

Approaches, Perceptions and Conceptions of 3rd year Physiotherapy Students in a Problem-Based Learning Module

by

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DECLARATION

I, the undersigned, hereby declare that the work contained in this assignment is my original work, and that I have not previously submitted it, in its entirety or in part, at any university for a degree.

Signature:

Date:

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ABSTRACT

Aim: The aim of this study was to investigate the approaches, conceptions and perceptions toward learning of undergraduate Physiotherapy students in a PBL module in order to inform curriculum development and enhance facilitation of learning at the Stellenbosch University Division of Physiotherapy.

Methodology: A mixed-method, descriptive study was conducted during 2010. Physiotherapy students currently in their 3rd year of the course, completed the Revised Two-factor Study Process Questionnaire (R-SPQ-2F) at the commencement of the academic year and again at the end of the first semester. The aim of this questionnaire is to determine the deep and surface approach toward learning of participants. Students also completed a perception of learning questionnaire and participated in focus group discussions to evaluate their perceptions and conceptions of learning in the module. Results of the three data instruments were analysed statistically, descriptively and phenomenographically, respectively.

Results: There was a 100% response rate to the R-SPQ-2F and perception questionnaires, with only 6 out of 16 participants responding to invitations for focus group interviews. There were a statistically significant greater number of students who adopted a deep approach toward learning at the commencement of the academic year. An increase in those with a deep approach and a decrease in those with a surface approach toward learning were seen at the end of the first semester. This shift was however not significant. Students showed a trend toward an increase in their intrinsic interest in the learning material as the module progressed. Clinical reasoning and internalizing information were seen as two of the advantages of the instructional approach. Conversely, the disadvantages of the module included the perception that the instructional approach used is time consuming and concerns regarding quality and accuracy of learning material. The presence of dysfunctional group dynamics also plays a role in students perceptions of disadvantages in APT. Students conceived the module to have an effect on their approach toward learning and both personal and professional skills.

Conclusion: The Applied Physiotherapy 373 module had no significant effect on students' approach toward learning. The results of this study however are not conclusive on why and how this lack of significant effect is present. Further research is needed to determine the long-term changes in approach toward learning and the possible determinants of these changes. This should be done in conjunction with implementation of quality assurance mechanisms for learning material, introduction of multi-media into PBL sessions and earlier preparation of students for the change in learning environment.

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GLOSSARY

Conception of learning:

Refers to the analysis by students of the subject matter and their ability to challenge basic assumptions of how learning occurs in the module and question these ideas (Pawan, Paulus, Yalcin and Chang; 2003).

Perception of learning:

Refers to the students' awareness of various aspects of the module (Pawan, et.al., 2003).

Deep Approach toward learning:

Learning which is motivated by an interest in the subject material and/or recognition of its vocational relevance, with the intention to understand its meaning and relate it to previous knowledge and personal experiences (Abraham, Vinod, Kamath, Asha and Ramnarayan, 2008)

Surface Approach toward learning:

Learning motivated by a desire to complete the course or a fear of failure, with the intention to fulfil the course requirements by memorizing and reproducing the material which is believed to most likely come up in assessments (Abraham et.al., 2008).

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

It is believed that students' conceptions of learning in a specific environment has an effect on their approach toward learning (Duke, Forbes, Hunter and Prosser, 1998; Bliuc, Ellis, Goodyear and Piggott, 2010). Studying approaches toward learning can guide the assessment and teaching styles in a direction to encourage students to adopt more effective approaches (Greasley and Ashworth, 2007). Furthermore, when students have integrated their conceptions of learning with the outcomes of a specific course or module, there will be a tendency to adopt less superficial approaches toward learning. There is anecdotal evidence that students in the Physiotherapy Division at Stellenbosch University (SU) are not necessarily adopting a deep approach toward learning in the Applied Physiotherapy (APT) module. The Division of Physiotherapy at SU aims to promote and abide by the policy on teaching and learning as promoted by the University (Stellenbosch University Teaching and Learning Policy, 2007). Thus, the APT module was designed to encourage application of knowledge and in agreement with literature, promote a deep approach toward learning. The students also have responsibilities documented in this policy, one of which is to participate in the provision of feedback on modules, such as is required in this study. This feedback in the format of students' perceptions of learning within APT module allows the Division of Physiotherapy to utilize these findings for the purpose of module refinement. This further strengthens the student-centered approach to education ascribed to by the staff at SU. These factors have subsequently provided motivation for this study.

The Bachelor of Science Physiotherapy program at SU is a four year degree. Students participating in the program at the Division of Physiotherapy at SU register for two main theoretical modules during their course of study. The first of which is Physiotherapy Science (PTS) and the second is Applied Physiotherapy (APT). The format of the two modules differs. PTS consists mainly of a didactic instructional approach with active learning strategies also employed through practical classes, and assessment which is carried out through written tests and practical technique assessments on models/simulated patients in controlled environments. APT on the other hand consists of a hybrid-Problem-Based Learning (PBL) instructional approach in the form of case discussions and student-generated learning material. PBL is "an instructional method in which students learn through solving

problems and reflecting on their experiences (Hmelo-Silver and Barrows; 2006)". Assessment in this module is carried out by means of extended matching/multiple choice questions on the WebCT learning management system (LMS) and technique tests in the clinical setting. The PBL approach has been used in the Physiotherapy Division at SU for the teaching of APT following a restructuring of the curriculum in accordance with the then-new South African Qualifications Authority (SAQA) levels and the Higher Education Quality Framework (HEQF).

The debate as to the undergraduate students' ability to use a deep approach toward learning as opposed to a surface approach is robust and has been documented by various educationalist research such as will be discussed in this study (Prince and Felder, 2006). By nature, the PBL approach requires a self-directed, deep approach toward learning (Duke Forbes, Hunter and Prosser, 1998) by the students and makes use of various learning theories, thus the rationale for outlining these theories as a part of the literature review for this study.

This study adopts a mixed method descriptive methodology with aspects of phenomenography and quantitative techniques used for representation of the data. Using this method, the study aims to investigate the approach toward learning of 3rd year Physiotherapy students in the APT module at SU, which adopts a hybrid-PBL pedagogy. This hybrid approach uses the traditional PBL format as a basis for the APT program. Incorporation of practical classes led by lecturers or case facilitators and the limited time frame given for each case is not the norm in most PBL curricula. Students are also required to perform practical techniques on patients in the clinical setting as part of the assessment for this module.

The purpose of this investigation is to enable the academic staff within the Division of Physiotherapy to gain insight into the approach toward learning by students within this relatively new method of instruction in this Division at SU and to make changes if necessary in an attempt to encourage students to follow the optimal approach toward learning. As a Division, the academic staff would prefer students to adopt a deep approach toward learning as it would impact positively on the students clinical reasoning which requires a high level of problem solving skills. It is assumed that the learning environment created by the APT module in the Physiotherapy curriculum has informed the approach toward learning that the students have adopted (Webb, 1997). Furthermore, it is believed that teachers need to understand student learning in order to facilitate learning (Mountford, Jones and Tucker, 2006). This investigation therefore aims to facilitate the understanding of the approach, perception and conceptions toward learning of the students in this module. This is done in order to

further facilitate their learning through adaptation and development of materials and optimization of the environment of the 3rd year Physiotherapy students in a favourable manner.

1.2 AIM OF THE INVESTIGATION

With the then new SAQA levels and HEQF soon to be implemented, planning for a new curriculum within the Division of Physiotherapy to maintain alignment with the regulatory frameworks began in 2003/4 – 2005 (Inglis-Jassiem 2009). In the PT curriculum (Addendum E), the first and second year of the B.Sc. Physiotherapy degree are comprised of a predominantly, though not exclusive, lecture-based pedagogy. One of the modules, namely, Physiotherapy Science (PTS), aims to equip students with the theoretical knowledge as well as technical skills which they are to use in their third and fourth year in the Clinical Physiotherapy (CPT) and APT module. In the CPT module, students are required to provide Physiotherapeutic care for patients in hospitals, schools, community health centers, home and work environments. The APT module was developed by making use of the PBL approach. This was derived from several workshops, internal research and associated literature review, which led the staff at the Division of Physiotherapy at SU to the conclusion that PBL would be the best approach to follow in order to bridge the gap which is left between the basic module, that is PTS and the APT module where these theories and techniques need to be applied. Students are thus exposed to entirely new forms of learning opportunities through this module and as such have adaptations to make. This could lead to frustration and dissatisfaction as they are required to switch from a traditional module based approach, where lecturing is the core mode of instruction, to a new approach half-way through their course (Choi, Lee and Kang, 2009).

Within medical education, PBL has grown to the point where there has been a progressive shift in the manner in which education is delivered (Lewis, Menezes, McDermot, Hibbert, Brennan, Ross, and Jones, 2009). Since 2007, third year Physiotherapy students at SU have been registered for and participate in the APT module. This module predominantly uses a PBL approach and the desired outcome is to have students able to integrate the theoretical concepts and principles of the biomedical sciences within the context of Physiotherapy practice (client management). They should:

- have knowledge of the medical and surgical management of clients as well as the disease processes appropriate for physiotherapeutic intervention.
- understand the role of all team members involved in the holistic management of the client.

- have basic knowledge with regard to relevant diagnostic tests and the impact that these have on client management.
- be able to demonstrate the necessary evaluation and treatment techniques on a model and interpret the findings accurately in order to form a hypothesis and prioritized problem list.
- be able to source appropriate subject-specific literature and motivate the choice for specific physiotherapeutic interventions and approaches.
- be able to draw up a specific, measurable and realistic set of goals within specified time limits.

The body of literature on the efficacy for promoting learning by using PBL is often conflicting in its conclusions, though the majority of authors concur that the approach lends itself to a self-directed, deep approach toward learning (Prince and Felder, 2006). This pedagogy therefore requires a higher cognitive level of engagement by students such as is not required with lecture-based modules (Loyens, Magda, and Rikers, 2008). The conflict as to the outcome of this approach elaborated on by educationalists such as Entwistle and Peterson (2004) in which they state that “students’ conceptions of knowledge, conceptions of learning and learning orientations are broad constructs that develop and change during the learning process and within different learning environments.” Added to this, Kirshner, Sweller and Clark (2006) provided motivation for changing this type of curriculum from PBL to conventional instructional teaching methods. A fairly strong statement made by Kirshner et.al (2006) is that “[n]ot only is unguided instruction normally less effective; there is also evidence that it may have negative results when students acquire misconceptions or incomplete or disorganized knowledge.” They go on to specifically discuss medical residents’ post-undergraduate PBL training as not having acquired forward-directed reasoning and imply that the lack thereof is a sign of a lack of expertise in comparison with those trained in a conventional curriculum.

Initial investigation into the general perception of students and staff of the APT module in 2007 at SU, yielded both positive and negative results (Statham, Inglis-Jassiem and Hanekom, 2008). These have all been used in further refinement of the module. The overall aim of this study is to investigate the approaches, conceptions and perceptions toward learning of undergraduate Physiotherapy students in a PBL module in order to inform curriculum development and enhance facilitation of learning at the Stellenbosch University Division of Physiotherapy. This will be done by answering the following questions:

- What are the approaches toward learning of the 3rd year physiotherapy students in 2010 participating in the APT module?

- Do the students participating in the APT module experience a change in their approach toward learning after gaining more experience in the module?
- What are the experiences and needs of the 3rd year physiotherapy students with regard to optimizing their learning experience in the APT module, including what their perception and conception of their own learning approaches are within this module?

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

To gain insight into approaches toward learning, we need to understand what learning is, how it occurs and the activities associated with learning. Learning occurs when synapses and neuronal networks in the brain are formed and stabilized. When this happens repeatedly, the networks and synapses become stronger, thus, existing knowledge becomes a part of the structure of the brain (Gravett, 2005). As such, this existing knowledge, when used in a PBL environment allows for enhanced integration of the existing knowledge in order to positively affect the development of clinical reasoning skills and improved academic achievement (Groves, 2005).

In order to learn, students need to engage in various activities. Vermunt and Verloop (1999) provide a taxonomy for understanding the activities in which students engage in the process of learning. These can be tabulated as follows:

Table 1: A Categorization of Learning Activities (Vermunt and Verloop, 1999:259)

Cognitive <i>Activities leading to a change in the students' knowledge base</i>	Affective <i>Lead to a mood that affects the progress of learning.</i>	Metacognitive(Regulative) <i>Thinking activities used to steer the course & outcomes of learning.</i>
Relating/structuring	Motivating/expecting	Orienting/planning
Analyzing	Concentrating/exerting effort	Monitoring/testing/diagnosing
Concretizing/applying	Attributing/judging oneself	Adjusting
Memorizing/rehearsing	Appraising	Evaluating/reflecting
Critical processing	Dealing with emotions	
Selecting		

The learning activities within the APT module will ideally fall within the metacognitive/reflective category tabulated above. A PBL approach has been adopted within the APT module in the Division of Physiotherapy at Stellenbosch University in order to foster the development of these learning activities and encourage the use of existing knowledge to apply to, and improve, clinical reasoning.

2.2 CONTEXT

In order to investigate the approaches toward learning of students in a PBL module, it was necessary to first gain an understanding of PBL, including the history and the learning theories which have contributed to the development of this instructional approach. A search of the literature was also conducted to gain an understanding of approaches toward learning and how this has been researched in light of PBL in recent times.

This literature review is therefore divided into two sections: PBL and Approaches toward learning. Further sub-divisions have been added to create an understandable text which explains the thought processes involved in the literature in preparation for the investigation into the learning approaches of 3rd year students in the APT module.

Prior to understanding the learning theories which apply to the APT module, it is necessary to understand the difference between conception and perception of learning in education. This has an impact on the understanding of the premise on which this investigation has been built and will further aid in promoting a deeper understanding for how students learn in the APT module. Though often used as synonyms, conceptions and perceptions can have a different meaning when regarded in an educational environment. A model of practical inquiry and reflective thinking, often used in e-learning research, can be used here to explain how these terms can differ. Dewey's model of practical enquiry and reflective thinking can be illustrated as follows:

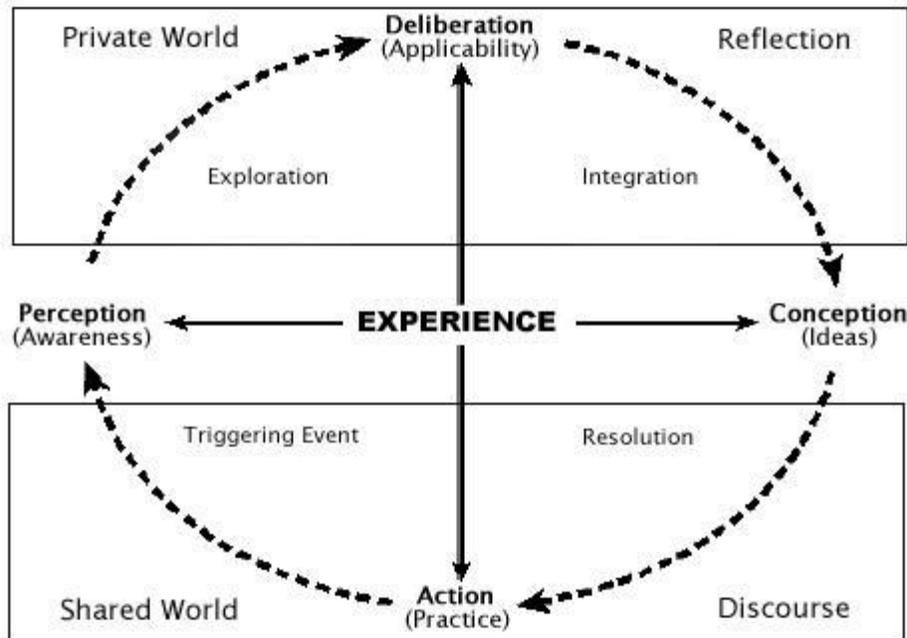


Figure 1: Practical inquiry model (Pawan, Paulus, Yalcin and Chang; 2003)

This model has been used to evaluate and understand collaboration and cognitive presence. The nature of PBL, as will be shown in this chapter, requires collaboration between students on a daily basis in order to learn. Cognitive presence refers to the reconstruction of experience and knowledge through critical analysis of a situation (Pawan, et.al. 2003). That being said, the perception of learning in the APT module refers to the students' awareness of various aspects of the module. Conception however, is the analysis by students of the subject matter, or the APT module, and their ability to challenge basic assumptions of how learning occurs in the module and question these ideas. It can be useful to break this explanation down into the simple terms of perception is 'what I think is happening to me', conception is 'how I think about what is happening to me'. Thus, this study addresses the experience dimension of the practical enquiry model, which in turn should have an effect on the applicability and practice in the student physiotherapists life.

