieving students were generally generous with awarding themselves marks, whereas high-achieving students were very critical and marked themselves harshly. A student who is unsuccessful in his/her academic studies is also often unable to assess the level of his/her own performance.

A recent study in Australia gave second-year economics students the opportunity to self-assess on four consecutive occasions. On each occasion, each student's self-assessment

grade was compared with the educator's grade. It was found that students improved their self-assessment technique through support during the process and progressive exposure to self-assessment. (Lawson *et al.,* 2012:7.)

A small study of only 10 students was carried out in South Africa on first-year chemistry students. The expectations of students were evaluated before an assessment. These were then compared with a self-assessment completed by the students after the actual assessment as well as with the final grade allocated by the educators. It was found that a strong correlation existed between self-assessment grades and the formal grades allocated by the educators. (Peckham & Sutherland, 2000:76-77.)

Various studies have shown the benefit or theoretical value of self-assessment but the accuracy thereof among students is poor. A possible solution to this problem is to provide explicit evaluation criteria with which students can assess themselves (Ward *et al.*, 2002:69-70). Peckham and Sutherland (2000:77) also believe that students will be able to self-assess accurately if they are provided with sufficient guidance.

This study investigated the effect of students being provided with guidance and detailed marking criteria on self-assessment. To ensure that proper guidance was provided to students, the researcher set out to create an environment which encouraged self-assessment and provided the necessary guidelines in order for them to self-assess.

2.7   PROMOTING AN ENVIRONMENT OF SELF-ASSESSMENT

According to Zimmerman (2002:69), only a few educators encourage their students to set goals for their studies and encourage methods of study. Students are also almost never asked to self-assess their progress. Students need encouragement and guidance to self-assess in order for them to fully engage in the process. Educators should provide this guidance and encouragement. (Cambra-Fierro & Cambra-Berdún, 2007b:108.)

By encouraging the development of self-assessment, educators will assist with evolving students from being dependent on others and taking responsibility for their own continual learning. This is a crucial skill in an ever-changing world (Donham, 2010:21).

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Students are not naturally able to reliably measure their own performance. It is a skill which needs to be taught to them and practised regularly (Peckham & Sutherland, 2000:75,77). Students should be allowed numerous opportunities to practise self-assessment. The majority of students who have been given the opportunity to self-assess would prefer to be given the opportunity again in future (Lawson *et al.*, 2012:7-10). Bourner (2003:269-270) suggests a questioning approach to encourage the development of self-assessment and reflective learning.

It is difficult for students to achieve honest self-assessment without them having the right attitude and being in a culture of self-assessment. It is also true that the students' attitude and behaviour depend on what criteria will be used to assess them. (Cambra-Fierro & Cambra-Berdún, 2007a:37.)

Langendyk (2006:173-174) is of the opinion that students who are unsuccessful in their own studies often do not have proper insight into their actual performance. Their judgements are usually overoptimistic and they do not realise that they do not know what is going on. Students also tend to focus on their overall score and therefore they do not naturally choose to self-assess. Langendyk (2006:174) suggests that future research could investigate the impact of more frequent opportunities of self-assessment.

Therefore, this study aimed to encourage students to self-assess on more than one occasion by creating an environment of self-assessment which encouraged students to develop the skill. In order to promote a positive attitude and to encourage self-assessment, additional marks were offered towards the students' final grade as an incentive for completing the self-assessment to the best of their ability. The aim of this incentive was to encourage students to learn the skill of self-assessment and to experience the benefits of this process. No incentives were offered to the students to participate in the survey. This was done on a voluntary basis. An extensive search in literature showed that no previous studies offered an incentive such as this to encourage the development of self-assessment.

2.8 CONCLUSION

This chapter discussed self-assessment and also described the educational theories supporting self-assessment. It focused on the importance of self-assessment, looked at the skills required to self-assess and determined how self-assessment could be measured. It also investigated how accurately self-assessment could be measured. This chapter was concluded by looking at how an environment of self-assessment could be created and promoted by incentivising students through awarding them marks for completing self-assessment.

In Chapter 3, the research design and methodology of the study, as well as the sample size and sampling method, the method of data collection and the validity and limitations of the data collected are explained.

CHAPTER 3

RESEARCH DESIGN AND METHODS

3.1 INTRODUCTION

Chapter 2 discussed self-assessment and focused on the importance thereof. It also investigated what skills are needed to self-assess, how self-assessment can be measured, how accurately it can be measured and how an environment of self-assessment can be created and promoted. From the literature review in Chapter 2, it is evident that self-assessment applied by students is beneficial in terms of developing lifelong learning and improving academic results. It is, however, necessary to determine how South African undergraduate commerce students perceive self-assessment when they are exposed to an environment which encourages it and furthermore, whether or not they will apply self-assessment techniques even if they are not encouraged to do so. This data will assist educators in determining the need to develop a self-assessment environment for their students.

This chapter describes the overall research design and methodology of this exploratory study. The design and methodology must help the researcher gather relevant data in order to meet the research objectives. The chapter also describes the determination of the sample size and sampling method, as well as the method of data collection. This includes an investigation into the correspondence between the survey and the research objectives. The chapter concludes by discussing the validity and limitations of the data collected with an outline of methods used to ensure the quality and rigour of the research objectives as well as ethics applied to this study.

3.2 DESCRIPTION OF INQUIRY STRATEGY AND BROAD RESEARCH DESIGN

An exploratory study was conducted to clarify and understand how students perceived self-assessment as a learning tool (Saunders, Lewis & Thornhill, 2009:139). This empirical study was conducted by means of an experimental design which aimed to test whether an

activity would make a difference to the participants of the design experiment (Creswell, 2005:51). The aim was to determine whether an environment of self-assessment which was created for students would make a difference to those specific students involved in the self-assessment design experiment. The data was collected specifically for the purposes of this study and was therefore classified as primary data (Saunders *et al.*, 2009:598).

A survey strategy was used to collect data in a structured manner as the population of students used was fairly large. A survey was considered the most appropriate manner in which to collect data from this sizeable population in the most economical way. In addition, a survey was considered as a strategy which would be easy to explain to students and the results would be comparable as the data would be standardised (Saunders *et al.*, 2009:144,601). Although the design experiment was implemented over a period of time, the students' views were only studied at a specific point in time when the data was collected. This study is therefore cross-sectional (Saunders *et al.*, 2009:595).

In this study, a unique survey, which asked the students to respond to the same set of specific questions, was designed to gather the data (Saunders *et al.*, 2009:599). The data collected was primarily quantitative data as the data could be quantified. A small portion of the data, which was collected by means of an open-ended question in the survey, was qualitative (Saunders *et al.*, 2009:598).

This study represents basic research as its purpose was to better explain the specific research objectives. The academic community will primarily use this study (Saunders *et al.*, 2009:588).

3.3 METHODOLOGY AND SAMPLING

3.3.1 Target population and units of analysis

The target population for this study was all the third-year undergraduate commerce students who were registered for a specific taxation module (Taxation 300) during the 2012 academic year. All these students were full-time students studying at the University

of Pretoria in South Africa. Taxation 300 represented one of their major subjects and its duration was for the full 2012 academic year.

The units of analysis of this study were all the third-year undergraduate commerce students who were registered for Taxation 300 as conclusions were drawn on these students only (Terre Blanche & Durrheim, 2002:37). Therefore, there was no difference between the population and the units of analysis. As this was an exploratory study, the aim was not to generalise the findings beyond the population.

3.3.2 Design experiment

The design experiment was implemented for all 561 students registered for Taxation 300. During the course of the academic year, the students wrote six class assessments (University of Pretoria, 2012:5). These assessments were 45 minutes long and were always written soon after a new topic of work had been covered with the students. The design experiment was applied over three of the class assessments during the 2012 academic year.

The details of the design experiment were explained to the students in one of their formal lectures prior to being implemented. In order to encourage the students to participate in the design experiment, a self-assessment assignment was developed and marks were allocated based on how accurately they assessed themselves for each of the three class assessments.

