Chapter 1

Factors[1] to consider in the transition from a teacher–centred model to a learner-centred model in a computer-rich learning environment

1.1   Introduction

In this dissertation the researcher reports on how one group of learners' made the transition from a more teacher-centred to a more learner- and computer-rich classroom. The learners' experiences were investigated and described in terms of the American Psychological Association's definition of "learner-centred learning" (Lambert and McCombs, 1998). In this study, the researcher hopes to identify those factors that would make the transformation of education to a more learner-centred learning environment easier for the learner, and to provide guidelines for teachers about what he or she needs to consider before successfully transforming his/her classroom into a learner-centred learning environment.

1.2   Background

During the last decades of the previous century, changes from traditional teacher-centred education towards learner-centred education occurred throughout the world. In the United States, extensive research sponsored by the American Psychological Association (APA) into effective learning and learner-centred learning culminated in the formation of the Presidential Task Force on Psychology and Education in 1990.

This change in educational focus has meant that some form of Outcomes Based Education has been introduced into schools in different countries including the United States of America and Australia.

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[1] The word *factor* (plural: *factors*), as used in the title, text and elsewhere in this study, does **not** refer to mathematical factors, statistical factors or factorial analysis. The researcher uses it to describe or refer to the component features, elements or characteristics of learner-centred learning as defined by the American Psychological Association (APA). Thus, when the researcher uses the word "factors", she is referring to those features, elements or characteristics that need to be considered when learners make a transition to a more learner-centred classroom. (E. Labuschagne)

When Outcomes Based Education (OBE) was introduced into South African schools in the form of Curriculum 2005 (Northern Province Department of Education, 2000), it brought with it concepts such as *continuous assessment* and *authentic learning experiences*. Outcomes Based Education (OBE) differs from traditional education in certain basic ways, of which the change from teacher-centred classrooms to learner-centred classrooms is one of the most prominent. In those grades where Curriculum 2005 has not yet been formally introduced, pupils engage in projects that require them to compile portfolios for continuous assessment. Authentic learning experiences involve learners in active participation in their learning (this is often described as *hands-on learning*). Because, in the past, hands-on learning was confined to subjects that lent themselves to practical activity subjects (such as woodwork and motor mechanics), the introduction of this concept into so-called academic subject classes is new. In the computer-rich classroom this concept is not new because the subject entails a large practical component. In such classrooms, the requirements for projects are more complex than the mere practice of computer skills, and much more input is requested from the learner.

Since 1994 several changes have been made to the education system in South Africa, the most important of which is the institution of Outcomes Based Education in the schools. Although Outcomes Based Education has not yet been fully implemented in high schools in South Africa, certain changes that are based on a new educational paradigm have been instituted for the higher grades.

Learners in grades 10 to 12 have to hand in a continuous assessment portfolio (the CASS portfolio) for each subject, including Computer Studies. The Department of Education requires each pupil to produce such portfolios as an ongoing project. As they are being completed for the subject concerned, examiners take them into account in order to assess the learner's progress. Such portfolio projects constitute the learner's first contact with learning in a learner-centred learning environment.

1.3   Research problem

While some teachers have been trained in the principles of Outcomes Based Education and changed methods of assessment, planning and group work, learners have not been prepared for the changes in the education system. A widespread belief that learners will automatically benefit from Outcomes Based Education-inspired changes in approach to education seems to prevail. The researcher however observed that many learners did not seem to react very positively to the continuous assessment projects they had been given and many learners did not experience group work as being "fair".

This study attempts to identify the factors that need to be considered when the transition is made to a more learner-centred classroom. If these factors are taken into account, learners should be able to obtain maximum benefit from changes to the traditional educational approach.

1.4   Aim of the research

This study aims to examine the principles of learner-centred learning as described by the APA in order to identify those factors (intrinsic and extrinsic to the learner) that influence the learner's ability to benefit from projects that are prescribed for learning and assessment purposes. The researcher's intention is to provide educators with ways of helping the learner to function well in learner-centred classroom

1.5   Objectives of the research

The specific objective of this study is to examine the way in which factors of learner-centred learning, as identified by the APA, influence the performance of learners in a more learner-centred learning environment, and to note those factors that need to be kept in mind when transitions are made to a more learner-centred learning environment. The factors that were considered are the following:

- cognitive and meta-cognitive factors

- motivational and affective factors

- social and developmental factors

- individual factors

1.6   Research questions

1.6.1 Context of the research questions

In order to identify the factors that need to be considered when the change to a more learner-centred learning environment is made, the researcher needed to situate them within a larger context.
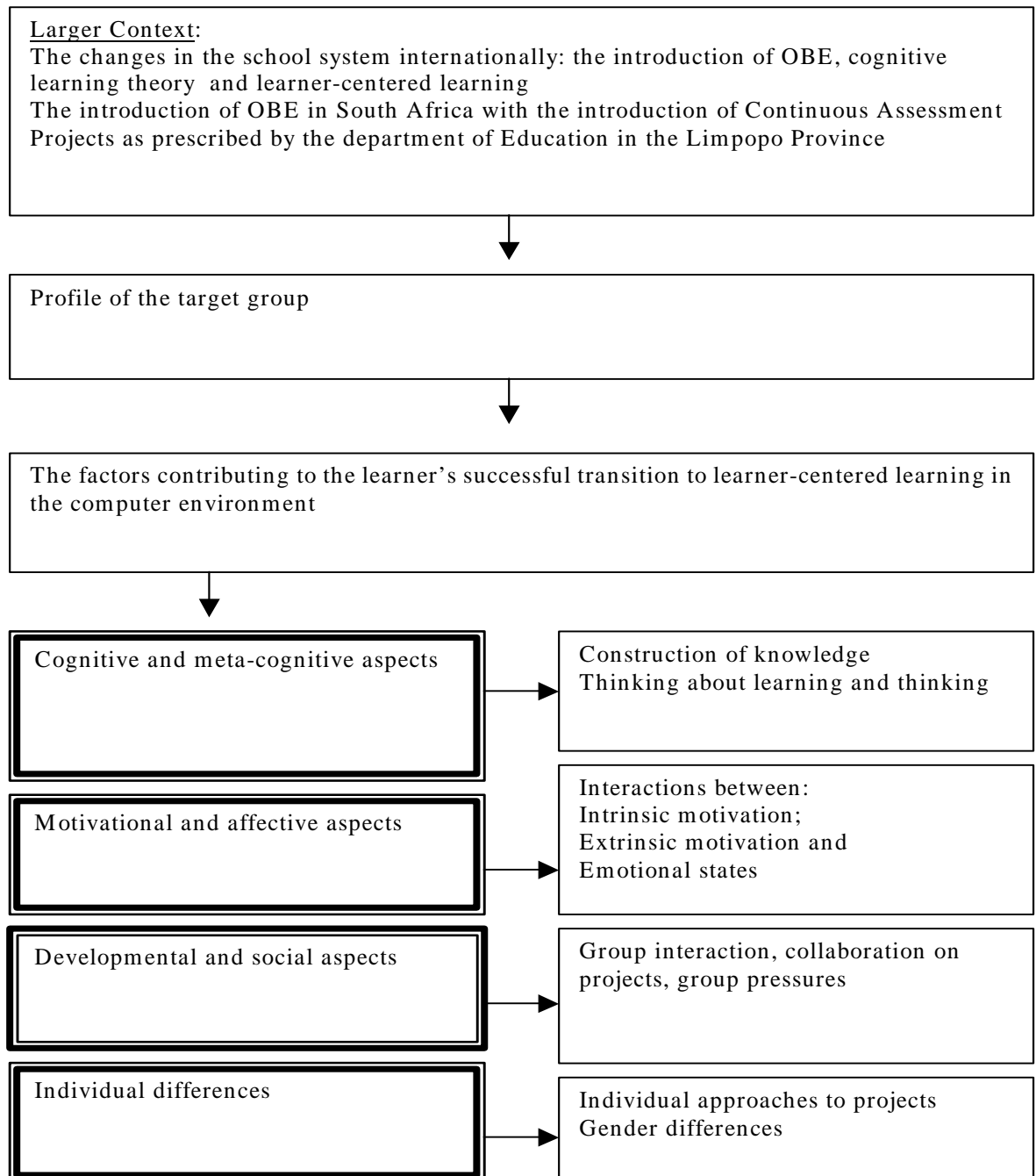
Larger Context:
The changes in the school system internationally: the introduction of OBE, cognitive learning theory and learner-centered learning
The introduction of OBE in South Africa with the introduction of Continuous Assessment Projects as prescribed by the department of Education in the Limpopo Province

Profile of the target group

The factors contributing to the learner's successful transition to learner-centered learning in the computer environment

Cognitive and meta-cognitive aspects

Construction of knowledge
Thinking about learning and thinking

Motivational and affective aspects

Interactions between:
Intrinsic motivation;
Extrinsic motivation and
Emotional states