It is necessary to understand the theory underlying the APT module in order to make deductions as to the approach toward learning and conceptions of learning in this module. As such, the first section of the literature review consists of an overview of the PBL approach, the history of the approach and learning theories relating to it, with a description of the modified implementation of PBL in the APT module within the Division of Physiotherapy at Stellenbosch University.

2.3 PROBLEM-BASED LEARNING

2.3.1 HISTORY AND DEFINITION OF PBL

When the medical school staff at McMaster University in Hamilton, Canada, started a restructuring process within their faculty aimed at improving the experience and learning opportunities of their students in the clinical environment, they adopted what is now known as the PBL approach (Prince and Felder, 2006). This approach or instructional method not only changed the way in which they educated their students clinically, but also served as a basis for their entire curriculum. PBL, though initially just a broad understanding of an approach, has been refined over the years and is now recognized mainly in the format of the model as designed by Barrows and published in various articles in the 1980's and 1990's (Savery and Duffy 2001). Since then the approach has gained popularity among many medical schools and is now used in about 500 curricula worldwide (Moust, Bouhuijs and Schmidt, 2007). It should also be noted that the origins of PBL, though widely believed to have been in McMaster University, is also said to have been used originally in the 1950's at Case Western Reserve University in Cleveland, Ohio (Prince and Felder 2006).

This instructional approach has gained popularity over time and as a result a journal has been established which is dedicated to the research of PBL-related topics. The *Interdisciplinary Journal of Problem-based Learning*, first published in 2006, included an introductory article outlining the definitions and distinctions of this approach (Savery, 2006). This author discusses various aspects of PBL and defines it as “an instructional (and curricular) learner-centered approach that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem”. Hmelo-Silver and Barrows (2006) describe the approach as “a premier example of a student-centered learning environment.” The literature provides us with a variety of definitions. However, the six core characteristics which underpin these definitions are noted here as:

- Learning is student centered.
- Learning occurs in small student groups.
- A tutor is present as a facilitator or guide.
- Authentic problems are presented at the beginning of the learning sequence, before any preparation or study has occurred.

- The problems encountered are used as tools to achieve the required knowledge and the problem-solving skills necessary to eventually solve the problems.
- New information is acquired through self-directed learning.
(Gijbels, Dochy, Van den Bossche and Segers, 2005)

The emphasis within the PBL approach is on self-directed learning which “demands discipline on the part of the students” (Moust et.al. 2007). PBL provides an environment for students in which they are exposed to professional problems and in so doing act as a stimulus and focus for their learning (Papinczak, 2009). These environments allow students to construct an extensive and flexible knowledge base and, by becoming effective collaborative leaders, they are able to develop the aforementioned self-directed learning skills (Loyens, et.al., 2006).

2.3.2 LEARNING THEORIES IN PBL

There are various learning theories and/or approaches which can be seen to be most applicable to PBL in the APT module as used in the Physiotherapy Division. A brief description of these applicable theories will be given for the purpose of this study.

2.3.3.1 ANDROGOGY

Androgogy is defined as “the art and science of helping adults learn” (Knowles, 1980 in Merriam, 2001). Merriam (2001) quotes Pratt (1993) as stating that androgogy “has done little to expand or clarify our understanding of the process of learning, nor has it achieved the status of a theory of adult learning”. As such, androgogy may not be seen as a true learning theory; however, this particular concept is applicable to PBL within the APT module. The majority of students currently enrolled in the APT module are aged between the 19 and 22 years. This is not necessarily considered to be the age of an adult learner, which is seen as 25 and older (Blakely and Tomlin, 2008). However, these students have an accumulation of prior knowledge gained through their primary, secondary and first two years of university education, and they are also cognizant of the changes in their social identities, from classroom based students to clinically training physiotherapy students. Thus, the term androgogy can be used when discussing their learning. Merriam (2001) elaborates on the fact that adult learning as a theory or approach in learning has been discussed at length since the first use of the term in 1968 by Malcolm Knowles. Initial assumptions made by Knowles are described by Merriam (2001) in

order to elaborate on what it is that undergirds this theory. These assumptions classify adult learners as self-directed learners who are problem-centered with their learning needs in close relation to changing social roles. They have an accumulated reservoir of life experiences and are thus motivated to learn by internal rather than external factors.

2.3.2.2 CONSTRUCTIVISM

Constructivism can be described more as a philosophical explanation about the nature of learning than a theory (Schunk 2004). Though based on the premise that students learn through creating meaning from things and/or situations which they have been exposed to previously, this is not a unified theory. Constructivism as a basis for curriculum design would require that students approach learning from various perspectives and that teachers/lecturers should not teach in the traditional sense of the word, but rather structure situations in which learners are able to actively interact with the content and other learners. There are different perspectives on constructivism. According to Schunk (2004), these can be summarized as follows:

Table 2: Perspectives on constructivism (Schunk, 2004:288)

Perspective	Premises
Exogenous	The acquisition of knowledge represents a reconstruction of the external world. The world influences beliefs through experiences, exposure to models, and teaching. Knowledge is accurate to the extent it reflects external reality.
Endogenous	Knowledge derives from previously acquired knowledge and not directly from environmental interactions. Knowledge is not a mirror of the external world; rather, it develops through cognitive abstraction.
Dialectical	Knowledge derives from interactions between persons and their environments. Constructions are not invariably tied to the external world nor wholly the workings of the mind. Rather, knowledge reflects the outcomes of mental contradictions that result from one's interactions with the environment.

The constructivist approach can also be seen as guiding the teacher to “foster critical reflection and negotiate meaning with learners” encouraging metacognition by assisting “learners in understanding how they developed certain assumptions and question learners as to whether those assumptions remain valid” (Torre, Daley, Sebastian and Elnicki 2006) The APT module incorporates many of these factors into the structure of the module as a direct result of the PBL approach. As such, this theory can be seen as one of the main learning theories which provide the foundation for the module.

2.3.2.3 SELF-DIRECTED LEARNING

Though often discussed on its own, self-directed learning is mentioned when discussing both constructivist and humanist learning theories. Self-directed learning can be defined as “a process in which individuals take the initiative, with or without the help from others (humanism), in diagnosing their learning needs, formulating goals, identifying human and material resources, choosing and implementing appropriate learning strategies, and evaluating learning outcomes” (Loyens et.al. 2008). It can also be defined as “the process whereby learners systematically direct their thoughts, feelings, and actions toward the attainment of their goals” (Schunk. 2004). This quality of PBL can therefore be seen as a product of the constructivist-based APT module.

2.3.2.4 SOCIAL LEARNING

As implied by its name, social learning is based on the underlying principle that learners gather information for learning based on social experiences, e.g. role model observation and through the actual performance of the task. Social learning contains an element of both cognitive and behavioural components. This is described by Torre et.al. (2006) as “the idea that learning may occur by observation alone.” Schunk (2004) speaks to the behaviourist component when it is said that “behaviours that result in successful consequences are retained; those that lead to failures are discarded” and that learning occurs by “observing models, listening to instructions, and by engaging with print or electronic media.” Students in the APT module learn with and from each other and the facilitators in each PBL case. Their shared experience in setting and achieving their learning outcomes for each case affords them the opportunity to retain those successful consequences in the learning environment.

2.3.2.5 KOLB'S THEORY ON EXPERIENTIAL LEARNING

Kolb's theory on experiential learning lead to the development of the four-step cyclical process and deals with not only learning through experience as with social and constructivist learning, but also deals with the basic questions of learning and development (Ernstzen and Bitzer. 2006). This description highlights the variation in the types of learners in any environment. This study argues that the variation in types of learners is indicative of the presence of variation in perceptions and conceptions of learning. As discussed earlier, this could have a direct influence on the students approaches toward learning in the APT module. The cyclical process described by Ernstzen and Bitzer (2006) is illustrated as:

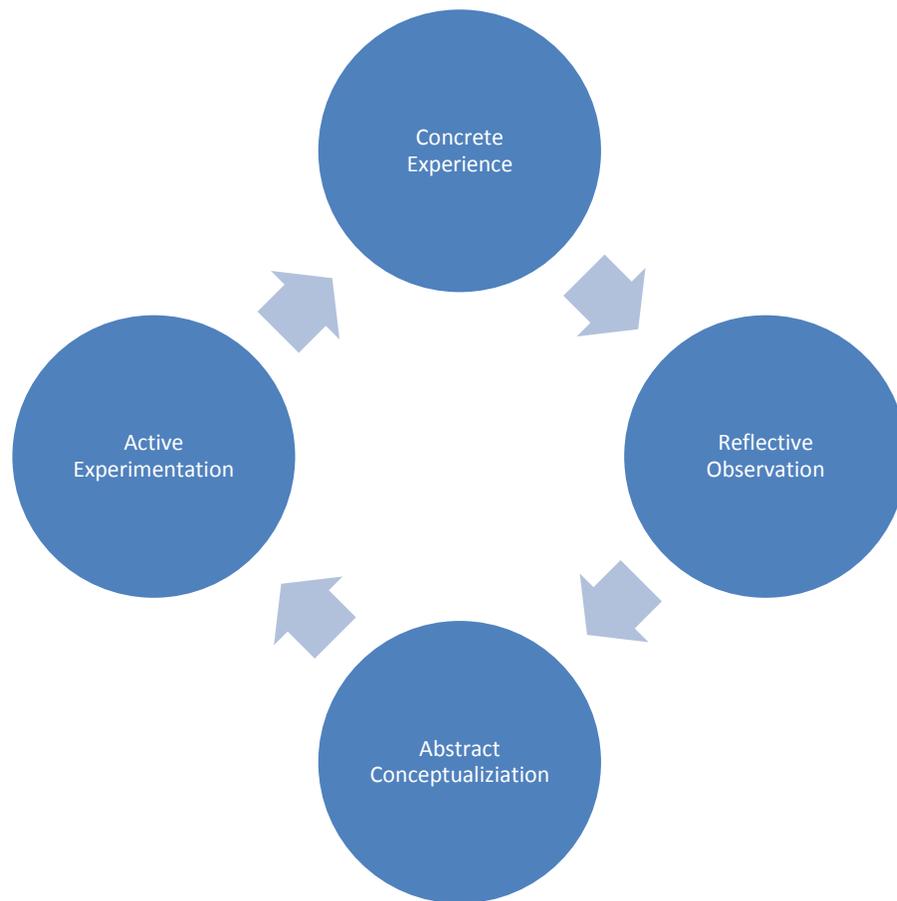


Figure 2: Kolb's cyclical process of learning

Varying types of learners prompts us to consider various types of learning facilitators and the interaction between the two and how that could impact on the entire process of learning. Elaboration on this cyclical process in the form of a description of the different types of learners follows:

Concrete experience learners:

- Learn by intuition
- Learn from specific experiences
- Relate and are sensitive to people and their feelings.
- Learn best from new experiences
- Prefer personalized counseling
- View teachers as coaches and helpers.

Reflective observation learners:

- Learn by perception
- Observe carefully before making judgments
- View things from different perspectives
- Look inward for meaning creation
- Learn most from lectures and from observing others
- Teacher is seen as a guide or task master

Abstract conceptualization learners:

- Learn by thinking
- Plan learning and events systematically using a logical analysis of ideas.
- Learn by theory readings and study time
- Present their ideas in a well-structured way
- See the teacher as communicator of information

Active experimentation learners:

- Learn by doing
- Take risks and have the ability to get things done
- Act to influence people and events
- Learn through practice and receiving feedback
- Enjoy small group discussions, projects and individualized learning activities
- The teacher is their role model

Though learning theories have not been discussed at length here, those which can be seen as applicable to APT as used in the Physiotherapy Division have been outlined. The large body of literature on all of these theories has provided the basis for many curricula, and those which have

been found to underpin the PBL approach have been highlighted. In keeping with the Stellenbosch University teaching and learning policy which requires a student centered approach to teaching (SU Policy on Teaching and Learning, 2007), the alignment of the APT module instructional approach is seen through the use of theories such as those described above.

With these theories as a basis for the instructional approach used in the APT module, the Division of Physiotherapy adopts a hybrid-PBL approach. The implementation of this in the APT module will be described; however, it is necessary to first understand the generic application of PBL in the classroom.

2.3.3 PBL IN THE CLASSROOM

The definitions provided here are derived from the description of the process as detailed in literature. The underlying premise of the PBL approach is to encourage students to engage in self-directed learning and ultimately to foster a sense of life-long learning through the incorporation of a deep approach toward learning rather than a surface approach toward learning within higher education. The PBL approach is used within small groups of students facilitated by a tutor. The problem discussion amongst the students relies heavily on their prior knowledge (Loyens, et.al., 2008). The process starts with the students being presented with a scenario which does not give any clues as to the objectives which they are to meet within the session, but rather a scenario which leads to discussion by the students with the aim of developing their own learning objectives based on the information gathered through a process of brainstorming (Savery and Duffy, 2001 and Moust et.al. 2007).

Once all unclear terms and concepts have been discussed within the student groups during the initial brainstorming session, research tasks are delegated to each group member. The students then all go in search of their own information from various sources including books, the internet and educators within their faculty (Moust et.al. 2007). Clarification of unclear terms and the ability to discuss the problem in the group takes place as a result of the prior knowledge that the students have as well as through facilitation of the metacognitive process by the tutor.

Once the students have conducted the necessary research into solving the problem and feel that they have achieved their self-determined learning objectives, a feedback session is held. In this final part of the process, the students do not only present their findings to their fellow group members, but also take part in a discussion so that everyone is clear on the findings and the tutor is sure that all the learning objectives have been met (Savery and Duffy, 2001).

Moust et.al. (2007) have described this PBL process within the confines of what is known as the seven step method, also known as the seven-jump or seven-leap process or method. The seven steps are as follows:

- Step 1: Clarify unclear terms and concepts in the problem text.
- Step 2: Define the problem: What exactly needs explaining?
- Step 3: Problem analysis: Produce as many ideas as possible.
- Step 4: Problem analysis: Arrange the ideas systematically and analyse them in-depth.
- Step 5: Formulate learning goals.
- Step 6: Seek information from learning resources.
- Step 7: Synthesize and apply the new information.

This method of describing the PBL process is echoed by Barrows and Myers (1993), and it has been further quoted in literature as the “Barrows model” (Savery and Duffy, 2001). The process is thus tabulated as:

Table 3: The PBL process [Barrows and Myers, (1993) in Savery and Duffy (2001)]

STARTING A NEW CLASS
<p>Introductions</p> <p>Climate setting (including teacher/tutor role)</p>
STARTING A NEW PROBLEM
<p>Set the problem</p> <p>Bring the problem home (students internalize the problem)</p> <p>Describe the product/performance required.</p> <p>Assign tasks (Scribe 1 at the board, Scribe 2 copying from the board, and reference person)</p>

IDEAS (Hypotheses)	FACTS	LEARNING ISSUES	ACTION PLAN
Students' conjectures regarding the problem – may involve causation, effect, possible resolutions, etc.	A growing synthesis of information obtained through inquiry, important to the hypotheses generated.	Students' list of what they need to know or understand in order to complete the problem task.	Things that need to be done in order to complete the problem task.
Reasoning through the problem: What you do with the columns on the board			
IDEAS (Hypotheses)	FACTS	LEARNING ISSUES	ACTION PLAN
Expand/focus	Synthesize & re-synthesize	Identify/justify	Formulate plan
Commitment as to probable outcome (although much may need to be learned)			
Learning issue shaping/assignment			
Resource identification			
Schedule follow-up			
PROBLEM FOLLOW-UP			
Resources used and their critique.			
Reassess the problem: What do you do with the columns on the board			
IDEAS(Hypotheses)	FACTS	LEARNING ISSUES	ACTION PLAN
Revise	Apply new knowledge and re-synthesize	Identify new (if necessary)	Redesign decisions
PERFORMANCE PRESENTATION			
AFTER CONCLUSION OF PROBLEM			
Knowledge abstraction and summary (develop definitions, diagrams, lists, concepts, abstractions, principles)			
Self-evaluation (followed by comments from the group)			
Reasoning through the problem			
Digging out information using good resources			
Assisting the group with its tasks			
Gaining or refining knowledge			

2.3.4 PBL IN APPLIED PHYSIOTHERAPY 373

Following recommendations to the Physiotherapy Division from the Health Professions Council of South Africa (HPCSA) with regard to the content of the curriculum and the then-new SAQA levels, planning for a new curriculum within the Physiotherapy Division began. This process, started in 2003/4 – 2005, aimed to maintain alignment with the regulatory framework of the HPCSA and HEQF, which was soon to be implemented in 2009 (Inglis-Jassiem 2009). Workshops, internal research and literature review, led the staff to the conclusion that PBL would be an appropriate method to use in order to bridge the gap between the PTS and CPT modules.