The experiment was designed to create an environment which encouraged self-assessment. Instead of the students writing their class assessments in the standard university lined assessment scripts, new assessment loose page sets were designed and printed. The new loose page sets, which were self-carbon paper were made up of two pages each and were bound with glue at the top. The front page, on which the students completed their answers, was white in colour with lines pre-printed to write on. The second page was yellow in colour and the self-carbon set ensured that students were left with a copy of their assessment on this yellow page. At the end of each assessment, students were given time to separate the white sheets from the yellow sheets and to collate the

white sheets before handing them in for marking. The students then kept the yellow sheets in order to assess themselves based on what they had done in their assessment.

Before the end of the same day on which the class assessment was written, students were provided with a model answer to the assessment as well as a detailed mark plan via the UP online learning management system (ClickUp). Students were then given an opportunity to manually self-assess, followed by an electronic submission of their own self-assessed mark via ClickUp. The students were also asked reflective questions via ClickUp, which encouraged them to focus on the positive and negative aspects of their assessment.

The submitted self-assessment marks as well as the reflection comments were used as a basis for giving the students marks for taking part in the design experiment. The total self-assessment assignment was out of 150 marks; each of the three class assessments which formed part of the design experiment represented a mini-assignment and contributed 50 marks to the total assignment. For each mini-assignment out of 50 marks, 10 marks were allocated to the reflection questions based on whether or not students did in fact spend time reflecting and whether they gave reasonable responses. The remaining 40 marks were then allocated based on the accuracy of the students' self-assessment mark by comparing their mark to the actual final mark as given by the educator. The marks were allocated on a sliding-scale to encourage accurate self-assessment. The mark out of 40 was based on the difference between the two marks as follows:

- Difference of 0 – 5%   40
- Difference of 5 – 10%   32
- Difference of 10 – 15%   26
- Difference of 15 – 30%   20
- Difference of > 30%   16

3.3.3 Sample size and sample method employed

Information obtained from the Faculty of Economic and Management Sciences at the University of Pretoria on the date that the survey was distributed (31 August 2012)

indicated that 561 students were registered for Taxation 300 on that date. The design experiment was implemented for all students registered for Taxation 300.

Self-selection sampling, which is a form of non-probability sampling, was used to select the sample for the completion of the survey. This method of sampling allowed each student who was part of the population to choose whether or not they wanted to be part of the study (Saunders *et al.*, 2009:241).

The students were given the choice to complete the survey during one of their formal lectures of Taxation 300. The students registered for this module were divided into three groups for class attendance. All three groups had a planned formal lecture on 31 August 2012 (University of Pretoria, 2012:11). The researcher invited all students who were present at one of the three classes to complete the survey on a voluntary basis. A shortfall of this method is that students, who did not attend the lecture on 31 August 2012, were not given the opportunity to complete the survey. The researcher, however, believes that this is not a major shortfall as the attendance of formal lectures for Taxation 300 was compulsory (University of Pretoria, 2012:2).

Of the entire population of 561, 282 students voluntarily responded to the survey. Therefore, the sample size represented 50% of the total population. For non-probability sampling, there are no fixed guidelines with regard to the sample size. It is rather a logical link between the sample selection method and the focus of the study (Saunders *et al.*, 2009:233). The students who self-selected were more likely to do so because they had specific feelings or opinions about the study being conducted (Saunders *et al.*, 2009:241). Since the research objectives focused on students' perceptions and opinions of self-assessment, self-selection was the most appropriate method of sampling and the researcher was of the opinion that the sample size was adequate to draw conclusions on the research objectives of this study with regard to all undergraduate students registered for Taxation 300. The findings of this exploratory study were not intended to be generalised beyond the population on which the design experiment was implemented.

The results of the study may have been different if the sample size represented a larger percentage of the population. It is unknown why only 50% of the population completed the survey. It is possible that students didn't complete the survey because they were not

attending class on that day, were not interested in completing a survey or were negative or indifferent to the self-assessment design experiment which they had been exposed to. Future research could clarify this.

3.4   DATA COLLECTION

This section deals with the method of data collection, the design of the survey, the pre-testing of the survey and the period during which the survey was distributed.

3.4.1   Method of data collection

To collect the relevant primary data, a manual survey was conducted using a unique self-administered survey (Saunders *et al.*, 2009:362). This study followed a mixed-method research approach, as primarily quantitative data with an element of qualitative data was collected (Saunders *et al.*, 2009:152).

All students registered for Taxation 300 had a compulsory lecture on 31 August 2012 (University of Pretoria, 2012:11). Prior to this date ethical clearance was obtained from the Research Ethics Committee (see section 3.7.1). The researcher explained the purpose and relevance of the survey and then offered the students who attended the class on 31 August 2012 the opportunity to complete the survey.

Students who did not attend the class were not given an opportunity to complete the survey. However, since class attendance was compulsory, the researcher did not feel the need to create an additional opportunity for data collection (University of Pretoria, 2012:2).

A total of 282 surveys were collected.

3.4.2   Design of the survey

The survey was made available in English and Afrikaans, since these were the languages in which Taxation 300 was formally offered. The survey is included as Appendix A (English version) and Appendix B (Afrikaans version).

In developing the survey, the questions were linked to the research objectives to ensure that all the objectives were met.

Of the 11 questions used in the survey, 10 were closed-ended questions, which gave the students a set of mutually exclusive options from which they could choose only one for each question (Saunders *et al.*, 2009:588). These closed-ended questions reduced the time spent on completing the survey as well as making the comparison of data collected simpler. Only one question (Question 10) was an open-ended question, which allowed students to answer and give their perception of self-assessment in their own words (Saunders *et al.*, 2009:596). This was the only question which provided qualitative information for the study.

Each question included in the survey and the reasons for its inclusion are discussed below.

Questions 1 to 3: These questions were not relevant for the purposes of the study. They provided general biographical information, such as the respondent's gender and whether or not they attended class in their home language. Their purpose was to set respondents at ease prior to answering questions which were relevant to the study.

Question 4: Respondents were asked what they did when they received a marked assessment back from their educators in the past (before the design experiment was implemented). They were given the following options to choose from:
- "Nothing";
- "Only check the adding up of marks";
- "Quickly scan through the assessment";
- "Scan through the assessment and review questions that I did badly in"; or
- "Work through the entire assessment in detail".

This question dealt with the following research objective:
- To determine whether or not students self-assessed prior to the implementation of this study.

Cambra-Fierro and Cambra-Berdún (2007b:106) are of the opinion that self-assessment is a process whereby students compare their results with the objectives which were set out and plan to improve on what they have done wrong in future assessments. Self-assessment therefore involves something more than simply checking the adding up of marks or quickly scanning through a marked assessment. The reason for including this question was to identify whether or not students applied self-assessment techniques prior to the implementation of the design experiment and to what extent these techniques were applied.

Questions 5 and 8: Question 5 asked respondents how they felt about the process of the design experiment when it was first introduced to them. Question 8 then asked how they felt about the design experiment once they had been exposed to it over three different occasions. For both Questions 5 and 8, respondents were given the following options to choose from:

- "Very positive";
- "Slightly positive";
- "Neutral";
- "Slightly negative"; or
- "Very negative".

These two questions dealt with the following research objective:

- To determine how students perceived self-assessment once they had applied it to their own written assessments over a period of time.

Students need to be committed and willing to engage in the process of self-assessment in order for them to develop this critical skill (Cambra-Fierro & Cambra-Berdún, 2007b:104). Question 5 and 8 were included to determine what students' perception towards self-assessment was and whether or not they were committed and willing to engage in the process. These two questions were also included to determine whether or not students' perceptions towards self-assessment changed over a period of time once they had been given the opportunity to apply it to their own assessments.

Question 6: Respondents were asked, once given the opportunity to self-assess, if they found the process beneficial in terms of improving their academic performance. They were given the following options:

- "Yes (definitely)";
- "Yes (to some extent)";
- "Not sure";
- "Not really";
- "Definitely not".