Developmental and social aspects

Group interaction, collaboration on projects, group pressures

Individual differences

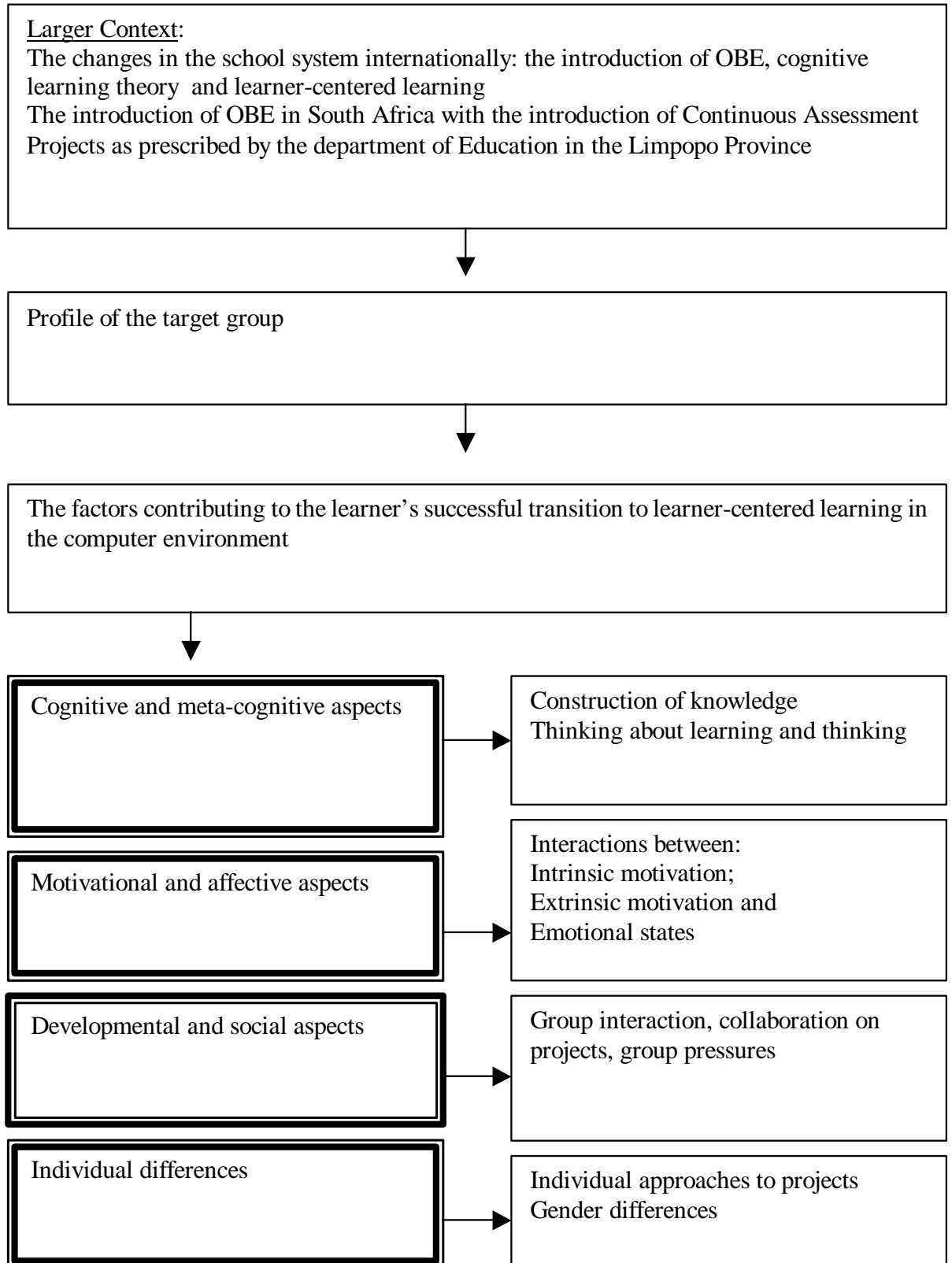Individual approaches to projects
Gender differences

Figure 1.1: The larger context of the study

1.6.2 Research questions

The main research questions of this study are tabulated in the table that follows (Table 1.1).