The format of the APT module is such that students are presented with various cases/problems relative to clinical situations and building on subject matter learnt in their previous year and a half of study in PTS. The method used within the small groups of approximately 10 students is the Seven-Jump Process (see 2.3.3). Each of the students in the group are required to take the role of group leader and that of scribe at least once in the four 'blocks' into which the cases are divided. They are also required to attend three scheduled learning opportunity sessions, over three consecutive days for each case.

Prior to the students receiving their handouts which contain the cases and references used in planning the cases, staff members are assigned specific cases to facilitate. The staff members revise the original case and ensure that the resources used are current and still aligned with the required outcomes for the module. Once a list of main goals/foci for the case and learning outcomes are finalized, the handouts are printed and are ready for use within the APT module.

In the first session the group is given a case/scenario to discuss. During this session, the facilitator (staff member) ensures that the students are clarifying the appropriate terms and that the learning outcomes which they decide upon are as close as possible to the learning outcomes decided upon in the planning process by the staff members. This is done by asking questions to guide the students in their discussion and thinking only when necessary, i.e. if the facilitator sees that the group is veering from the outcomes set for that case or have seemed to reach a stage in their discussion where they are unsure of what to do or how to approach the case further. Once the group has formulated their learning outcomes, they divide these outcomes up amongst themselves for the purpose of gathering information through research on their assigned outcome.

The second session consists of a facilitator-led practical session in which they are reminded about techniques learnt in the PTS module and apply it to the case at hand. This session is one that is not normally part of the Barrows model or seven-jump process. Specific precautions and contraindications as well as treatment techniques for the case are highlighted by the facilitator while the students practice these techniques.

The third and final session is the feedback session. Students are required to submit their summarized information on the learning outcomes relevant to the case, as their learning material, to the facilitator by 18h00 on the day of the practical session, i.e. the day before feedback is given. In the feedback session, the students present their findings to the group and answer any questions which may arise after their presentation. They are then required to formulate multiple choice questions based on everything they have learnt and hand it in to the facilitator. Students are also required to create a mind map of all the information sourced and use it as a cover page for the case learning material. These requirements by the APT module are also specific to this program and are not identified as one of the steps in the Barrows model. The facilitator provides feedback to the students immediately after they have completed their presentations and if necessary, will ask a student to re-submit their particular outcome if the quality of the material is not suitable for their fellow students to learn from.

2.3.5 ADVANTAGES OF PBL

In the ongoing debate regarding the continued use of PBL in medical education, much of the literature searched in the process of this investigation alludes to various advantages versus the disadvantages of the approach. Many authors appear to include one, if not several, 'advantage versus disadvantage' paragraphs in their introductory statements.

With regard to the advantages of PBL, the approach is said to have a positive effect on students skills (Loyens, et.al., 2006) one of which is their grasp on epidemiology and its professional relevance (Krueger, Neutens, Bienstock, Cox, Erickson, Goepfert, Hammoud, Hartmann, Puscheck and Metheny, 2004). The approach also allows for a range of learning styles to be accommodated, which in turn supports the research into students' preference for approaching and understanding learning

(Duke, et.al., 1998). Students are said to be better equipped in the real world due to their increased retention of knowledge, enhanced integration and application of basic science concepts into clinical contexts and subsequent enhancement of their intrinsic interest in the subject matter (Groves, 2005). As the outcome based educational strategy is applied within the Division of Physiotherapy at Stellenbosch University, the positive effect on learning outcomes as mentioned in the literature also serves as an advantage when looking at this particular instructional approach (Moust, Berkel, Schmidt, 2005). Student attitudes, mood, distress and class attendance has been shown to be consistently positive toward PBL over a traditional approach (Vernon and Blake, 1993), and this was echoed by the students within the Division of Physiotherapy during the process evaluation of the APT 373 module (Statham et.al., 2008). Students have also shown a greater appreciation for cultural aspects, including legal and ethical issues, when it comes to caring for patients (Norman, 2008). This in particular is applicable to the APT 373 investigation, as it addresses a need within the communities in which our students will work.

2.3.6 DISADVANTAGES OF PBL

Due to the drastic change that students may perceive a new instructional approach such as PBL to be, they may be unaccustomed to the high levels of responsibility with which they are now faced for their own learning (Prince and Felder, 2006). Students are thus presented with real-world, messy problems and often do not have the skills to know where to begin, taking time and effort to overcome their bewilderment (Hoffman and Ritchie, 1997). Evidence of possible knowledge gaps in a poorly planned PBL program (Prince et.al., 2006) could also be perceived as a disadvantage of this instructional approach. Hoffman et.al. (1997) found that students having to rely on verbal or written problems and resource materials, as is the case with most PBL curricula, could adversely affect transfer between problem situations in a course and similar ones in real life.

Assessment of PBL has also been listed as one of the possible disadvantages of this approach, in that the assessment methods are often not able to assess students' abilities to understand concepts (Gijbels et.al., 2005). Though at times not seen as a disadvantage, the considerable subject expertise and flexibility required from the facilitators could pose difficulties in the implementation of a PBL program (Prince et.al., 2006) and as such the lack of expert facilitators could negatively impact on the feasibility of the problems/cases presented to students for learning (Colliver, 2000).

2.4 APPROACHES TOWARD LEARNING

Self-directed learning is fostered by modules such as APT and has been said to encourage deep-level processing of subject matter as opposed to surface learning (Loyens et.al., 2008). This should lead to the development of an autonomous learner as they are presented with a choice as to their motive for learning, time spent learning, setting, and conditions of learning, among others (Schunk, 2004).

The self-directed learning quality of a PBL module or curriculum has been reiterated by other authors, among which is Duke et.al. (1998). In the aforementioned article, the authors discuss conceptions and approaches to learning of their students in a PBL program, but are clear in stating that previous research does not prove that there is a guarantee that students will know how to apply themselves in such a way as to become self-directed learners.

It is recognized by the researcher in this study that there is literature available regarding a third approach toward learning, namely, a strategic approach toward learning. A strategic approach toward learning refers to students whose main aim is to achieve high grades. These students will adopt a deep or surface approach toward learning depending on what they may perceive the best possible way to achieve high grades will be in a specific learning environment (Abraham, et.al., 2008). However, the data instrument used in this study only addresses the deep and surface approach toward learning with the students motives and strategies which lead to these approaches being incorporated into the analysis of the findings. Based on the afore-mentioned description, it could be useful to investigate the strategic approach toward learning should assessment outcomes be included in the domains of an investigation into this module.

The deep-level processing as characterized by self-directed learning (Loyens et.al., 2008) gives rise to the question of what deep learning alludes to. The deep approach toward learning is characterized by studying for meaning and aiming at understanding (Greasley and Ashworth, 2007). Students adopting this approach toward learning are said to engage with subject matter in a way which promotes understanding (Ellis, Goodyear, Brilliant and Prosser, 2008). This is contrasted by the surface approach toward learning in which students study by means of reading to remember disjointed facts

(Greasley et.al., 2007). The students adopting this approach rely on external regulation and concentrate on the surface features of the work they are required to engage within their learning environment (Papinczak, 2009).

The conceptualization of this phenomenon in early research by Marton and Saljo has paved the way for further research into learning approaches of students (Newble and Entwistle, 1986). Varying starting points have been used for this research, ranging from attempting to establish a relationship between learning approaches and academic achievement (Groves 2005), to trying to determine the conception of learning and learning approaches in relation to on-line activities (Ellis et.al., 2008). Duke, Forbes, Hunter and Prosser (1998) investigated the relationship between conceptions of PBL and their students approach toward learning and they too found that further research is needed into the relationship between conceptions of learning in PBL and approaches toward learning.

Another area under debate within the PBL discourse is that of the relationship between students' approach toward learning and clinical reasoning. This, though not a focus of this investigation, has been found in the literature, which stated that more data is needed to validate findings indicating a positive relationship between students deep approach toward learning and clinical reasoning skill (Groves, 2005). The APT module also aims to encourage evidence based practice (EBP) by students being responsible for sourcing relevant, and current, evidence for their choices in assessment and treatment techniques.

Ultimately, the premise on which all this research is based, on varying levels, is that the concept of studying approaches toward learning can guide the assessment and teaching styles in a direction to encourage students to adopt more effective approaches (Greasley et.al., 2007). This identification of the impact which research into learning approaches can have is necessary for curriculum development in a fairly new module such as APT. Using the identified literature on PBL and the learning theories which underpin it, an understanding of why and how the module should have an impact on learning can be initiated. By understanding that APT can have advantages and disadvantages for student learning which are common in other PBL and hybrid-PBL modules the Physiotherapy Division would have a background into understanding the perceptions of the students enrolled in the course. Their understanding of these common perceptions across various curricula

could facilitate the adaptation of module in ways which have been shown to work in similar environments.

In conclusion, PBL provides students with a learning environment which has advantages and disadvantages for learning. The history of the instructional approach and underpinning theories can assist in understanding the need for students to be encouraged to adopt a deep approach toward learning. This being said, the students enrolled in the APT module should benefit in their academic and clinical domains from adopting a deep approach toward learning. This study aims to identify if this is the case, as it has not yet been determined.

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

This study utilized a descriptive study design using both quantitative and phenomenographical methods of analysis. This mixed-method approach to the study is often seen in qualitative studies, though not often described sufficiently to ensure rigour and transferability (Caelli, Ray and Mill, 2003). The data collection period started at the beginning of the academic year in 2010 after the 3rd year class had started the APT module. The final data collection was completed in July 2010 once the 3rd year students had completed their first semester in the APT module. The aim was to investigate their approach toward learning at the inception of their involvement in a PBL learning environment and then again at a later date once they had become accustomed to the instructional approach. Data regarding their perception and conception of learning in the module was also gathered during this time period.

This chapter aims to identify the methodological approach used in this study and outline the instruments and methods used in investigating the perceptions, conceptions and approach toward learning of 3rd year students in the APT module. A discussion of the ethical considerations is also included in this chapter.

3.2 RESEARCH DESIGN

Though primarily a descriptive qualitative study, the research has in part lent itself to a phenomenographical and statistical approach in its analysis of the data. Descriptive study designs set out to describe certain individuals or groups of individuals with regard to a specific phenomenon (Kothari, 2004). The goal of a study which adopts a qualitative descriptive methodology is to provide a straight summary of the data in a categorical manner (Caelli, et.al., 2003). Qualitative descriptive methodology incorporates various other methodologies in order to describe the phenomenon on which the study is based (Sandelowski, 2000).

Phenomenography aims to discover and classify people's conceptions of reality, thus structuring the determined conceptualizations in a structured format (Greasley et.al., 2007). This methodology has its

roots in studies carried out in Sweden at the University of Göteborg in the 1970s, the aim of which was to describe learning through the eyes of the learner, and is therefore a suitable methodological design for a study such as this one.

In this study, the researcher aims to describe the approach toward learning as experienced by the 3rd year students in the APT module and classify these experiences in a logical and hierarchical manner in order to illustrate their interrelation with each other (Greasley et.al., 2007). This exercise is indicative of the phenomenological methodological concepts incorporated into this study. Though this is in part the aim of the research project, it is by no means the only methodological approach used, and this is in keeping with the qualitative descriptive methodology (Sandelowski, 2000), which many times uses various methodological approaches as a means to qualitatively describe a research study.

3.3 PARTICIPANTS

The students were invited to participate in the study by means of purposive sampling, as the researcher had regular contact with all the students, and could therefore ensure that data collection would be completed within the study timeframe. The study population was the entire 3rd year class in 2010 at the Division of Physiotherapy, n=38. There were a greater number of females (n=35) than males (n=3) who registered for their 3rd year in 2010. The average age of the students participating in this study was 23 years.

The students involved in this research were registered for the APT module in 2010 in the third year of their B.Sc. Physiotherapy degree. They were approached at the beginning of the year to explain the overall rationale behind the research project and were invited to ask any questions relating to the study if clarity was needed. Following the signing of informed consent (Addendum C), each student was given a participant number to ensure anonymity in the data collection and analysis process. The students were reminded that although they had signed informed consent for participation in the study, they were welcome to withdraw at any stage during the research project.

Students were asked to complete three questionnaires and participate in a focus group discussion. The three questionnaires were one perception of learning questionnaire and another to determine their approach toward learning, which would be administered on two separate occasions. These questionnaires were used to determine their overall approaches toward learning while registered for the APT module and their perception of the module itself. The aim of administering the one

questionnaire on two occasions was to determine the effect of the PBL module on their approach toward learning in comparison to the results of the first questionnaire. The perception questionnaire would be an open-ended enquiry into the students' perceptions of their learning in comparison to what they already know, or knew, after having engaged with learning material in the PTS module. The focus group interviews were intended to authenticate the findings of the perception questionnaire and to then classify the students' conceptions of learning in the APT module.

3.4 RESEARCH INSTRUMENTS AND DATA

The participants completed the Revised Study Process Questionnaire (R-SPQ-2F) (Biggs, Kember and Leung, 2001) which is a validated tool for determining whether or not a student has a deep or surface approach toward learning (Addendum A). This questionnaire has been revised since its original design in the 1970s to ensure reliability in its use within research to determine deep and surface approaches toward learning in students (Biggs et.al., 2001). This 20-item questionnaire, though used to ultimately determine the approach toward learning, be it either deep or surface, also seeks to determine the students' motive and strategy with regard to their learning in congruence with these approaches. Therefore, the outcome of the R-SPQ-2F allows the researcher to determine each student's approach to learning and the motive, e.g. fear of failure or intrinsic interest, and strategy for learning, e.g. rote learning or maximizing meaning, with regard to that particular approach (Biggs, et.al., 2001 and Groves, 2005).

Students completed the R-SPQ-2F for the first time after having completed only a few cases in the APT module. Due to the nature of the questionnaire, it was necessary for the students to already have had some experience of learning in the APT module. The questionnaire requires students to answer the questions in relation to the subject/module question, thus the importance of administering the questionnaire after the inception of the module. The students were, at this point, still fairly unsure of their capabilities with regard to the level of responsibility required of them and adapting to the different learning environment. This questionnaire was then administered again after the students had completed an entire semester of the module. Students provided anecdotal evidence to case facilitators that their approach toward learning in this module had changed since the beginning of the module, the second administration of the questionnaire would therefore confirm or negate this evidence.

The perception questionnaire (Addendum B) was piloted as part of an unpublished inquiry into students' perceptions of learning with 3rd year students registered for the APT module in 2009. The

purpose at that time was to determine their perception of learning in the module for an investigation which served as the initial exploration into student learning in the module. The questionnaire in 2009 served as the foundation and motivation for the current study, as the questionnaire at that time highlighted areas regarding perceived disadvantages of the module that needed further investigation before any changes could be implemented. The questionnaire, designed by the researcher, required the students to reflect on their learning in the APT module itself, as well as in comparison to the PTS module, which adopts a different instructional approach. The rationale for asking students to reflection the difference or similarities between PTS and APT was to identify if they perceived PBL to facilitate their learning more than lecture based modules such as PTS. The questionnaire poses three basic questions to students, one enquiring as to their perceived advantages of the module, one regarding their perceived disadvantages and one which serves to identify if students find that their learning is better facilitated in APT in comparison to PTS. No further instructions were given, other than for students to answer each question in their own words.

The perception questionnaire was administered once students had already completed one APT block of cases in order to provide the researcher with a fair interpretation of the results. Had their responses been solicited earlier in the module, the students might have not been able to have had enough time to describe accurately their perceptions of the module, as they would not have had much experience in the PBL environment.