This question dealt with the following research objective:

- To determine if students believed whether or not self-assessment was a beneficial process that would ultimately improve their overall academic performance.

Cambra-Fierro and Cambra-Berdún (2007b:108) are of the opinion that self-assessment is beneficial to students' academic performance. Question 6 was included to identify whether or not students perceived self-assessment as a learning tool which could be beneficial to their studies and their academic performance.

Question 7: Respondents were asked what they would do when they received a marked assessment back in future, even if they were not required to do anything with it. They were given the following options to choose from:

- "Nothing";
- "Only check the adding up of marks";
- "Quickly scan through the assessment";
- "Scan through the assessment and review questions that I did badly in"; or
- "Work through the entire assessment in detail".

This question, read together with Question 4, dealt with the following research objective:

- To determine if students would continue applying self-assessment in their studies in the absence of an environment that encouraged it.

Students are almost never encouraged to set goals for their studies and to self-assess by their educators (Zimmerman, 2002:69). Questions 4 and 7 were of significance to the

study as they provided information on whether the respondents had been encouraged to self-assess and if they had changed their view of self-assessment over the implementation of the design experiment. The questions also considered whether students would choose to continue self-assessing even if they were not required to do so in future. It also determined to what extent they self-assessed prior to the design experiment in comparison with to what extent they would continue to self-assess in future.

Question 9: Respondents were asked if they would like the design experiment to be applied to their future assessments. They could choose from one of the following options:

- "Yes";
- "Maybe"; or
- "No".

Educators need to design learning environments which develop and encourage non-technical skills such as self-assessment in students (Cassidy, 2006:176). This question identified whether or not the self-carbon sets were perceived as an effective tool which could be used in an environment to encourage self-assessment. This information is significant for future educators in determining whether they can use a similar tool with their students.

Question 10: This question was an open-ended question, which asked respondents if they had any further comments regarding the design experiment which they had been exposed to as a method of self-assessment.

An open-ended question allows respondents to communicate in their own words how they perceive a situation and it also allows for more in-depth answers (Hofstee, 2006:133). The qualitative information collected from this question provided meaningful information on the respondents' perceptions of self-assessment, which had not necessarily been dealt with elsewhere in the survey. It was also of importance as it provided information which would help the researcher confirm if the responses received to the previous questions corresponded with this open-ended question. This question was the only question which provided qualitative data for the study.

Question 11: This question was not relevant for the purposes of the study. It asked permission from the respondents to access their personal data (in aggregate with other respondents) from the University of Pretoria's database in order to facilitate the extension of the study in future.

3.4.3   Pilot testing of the survey

The survey was reviewed by Mrs Rina Owen, an independent research consultant employed by the Faculty of Economic and Management Sciences at the University of Pretoria, to ensure that any misinterpretations would be limited.

To ensure that all students completing the survey would understand all questions clearly and not have problems in completing the survey, a pilot study was then performed (Saunders *et al.*, 2009:597). The pilot study was carried out by five senior lecturers in the Department of Taxation at the University of Pretoria, who critically evaluated the survey. After a few minor amendments, they were satisfied that the survey was well structured, easily understandable and that it would meet the research objectives effectively.

3.5   DATA ANALYSIS

Numerical codes were assigned to all the closed-ended questions (Questions 1 to 9 and Question 11) of the survey. The coding was done as these questions were analysed by a computer program (Saunders *et al.*, 2009:385). The closed-ended questions had available response options which were mutually exclusive in order to facilitate coding. The numbers allocated to these responses are indicated in the survey (Appendices A and B). Question 10 was an open-ended question, which provided qualitative data. A response category for this question was not allocated and the question was subsequently not coded.

Mrs Rhuhanda Bron, a data processor in the Department of Statistics at the University of Pretoria, captured the coded closed-ended questions in an Excel Spreadsheet format. This data was then analysed by Mrs Rina Owen by means of the Statistical Analysis Software (SAS) package. The researcher summarised and analysed the data from the open-ended qualitative question. Chapter 4 provides the detailed data analysis.

3.6 ASSESSING AND DEMONSTRATING THE QUALITY AND RIGOUR OF THE PROPOSED RESEARCH DESIGN

The validity and reliability of data have a direct influence on the reliability of the study's findings. The study's findings will be reliable if the data collection and analysis techniques generate findings which are consistent (Saunders *et al.*, 2009:156). This reliability could be threatened by participant bias if participants gave inaccurate responses (Saunders *et al.*, 2009:601). The researcher was involved in lecturing the students in Taxation 300 during the 2012 academic year. It was possible that the students, when answering the survey, could have answered what they thought the researcher would have wanted them to say. The researcher tried to solve this problem by explaining the importance of accurate, honest responses. Students were also guaranteed that results would be anonymous and that data would be used only for the purposes of this study.

Furthermore, a possibility existed that a language barrier could have affected respondents' responses. This problem was solved by making the survey available in both English and Afrikaans, the languages in which Taxation 300 was formally offered.

Lastly, the internal validity of the survey was considered. This refers to the ability of the survey to measure exactly what it was intended to measure (Saunders *et al.*, 2009:372). To ensure the internal validity of the survey, it was designed specifically to meet each of the research objectives. To ensure that this internal validity was met, the survey was critically reviewed by five senior lecturers in the Department of Taxation as well as by Mrs Rina Owen.

3.7 RESEARCH ETHICS

To ensure that the design and methodology of this study did not affect the rights of those involved with the study, the following ethical issues were considered: ethical clearance from the Research Ethics Committee of the Department of Taxation at the University of Pretoria, informed consent from the participants, confidentiality of any data provided by the participants, anonymity of participants and voluntary participation (Saunders *et al.*, 2009:183-185).

3.7.1 Ethical clearance from the Research Ethics Committee

The Department of Taxation has blanket ethical clearance from the Dean of the Faculty of Economic and Management Sciences at the University of Pretoria for any educational innovation research among the taxation students. Since this study falls under the blanket of educational innovation, ethical clearance was requested from the Research Ethics Committee of the Department of Taxation and subsequently obtained.

3.7.2 Informed consent and voluntary participation

The informed consent was included in the survey (Appendices A and B). It was clearly indicated to students that by completing the survey, they were giving their consent to participate in the study on a voluntary basis. Although incentives were offered to students to take part in the design experiment (see section 3.3.2), no incentives were offered to encourage participation in the survey.

3.7.3 Confidentiality of data and anonymity of participants

The survey (Appendices A and B) clearly stated that any answers given would be treated as strictly confidential and that the data collected would only be used for the purposes of the study. To ensure anonymity, it was also clearly stated that any responses would be used in aggregate with other responses and that participants could not be individually identified.

To emphasise the importance of this, the researcher also verbally guaranteed participants anonymity and confidentiality prior to the surveys being distributed.

3.8 CONCLUSION

In this chapter, the research design, the research methodology and sampling employed were considered. The design of the research instrument used, the sample selection as well as the process of data collection and analysis were discussed. The validity of the data

and research ethics were also considered. Chapter 4 discusses the results and findings of the data after detailed analysis.

CHAPTER 4

ANALYSIS OF RESULTS

4.1 INTRODUCTION

Chapter 3 focused on the research design and methodology employed in the study. It considered the self-selection sampling method which was applied as well as the design of the survey, which was the research instrument used for the study. The method of data collection and data analysis was also discussed. Finally, in Chapter 3, the research ethics and the validity of data were considered.

The aim of the study was to investigate what students' perceptions of self-assessment were once they had been given the opportunity of being exposed to the process over a period of time and in a facilitated environment. This was done by way of a design experiment which was implemented in three of their formal assessments during an academic year, followed by the completion of a structured survey (Appendices A and B) by the students.

A total 282 surveys were completed and the data was captured. The quantitative data gathered was analysed using the Statistical Analysis Software (SAS) package. Qualitative data was summarised and interpreted by the researcher.

This chapter focuses on the results of the analysis of all the data collected from the completed surveys.

4.2 RESULTS OF THE SURVEY

The results of the survey are discussed in terms of the research objectives.