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┌─────────────────────────────────────────────────────────────────────┐
│ Larger Context:                                                      │
│ The changes in the school system internationally: the introduction  │
│ of OBE, cognitive learning theory and learner-centered learning     │
│ The introduction of OBE in South Africa with the introduction of    │
│ Continuous Assessment Projects as prescribed by the department of   │
│ Education in the Limpopo Province                                    │
└─────────────────────────────────────────────────────────────────────┘
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┌─────────────────────────────────────────────────────────────────────┐
│ Profile of the target group                                         │
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                                  │
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│ The factors contributing to the learner's successful transition to  │
│ learner-centered learning in the computer environment               │
└─────────────────────────────────────────────────────────────────────┘
          │
          ▼
┌────────────────────────────────┐      ┌──────────────────────────────┐
│ Cognitive and meta-cognitive   │ ───► │ Construction of knowledge    │
│ aspects                        │      │ Thinking about learning and  │
│                                │      │ thinking                     │
└────────────────────────────────┘      └──────────────────────────────┘

┌────────────────────────────────┐      ┌──────────────────────────────┐
│ Motivational and affective     │      │ Interactions between:        │
│ aspects                        │ ───► │ Intrinsic motivation;        │
│                                │      │ Extrinsic motivation and     │
│                                │      │ Emotional states             │
└────────────────────────────────┘      └──────────────────────────────┘

┌────────────────────────────────┐      ┌──────────────────────────────┐
│ Developmental and social       │      │ Group interaction,           │
│ aspects                        │ ───► │ collaboration on projects,   │
│                                │      │ group pressures              │
└────────────────────────────────┘      └──────────────────────────────┘

┌────────────────────────────────┐      ┌──────────────────────────────┐
│ Individual differences         │ ───► │ Individual approaches to     │
│                                │      │ projects                     │
│                                │      │ Gender differences           │
└────────────────────────────────┘      └──────────────────────────────┘
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An attempt to answer these questions will be made by studying the learners' reactions to (and performance on) three projects that differ in the extent to which they reflect the principles of learner-centred learning. For each of the projects, the four factors of learner-centred learning will be considered.

1.7   Rationale of the study

The rationale behind this study is to determine the extent to which the four categories of criteria that define learner-centred learning influence the learners' readiness to learn in a more learner-centred learning environment. If the extent to which the different factors influence the learners ability to benefit from the change to a more learner-centred learning environment can be determined, such information could be valuable to educators and planners who effect changes in curricula.

1.8   Previous research

A search of the NEXUS database was undertaken to determine the extent to which this study is relevant to recent studies that have been undertaken in this topic. The following table shows the keywords used in the search and the number of returns from the database:

Table 1.2: Search words for the NEXUS database search

Keyword	Number of returns
Change	19
Learner AND centred	8
Motivation	19
Change AND motivation	1
Learning AND environment	4
Change AND learner	31
Learning AND events	15

Learning AND computers	28
Change AND learner centred	0

The following table lists studies that are relevant to this research.

Table 1.3: Recent relevant literature

Author	Title	Level	Institution
1. Mampane, S.T	Management of change as a determination of school climate in the traditionally Black schools in Gauteng Province	MEd	University of Pretoria
2. De Villliers, M.R.	The dynamics of theory and practice in instructional systems design	PhD (Education)	University of Pretoria
Seekola, L.C.	Cooperative cognitive learning with computers: a case study	MEd	University of Pretoria
Miller, P.A.	How South African Further Education and Training learners acquire, recall, process and present information in a digitally enabled environment	PhD (Unpublished)	University of Pretoria

The study by Mampane is relevant because she considers the changing learning environment in South Africa, looks at ways of overcoming resistance and motivating learners, teachers and parents.

The study by De Villiers looks at learning events and learning environments in order to facilitate effective learning in systems using computer technology. She pays a lot of attention to the various underlying theories and defines a model to facilitate instructional systems design.

Seekola studied cooperative cognitive learning in the computer-rich environment of a FutureKids centre in South Africa and found that although effective learning took place, the students did not work *cooperatively* as prescribed, but were placed in front of a computer and told to work together.

Miller studied the dynamics of the interaction between the way learners acquired, reviewed and processed information and the digital environment, paying attention to a profile of typical characteristics of the present generation of learners. Miller found that the learners exerted an important influence on one another and noted that the effect of extrinsic motivation on the learning activities is of cardinal importance.

While these studies are relevant to this study, none of them specifically identifies the different factors that influence the South African learner's ability to learn effectively in a changing learning environment.

1.9   Research approach

A qualitative research approach seeks to understand an event from the participant's point of view (Macmillan & Schumacher, 1993). The participants in this study include the students and the teacher. Because the present study is a case study that investigates the experiences of one group, the research is concerned with understanding how events unfold in a temporal sequence (McMillan & Schumacher, 1993). Steyn (2001) quotes Merriam when he suggests that the primary rationale for qualitative research is *understanding*.