The two semi-structured focus group interviews were conducted for two specific reasons. One was to further clarify the findings of the perception questionnaire and the other was to categorize the students' conceptions of learning for the phenomenographical analysis. By conducting a second focus group, the statements made in the second interview served as a basis for further confirmation of findings from the first focus group interview. It has been said that phenomenography is, in itself, not clear in the process of this type of research, though there is considerable literature on the outcome of studies using this particular approach (Ashworth and Lucas, 2000). Though most of the studies using this methodology use individual interviews, time limitations in this study made it difficult to use this particular data collection method. Focus group interviews as a data collection method is however reported to have been used in other studies adopting a phenomenographical approach to the data collection, though the individual interview is still the preferred method (Marton, 1994). The focus groups were chosen randomly by entering participant numbers into a Microsoft Excel spreadsheet and having the computer program select sixteen participant numbers. Sixteen students were invited to participate in the focus group interviews via e-mail by the researcher. Ten students did not attend the scheduled session due to various timetable clashes. Though both male and female students were

randomly selected to attend the focus group interviews, the six participants who attended were all female students. These interviews were conducted by the researcher in both English and Afrikaans, and were recorded for transcription purposes. All recordings are stored digitally for future research purposes.

Data was therefore collected using three methods. A structured, validated questionnaire was used to collect data in order to determine the approach toward learning. Perceptions of learning in the APT module would be determined by collecting data using the open-ended questionnaire designed by the researcher, and the semi-structured focus group interviews were used for conception of learning and confirmatory information data collection purposes. By using these three methods for data collection, triangulation in the research project has been achieved.

3.5 ANALYSIS OF DATA

The three instruments of measurement were analyzed independently, as each data analysis method differed from the other. This supported the study design which aimed to incorporate a mixed-method investigation for the purposes of gaining insight into various aspects relating to the perceptions, conceptions and approaches toward learning of the study participants.

Data from the R-SPQ-2F was entered into Microsoft Excel by the researcher and handed over to a statistician. The R-SPQ-2F data was then analyzed by the statistician. The statistician used the term “strategy” to describe the approaches toward learning in his analysis of the data. Deep and surface approaches, along with their sub-categories, were compared over the two time points using repeated measures mixed model ANOVA. Post hoc tests were conducted using Fisher least significant difference (LSD). Significant effects were judged on a 5% ($p < 0.05$) level.

The qualitative data gathered from the perception of learning questionnaire (Addendum B) was captured in Microsoft Word to allow for in-depth qualitative analysis of the responses. The responses were analyzed by the researcher to identify common themes arising in the study participants’ responses. Bias in the analysis of the questionnaire was limited by consulting the research supervisor. The responses were entered into Microsoft Excel for graphical representation to support the qualitative description of the data in the discussion of the results. This graphical representation allows for an overall understanding of the 3rd year students’ perceptions of learning in the APT module.

Finally, the focus group interviews (Addendum D) were recorded and transcribed verbatim by an independent transcriber, in both English and Afrikaans, dependent on the respondents choice of language. Once transcribed, the researcher categorized the perceptions of the focus group interviewees. The research supervisor was consulted during the analysis process of these interviews. The process of analyzing the student responses to questions posed in the interview was guided by the Ladder of Analytical Abstraction (Carney 1990, cited by Miles and Huberman, 1994). This can be illustrated as follows:

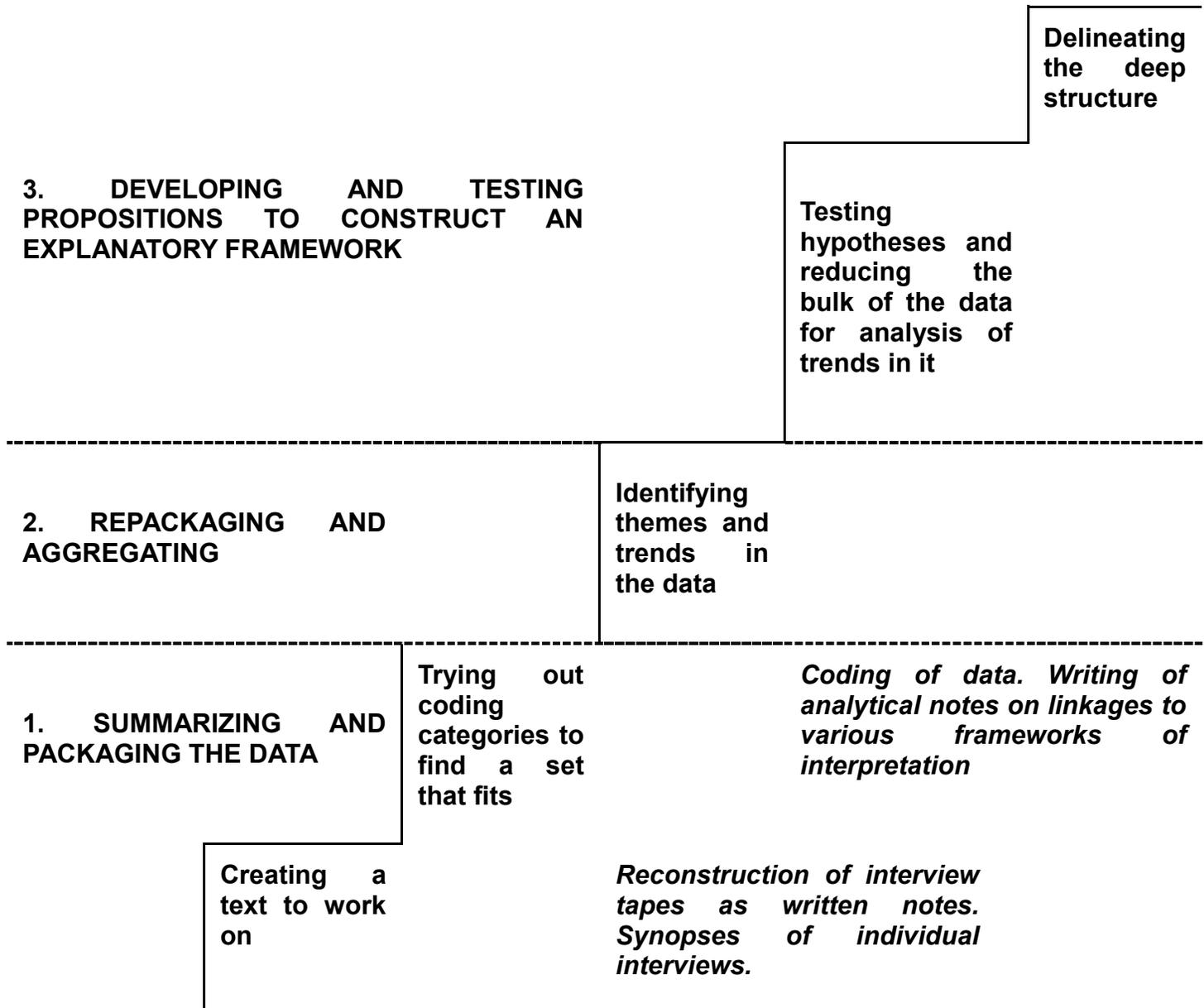


Figure 3: Ladder of Analytical Abstraction (Miles & Huberman, 1994:92)

The process was carried out specific to the current study in the following manner:

- Each interview was read to gain an understanding of the opinions expressed in response to the questions posed by the researcher.
- Various themes were extracted from the responses by the students (n=13).
- The responses were then re-read to determine any links between the 13 themes.
- A total of 5 themes were then decided upon by the researcher.

These themes were then tabulated and a narrative description of the participants' perceptions of the APT (PBL) phenomena was derived from the categorization of the responses. This analysis is by no means a strictly phenomenographical methodological approach, though it does focus on the situation created by the APT module and has attempted to map the various ways in which the module is construed (Greasley et.al., 2007).

3.6 ETHICAL CONSIDERATIONS

All students were approached by the researcher and given a broad overview of the reason for and potential impact of the study. Students were assured that their participation would in no way affect their academic outcome in the module. The students were then invited to pose questions to the researcher before signing informed consent forms in either English or Afrikaans, if preferred (Addendum C). Students were also assured that they were able to ask any questions regarding the study at any point in the data collection process and could voluntarily withdraw from the study at any point. There were no students who chose not to participate or to withdraw from the study during the time in which the investigation was conducted. The students were instructed to only use their individual participant numbers on both R-SPQ-2F questionnaires, as well as the perception questionnaire to ensure anonymity during the data collection process. The random selection of focus group interviews using the participant numbers also ensured ethical integrity in the data collection process. The focus group interviews, though conducted by the researcher, were independently transcribed and all statements identifying specific persons were omitted. None of the study activities impacted on the students' academic outcome while they were enrolled in the APT module. Their participation served only to further enhance learning for the students through dissemination of the final results to the Division of Physiotherapy.

Ethical approval for this study was given by the SU Health Research Ethics Committee with the Head

of the Division of Physiotherapy also providing approval for the research to be conducted in the Division.

3.8 SUMMARY

The respective analyses of the three data collection instruments allows for triangulation of the results. The interpretation of the results is therefore organized into three distinct sections. A conclusive discussion of the implications of the results of each of the measurement instruments data to provide a summary of the findings of the investigation is included in the representation of these results.

CHAPTER 4: RESULTS AND DISCUSSION

4.1 INTRODUCTION

Using the data instruments as described in chapter three, this study aimed to answer the following questions:

- What are the approaches toward learning of the 3rd year physiotherapy students in 2010 participating in the APT module?
- Do the students participating in the APT module experience a change in their approach toward learning after gaining more experience in the module?
- What are the experiences and needs of the 3rd year physiotherapy students with regard to optimizing their learning experience in the APT module, including what their perception of their own learning approaches are within this module?

These questions were answered by conducting an analysis, both qualitative and quantitative, of the results of the data instruments. The findings of the R-SPQ-2F instrument, the perception questionnaire, as well as the focus group interviews will be discussed here, with the aim of providing a graphical as well as descriptive explanation of the findings for clarification. Firstly, the students' approaches toward learning, followed by their perceptions of the module and finally their conceptions of learning in the APT module will be described in this chapter.

4.2 APPROACHES TOWARD LEARNING IN 3RD YEAR PHYSIOTHERAPY STUDENTS

The introductory chapters of this study gave a brief background into what approaches toward learning are and how this has been investigated in the past in PBL environments. Having been the one of the main questions of this study, this investigation sought to determine if the initial approach which students have toward learning in the APT PBL module will favour a deep approach toward learning, as is the intention of those who have planned this module. Have students in the APT module learnt to apply themselves in such a way as to become self-directed learners, that is, adopt a deep approach toward learning, as a result of this instructional approach?

To determine the effect of the APT module on the students' approach toward learning, the R-SPQ-2F was administered at the beginning and again, halfway through the academic year. The responses were scored as required by the questionnaire and yielded scores which identified those students who could be classified as having a deep or surface approach to learning. A full breakdown of these raw figures is represented by Table 5. A summary of these figures for the first administration of the R-SPQ-2F identifies students with a deep approach to learning (68.42%) and surface approach toward learning (31.58%). The second administration of the R-SPQ-2F identified students with a deep approach toward learning as 71.05% and surface approach toward learning as 26.32%. At the second administration of the questionnaire, 1 (one) student had equal scores for the total score used to identify those with a deep or surface approach toward learning, this contributes to 2.63% of the students participating in this study. Equal scores indicate that one student did not have a higher score for either the deep or surface approach toward learning categories once they had completed the questionnaire.

4.2.1 RELIABILITY OF RESULTS

A response rate of 100% (n=38) was achieved for the R-SPQ-2F for both the beginning and end of the semester administration of the questionnaire. The Cronbach alpha for the deep and surface approach were 0.85 and 0.79 respectively, indicating an acceptable reliability for this instrument's ability to measure a student's overall approach toward learning with regard to deep or surface strategies and motives (Table 6). This however was not the case for the individual sub-categories of the questionnaire, with regard to the inter-item reliability. It should be noted that this data instrument has been proven to be both reliable and valid in other studies (Biggs et.al., 2001; Leung and Chan, 2001; Kember, Biggs and Leung, 2004 and Groves, 2005) and it could therefore be seen as specific to this group of study participants. Kember et. al., (2004) also highlights the fact that the arbitrary figure, or common agreement, that reliability is acceptable if the Cronbach alpha is 0.7 or above, can be questioned when analyzing questionnaires of this nature. That is, the multidimensionality of the questionnaire has a role in the ability to perform a simple analysis of the categories and this further supports the suggestion that the reliability of the questionnaire in this instance is specific to the study environment and participants.

Table 4: Approaches toward learning at the beginning (February) and middle of the year(July)

Approach to learning	R-SPQ-2F February		R-SPQ-2F July	
	Number	Percent	Number	Percent
Surface Approach	26	68.42	27	71.05
Deep Approach	12	31.58	10	26.32
Equal scores	0	0	1	2.63

Table 5:Reliability of individual and overall categories Deep Motive inter-item reliability

Deep Motive inter-item reliability	Mean	Std. Dv.	Chronbach alpha	Std. alpha	Average inter-itemcorr
Deep Motive	14.92	3.04	0.58	0.57	0.21
Deep Strategy	13.95	3.42	0.71	0.71	0.33
Surface Motive	9.68	2.71	0.39	0.39	0.11
Surface Strategy	12.55	3.26	0.61	0.62	0.25
Deep Approach	28.87	6.05	0.85	0.85	0.75
Surface Approach	22.24	5.46	0.79	0.80	0.67

4.2.2 MOTIVES AND STRATEGIES ADOPTED BY STUDENTS OVER TIME

The motive sub-categories of the R-SPQ-2F identify students' intrinsic interest in the learning environment and materials, i.e. deep motive or conversely, a fear of failure, i.e. surface motive (Kember et.al., 2004). These motives cannot, however, be viewed on a solely independent basis as the specific structure of the R-SPQ-2F requires a concurrent analyses of the strategies employed by students along with their motives. The strategies either related to a student's tendency to have a narrow target approach to learning materials and rote learning or those who tend to approach a learning environment with a need to maximize meaning in that environment (Kember et.al., 2004). The analyses of the results showed a trend toward a deep strategy being adopted by students participating in the study over the time period during which the study was conducted. This trend was, however, not significant, with a p-value of 0.05. This p-value refers to the interaction between the deep and surface strategies over time. There was a slight increase in deep strategy and a slight decrease in surface strategy over time. The initial analyses of the results showed a very similar result for Deep and Surface strategies, with the mid-year administration of the questionnaire showing a definite shift in the strategy adopted by students toward a deep over surface strategy as represented by Figure 4. This trend was not seen in the results pertaining to the Deep versus Surface motives, with no shift seen at

either the first or second administration of the R-SPQ-2F for both deep and surface motives. Deep motive, however, measured significantly higher than surface motive, p -value < 0.1 (Figure 5). As indicated by the description of the motives and strategies, this implies that the 3rd year students in the APT module have developed a tendency to attempt to maximize meaning of the learning materials and opportunities over adopting rote learning strategies in engaging with the APT module environment and learning outcomes.