4.2.1 Student self-assessment prior to the implementation of the design experiment

This question dealt with the following research objective:

- To determine whether or not students self-assessed prior to the implementation of the study.

To determine if students self-assessed prior to the implementation of the design experiment, Question 4 asked respondents what they did with marked assessments (prior to the experiment) when they received them back from their educators. They were given the following options to choose from:

- "Nothing";
- "Only check the adding up of marks";
- "Quickly scan through the assessment";
- "Scan through the assessment and review questions that I did badly in"; or
- "Work through the entire assessment in detail".

A frequency distribution was used to analyse this question as it was the simplest way to summarise the data for an individual variable (Saunders *et al.*, 2009:429). Of the 282 respondents, 278 answered this question. The results of Question 4 are summarised in Figure 4.1.

Figure 4.1: Level of self-assessment applied by respondents prior to the design experiment
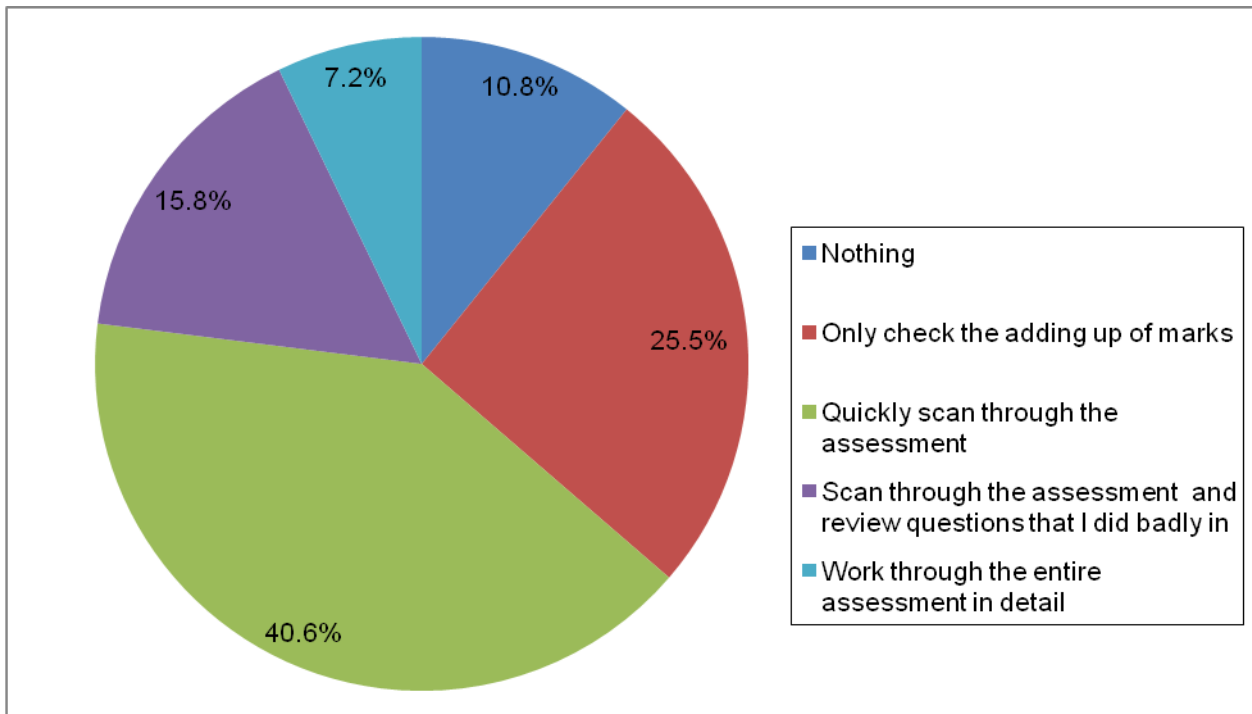
Self-assessment involves something more than simply checking the adding up of marks or quickly scanning through a marked assessment. It is the process whereby students compare their results with the objectives which were set out and plan to improve on what they have done wrong in future assessments (Cambra-Fierro & Cambra-Berdún, 2007b:106). Therefore, it can be concluded that only the respondents who chose one of the following two options were involved in a form of self-assessment:

- "Scan through the assessment and review questions that I did badly in"; or
- "Work through the entire assessment in detail".

The data clearly shows that, prior to the implementation of the design experiment, 15.8% of respondents scanned through their assessments and reviewed questions they had done badly in and only 7.2% of the respondents worked through their assessments in detail.

Therefore, prior to the implementation of the design experiment, only 23% of the respondents engaged in some form of self-assessment while the other 77% did not self-assess at all.

4.2.2 Motivation of students to apply accurate self-assessment in a supportive environment

This question dealt with the following research objective:

- To determine if students would be encouraged to apply accurate and meaningful self-assessment in an environment which supported it.

To encourage students to self-assess, a self-assessment assignment was developed and marks were allocated to students who took part in the design experiment. The researcher compared the number of students who wrote the formal assessment with the number of students who submitted the self-assessment mini-assignment linked to each assessment to determine to what extent students were encouraged to self-assess. Table 4.1 summarises the findings.

Table 4.1: Students who self-assessed during the design experiment

	Number of students who completed the formal assessment (A)	Number of students who completed the self-assessment mini-assignment (B)	Percentage of students who self-assessed (A/B)
Assessment 1	561	535	95.4%
Assessment 2	561	540	96.3%
Assessment 3	545	523	96.0%

For each assessment which formed part of the design experiment, between 95.4% and 96.3% of the students took part in the self-assessment mini-assignment. Therefore, it is clear that students are supported and encouraged to self-assess if they are offered marks for doing so.

The question which still remains is whether or not the students spent a reasonable amount of time on their self-assessment to ensure that they obtained the maximum benefit from the learning experience. To encourage students to do meaningful self-assessment, marks for accurate self-assessment were awarded. Each student's self-assessed mark was compared with the formal mark allocated by their educators. The students were then

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awarded a mark out of 40 for each mini-assignment based on the difference between the two marks calculated on a sliding-scale. The mark out of 40 was calculated as follows:

- Difference of 0 – 5%   40
- Difference of 5 – 10%   32
- Difference of 10 – 15%   26
- Difference of 15 – 30%   20
- Difference of > 30%   16

The closer the students were to their formal mark the students were, the higher the mark they received for their self-assessment assignment. Therefore, they were encouraged to assess themselves as accurately as possible.

The researcher evaluated the average differences per assessment between the students' self-assessed marks and their formal marks awarded by the educators. The findings are summarised in Table 4.2.

Table 4.2: Accuracy of self-assessment

	Average formal mark (%) as awarded by the educators (A)	Average self-assessed mark (%) as awarded by the students (B)	Difference (A less B)
Assessment 1	63.3%	61.5%	1.8%
Assessment 2	59.8%	59.8%	-
Assessment 3	55.4%	52.5%	2.9%

Considering the sliding-scale mark plan of each mini-assignment, students were encouraged to assess themselves within a 5% range of their actual formal mark. As can be seen from Table 4.2, on average, students appeared to be able to apply accurate self-assessment and the average difference over the three assessments ranged from 0% to 2.9%.

It was not the objective of this study to consider how various antecedents caused students to self-assess differently and whether or not certain students self-assessed more

accurately than others. Those antecedents which could affect the accuracy of self-assessment could be investigated further in later studies.

However, the researcher did set out to determine if students could be encouraged to apply accurate and meaningful self-assessment in an environment which was created for it. After analysing the data, it is clear that students can be encouraged to self-assess and furthermore that they will apply accurate and meaningful self-assessment if there is an incentive which motivates them to do so.

4.2.3   Students' perception of the self-assessment environment

In this section, the following research objective is considered:
- To determine how students perceived self-assessment once they had applied it on their own written assessments over a period of time.

The aim of the design experiment was to design an environment which encourages students to self-assess. Respondents were asked in the survey how they felt about the environment of self-assessment prior to having been exposed to it (Question 5) and how they felt after they had been exposed to it on three occasions (Question 8). They were given the following options to choose from:
- "Very positive";
- "Slightly positive";
- "Neutral";
- "Slightly negative"; or
- "Very negative".