This study is qualitative in approach because it seeks to understand and describe the events in the computer classroom in order to identify whatever factors may influence events. Although some quantitative methods are used to analyse the results of the assessment of the learner's projects, these

analyses are used with a qualitative emphasis so as better to understand the events that took place.

1.9.1 Reliability

Reliability refers to the *consistency* of research and answers the question: "If I approach the study again using the same methods, will I get the same answer?" (Kerlinger, 1986: 405). Reliability is the "accuracy or precision of the measuring instrument" (Kerlinger, 1986: 405).

In qualitative research, reliability refers to the consistency of the researcher's interactive style, data recording, and the interpretation of the meanings that participants derive from the data. This latter exercise difficult because no-one interacts, records and interprets exactly like anyone else (Macmillan & Schumacher, 1993). Macmillan & Schumacher (1993) suggest that adequate descriptions of the following factors will reduce obstacles in the way of attempting to obtain reliability if they are described adequately because they will enable others to discover similar phenomena. The table below shows the factors that have to be adequately described in order to maintain the reliability of the study. This table has been derived from the strategies proposed by McMillan and Schumacher (1993).

Table 1.4: Obstacles in the way of establishing reliability (and ways of reducing them)

Obstacle	Obstacle diminished by adequate description of:
Researcher role	Social relationship of the researcher and the participants
Information selection	Criteria Rationale Decision process used in sampling

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Social context	Physical
	Social
	Interpersonal functional scenes of data collection.
Data collection strategies	Multiple methods used:
	▪ Ethnographic observation
	▪ Ethnographic interviews
	▪ Documents
Data analysis strategies	Process of data analysis
Analytical premises	Initial theoretical framework of concepts that informs the study and others added as the study progresses

The researcher also used another measure to ensure the reliability of the study: she discussed classroom events with teachers at the same school in different subjects to find out if they experienced similar events in their classrooms.

1.9.2 Validity

Kerlinger (1986:417) defines validity as the answer to the question: "Are we measuring what we think we are measuring?" Kerlinger (1986) distinguishes between the following types of validity:

- Content validity: the representativeness of the sample or content
- Criterion-related validity: this is achieved by comparing the test of scale scores with external variables of criteria known to measure the attribute under study.
- Construct validity: this type of validity explains the meaning of the test, and focuses on the properties that are measured.

Validity of the study, as described by Kerlinger, presents many problems to those engaged in qualitative research. To validate the content of the test, the researcher must assess the items of the test to determine how representative they are of the universe from which the test is derived. When measuring the content validity of a test, it is difficult to decide which criteria must be used to ascertain whether the attributes are actually being measured or not. To validate the construct would mean that the reason for the variance on a test and the theory behind it must be explained and justified.

McMillan and Schumacher (1993) propose that the validity of qualitative research designs refers to "the degree to which the explanations offered match the realities of the world" (McMillan and Schumacher, 1993:391).

- **The internal validity of a qualitative design**

They state that internal validity of a qualitative design is "the degree to which the interpretation and concepts have mutual meanings between the participants and the researcher" (McMillan & Schumacher, 1993: 391). High internal validity is contingent on the way in which data has been collected and analysed. McMillan and Schumacher suggest that various strategies can be used to increase the validity of the research.

The table below is based on the suggestions made by McMillan and Schumacher, and includes the efforts the researcher made to increase the internal validity of this study.

Table 1.5: Strategies to increase the validity of qualitative research, based on the suggestions by McMillan and Schumacher (1993: 391-394)

Strategy	Rationale for the strategy	How the strategy was used in this study
Lengthy data collection period	A lengthy data collection period gives the researcher the opportunity to analyse data continually, refine ideas, and to make sure that the research-based categories and the participant realities match.	Data was collected over 11 months. Analysis, and the refining of ideas took place continuously.
Participant language	Interview formats that utilise the language of participants are less abstract than many other instruments.	Interviews were held over a period of time and were carefully compiled in the language of the participants.
Field research	The natural setting reflects the reality of the experience more closely than laboratory or contrived settings.	The research was conducted in the school itself − in the natural classroom setting.
Disciplined subjectivity	Researcher self-monitoring submits all the phases of the research to continuous self-questioning and re-evaluation, and takes various biases into account.	A journal was kept throughout the data collection period that also reflected the feelings and reflections of the researcher. This provided a source for indications of possible biases that could then be considered when analysing the data.