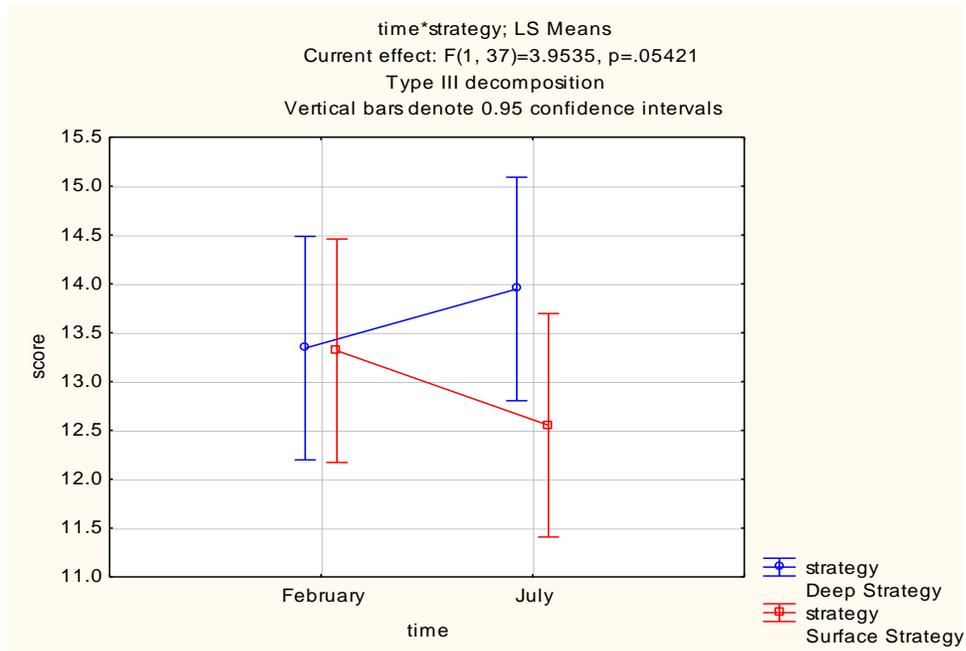


Figure 4: Deep versus Surface strategies over time

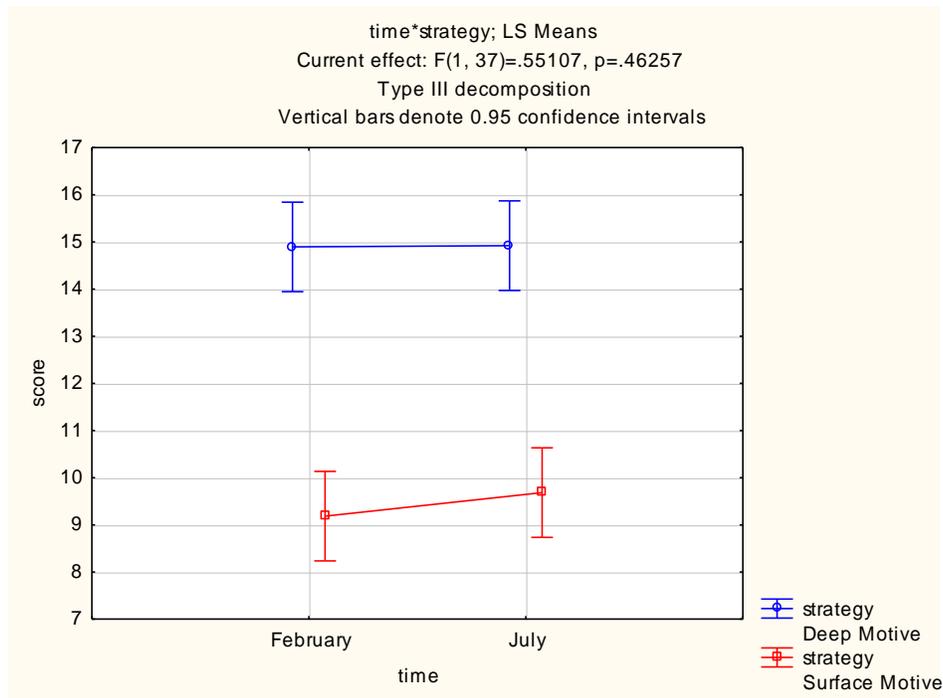


Figure 5: Deep versus Surface motive over time

4.2.3 PROFILE OF STUDY PARTICIPANTS - DEEP AND SURFACE APPROACH TOWARD LEARNING

The learning environment is likely determine a student’s approach toward learning more than the inherent traits of that student (Groves, 2005). Therefore we aim to see if PBL, as applied in the APT module, has encouraged a deep approach toward learning as is the intention behind adopting such an instructional approach. Students completed the self-reporting likert-type R-SPQ-2F in February and July of the academic year in 2010. At the first administration of the questionnaire, a mean surface approach score of 22.50 was found in comparison to a mean score of 28.24 for the deep approach toward learning. The p-value of this analysis was <0.0078 , which shows a statistically significant difference in the number of students scoring higher in favour of the deep approach toward learning. In July, these figures had changed to 22.37 and 28.55 for surface and deep approach scores respectively. The results therefore continued to indicate a tendency to classify more students as having a deep approach toward learning than a surface approach (p-value of <0.01). However, the comparison of the participants’ scores at these two time intervals reveal no significant change in overall approach toward learning by the students from the start of their PBL environment experience to mid-way through that year. Figure 6 illustrates the comparative analysis of deep versus surface approach toward learning over the time period described above, with a no shift over time (p-value: 0.75).

This confirms the findings of similar studies (Groves, 2005; Kember et.al., 2004; Dolmans, Wolfhagen and Ginns, 2010) in that students participating in PBL modules do not necessarily show a significant change in their approach toward learning, simply because that is the intention of the instructional approach. Rather, students are influenced by various factors, including the facilitators, learning outcomes, a student’s willingness to accept responsibility for their learning, and possibly even assessment (Papinczak, 2008; Scouller, 1998), or their previous learning environment (PTS).

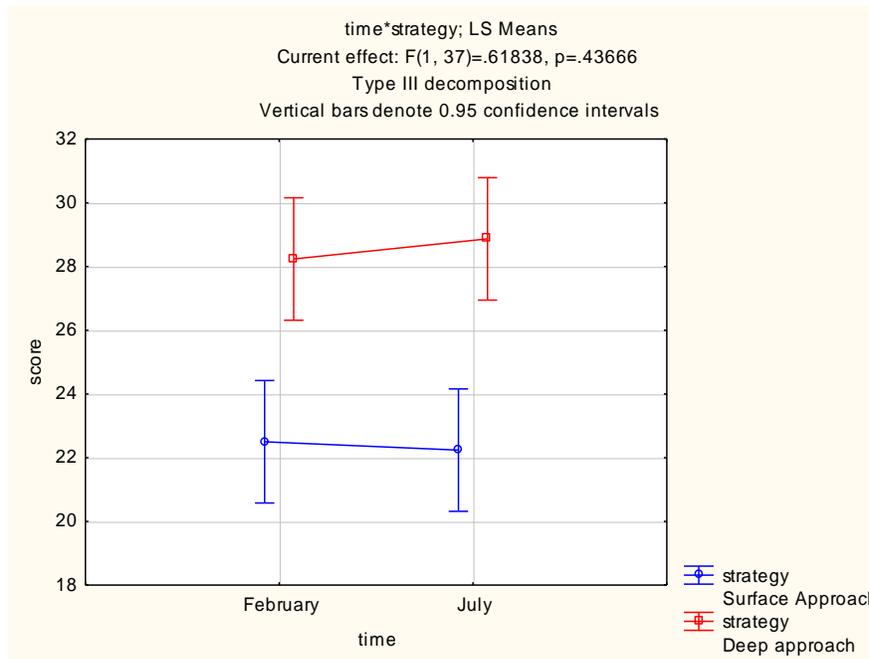


Figure 6: Deep versus Surface Approach over time

4.3 STUDENTS PERCEPTIONS OF THE APT MODULE

Determining the benefits of the APT module for student engagement in learning requires an investigation into their perceptions regarding the advantages and disadvantages of the module. A pilot study of this questionnaire was conducted in 2009. The perception questionnaire administered to the 3rd year class of 2009 yielded results which demonstrated an overall positive perception of learning in the APT module. The administration of this pilot questionnaire confirmed a hypothesis that this student population would have similar perceptions to others seen in literature regarding PBL. Physiotherapy students in previous studies have been shown to have difficulties adapting to their independence in this self-directed learning environment, while at the same time finding that their development of an identity as a physiotherapist is an advantage of the instructional approach (Dahlgren and Dahlgren, 2002). Students have also been shown to retain knowledge for a longer period of time in the PBL

method of learning as opposed to the short term acquisition of knowledge in conventional instruction (Prince and Felder, 2006). The questions regarding the perceptions of the 3rd year Physiotherapy students in the Division of Physiotherapy at SU aimed to determine if their experiences were similar to previous studies, and in so doing enable the staff within the Division to further facilitate learning.

The response rate for this questionnaire was 100% (n=38). The responses to each question answered by the students are graphically represented with a narrative description and discussion of these findings.

4.3.1 ADVANTAGES OF THE APT MODULE

Students were asked to reflect on the advantages of the PBL approach used in the APT module. The responses were varied. However, given that this was an open-ended questionnaire which the students completed independently, it was interesting to discover that the responses were often similar between study participants. The main advantages included the promotion of clinical reasoning, promoting EBP and enabling them to internalize information. The full analysis of the data provided, allowed for the graphical representation as seen in Figure 7. This figure represents the total number of responses in each category of perceptions identified in the administration of this questionnaire.

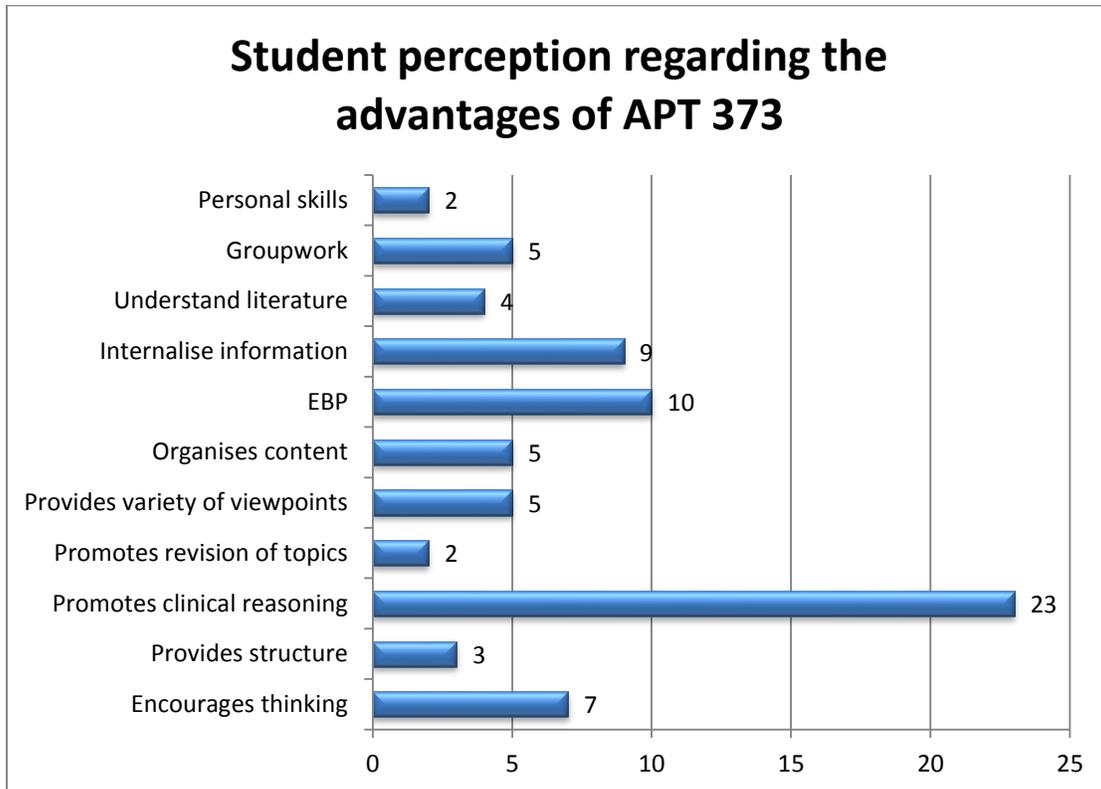


Figure 7: Students perceptions of the advantages of the PBL format used in the APT module

Twenty-three (60.5%) of the respondents felt that the APT module promotes clinical reasoning; this is in keeping with one of the outcomes of the module as well as the findings of other authors regarding the enhanced clinical reasoning displayed by students in a PBL curriculum in comparison to those in a traditional didactic environment (Groves, 2005; Vernon and Blake, 1993). The Division of Physiotherapy promotes a curriculum in which evidence based practice is key in the formulation of learning materials. Ten (26.3%) of the students felt that promoting EBP is an advantage of the module. Students felt that the module also allows them to internalize the information (23.7%) and encourages thinking (18.4%). This echoes the theoretical underpinnings of the PBL instructional approach with specific linkages been seen to the learning theory of constructivism. Constructivism incorporates the use of prior knowledge as a basis for new knowledge. An acknowledgement of these advantages by students supports the notion that students in a PBL environment recognise the importance of constructivist learning principles (Loyens, et.al., 2006). The 3rd year students responding to this questionnaire demonstrated this by stating that their ability to organize information (13.2%), both new and past, is an advantage of the format used in the APT module. However in terms of the learning material itself, only two (5.3%) of the students felt that the module promotes the revision of previously learned subject matter.

Though one of the outcomes of the module are for students to gain the ability to successfully source appropriate literature, only four (10.5%) of the students felt that this was an advantage of the APT module. With regard to the format of the PBL approach as it is employed in a classroom environment, students felt that an advantage of the approach is that it provides structure for their learning (7.9%).

The development of personal skills, specifically with regard to working in groups and preparing mentally for clinical environments was expressed as an advantage of the APT module by two (5.3 %) of the study participants. Their motivation to work well together in their groups is likely to improve their productivity as a group (Dolmans & Schmidt, 2006); this information could therefore be utilized when students are divided into their groups for each APT theory block. That is, if students are equipped with skills that ensure that each individual has the ability to constructively contribute to a group, their motivation to work in groups could be increased. This could be further investigated in future research as it is imperative for productive group functioning. Thus, it can be said that the perceptions regarding group work being an advantage of the APT module, as expressed by 5 (13.2%) of students responding to this questionnaire, can be seen as a starting off point for such research. Correlating information regarding the ability of this format to allow a variety of viewpoints to be brought into their groups through brainstorming, (13.2%), was another advantage found through this questionnaire.

It would be fool-hardy of those researching student perceptions of any learning experience to assume that the advantages of a specific learning environment as perceived by students is enough to foster change or improvements within a module (Vernon and Blake, 1993). Therefore, these responses can only be accepted as a means to further facilitate learning once an understanding is gained of the students perceptions of the disadvantages of the APT module. This allows those aiming to facilitate learning to attempt to create a balance between the perceived advantages and disadvantages.

4.3.2 DISADVANTAGES OF THE APT MODULE

The 3rd year Physiotherapy students participating in this study had similar responses to the item on the questionnaire regarding their perceived disadvantages of a PBL environment as students in other studies. The responses, illustrated in Figure 8, included the high demand on time resources needed for participation in the module and difficulties with being able to work in a small-group environment due to issues arising from dysfunctional group dynamics.