A frequency distribution was once again used to evaluate the data collected from each individual question. All 282 respondents answered both these questions. The results of the frequency distribution of Question 5 and Question 8 are summarised in Figure 4.2.

Figure 4.2: Respondents' perceptions of a self-assessment environment
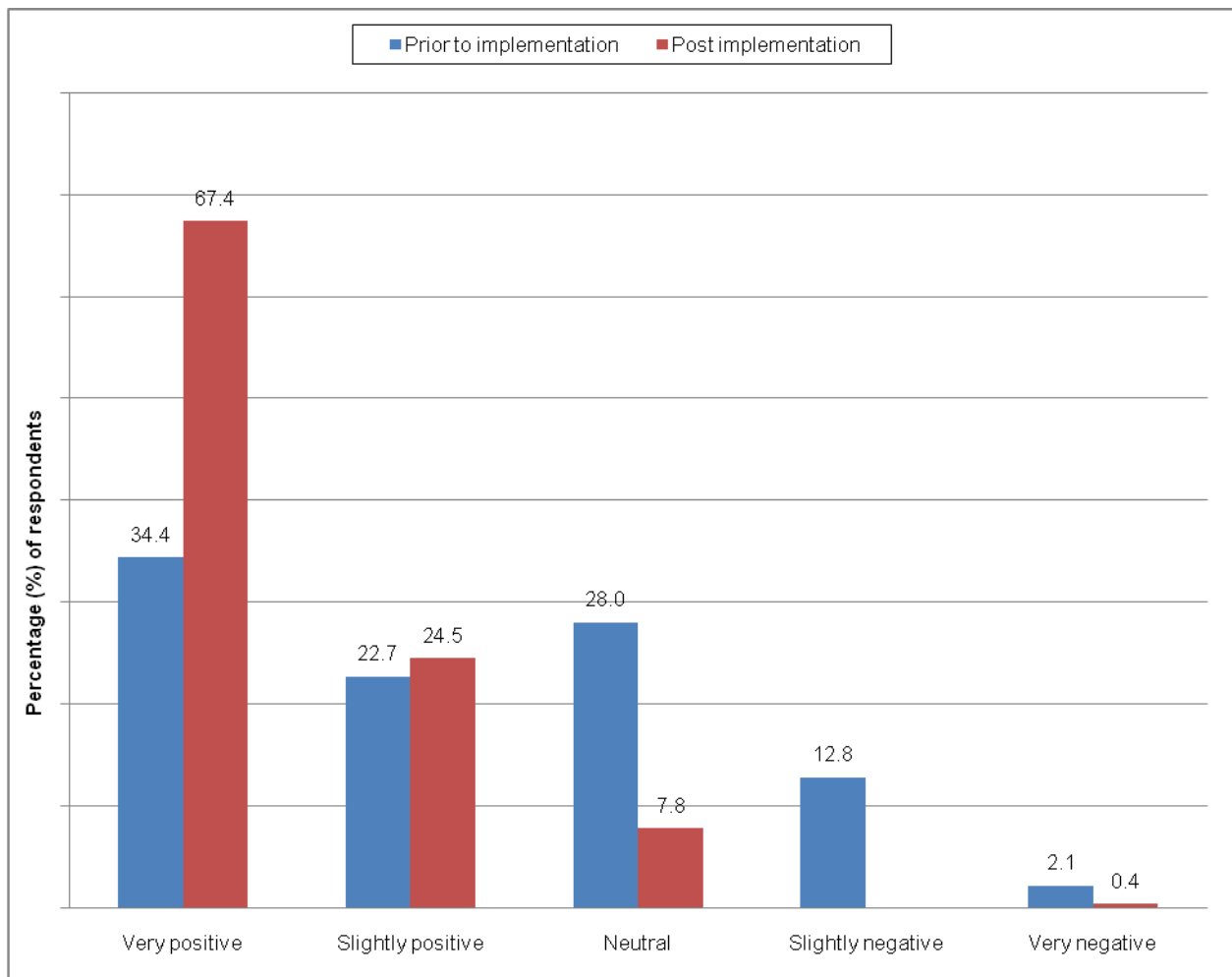
It is clear from the above graph that the respondents were more positive about self-assessment after being exposed to an environment conducive to self-assessment. Prior to the design experiment, only 57.1% of the respondents were positive, 34.4% were very positive and 22.7% were slightly positive. After the design experiment, 91.9% of the respondents were positive, 67.4% were very positive and 24.5% were slightly positive.

A paired t-test was then used to compare the respondents' perception of a self-assessment environment before (Question 5) and after (Question 8) being exposed to it. The paired t-test assesses changes over time (Saunders *et al.*, 2009:451). The results of the paired t-test are summarised in Table 4.3.

Table 4.3: Paired t-test

DF	t-value	Significance Pr > |t|
281	12.76	<0.0001

The change in the respondents' feelings over the design experiment was significant on a 1% level. This shows a definite increase in the positivity of the respondents towards self-assessment once they had been exposed to an environment that encouraged it.

Question 9 of the survey then asked respondents if they would like the self-carbon self-assessment environment to be applied to future assessments which they were involved in. A frequency distribution was used to analyse the data from this question. The results are summarised in Table 4.4.

Table 4.4: Self-assessment environment to be applied to future assessments

Respondents' answer	Frequency	Percentage
Yes	190	67.4%
Maybe	81	28.7%
No	11	3.9%

From this data, it is clear that the majority of the respondents appreciated the environment which was created for them. Of the respondents, 67.4% would like the self-assessment environment to be applied future assessments, 28.7% are not sure and only 3.9% would not like to have it applied in future. This data correlates with the data from Question 8 which tested the positivity of the respondents after being exposed to the self-assessment environment. In both instances, 67.4% of the respondents were very positive about the self-assessment environment (see Figure 4.1 and Table 4.4).

Therefore, it can be concluded that students are positive about a facilitated self-assessment environment and will appreciate the environment being created for future assessments in their studies.

4.2.4   Students' belief that self-assessment is beneficial

This question dealt the following research objective:

- To determine if students believed whether or not self-assessment was a beneficial process that would ultimately improve their overall academic performance.

Research has shown that self-assessment is beneficial to students' performance and in developing lifelong learners (Cambra-Fierro & Cambra-Berdún, 2007b:108; Lawson *et al.*, 2012:4; Zimmerman, 2002:66). However, one of the objectives of this study was to determine if students themselves believed that self-assessment was beneficial and could ultimately improve their academic performance.

Question 6 of the survey asked respondents (once they had been given the opportunity to self-assess) whether they found self-assessment beneficial in terms of it improving their academic performance. They were given the following options to choose from:

- "Yes (definitely)";
- "Yes (to some extent)";
- "Not sure";
- "Not really"; or
- "Definitely not".

The data from the question was analysed with the SAS system by applying a frequency distribution. All 282 respondents answered this question and the results are summarised in Figure 4.3.