- **External validity of a qualitative design**

  In a qualitative research design, the researcher's aim is not to generalise from results but to extend the scope of the researcher's understanding of the phenomena. Whatever detailed descriptions are provided will enable others to understand similar situations so that they can extend these understandings in further research (McMillan & Schumacher, 1993).

1.9.3 Credibility

McMillan and Schumacher (1993) point out that while reliability may be a threat to much qualitative research, validity can be considered to be its great asset and strength. If one takes the aim of the qualitative research design into account, the detailed description of the situation and the events add to the credibility of the study.

1.9.4 Methodology

The learners in this study were required to complete three different types of projects during the last year of school. The learners' behaviour while completing the three types of projects was observed. The teacher of this class kept a journal in which details of observed behaviour, the comments made by the learners during the learning process, and the discussions with the learners were recorded. The events in the classroom, and the assessment of the outcomes of three different types of projects were analysed by the researcher in order to determine the extent to which the different features that characterise learner-centred learning functioned when students made the transition to a more learner-centred classroom.

For each type of project, the learners reactions and assessments of the outcomes were analysed according to the following features of learner-centred learning:

- Cognitive and meta-cognitive factors
- Motivational and affective factors
- Social and developmental factors

- Individual factors

The assessment criteria used for the assessment of the outcomes of the projects are in line with the Department of Education in the Limpopo Province's guidelines.

1.10 Research design

A literature study was carried out to determine the current thinking on learner-centred learning and Outcomes Based Education in order to place the study in a wider context.

Learners were observed in the execution of three different types of projects. The completion of the tasks, and the assessment of the extent to which the learning outcomes were achieved, were also taken into consideration in order to identify the factors that need to be considered if learners are to benefit from a more learning-centred learning environment. The overall research design is that of a naturalistic inquiry set in a case study.

The three types of projects are set on three different levels of learner-centredness because although all the projects are learner-centred to some extent, the projects do not equally reflect the principles of learner-centred learning.

The three types of projects can be classified as follows:

Table 1.6: Project levels of learner-centredness

Projects designed largely in accordance with learner-centred learning principles	Projects that reflect fewer learner-centred principles	Projects that reflect very few learner-centred learning principles
The FutureKids Project	Prescribed CASS project	Class projects
Projects with high intrinsic motivation	Projects with a lower level of intrinsic motivation	Projects with the lowest level of intrinsic motivation

The researcher observed learners' reactions to different tasks. The completion and the quality of completed tasks (as determined by the assessment of the projects) were considered according to the affective, cognitive, motivational, social and individual factors. This was done in order to ascertain the degree of importance of each of these factors in the learners' readiness to benefit from learner-centred learning. The different reactions to and assessment of the different types of projects were compared to determine the extent to which each of the principles of learner-centred learning influences the learner's readiness to benefit from the more learner-centred learning environment.

1.11   Data collection methods

The data collection methods used for all the questions and sub-questions of this study are the same. They are:

- **Participant observation**

   As the researcher and the teacher in this instance are the same person, observation of the class and classroom events is inevitably subjective to some degree. The researcher took care to be self-critical and to evaluate observations over time. These observations were recorded in tables and re-evaluated over time. The researcher was aware of interactive elements that can make the study too subjective and (in so doing) limit the internal validity of the research.

   The learners' reactions to the work, in groups and individually, expressed in behaviour and verbally, was observed by the researcher.

   The learners were observed in a non-artificial environment as the classes were part of the usual curriculum for the learners. The composition of the class was not manipulated by the teacher in any way.

- **Interviews and focus group discussions**

The learners were drawn into discussions by the teacher throughout the year. They were encouraged to express their feelings and frustrations with the learning process. The learners were also asked certain questions in small groups and individually. These questions mainly concerned the personal significance of the projects – whether or not the learners felt they were learning, and the relevance of the projects to their learning and experience. Focus group discussions on the topics of learner-centredness and learners reactions were held with some of the other teachers at the school in order to ascertain whether certain reactions were observed *only* in the computer-rich classroom or whether other teachers also noticed the same reactions in their classes.

- **Analysis of assessment results**

  The class projects and the CASS projects were formally assessed according to the principles prescribed by the Department of Education. The FutureKids projects were assessed according to principles that were not prescribed by FutureKids, but that were more in line with the assessment of the other projects, in order to have a common base to analyse the assessment.

  The results of the assessment of the three projects were analysed in different ways according to the principles of learner-centred learning as defined by the APA.

1.12 Limitations of this study

- The scope of this study is limited by the nature of the study and the limited time available for the study. The study is an exploration into the factors that can contribute to learner's reactions to the prescribed projects in the computer class. Only one group of learners were observed while they were reacting to three different types of projects.

- The findings of this qualitative study cannot be reliably generalised because the sample of learners was limited to the learners who had

elected to take the school subject Computer Studies and because the sample is too small and limited. The learners observed in the sample came from only one school.

- The learners were all from one year's intake. Race was not taken into consideration for this study because the learners all came from a behaviourist teacher-centred learning environment.

- The differences in background and culture of the learners were not researched in depth prior to the study. The differences in gender, language of tuition and the level at which the learners took the subject Computer Studies, were all taken into account.

- No attempt was made to determine the learning styles of the learners.

- The characteristics of the present generation, or generation-N, have been researched in the USA and may not be generalisable to the present generation of South African learners. Similarly the characteristics of the present generation of learners in different areas of South Africa was not taken into account

- The learners in this study are of roughly the same age and live in the same rural environment. Differences in prior experiences and cultural backgrounds of learners were not measured or discussed in any way. It is known that these differences influence learning. But since teachers in a normal teaching situation would not be to privy to detailed information of this kind without undertaking special investigations, the researcher did not obtain any specific knowledge about learners' individual backgrounds.

- The assumption that the learners share a certain knowledge base was predicated on the fact that the learners are all in the same grade at school and have been at this school for at least one year prior to the start of this study.

- The researcher did not compare the developmental stages of learners. Although there may be great differences in learner experiences, the

scope of the study is too small to research the developmental factors of each learner. Thus, although learners were deemed to share more or less the same developmental level, the individual differences in learner developmental levels were not taken into account.

- The pool of available research on learner-centred learning in South African classrooms is very small.

1.13   Overview of the study

Because the researcher attempted to indicate the dynamic and interactive nature of the factors of learner-centred learning, she complied the document in the three sections that are indicated in the table below.

Table 1.7: Overview of the study

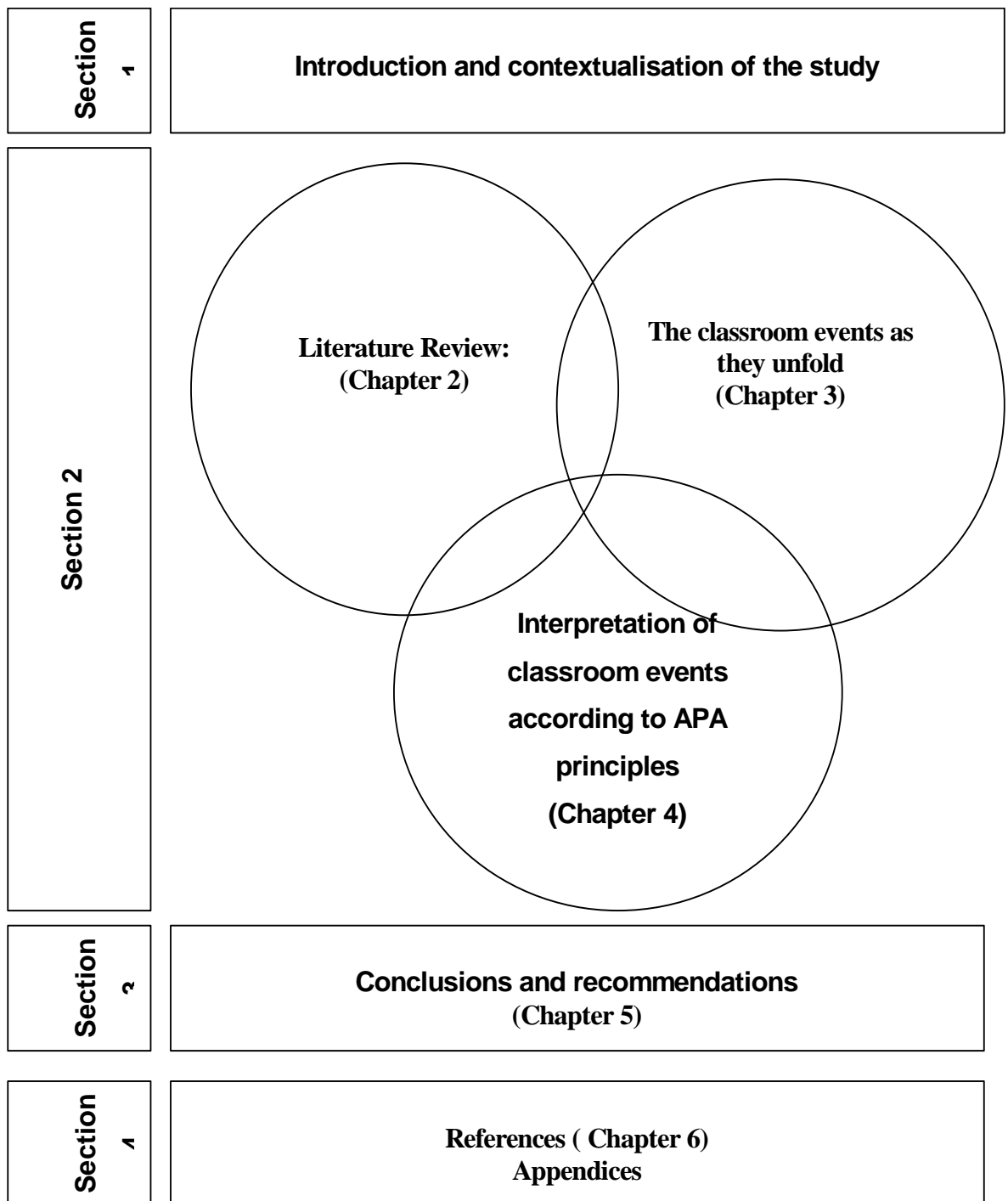| Section 1	The introduction to the study, the context of the exploration, and the research methodology of the study
Section 2	This section consists of three chapters that are intended to be read as a unit. They comprise a literature review that identifies the concepts used, the "story" of the classroom events as they unfolded, and, lastly, the interpretation of classroom events.
Section 3	Conclusions and recommendations