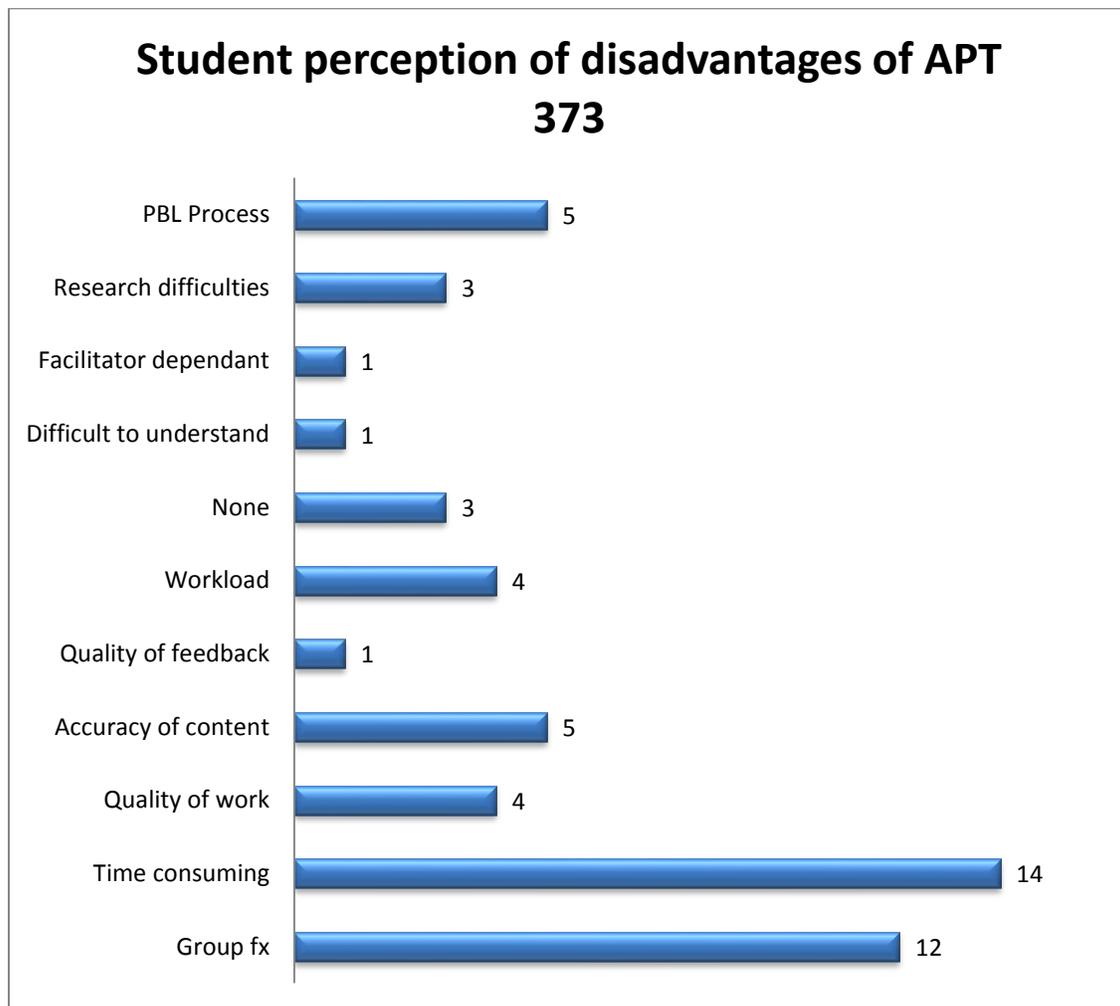


Figure 8: Students perceptions of the disadvantages of the PBL format used in the APT module

The main perceived disadvantage of the PBL format was that it is time-consuming. Fourteen (36.8%) of students participating in this study felt that the instructional approach used in the APT module is time consuming. Though not as large a percentage as other studies, it does correlate with recent PBL perception studies elsewhere in which the cost (in terms of time resources) of a PBL approach is seen as the main disadvantage of the module in comparison to the formal lecture format (Saalu, Abraham and Aina, 2010). Kirschner et.al., (2006) also report an increase in time spent on studying as being a disadvantage of the PBL approach. The perceived disadvantage of the APT module with regard to workload could be attributed in this study to the difficulties these students were having in adapting to the new instructional approach at the time of administration of the questionnaire, and is in keeping with the adaptation from didactic teaching to the self-directed, constructivist environment of PBL modules (MacKinnon, 1999). A similar percentage of the respondents (31.6%) listed poor group functioning/dynamics as the main disadvantage of the APT module. These perceptions have also been seen in various other curricula using PBL. Students in a virtual PBL course also felt that group

interactions or dynamics presents a major disadvantage of this approach (Brodie, 2009). The students also seem displeased with the quality of work which was being produced, with four (10.5%) of the respondents listing various aspects of the learning material being generated lacking definite quality. In contrast to this, only one (2.6%) of the respondents listed the quality of the feedback given by fellow students as being a disadvantage of the approach. Regardless of these findings, students have been shown to choose to select their own learning material as opposed to faculty-determined material. (Hmelo-Silver, 2004). There were five (13.2%) of students who felt that the content accuracy is a disadvantage in this module in this study population. Kirschner et.al., (2006) support this finding by stating that medical students in a PBL curriculum provide less coherent explanations and also produce work with more errors. Dahlgren and Dahlgren (2002) also highlight the fact that the autonomy regarding the responsibility of formulating their own learning tasks from self-selected literature relating to the case is often a dilemma for students in a PBL module (Dahlgren & Dahlgren, 2002).

The structure of the module, that is timetable and classroom application of PBL, was reported to be a disadvantage of the APT module by 5 (13.2%) of the students. Various other responses were listed regarding the perceived disadvantages of the APT module. These included difficulty understanding the work (2.6%), difficulties with conducting research (7.9%), and that there is a disproportionately high workload in this module in comparison to others (10.5%). Students perceived the outcome of the cases as being facilitator dependent (2.6%). Facilitators need to be seen as supportive rather than controlling (Bosse, Huwendiek, Skelin, Kirschfink and Nikendei, 2010). This balance has been perceived by students as playing a role in their ability to understand and effectively learn in the APT PBL cases. Students' approach toward learning is also attributed to having partly been determined by facilitators who have an approach to learner-centered educational environments (Kek, Yih and Huijser, 2009). It should be noted that each case is facilitated by a different staff member, none of which have had specific training in facilitation skills in a PBL environment. However, the decision to adopt this instructional approach was in part made in accordance with the SU policy on teaching and learning which subscribes to a student-centered approach. The perception regarding workload and difficulties understanding and conducting research related to the cases is similar to that of the 3rd year class of 2009.

Once the students had reflected on what they felt were the advantages and disadvantages of the module, they were invited to reflect on whether or not they have found that they have a preference for the PBL instructional approach as opposed to the formal lecture approach used in PTS in their first and second year. This provided the researcher with a final overview of their perception of the module

in the context of the entire curriculum as the students had experienced it thus far after analyzing the advantage and disadvantage responses.

4.3.3 PERCEPTIONS OF THE EFFECTIVENESS OF PBL VERSUS DIDACTIC LECTURES IN A 3RD YEAR PHYSIOTHERAPY CLASS.

The students in the 3rd year Physiotherapy class were requested to respond to whether or not they felt that they learnt better in a PBL module such as APT or in a formal lecture format module such as PTS. This was done to determine if the students currently registered for this module displayed any preference for instructional style with regard to which one optimizes learning, as they had only recently started learning in this new style and could possibly struggle with adapting to the new method of learning (Choi, et.al., 2009). Also, their relatively recent experience in the PTS module allowed the students to easily reflect on and compare the two instructional approaches. These findings are illustrated in Figure 9.

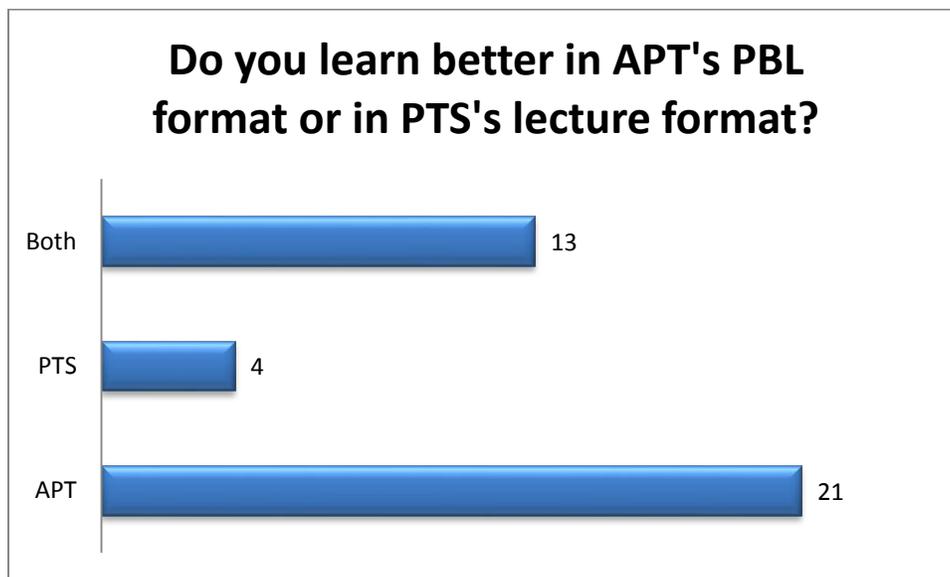


Figure 9: Students preference for PBL instructional approach vs. formal lecture format

Twenty-one (55.3%) of the respondents felt that they learn better in the PBL format with four students (10.5%) stating that they specifically learn better in a formal lecture environment. The remaining thirteen students (34.2%) felt that they learnt equally well in both formats as each provided a different set and type of learning materials and required different skills in order to engage with the work in the respective modules.

Within the body of literature regarding PBL, this is a common finding. Wood (2008) discusses the outcomes of PBL within education based on literature and systematic reviews, and finds that PBL has positive effects on graduate competencies in both social and cognitive domains. PBL has also been found to have a positive effect on changes in learning styles of students (Novak, Shah, Wilson, Lawson and Salzman, 2006) and learning outcomes (Sahin and Yorek, 2009). The implied preference by students to a mixed method instructional approach is also supported by literature (Duke, et.al., 1998). These findings, now shown to be supported by literature, could only benefit from further confirmation of the students' perceptions of learning in the module. Confirmation of these results could benefit the Physiotherapy Division staff by providing them with a hierarchical description of the students conceptions of learning in the module, that is, how do students conceive this module to have an effect on their learning? Are there specific conceptions of the APT module that could enable staff to facilitate learning, and can these be identified in more detail than with a simple perception questionnaire?

4.4 STUDENTS CONCEPTIONS OF THE APT MODULE

The results of the perception questionnaire outlined and discussed above, though interesting and enlightening for future curriculum planning, cannot be taken purely at face value. In order to further validate opinions expressed by the students, semi-structured focus group interviews sought to determine the students' perceptions and conceptions of learning in the APT module. Only female (n=6) students accepted the invitation to attend the focus group interview. Their average age was 21.25 years. Two interview sessions, with three students in each session, were recorded and transcribed verbatim. The goal was to understand the underlying reasons for the perceptions regarding the advantages, disadvantages and preference for instructional approach as expressed in the previous section of this chapter. An understanding of the student conceptions of engaging with the APT module is necessary for understanding the process and outcomes of this PBL-based learning environment (Ellis et.al., 2008).

The two focus group interviews were transcribed and analyzed to determine common themes within the responses. All names were excluded from the transcription to ensure anonymity of participants. There were ultimately five categories into which the responses could be organized. These categories were:

Table 6: Student conceptions of PBL as presented in the APT 373 module

Conceptions of PBL - APT 373
Effect of APT on approach toward learning
How learning occurs in APT
Effect of APT on skills
Positive aspects of APT for learning
Negative aspects of APT for learning

The effect of the APT module on approach toward learning specifically deals with the students' responses relating to a deep or surface approach toward learning. This entails situations in which the students are reportedly learning either in a manner in which they are able to gain a deeper understanding of the learning material by relating it to previous knowledge and personal experiences or to learn by simply identifying important facts and memorizing them, regardless of structure or principles embedded in the cases (Newble and Entwistle, 1986). Whereas the second category identifies specific studying or learning methods used as described by students in order to learn or apply the knowledge presented in APT.

The last three categories deal with the conceptions of students regarding how the APT module has influenced their personal and professional (clinical) lives. It begins to identify their barriers to and advantages for learning. That is, the negative and positive effects of this module on the other aspects of their studies, such as social and clinical interaction.

The illustration of the categories are therefore presented with illuminating comments by students used in order to gain a deeper understanding of how the categories have been determined and illustrates how these comments have been an integral part in the determination of these categories. Students within the Division of Physiotherapy are bilingual. As such, some of the responses are in Afrikaans and are presented here verbatim.

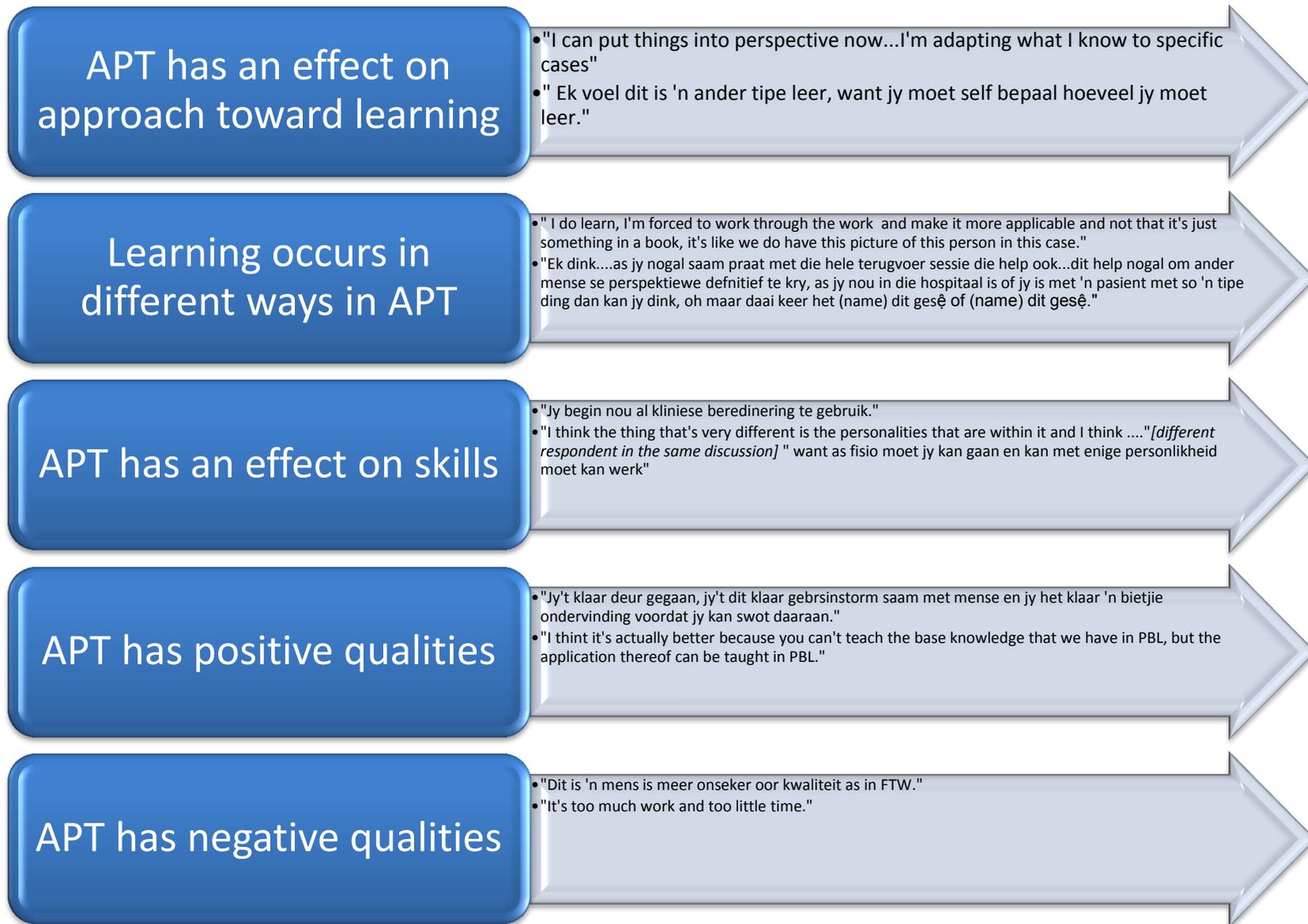


Figure 10: Conceptions of PBL in APT 373

The implication of this categorization of the conceptions of PBL is that in the APT module, Physiotherapy students can expect to develop a deeper understanding of their previous knowledge and its application in clinical practice through modules such as APT. The necessary adaptation to the workload, time constraints and levels of confidence in researching skills can be made and with time, the transition to an alternative learning environment are likely to be accepted and understood through a concerted effort by staff in facilitating a smooth transition process to this module.

These conceptions of the module as illustrated in Figure 10 further confirm the perceptions expressed by the entire class as discussed previously. The conceptions specifically concur with research conducted in other medical fields investigating conceptions of PBL (Ellis et.al. 2007; Saalu et.al. 2010). Students in other programs have been found to conceive learning in PBL environments as being a means to understand clinical problems and build skills which are transferrable to other areas in their lives and careers (Ellis et.al., 2008). This is in keeping with the findings of the present study in which students discussed the “database for clinical” which APT has given them and “being able to work with all types of personalities.”

Students’ conceptions regarding the negative qualities of the APT module are centered around four main characteristics: the concerns that group dynamics impact on learning; the workload is comparatively higher than other modules; the quality of the learning material is not always guaranteed and the module is extremely time consuming. While these conceptions are valid, they are not completely new to students who participate in PBL learning environments. Reviews on the PBL approach have found numerous indications that these particular conceptions of students in a PBL module in comparison to those in a traditional didactic lecture module are a common denominator across varying disciplines (Prince and Felder, 2006; MacKinnon, 1999; Kirschner et.al., 2006; Loyens et.al., 2008; Lewis, et.al., 2009; and Saalu et.al., 2010).