Figure 4.3: Respondents' perception of the benefits of self-assessment on academic performance
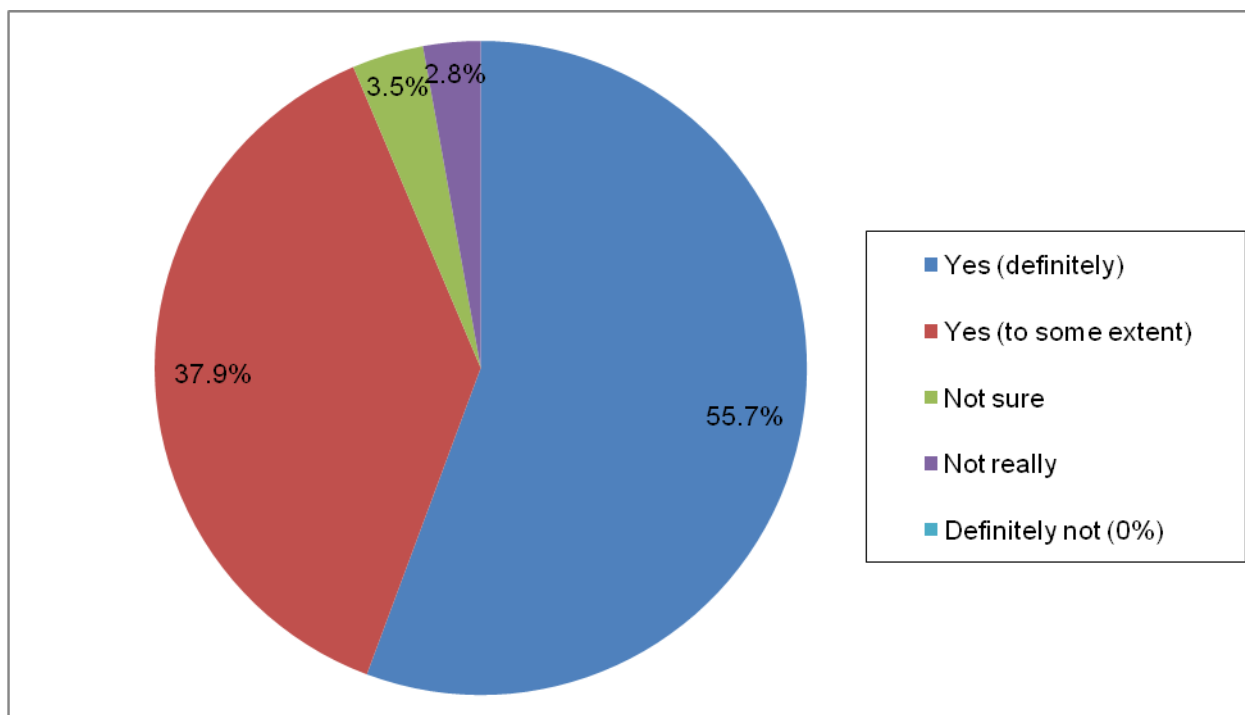
Of the respondents, 96.3% believed that self-assessment was beneficial to their academic performance to some degree, 55.7% believed it was definitely beneficial, while 37.9% believed it was beneficial to some extent. Of the respondents, 3.5% were not sure whether or not it was beneficial while 2.8% believed it was not really beneficial. None of the respondents felt that it was not beneficial at all.

Therefore, students do believe that self-assessment is beneficial to their studies and that it can ultimately improve their academic performance.

Question 10 of the survey was an open-ended question and respondents were given the opportunity to make any further comments on the self-assessment experiment. A total of 202 respondents made use of the opportunity to provide additional comments. Only the data relevant to self-assessment being beneficial was summarised by the researcher. After analysing these comments, the researcher identified three additional broad benefits of self-assessment as perceived by the respondents. These three benefits, as well as the frequency of which they were mentioned in the open-ended question, are set out in Table 4.5.

Table 4.5: Additional benefits of self-assessment identified by respondents

Benefit of self-assessment	Frequency
Improved exam technique	50
Ability to identify errors and problem areas which need to be worked on	25
Information still fresh in mind and ability to deal with issues immediately	15

The most frequently mentioned benefit was improved exam technique and this is now discussed in more detail. Respondents felt that the self-assessment would in particular improve their exam technique by:

- Helping to improve the layout of their answers in future assessments. It gave them insight into how to answer in a more structured manner.

- Helping to structure assessments in such a way that they were easier to mark by their educators.

- Understanding how marks are awarded in an assessment and thereby ensuring they will obtain the maximum marks possible in future assessments.

- Understanding how much detail to provide when answering a question.

As the intention was not to generalise the findings beyond the population, the frequency of the benefits above is not necessarily meaningful. The open-ended question was intended to identify benefits of self-assessment, other than improved academic performance, as the respondents had perceived them during the design experiment. The benefits identified are therefore not an exhaustive list of benefits of self-assessment.

The researcher did not set out to identify an exhaustive list of benefits of self-assessment, but merely to determine if students believed whether or not self-assessment was a beneficial process. Based on the above results, it can be concluded that students do find self-assessment beneficial, and among other benefits, that it will ultimately improve their academic performance.

4.2.5   Self-assessment techniques to be applied by students in future

This question deals with the following research objective:

- To determine if students would continue applying self-assessment in their studies in the absence of an environment that encouraged it.

To determine if students would continue to self-assess in the absence of an environment which encourages it, Question 8 asked the respondents what they would do in future (even if they were not required to do so) when they received marked assessments back from their educators. They were given the following options to choose from:

- "Nothing";
- "Only check the adding up of marks";
- "Quickly scan through the assessment";
- "Scan through the assessment and review questions that I did badly in"; or
- "Work through the entire assessment in detail".

The data collected from this question was compared with the data collected from Question 4, which looked at what the respondents did with their assessments prior to the implementation of the design experiment. The options available for Question 4 and Question 8 were identical.

A total of 278 respondents completed both Questions 4 and 8. A frequency procedure was used to compare the data from the two questions to identify how the respondents' perceptions on self-assessment had changed over the period of the design experiment. These findings are summarised in Figure 4.4.

Figure 4.4: Level of self-assessment prior to and after the design experiment
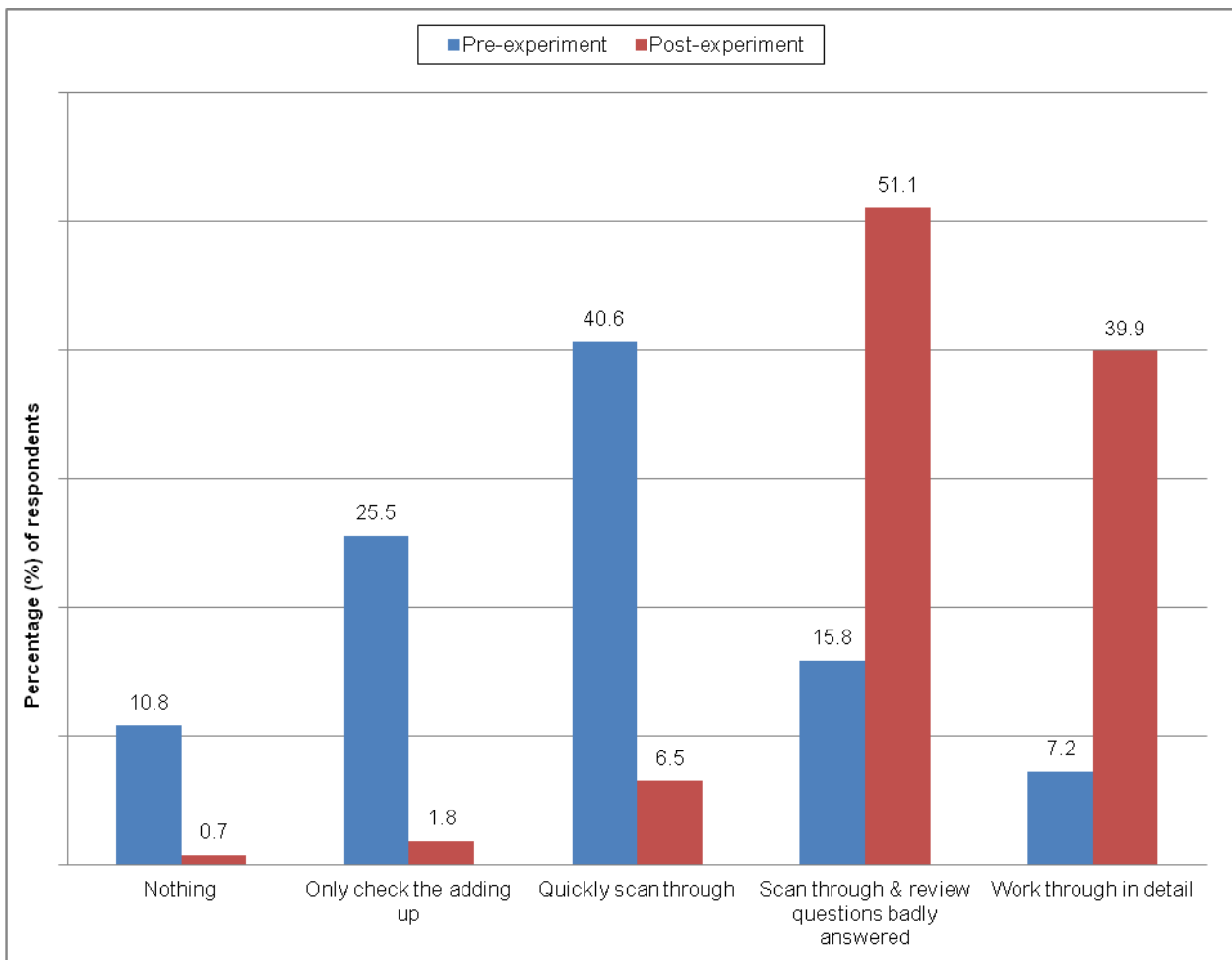
It is clear from the above graph that respondents would be more inclined to self-assess after the design experiment even if they were not encouraged to do so. Previously, it was stated that only the respondents who chose one of the following two options were involved in a form of self-assessment:

- "Scan through the assessment and review questions that I did badly in"; or
- "Work through the entire assessment in detail".

The data clearly shows that 51.1% (post-experiment) against 15.8% (pre-experiment) of the respondents would scan through their assessments and review questions they had done badly in; and 39.9% (post-experiment) against 7.2% (pre-experiment) of the respondents would work through their assessments in detail.

Therefore, prior to the implementation of the design experiment, only 23% of the respondents were engaged in some form of self-assessment as compared with 91% of the respondents who would self-assess after the design experiment. This indicates a substantial increase in the number of respondents who will self-assess.

Therefore, it can be concluded that students who were exposed to the design experiment would continue to self-assess in future, even in the absence of an environment that encouraged it.

4.3 CONCLUSION

This chapter focused on the analysis of responses obtained by means of a structured survey. A total of 282 surveys were completed, the data was then captured and analysed.

The researcher considered whether students were involved in self-assessment prior to the implementation of the design experiment and also whether they would be encouraged to self-assess by an environment created to promote self-assessment. It was concluded that prior to the design experiment, only 23% of the respondents were involved in some form of assessment. However, when an environment was created in which they could self-assess, between 95.4% and 96% of the respondents were involved in self-assessment.

The researcher then considered how students perceived a self-assessment environment and whether or not they believed it was beneficial to their academic performance. It was concluded that students were positive about a facilitated self-assessment environment and would appreciate a self-assessment environment being created for future assessments in their studies. It was also concluded that 96.3% of the respondents believed that self-assessment was beneficial to their academic performance to some degree.

Lastly, the researcher considered whether students would apply self-assessment techniques in future. The results show that 91% of the respondents who were exposed to the design experiment would self-assess to some degree in future as opposed to the 23% who self-assessed prior to the experiment.

The final chapter highlights significant findings resulting from this study and makes suggestions for future research.

CHAPTER 5

CONCLUSION

5.1   INTRODUCTION

The aim of this study was to determine, by means of a design experiment and a structured survey, what students' perceptions of a self-assessment process was once they had been exposed to it over a period of time and in a facilitated environment. It was considered whether students self-assessed prior to the implementation of the study, as well as whether they could be encouraged to apply accurate and meaningful self-assessment in an environment which supported it. The study also looked at the value students attached to the process as well as whether or not they believed it would improve their overall academic performance. Furthermore, the study determined whether or not they would continue using self-assessment as a tool even if an environment of self-assessment was not created by their educators in future.

5.2   METHODOLOGY

The study was exploratory in nature and was conducted by means of a design experiment, which was implemented for all students registered for the Taxation 300 module at the University of Pretoria in South Africa during the 2012 academic year. The design experiment was implemented over a period of time for three formal student assessments during the year. The target population for this study was all the third-year undergraduate commerce students who were registered for the Taxation 300 module. This module represented one of their major subjects and its duration was for the full 2012 academic year.

The experiment was designed to encourage self-assessment. Students completed their three assessments on self-carbon loose page sets, which enabled them to take home a copy of their answers directly after the assessment. The model answer was then provided to students before the end of the same day in order for them to self-assess what they had

done. Students were required to do so by marking their copy of the assessment that they had written and to reflect on how they believed the assessment had gone. These self-assessment marks were then compared with the formal grade awarded by their educators. Based on how accurately the students self-assessed, an assignment mark was then allocated to each student. The more accurate the self-assessment, i.e. the smaller the difference between the self-assessment and formal mark awarded, the higher the overall assignment mark. This was done to encourage accurate and meaningful self-assessment by the students.

A structured survey was designed to be used as a data collection instrument. In developing the survey, the questions were linked to the research objectives to ensure that all the objectives were achieved. Prior to the survey being distributed to the students, ethical clearance was obtained from the Research Ethics Committee. Students were given the opportunity to complete the survey once the design experiment had been concluded. This method of sampling represents self-selection sampling. Of the entire population of 561, 282 students voluntarily responded to the survey. Therefore, the sample size represented 50% of the total population.

The study followed a mixed-method research approach as primarily quantitative data with an element of qualitative data was collected.

It is possible that some participant bias might have occurred as the researcher was involved in lecturing the students in Taxation 300 in question during the 2012 academic year. The researcher solved this problem by explaining the importance of accurate, honest responses and by guaranteeing that the results would be anonymous and that data would be used only for the purposes of this study.

The data collected from the surveys was then captured, analysed and interpreted.

5.3 SUMMARY OF FINDINGS

The results of the study indicated the following:

- Only 23% of the students engaged in some form of self-assessment prior to the implementation of the design experiment. The remaining 77% did not self-assess at all.

- Students were encouraged to self-assess when they were supported and incentivised to do so. Between 95.4% and 96.6% of the students completed the self-assessment assignment after each of the three formal assessments which formed part of the design experiment.

- Furthermore, it was found that when incentivised to do so, the students applied accurate and meaningful self-assessment.

- Students' perceptions of self-assessment were significantly more positive once they had been exposed to it on three different occasions. Prior to the design experiment, only 57.1% of the students were positive about self-assessment. After the experiment, this increased to 91.9%.

- The majority of the students appreciated the self-assessment environment which was created for them, indicated by the 67.4% who said that they would definitely like the self-assessment environment to be implemented in future.

- Of the students, 96.3% believed that self-assessment was a beneficial process which could ultimately improve their academic performance.

- Students were encouraged to continue applying self-assessment to their studies, even in the absence of an environment that encouraged it. Of the students, 91% would continue to self-assess. This is a substantial increase from the 23% who self-assessed prior to the implementation of the design experiment.

These findings may have differed if the same study was to be conducted on a different population of students. However, as this was an exploratory study, the aim was not to generalise the findings beyond the population.

5.4   CONTRIBUTION OF THE STUDY

This study appears to be the first of its kind in terms of its methodology and magnitude in South Africa. An extensive search on various leading online databases (Proquest, Sabinet and EbscoHost) indicated that only one other small study on facilitated self-assessment, which involved 10 students, was conducted in South Africa. The search also showed that this study is the first of its kind in terms of the fact that it focuses on students completing a commerce degree. Other international studies focused mainly on scientific fields of study.

This study also adds to the existing body of knowledge on the benefits of self-assessment. Unlike most previous studies which tended to focus on the theoretical value of self-assessment, this study focused on a practical environment which encouraged self-assessment and how students perceived this.

Furthermore, this study can assist educators at tertiary level to create an environment which encourages self-assessment by students. This will give students the opportunity to be exposed to facilitated self-assessment and encourage them to utilise this highly beneficial technique in their lifelong learning.

5.5   SUGGESTIONS FOR FUTURE RESEARCH

Based on the findings as well as the delimitations (as discussed in section 1.6.1) of this study, the following focus areas are suggested for future research:

- Conducting the same study using a different target population. Students at a different level in their tertiary studies could be the focus of the study, or commerce students with a subject other than taxation.
- Researching the effect of self-assessment on students' actual academic performance.
- Researching the effect of peer assessment in a similar situation as this study.
- Researching the various antecedents which impact the accuracy of self-assessment. These antecedents could include gender, age, home language, demographic background and other environmental factors.

- Conducting a study to determine if creating an environment of self-assessment at secondary education level would lead to self-assessment in tertiary institutions with associated benefits.

5.6   FINAL CONCLUSION

The main purpose of this exploratory study was to investigate students' perception of the self-assessment process once they had been exposed to it over a period of time and in a facilitated environment.

This study concludes that students tend not to self-assess if not encouraged to do so. However, once given the opportunity to do so, students are positive about the process of self-assessment. They believe that it is a beneficial process which will ultimately improve their academic performance. The results show that students do apply accurate and meaningful self-assessment in an environment which supports it. Furthermore, the results show that students will continue to apply self-assessment in their studies once they have been exposed to it, even if an environment no longer exists which would encourage it.

It is envisaged that this study will assist educators in creating an environment which encourages self-assessment and, in turn, stimulate lifelong learning for their students through internalisation of self-assessment techniques as part of their learning process.

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APPENDIX A

- Self-administered survey, including informed consent obtained from participants (English version) -

Taxation 300 Self-Assessment Students' Survey

Dear respondent

You are invited to participate in an academic research article conducted by Tanya Hill, a senior lecturer in the Department of Taxation at the University of Pretoria. Ethical clearance for this study has been obtained from the Faculty of Economic and Management Sciences.

The answers you give will be treated as strictly confidential and will be used only for purposes of this study in aggregate with the other responses from fellow students. By completing this survey you are giving your consent to participate in the study on a voluntary basis.

Thank you for your willingness to participate in this study, which is based on the three class tests in which the carbon copy method of self-assessment was implemented during this year in Taxation 300. The purpose of the article is to determine whether or not self-assessment is a beneficial learning tool which can be used by undergraduate commerce students.

Please answer all the questions as honestly as possible.

Indicate your answer by marking an 'X' in the blank block to the right of the answer of your choice. Pick only <u>ONE</u> option per question.			For office use	

1. Student number:

V1	

2. Gender:

Female	1
Male	2

V2	

3. I attend Taxation 300 classes in my home language:

Yes	1
No	2

V3	

4. Previously, when I received a test back from my lecturer (before the carbon copy method was implemented), I would do the following with my test:

Nothing	1
Only check the adding up of marks	2
Quickly scan through the test	3
Scan through the test & review questions that I did badly in	4
Work through the entire test in detail	5

V4	

5. When the carbon copy method of self-assessment was introduced to my class, my feelings towards the process were:

Very positive	1
Slightly positive	2
Neutral	3
Slightly negative	4
Very negative	5

V5	

6. Now that I've had the opportunity to self-assess my tests with the carbon copies, I find it beneficial in terms of it helping me to improve my academic performance:

Yes (definitely)		1
Yes (to some extent)		2
Not sure		3
Not really		4
Definitely not		5

V6 ☐

7. As a result of my experience with the carbon copy self-assessments, in future (even if not required to do so) when I've written a test I will do the following with my test:

Nothing		1
Only check the adding up of marks		2
Quickly scan through the test		3
Scan through the test & review questions that I did badly in		4
Work through the entire test in detail		5

V7 ☐

8. Now that I've experienced the carbon copy method of self-assessment, my feelings towards the process are:

Very positive		1
Slightly positive		2
Neutral		3
Slightly negative		4
Very negative		5

V8 ☐

9. I would like the carbon copy method of self-assessment to be implemented on future tests:

Yes		1
Maybe		2
No		3

V9 ☐

10. Please share any further comments that you may have on the carbon copy method of self-assessment in general:

_____
_____
_____
_____

11. I give permission to the researcher to access my personal data on UP's database in order to extend the study (your data will be used in aggregate, together with the data of other students, and not individually):

Yes		1
No		2

V10 ☐

APPENDIX B

- Self-administered survey, including informed consent obtained from participants (Afrikaans version) -

Belasting 300 Selfassesseringsvraelys aan Studente

Geagte respondent

U word vriendelik versoek om aan 'n akademiese navorsingstudie van Tanya Hill, 'n senior lektor in die Departement Belasting by die Universiteit van Pretoria, deel te neem. Etiese goedkeuring vir die uitvoering van die studie is vanaf die Fakulteit van Ekonomiese en Bestuurswetenskappe verkry.

Die antwoorde wat u verskaf, sal streng vertroulik hanteer word en sal slegs vir die doeleindes van hierdie studie, in geheel saam met die antwoorde van ander studente, gebruik word. Deur hierdie vraelys in te vul, stem u daartoe in om op 'n vrywillige basis aan die studie deel te neem.

Dankie vir u bereidwilligheid om aan die studie, wat op die drie klastoetse wat gedurende die jaar op die deurslaankopie selfassesseringsmetode in Belasting 300 gebaseer is, deel te neem. Die doel van hierdie studie is om vas te stel of selfassessering 'n voordelige hulpmiddel is wat deur voorgraadse studente in handel gebruik kan word.

Antwoord asseblief al die vrae so eerlik as moontlik.

Dui u antwoord aan deur 'n "X" in die toepaslike leë blokkie in te vul. Kies slegs EEN opsie per vraag.

Vir kantoor gebruik

1. Studentenommer: V1

2. Geslag:

Vroulik	1
Manlik	2

V2

3. Ek woon Belasting 300-klasse in my huistaal by:

Ja	1
Nee	2

V3

4. Voor die deurslaankopie-metode geïmplementeer is, het ek die volgende gedoen as ek my resultate van 'n toets vanaf my dosent terugontvang:

Niks	1
Net seker gemaak dat die optelling van punte korrek is	2
Vinnig deur die toets geblaai	3
Deur my antwoorde geblaai & vrae waarin ek swak gevaar het, hersien	4
Deur die hele toets in detail gewerk	5

V4

5. Toe die deurslaankopie-metode van selfassessering aan my klas bekendgestel is, was my mening teenoor die proses soos volg:

Baie positief	1
Bietjie positief	2
Neutraal	3
Effens negatief	4
Baie negatief	5

V5

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6.	Noudat ek die geleentheid gehad het om my toetse met die deurslaankopie te selfassesseer, vind ek dit bevorder my akademiese prestasie:				
	Ja (beslis)		1	V6	
	Ja (in 'n mate)		2		
	Nie seker nie		3		
	Nie regtig nie		4		
	Beslis nie		5		

7.	As gevolg van my ervaring met die deurslaankopie-selfassessering, sal ek in die toekoms, selfs as dit nie vereis word om dit te doen nie, die volgende doen wanneer ek my resultate terugontvang:				
	Niks		1	V7	
	Net seker maak dat die optelling van punte korrek is		2		
	Vinnig deur die toets blaai		3		
	Deur die toets blaai & vrae waarin ek swak gevaar het, hersien		4		
	Deur die hele toets in detail werk		5		

8.	Noudat ek met die deurslaanmetode van selfassessering bekend is, is my mening teenoor die proses:				
	Baie positief		1	V8	
	Bietjie positief		2		
	Neutraal		3		
	Effens negatief		4		
	Baie negatief		5		

9.	Ek wil graag hê dat die deurslaankopie-metode van selfassessering op toekomstige toetse geïmplementeer word:				
	Ja		1	V9	
	Miskien		2		
	Nee		3		

10. Deel asseblief enige verdere kommentaar wat u op die deurslaankopie-metode van selfassessering in die algemeen mag hê:

_____

_____

_____

_____

11.	Ek verleen toestemming aan die navorser om toegang tot my persoonlike rekords op UP se databasis te verkry ten einde die studie uit te brei (data sal slegs in totaal saam met ander studente se data, en nie individueel nie, gebruik word):				
	Ja		1	V10	
	Nee		2		