Section 1	**Introduction and contextualisation of the study**

Section 2

Literature Review:
(Chapter 2)

The classroom events as
they unfold
(Chapter 3)

Interpretation of classroom events according to APA principles (Chapter 4)

Section 3	**Conclusions and recommendations** (Chapter 5)

Section 4	**References (Chapter 6)** **Appendices**

Figure 1.2: Diagrammatic illustration of the overview of the study

1.14   Ethical considerations

The photograph of learners in the classroom does not depict learners in this study.

1.15 Definitions and acronyms

Below are some definitions of the major concepts used in this study.

- **Constructivism**

  Constructivism is a theory that states that people learn by means of constructing their own knowledge by actively asking questions, solving problems and interpreting events in order to reach an in-depth understanding of their world and experiences (Marlowe & Page, 1998).

- **Outcomes Based Education (OBE)**

  Outcomes Based Education is a new approach to education that has been adopted by the South African Department of Education. It is based on constructivist learning theory and places the emphasis on what learners are able to do, understand, know and become, and its activities focus on (or are "based on") the results of the educational process (the *outcomes*) (Northern Province Department of Education, 2000; Vermeulen, 2000).

- **Continuous Assessment (CASS)**

  This is assessment that takes place over a period of time and that is integrated into the learning process. It comprises several assessment methods (Northern Province Department of Education, 2001: 5, Vermeulen 2000). In this study, *CASS projects* refer to the projects prescribed by the Limpopo Department of Education for completion and assessment.

- **Portfolios**

  A *portfolio* is a carefully compiled collection of a learners work that will show the learner's efforts, progress and achievements in one or more areas (Paulson, Paulson & Meyer, in Van Niekerk, 1998).

- **Project-based learning**

  Project-based learning creates unique learning experiences because by means of it learners can engage in activities that help him or her to explore events or concepts that are personally relevant and that are pitched to his or her current knowledge. This enables the learner to construct new knowledge (Open Learning Technology Corporation, 1996; Jonassen & Mayes, 1993).

- **Learner-centred learning**

  Learner-centred learning is defined as learning where the learner is the main character in the learning process: he or she takes the initiative, controls the learning process, and actively learns in a socially interactive way (Hansen, 2000).

- **The American Psychological Association (APA)**

  The American Psychological Association is a professional and scientific body with more than 150 000 members in the United States of America. The members of this association have carried out extensive research into education, psychology and other fields, and many have contributed to much of the theory that is utilised in education.

1.16   Summary

This study reports on an exploration of the factors of learner-centred learning that need to be considered in order to identify the factors that influence learners as they make a transition from a traditional, more learner-centred learning environment. This section has provided a framework for the study. In section 2, the events will be regarded from the following three different perspectives:

- A review of the literature in order to find out what we already know about the topic as well as to establish what existing knowledge can be used as tools for this exploration

- The unfolding events in the classroom as they are interpreted in the light of the APA principles of learner-centred learning

- The interpretation of those events in the light of the research questions