An understanding of the third year physiotherapy students’ conceptions and perceptions of learning in the APT module has been gained by the data collection as described above. These findings concur with literature and will provide a basis for discussion within the Division in planning further curriculum development. The discussion would include the question regarding whether or not the Division has achieved what it set out to do by selecting a PBL instructional approach, and that is in part to develop self-directed learners who adopt a deep approach toward their learning.

4.5 SUMMARY OF RESULTS

4.5.1 APPROACHES TO LEARNING IN THE APT MODULE

The assumption that an instructional approach used in a module which incorporates and is built on the foundations of Self-Directed Learning Theories, Constructivism and Androgogy, will automatically motivate students to adopt a deep, self-directed approach toward learning is one that should not be made (Duke et.al., 1998). While this assumption was not necessarily made by this study, it was, however, the intention of the study to investigate the approaches toward learning of the 3rd year students at a relatively early stage in their transition to a learning environment which forced them to take a greater responsibility for their own learning than was previously expected of them. This investigation would then allow academic staff to use the information for facilitation of learning.

There were a statistically significant higher number of those participating in the APT module that were classified as having a deep approach toward learning than those classified as having a surface approach at both the beginning and middle of the academic year. Though there was a slight increase in those classified as having a deep approach toward learning in the middle of the year and a slight decrease in those classified as having a surface approach toward learning, this change was not significant. Surface and deep motives, subcategories to the surface and deep approach, were not similar at the first data collection date, though there was a slight increase in surface motives at the second data collection date, and an even smaller increase in deep motives at that point in the academic year. These subcategories were statistically insignificant in their changes from February to July. The surface and deep strategies employed by students in February were scored as being very similar. There was, however, a trend toward employing deep strategies in July.

These findings indicate that students responded to the learning environment by starting to shift their focus from having a narrow target approach, or focusing on lists of facts, to attempting to maximize meaning of their experiences and learning in the module (Kember et.al., 2004). The inclination toward their motive being driven by a fear of failure as opposed to an intrinsic interest in the learning material at the middle of the year, is cause for concern. This raises questions regarding the facilitation and assessment methods used, as these may be linked to this change. There was, however, a greater

number of students adopting a deep approach toward learning at the beginning of the module, and this should encourage staff to ensure that these students are maintaining their approach throughout the module, and if possible, increase their inclination to this approach. Those students who were adopting a surface approach toward learning at the beginning of the module should be encouraged to see the need for more self-directed learning in this type of environment. It is, however, necessary to remember that students often change their approach toward learning depending on the environment in which they find themselves, and can therefore easily change from deep to surface or surface to deep approach depending on the assessment, learning outcomes or facilitator, among others (Kember et.al., 2004; Groves, 2005; Greasley et.al., 2007; Dolmans et.al. 2010).

4.5.2 PERCEPTIONS OF LEARNING IN THE APT MODULE

Students enrolled in the APT module are embarking on an experience of self-directed learning which requires a level of constructivism in their learning environment such as they have not yet experienced in their Physiotherapy studies. These students are struggling with the adaptation from having a structured, didactic learning environment to having a relatively free, social learning context in which to engage with learning material (Dahlgren, et.al., 2002; Choi et.al., 2009). This adaptation gives rise to individual, and often, collective frustration with perceived disadvantages and, conversely, satisfaction with perceived advantages. These allow students to understand their own preferences for the type of learning environment as it highlights their own position within the experiential cycle of learning. Their transition between concrete experience, reflective observation, abstract conceptualization and active experimentation (Ernstzen, et.al., 2006) enables the students to engage with the learning environment on all levels and influences their perception of that environment.

The 3rd year students at the Physiotherapy Division of SU find that the APT module enhances clinical reasoning, promotes evidence based practice and allows them to internalize information while encouraging thinking. These perceptions concur with those of students in other studies performed internationally (Vernon and Blake, 1993; Groves, 2005) and is aligned with the theoretical foundations of PBL (Loyens, et.al., 2006). The main disadvantages of the APT module, as perceived by this study cohort, and with regard to the time resources required for participation in the module, correlates with the perceptions amongst other students involved in PBL learning environments (Kirschner et.al. 2006; Saalu et.al., 2010). They struggled with the quality of the learning material and, at times, dysfunctional group dynamics, as do students in other PBL environments (Brodie, 2009). Regardless of these

disadvantages, the majority of the study cohort still perceive the PBL environment as being more conducive to learning than the traditional didactic lecture format. The foundational theory taught in the latter instructional environment is, however, still perceived as important for many of these students, as they feel that the requirement of a different type of engagement with learning material cannot be ignored, and therefore could not categorically say that either PBL or didactic lecture environments were superior or inferior to the other.

4.5.3 CONCEPTIONS OF LEARNING IN THE APT MODULE

Students' conceptions of learning develop over time (Duke et.al., 1998) and are therefore likely to change as their engagement with the PBL environment develops and progresses through the year that they are enrolled in the APT 373 module. The results of this study show that students' conception of the APT module is that it has an effect on their approach toward learning; it promotes learning in different ways and encourages the development of both personal and clinical skills. Their conception of learning is also affected by the negative and positive qualities of the APT module. Studies regarding PBL and conceptions of learning have highlighted similar categories as have been identified by this study (MacKinnon, 1999; Prince and Felder, 2006; Kirschner et.al., 2006; Ellis et.al., 2007; Loyens et.al. 2008; Lewis, et.al., 2009; and Saalu et.al., 2010). The findings also confirmed the perception questionnaire results and further strengthen the motivation for module refinement. These perceptions and conceptions of learning by the students should stimulate discussions on possible changes to the module in the Physiotherapy Division, as the Division aims to uphold the student-centred learning as outlined by the Stellenbosch University Policy on Teaching and Learning.

Using the results optimally for the facilitation of student learning will require the academic staff in the Division of Physiotherapy to make certain changes to the curriculum. This includes, *inter alia*, changes to the planning and structure of the module. It will also be necessary to conduct further research to ensure that these results are not specific to this particular cohort of students, but rather, transferrable to other groups of students in PBL environments.

The discussion of these recommendations will be provided in the following chapter. This will synthesize the findings of this study in a way that allows for further curriculum refinement and potential starting points for discussions into strategies for facilitating learning in a PBL environment.

CHAPTER 5: CONCLUSION

5.1 INTRODUCTION

Within the profession of Physiotherapy, PBL remains a viable curricular option which needs to be further studied and debated (Solomon, 2005). The Physiotherapy Division of SU decided on this approach for the APT module in 2007 as one which would help to develop the skills needed by students to be competent when working in the community such as clinical reasoning and evidence based practice (Statham, 2008). The need to evaluate the module on various levels remains pertinent to the continued refinement of the module. This is in keeping with the findings of the premise on which the majority of research into learning approaches of students is based, which is that on varying levels, the concept of studying approaches to learning can guide the assessment and teaching styles in a direction to encourage students to adopt more effective approaches (Greasley et.al., 2007).

With this in mind, this chapter aims to summarize the findings and identify limitations of this study. Recommendations for further research, curriculum development and overall strategies to facilitate student learning in the Physiotherapy Division at Stellenbosch University will also be made.

5.2 SUMMARY OF FINDINGS

The implementation of a hybrid-PBL module in the Physiotherapy curriculum at Stellenbosch University was embarked upon for various reasons. One of those reasons was to create a learning environment in which students would be encouraged to learn in a constructivist way in order to enhance their clinical reasoning and, subsequently, apply their theoretical knowledge to the clinical setting. The 3rd year students enter a learning environment which requires them to actively engage in the production of learning material after having been involved in one where manuals containing notes and lecturers providing structured guidance has been the norm for them. They are asked to make a shift from learning a list of facts and practicing specific skills without applying them to pathology in the Physiotherapy Science module, to searching for a deeper meaning in those facts in order for them to apply the knowledge they have to patients, in learning material used in cases as well as in clinical settings. These requirements, along with the theoretical underpinnings of PBL, have raised the

question of whether or not the students are indeed making these changes to their approach toward learning in this new environment. Furthermore, if they are not making these changes, what are the underlying reasons for this, and if they are, is it attributable to the module?

This study has shown that there is a significant difference in terms of the number of students who present with a deeper approach toward learning, compared to those with a more surface approach toward learning. Although there is an inclination toward having a deep approach toward learning as they progressed through the module, the results have not shown a significant change. It has also been shown that approaches toward learning are not necessarily a static phenomenon; rather, it varies as the learner is faced with different situations and expectations in a module. The students participating in this study have highlighted many advantages of learning in this PBL module which should be maintained and improved upon. Namely, promoting clinical reasoning and evidence based practice. The disadvantages of learning in the APT module are similar to those perceived by students in other PBL curricula, such as dysfunctional group dynamics and time resources required for learning. They are, however, areas which need to be addressed, and, if possible, eliminated in the Physiotherapy programme. A majority of the students enrolled in the APT module have a preference for learning in the PBL environment over a didactic lecture room setting.

5.3 LIMITATIONS

Data collection was limited. Ideally, a more holistic picture of the findings would have been achieved by administering all data instruments at the end of the year. Added to this, a sample size calculation done prior to inception of this study could have eliminated issues regarding participant selection such as was seen in the focus group selection. Another limitation with regard to the focus group interviews was the limited number of interviewees. This could have an effect on the phenomenographical interpretation of the results, as a larger sample of the 3rd year class would have further strengthened the analysis of the data by providing a more holistic picture of the conceptions of learning in this population. Potential bias imposed on the process of the interviews should be noted. Students who accepted the invitation to attend the focus group interviews may have been biased toward either the module or the researcher. This bias could have been avoided by utilizing an independent interviewer. Student availability during the data collection period for the questionnaires also proved to be a limitation, as half of the class was working in the clinical setting, while the other half was on campus participating in a specific APT block. This meant that the perception questionnaire could not be

completed by all participants at the same time, and could thus influence the perception regarding student learning in the module. Furthermore, it was impossible to employ another focus group due to the timetable restrictions.

The study can also be considered reliable as it has already been shown to have similar results in a student population completing the same module in 2009 as part of a pilot study referred to earlier. Discussion of the results of the perception and conception data in Chapter 4 illustrate the correlation between the findings of the student population in the Division of Physiotherapy and other student populations in similar hybrid-PBL systems (Dahlgren and Dahlgren, 2002), and further strengthen the argument for reliability.

The administration of the R-SPQ-2F was not carried out in the pilot group. However, the two instances in which they were administered in this study group have resulted in similar raw data results at different points in the academic year. The validity of the study is shown in the findings providing the researcher with answers to the questions posed in the aim of the study. The data instruments used have determined the approaches toward learning as well as the perceptions and conceptions of learning in the APT module by 3rd year Physiotherapy students.

The triangulation of data further solidifies this study and thus supports this statement of validity (See 3.4). This study has value in that it provides guidelines for future investigative studies looking at the impact of this instructional approach on the students as well as the Physiotherapy curriculum. The transparency of the methodology used will be valuable in the design of future studies in which the entire new curriculum of the Division may be studied with specific emphasis on its impact on learning.

5.3 RECOMMENDATIONS

Students are not demonstrating a significant shift from a surface approach to a deep approach. This knowledge, along with the perceptions of both the advantages and disadvantages of the module, can be used for making recommendations for further research or changes. These recommendations aim to facilitate learning in the APT module. Recommendations are separated into two categories, one being specific to the APT module and the other for further research.

5.3.1 RECOMMENDATIONS FOR THE APT MODULE

To ensure that students continue to internalize information they come into contact with through the PBL sessions, in-depth discussion during feedback sessions should be encouraged and facilitated by the staff member involved with the case (Entwistle and Peterson, 2004). A possible reflection process after each case, supported by time built into the timetable for this reflection, could ensure that students are not losing out on valuable information. In some instances students leave feedback sessions without a clear understanding of the importance of all the learning material. Multi-media tools are a viable option for the Division to ensure that feedback and reflection are optimized (Hoffman and Ritchie, 1997). Therefore, a recommendation for improving the feedback sessions is to change the format. Students could be required to combine their research of the theoretical background for each case into an electronic presentation. The remaining students who are responsible for sourcing literature and learning material relating to evaluation and treatment of the patient presented in the case, could practically demonstrate their findings to the class, or via a video clip. This does not eliminate the need for a written description of the learning material. In fact, it could only enhance the electronic presentations. Students could therefore use the written material when preparing for assessments, and if loaded onto the LMS, WebCT, the electronic material would serve as a reminder of what was done in the case.

This study highlighted the fact that students perceived the quality of learning material as a disadvantage within the APT module. The issue of quality of learning material could be attributed to the fact that students do not receive standardized feedback on their contribution to the case materials from each facilitator. It is also possible that this perceived disadvantage is peculiar to Physiotherapy PBL curricula (Dahlgren and Dahlgren, 2002) and as such should not be a cause for too much concern. However, a recommendation from this study is to address the concerns of the students by providing more structured feedback. A standardized feedback system is recommended to ensure that all students are receiving the same feedback from case facilitators. Facilitators could use *Turnitin*, provided by the University LMS, to give constructive feedback in the form of formative assessment (Kadri, Moamary and van der Vleuten, 2009).

The different facilitation techniques employed by the staff members involved in the facilitation of the cases, is perceived as a disadvantage. The recommended means of addressing this issue is to

embark on a series of facilitator training sessions or workshops to ensure uniformity in facilitation techniques and feedback practices of Physiotherapy staff members (Bosse, et.al., 2010).

On the issue of training, it could be beneficial to the facilitation of learning for students to receive a more comprehensive series of workshops on group work and conducting research. This could be started in the final academic semester of the second year in preparation for the PBL workshops at the beginning of the third year. Students could then start exploring different approaches toward learning at an earlier stage in the curriculum on a more informal level. They would then explore this integration and emphasis can be placed on how the PBL instructional approach will enable them to facilitate the application of knowledge. Focus group discussions, as already conducted by the APT module coordinator, could provide students with an environment in which they would be able to discuss issues relating to group dynamics as they arise during the academic year, and this practice should therefore be continued.

5.3.2 RECOMMENDATIONS FOR FURTHER RESEARCH

The possibility of having time allocated for reflection and more in-depth discussions in the timetable, preparatory workshops and formative feedback, will require investigation into their effectiveness in facilitating learning.

The final recommendation of this study is therefore that further research be conducted on this topic over a longer period of time, to ensure the transferability of the results to other student cohorts and to strengthen the outcome of this research. Studies should make use of a sample size calculation to determine the number of students in the Physiotherapy curriculum to be included in the study. This can ensure that future studies are more representative of the Physiotherapy student body. Rigour in the research process will also be ensured by using impartial researchers for data collection in the form of interviews. Future research could include using the PBL-R-SPQ, which is a modified version of the questionnaire used in this study specifically for PBL environments (Dolmans et.al. 2010). A longitudinal study such as this will provide the Physiotherapy Division with a better understanding of the effect of the module on students' approach toward learning. Understanding why and how students can have an inclination toward a deep approach toward learning and yet not significantly change their approach from surface to deep, would then be clarified. This will be useful for module refinement and

curriculum planning in the long term. A recently published study highlights the importance of aligning assessment, learning outcomes, and teaching and learning activities to positively influence approaches toward learning in a PBL environment (Dolmans et.al. 2010). The program itself should cater to the needs of the students in a specific learning environment, that is, in that profession and its educational arena. To ensure this alignment, it is important to identify and address the perceptions and conceptions of the learning environment from the students' perspective to enable academic staff to allow for enough flexibility in their own conception of what PBL is, so that the program is tailor-made for their environment. Thus, an addition to the current study, for future research, could be to investigate the assessment outcomes with the approaches, conceptions and perceptions of students in the APT module in order to identify any correlation between these factors and academic achievement. The results of which, over an extended period of time, would ensure further curriculum refinement and facilitation of learning (Groves, 2005)

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ADDENDA

Addendum A

Participant no.

Revised Study Process Questionnaire (R-SPQ-2F)

This questionnaire has a number of questions about your attitudes towards your studies and your usual way of studying.

There is no *right* way of studying. It depends on what suits your own style and the course you are studying. It is accordingly important that you answer each question as honestly as you can. If you think your answer to a question would depend on the subject being studied, give the answer that would apply to the subject(s) most important to you.

Please fill in the appropriate circle alongside the question number on the "General Purpose Survey/Answer Sheet". The letters alongside each number stand for the following response.

A – this item is *never* or *only rarely* true of me

B – this item is *sometimes* true of me

C – this item is true of me about *half the time*

D – this item is *frequently* true of me

E – this item is *always* or *almost always* true of me

Please choose the *one* most appropriate response to each question. Fill the oval on the Answer Sheet that best fits your immediate reaction. Do not spend a long time on each item: your first reaction is probably the best one. Please answer each item.

Do not worry about projecting a good image. Your answers are CONFIDENTIAL.

Thank you for your cooperation.

1. I find that at times studying gives me a feeling of deep personal satisfaction.
2. I find that I have to do enough work on a topic so that I can form my own conclusions before I am satisfied.
3. My aim is to pass the course while doing as little work as possible.
4. I only study seriously what's given out in class or in the course outlines.
5. I feel that virtually any topic can be highly interesting once I get into it.

6. I find most new topics interesting and often spend extra time trying to obtain more information about them.
7. I do not find my course very interesting so I keep my work to the minimum.
8. I learn some things by rote, going over and over them until I know them by heart even if I do not understand them.
9. I find that studying academic topics can at times be as exciting as a good novel or movie.
10. I test myself on important topics until I understand them completely.
11. I find I can get by in most assessments by memorizing key sections rather than trying to understand them.
12. I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.
13. I work hard at my studies because I find the material interesting.
14. I spend a lot of my free time finding out more about interesting topics which have been discussed in different classes.
15. I find it is not helpful to study topics in depth. It confuses and wastes time, when all you need is a passing acquaintance with topics.
16. I believe that lecturers shouldn't expect students to spend significant amounts of time studying material everyone knows won't be examined.
17. I come to most classes with questions in mind that I want answering.
18. I make a point of looking at most of the suggested readings that go with the lectures.
19. I see no point in learning material which is not likely to be in the examination.
20. I find the best way to pass examinations is to try to remember answers to likely questions.

Scoring code for R-SPQ-2F

To score: add the ratings on each item to obtain:

Deep Motive	1	5	9	13	17
Deep Strategy	2	6	10	14	18
Deep Approach	Sum of Deep Motive and Deep Strategy				
Surface Motive	3	7	11	15	19
Surface Strategy	4	8	12	16	20
Surface Approach	Sum of Surface Motive and Surface Strategy				

INFORMED CONSENT FORM

Research Project Title: Investigation into the learning approach of 3rd year Physiotherapy students in a Problem-Based Learning module

Principal Investigator: Mrs. Lianne Keiller

University of Stellenbosch: Division of Physiotherapy, Department of Interdisciplinary Health Sciences

1. Introduction

You are being asked to take part voluntarily in the research project described below. Please take your time making a decision and feel free to discuss it with your friends and family. Before agreeing to take part in this research study, it is important that you read the consent form that describes the study. Please ask the study researcher to explain any words or information that you do not clearly understand.

2. Why is this study being done?

You have been asked to take part in a research study of the learning approaches of 3rd year students in the Physiotherapy Division in 2010. This research aims to determine the relationship between these learning approaches, perceptions of learning and the Problem-Based Learning approach for the purposes of facilitating the learning of students participating in the Applied Physiotherapy module.

This study is being conducted in part as a research assignment for a MPhil in Health Science Education degree with the intention to have the results published in an accredited medical/allied health/educational journal.

Approximately, 40 subjects, will be enrolling in this study at the University of Stellenbosch.

You are being asked to be in the study because you are currently registered for and are participating in the Applied Physiotherapy module.

If you decide to enroll in this study, your involvement will be required over a period of about six (6) weeks.

3. What is involved in the study?

If you agree to take part in this study, the researcher will:

- Provide you with, and ask you to complete two questionnaires.
- Your name will be required on the questionnaire initially, but all personal information will be omitted from the data capturing sheet at the time of data capturing. The reason for this is that your gender and participant number needs to be recorded for statistical purposes and by providing your name on both questionnaires, this information can be used to correlate with the participant number on this consent form.
- The questionnaires will be administered at a time when all 3rd year Physiotherapy students are available as per your class timetable.
- A random selection of 8 participants will be asked to participate in a focus group interview to further elaborate on your perception of learning in APT. Should your participant number be selected, you will be required to participate honestly in a discussion based on one of the questionnaires regarding perception of learning in APT.
- The focus group interview will be recorded and transcribed by an independent transcriber for further data analysis.
- Who will have access to the recordings? – The researcher and the transcriber
- Where the recordings will be stored? – These will be stored digitally on the in the researchers archives
- What will happen to the recordings after the project has terminated? – They will be stored for a period of 2 years.
- How will the recordings be used in data analysis? – The common themes and differences will be categorized according to perceptions of learning of the focus group participants and possibly compared with the results of the perception questionnaire for statistical purposes.

4. What are the risks and discomforts of the study?

There are no known risks associated with this research. Your results or outcome in assessment opportunities in this module will in no way be affected by your participation in this research study.

6. Are there benefits to taking part in this study?

This research may help us to understand how we can further develop the APT module to optimize the learning of students participating in this module.

7. What other options are there?

You have the option not to take part in this study. There will be no penalties involved if you choose not to take part in this study.

8. Who is paying for this study?

Internal Funding:

Funding for this study is provided by the principal researcher.

External funding:

The Fund for innovation and research into teaching and learning will be approached for further funding at a later date.

9. What are my costs?

There are no direct costs.

10. Will I be paid to participate in this study?

You will not be paid for taking part in this research study.

11. What if I want to withdraw, or am asked to withdraw from this study?

Taking part in this study is voluntary. You have the right to choose not to take part in this study. If you do not take part in the study, there will be no penalty.

If you choose to take part, you have the right to stop at any time. However, we encourage you to talk to the researcher so that she knows why you are leaving the study. If there are any new findings during the study that may affect whether you want to continue to take part, you will be told about them.

The researcher may decide to stop your participation without your permission, if she thinks that being in the study may cause you harm.

12. Who do I call if I have questions or problems?

You may ask any questions you have now. If you have questions later, you may call

Mrs. Lianne Keiller

(021) 938-9502

lkeiller@sun.ac.za

If you have questions or concerns about your participation as a research subject, please contact the University of Stellenbosch Health Research Ethics Committee 2

Mertrude Davids at 021 938 9207 or mertrude@sun.ac.za

13. What about confidentiality?

Your part in this study is confidential. None of the final data analysis will identify you by name. All records containing your name will be erased from the documentation prior to the researcher sharing the data with the statistician, study supervisor, and or any other interested parties within the University. All records will be stored in the researchers' archives for a period of 2 years, during which time no other person will have access to this information without the express consent of the researcher. Should this consent be given to another person for the purposes of research, anonymity of all participants will be maintained.

15. Authorization Statement

I have read each page of this paper about the study (or it was read to me). I know that being in this study is voluntary and I choose to be in this study. I know I can stop being in this study without penalty. I will get a copy of this consent form now and can get information on results of the study later if I wish.

Participant Name: _____ Date: _____

Participant Signature: _____ Time: _____

Gender: Male Female

Consent form explained/witnessed by

Signature _____

Printed name: _____

Date: _____ Time: _____

All research conducted for this project are in accordance with the guidelines set out by the Declaration of Helsinki and the MRC for ethical guidelines in medical research

INGELIGTE TOESTEMMINGSVORM

Navorsings Projek Titel: Ondersoek na die leer-benadering van die 3de jaar Fisioterapie studente in 'n Probleem-Gebaseerde Leer Module

Hoofnavorser: Mev. Lianne Keiller

Universiteit van Stellenbosch: Afdeling Fisioterapie, Departement Interdissiplinêre Gesondheidswetenskappe

1. Inleiding

Jy is gevra om vrywillig deel te neem aan die navorsing wat hieronder beskryf word. Neem die tyd om 'n besluit te maak en voel vry om dit met jou vriende en familie te bespreek. Voordat jy die toestemmingsvorm invul, is dit belangrik dat jy die vorm wat die studie beskryf, lees. Vra asseblief die studie navorser om enige woorde of inligting wat jy nie duidelik verstaan nie te verduidelik.

2. Hoekom word hierdie studie gedoen?

Jy is gevra om deel te neem in 'n navorsingstudie van die leer-benaderings van die 3de jaar studente in die Fisioterapie-afdeling in 2010. Die doel van hierdie navorsing is om die verhouding tussen hierdie leer-benaderings, persepsies van leer en die Probleem-Gebaseerde Leer benadering vir die doeleindes van die fasilitering van die leer van studente wat deelneem aan die Toegepaste Fisioterapie module vas te stel.

Hierdie studie word uitgevoer as 'n navorsingsopdrag vir' n MPhil in Gesondheidswetenskappe Onderrig graad met die voorneme om die uitslae bekend gemaak in 'n geakkrediteerde mediese / gesondheid geallieerde / opvoedkundige tydskrif.

Ongeveer, 40 deelnemers sal aanteken in hierdie studie aan die Universiteit van Stellenbosch.

Jy is gevra om in die studie deel te neem, omdat jy tans geregistreer is vir en deelneem aan die Toegepaste Fisioterapie module.

As jy besluit om in te skryf in hierdie studie, sal jou betrokkenheid oor 'n tydperk van ongeveer ses (6) weke vereis word.

3. Wat is betrokke by die studie?

As jy jou toestemming gee om deel te neem aan hierdie studie, sal die navorser:

- Jou verskaf met, en vra dat jy twee vraelyste invul.
- Jou naam aanvanklik op die vraelys benodig, maar alle persoonlike inligting sal van die datavaslegging plaas op die oomblik van datavaslegging uitgelaat word. Die rede hiervoor is dat jou geslag en deelnemer nommer aangeteken moet word vir statistiese doeleindes en deur jou naam op albei vraelyste in te vul, kan hierdie inligting gebruik word om te korreleer met die deelnemer nommer op hierdie toestemming vorm.
- Die vraelyste in 'n tyd wanneer al die 3de jaar Fisioterapie-studente wat beskikbaar is soos per die klas rooster geadministreer word.
- 'n Ewekansige seleksie van 16 deelnemers sal gevra word om in 'n fokusgroep onderhoud deel te neem aan verdere uitwerking op jou persepsie van die leer in Toegepaste Fisioterapie (TFT). Sou jou deelnemer nommer gekies word, sal jy gevra word om deel te neem aan 'n fokusgroep wat gebaseer is op een van die vraelyste met betrekking tot waarneming van die leer in TFT.
- Die fokus groep onderhoud sal aangeteken word en getranskribeer deur 'n onafhanklike transcriber (skriba?) vir verdere data-analise.
- Wie sal toegang hê tot hierdie opnames? - Die navorser en die transcriber
- Waar sal die opnames gestoor word? - Dit sal digitaal gestoor word in die navorsers se argiewe
- Wat sal gebeur met die opnames nadat die projek end? - Dit sal vir 'n tydperk van 2 jaar gestoor word.
- Hoe sal die opnames in die data-analise gebruik word? - Die gemeenskaplike temas en verskille sal volgens die persepsies van die leer van die fokus groep deelnemers in vergelyking geplaas en met die resultate van die persepsie vraelys vir statistiese doeleindes gekategoriseer word.

4. Wat is die risiko's en die ongemak van die studie?

Daar is geen bekende risiko's in verband met hierdie navorsing. Jou resultate of uitslag in die assesseringsgeleenthede van hierdie module sal op geen manier deur jou deelname aan hierdie navorsing bestudeer word.

5. Is daar voordele om deel te neem aan hierdie studie?

Hierdie navorsing kan ons help om te verstaan hoe ons verder die TFT module kan ontwikkel om die leer van studente wat deelneem aan hierdie module te optimaliseer.

6. Watter ander opsies is daar?

Jy het die opsie om nie deel te neem aan hierdie studie nie. Daar sal geen straf betrokke wees as jy kies om nie deel te neem aan hierdie studie nie.

7. Wie betaal vir hierdie studie?

Interne befondsing:

Befondsing vir hierdie studie word verskaf deur die hoofnavorsers.

Eksterne befondsing:

Die Fonds vir innovering en navorsing in onderrig en leer sal vir verdere befondsing genader word op 'n later datum.

8. Wat is my koste?

Daar is geen direkte koste.

9. Sal ek betaal word om deel te neem in hierdie studie?

Jy sal nie vir deelname aan hierdie navorsing studie betaal word.

10. Wat as ek wil onttrek, of word gevra om te onttrek uit hierdie studie?

Om deel te neem aan hierdie studie is vrywillig. Jy het die reg om te kies om nie deel te neem aan hierdie studie nie. Daar is geen straf as jy nie deelneem aan die studie nie.

As jy kies om deel te neem, het jy die reg om op enige tyd te stop, maar ons moedig jou aan om 'n afspraak met die navorser te maak, sodat sy weet hoekom jy die studie wil verlaat. Indien daar enige nuwe bevindinge tydens die studie jou kan beïnvloed sodat jy nie meer wil voortgaan om deel te neem nie, sal jy daarvan vertel word.

Die navorser kan besluit om jou deelname sonder jou toestemming ??(I don't understand what you wanted to say) nie ophou, as hulle dink dat dit nie in die studie skade kan berokken nie.

11. Wie kan ek bel as ek nog vrae of probleme het?

Jy mag enige vrae wat jy nou het vra. As jy later vrae het, kan jy die navorser (Mev Lianne Keiller) skakel by (021) 938-9502 of e pos by lkeiller@sun.ac.za

As u enige vrae of kommentaar het oor jou deelname as 'n ondersoek onderwerp, kontak asseblief die Universiteit van Stellenbosch Gesondheid Navorsingsetiekkomitee 2

Mertrude Davids by 021 938 9207 of mertrude@sun.ac.za

12. Wat oor vertroulikheid?

Jou deelname in hierdie studie is vertroulik. Geeneen van die finale data-analise sal jou by die naam kan identifiseer nie. Alle rekords met jou naam, sal uitgewis word uit die dokumentasie voor die navorser die inligting deel met die statistikus en studieleier, en of enige ander belanghebbende partye binne die Universiteit. Alle rekords sal in die navorser se argiewe gestoor word vir 'n tydperk van 2 jaar, tydens hierdie tyd sal geen ander persoon toegang hê tot hierdie inligting sonder die uitdruklike toestemming van die navorser nie. Sou hierdie toestemming aan 'n ander persoon gegee word vir die doeleindes van navorsing, sal anonimiteit van al die deelnemers handhaaf word.

13. Magtiging (Beëdigde) Verklaring

Ek het elke bladsy van hierdie vraestuk oor die studie gelees (of dit is vir my gelees). Ek weet dat ek vrywillig kies om deel van hierdie studie te wees. Ek weet dat ek kan onttrek uit hierdie studie sonder enige boetes . Ek ontvang nou 'n afskrif van hierdie toestemmingsvorm en sal toegang tot inligting oor die resultate van die studie later hê as ek daarin belangstel

Deelnemer Naam: _____ Datum: _____

Deelnemer Handtekening: _____ Tyd: _____

Geslag: Manlik Vroulik

Toestemmingsvorm verduidelik / getuie deur:

Handtekening _____

Naam in drukskrif: _____

Datum: _____ Tyd: _____

Alle navorsing gedoen vir hierdie projek is in ooreenstemming met die riglyne soos uiteengesit deur die Verklaring van Helsinki en die MNR vir etiese riglyne in mediese navorsing

Addendum D

Participant no.

Student perception of learning in Applied Physiotherapy – Focus group interview

1. How do you think you are adapting to the PBL approach?
2. Do you feel you learn better in the APT module compared to the PTS module?
3. Why do you feel this way?
4. What do you think makes the APT module better/worse than the PTS module for learning?
5. What do you think are the advantages of the APT module when it comes to learning?
6. What do you think are the disadvantages of the APT module when it comes to learning?

Addendum E

Schematic representation of the 4 Phases of the Physiotherapy Curriculum at Stellenbosch University

	Phase 1 Scientific Basis	Phase 2 Intermediary	Phase 3 Application	Phase 4 Professional Entry
Foundation Phase				
Psychology				
Anatomy				
Physiology				
Pathology				
Physiotherapy Science (PTS)				
Clinical Physiotherapy (CPT)				
Research Methodology (RM)				
Applied Physiotherapy (APT)				
Physiotherapy Practice (PTP)				

Diagrammatic representation of the integration of modules into the curriculum:

