STUDENT EXPERIENCE OF THE LIFE SCIENCE PRACTICALS

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I _____ declare that STUDENT EXPERIENCES OF THE LIFE SCIENCE PRACTICALS is my own work, and that all the sources I have cited or used have been acknowledged and indicated by means of complete reference.

ABSTRACT

Science Educationists seem to agree that practical work should form an important component of any science course. Many students arrive at University without having been exposed to any practical work, while others were exposed to a range of different practical activities. This background seems to impact on how students experience and benefit from laboratory work at University. This research is aimed at determining what first year students' experiences of the life science practical course were.

Reflective journals were used as a tool to get students opinions about their experiences in the practical classes. Interviews served to clarify the problems that seemed to surface. Eighteen students, selected on various levels of academic progress were interviewed. The comments from the journals were categorized, the interviews were audio taped and transcribed to form a basis for the development of a questionnaire which was used to verify whether these problem areas really existed.

The general trend of the feedback from the questionnaire was positive, there were a small percentage of students who did not benefit optimally from the practical program.

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND TO THE STUDY

The first year Life Science course at the University of the western Cape was a qualifying course for a number of different degree courses: Science, Dentistry, Pharmacy, Occupational Therapy, Dietetics and Human Movement Studies. Life Science fed into the following second year courses: Botany, Biochemistry, Zoology, Microbiology and Physiology.

A large amount of money was spent on equipping our laboratories. Presently first year Life Science students are each provided with a compound microscope and a dissecting microscope. The average cost to provision a first year laboratory, which accommodates seventy students is in the region of R2, 3 m.

The department appointed students to assist first year students during practicals, at a ratio of fifteen to one assistant. These assistants were paid R10.50 per hour for six hours per week. The six hours include an average of three hours for the practical and the rest for preparation, marking of reports and recording of marks. The student assistants, are senior students who are studying Biochemistry or Botany and Zoology, respectively.

The first year student intakes for life sciences for the past two years were 320 for 1997 and between 259 for the first semester and 307 for the second semester for 1998. Five laboratory sessions per week were run in two different laboratories which can accommodate seventy students per laboratory. Technical staff, who are permanently employed by the university,

have to prepare(collect plant and animal material, make up solutions, set out equipment, slides and specimens) and clear up laboratories five times a week. The amount of time, effort and finances invested in this course is quite extensive.

First year students spent an average of three hours per subject per week in the laboratory. The time spent in lectures were about one hour and forty minutes per week, which is half the time a student spends in the practical laboratory. The nature of the contact during practical time is of a much more personal nature, and lecturers have the opportunity of communicating with students on a very personal level.

It is generally expected that the time spent in the practical laboratory should be a learning experience that would add to the student becoming competent in a variety of skills and be enriched in the scientific experience. Students arrive at University from a wide range of backgrounds, leaving it up to the course coordinator to design a course which will satisfy the needs of a diverse student body.

1.2 ASSUMPTIONS ABOUT PRACTICAL WORK

Upon reflection on how the Life Sciences practical work was being offered, it became clear that there are a number of assumptions which guided the design of the practical programme. Although none of these "guidelines" were explicit anywhere in the Life Sciences course description, an analysis of the practical programme points to their existence. This is a first attempt to describe these guidelines; since they were not explicitly mentioned in the course description, they are called assumptions about practical work in the thesis.

The first assumption was that most of the students have little or no background in Biology. Not all students who were accepted into the Life Sciences course did Biology at school. Therefore, it cannot be assumed that students have any specific amount of background. Interviews with staff disclosed that although certain topic covered at first year level should have been covered at school, they assume that the majority of students do not have this background (personal communication). Practicals were therefore drawn up with certain aims in mind. Theory was presented, assuming minimal background knowledge, and practicals were as far as possible based upon this. The very first practical session which was presented, taught students about measurement. Students were exposed to various units of measurement, as well as conversions from smaller to bigger units and from bigger to smaller units. The next practical lesson taught students the various parts of the microscope, and how to use it. This practical lesson assumed that students had never used a microscope, since it dealt with all the basics about microscopes.

The second assumption was that students have had no practical exposure at school and therefore had no practical experience. In practical sessions a certain amount of theory was covered. Students were taught the practical side of what lecturers covered in theory. As trainee scientists students needed to acquire certain skills including the basics about the microscopes, how to use them and how to interpret what they saw under the microscope. Other basic skills which were taught included how to draw in a neat and scientific way, how to represent certain observations diagrammatically. This meant emphasizing neatness, accuracy and getting ratios and proportions right.

The third assumption was that a simple generic first year course was sufficient to address the

needs of and meet the expectations of all the students who were registered for the Life Sciences. The Life Science course is a feeder course for a variety of second year courses and different degrees. Students enrolled for the Life Science course would therefore have different perceptions, expectations and different levels of motivation towards the courses they have to take, leading to difference in perception of the value of the practical work.

The fourth assumption was that students were willing and able to work hard and catch up when they registered late. Late registrations impacted severely on students' ability to master important skills. Many students registered late and missed out on the important first few practicals where valuable skills were explained and taught. No special arrangements were made to accommodate students who registered late. It was expected that these students make time to catch up with some of the work which they had missed out on. This meant that they had to find time in their already full schedule to fit in these practical sessions.

1.3 AIM OF STUDY

Given the investment in practical work and accepting that the assumptions about practical work are correct, it was expected that the students would have a valuable, enjoyable learning experience, getting out of the practicals what was expected and intended. However, despite this huge investment in the first year practical programme, the programme has never been formally evaluated. Judging from the comments of lecturers teaching at second year the practical programme might not be achieving its aims. Here are some comments: (personal communication)

"Our students do not know how to use a microscope."

"Our second year students draw like primary school kids."

"They do not know how to carry out instructions"

The aim of this study is therefor to answer the question "How do Life Science students at UWC, experience the first year practical programme?"

1.4 CONTEXT OF THE STUDY

The life science's course was presented by three different departments: Botany, Zoology and Biochemistry. The first module was offered by the Botany Department and dealt with cell structure and processes, while the second module dealt with the diversity of life and the processes of maintaining it, and was offered by the Zoology Department. Module three, was offered by the Biochemistry Department. This module covered hereditary and biochemical processes. The fourth module covers ecology and ecological processes and was offered jointly.

The practical module offered by the Botany Department dealt with the teaching of basic skills and was offered in the first quarter. These practicals dealt with how to handle the microscope, measurements and units. Other practicals involved cell structure and function including the skill of making wet mounts. The practical program normally included two excursions. When faced with financial constraints the one excursion gets replaced with a video practical on mind mapping.

The Zoology practicals dealt with the diversity in the animal and plant kingdoms. It covered

bacteria, fungi, mosses, ferns, gymnosperms and angiosperms. It also covered unicellular animals, right through to vertebrates. The Biochemistry practicals dealt with mitosis, pedigree studies, x-linked inheritance and multiple alleles, meiosis, Mendelian genetics: segregation and recombination, probability studies of gene combinations and structure and function of DNA.

The practical on the microscope covered the basics of how to handle a microscope, getting students familiar with the different parts of a microscope and how to focus. Measurements and units dealt with different metric units and conversions. Practicals three and five, covered structure and function of cells and tissues and was not directly related to the theory. However, it provided background knowledge to concepts that were dealt with in theory. The aims of these two practicals were to teach students about different types of cells: eukaryotic and prokaryotic cells, plant and animal cells, and their structure and function in the different processes.

Students were provided with a practical manual which gave some background on the specific topic, instructions and questions. The questions are divided into pre laboratory and post-laboratory sections. It was expected that students should at least prepare for the practical before coming to the laboratory and complete the pre-laboratory questions. The answers to the questions could be found in either the prescribed textbook or the practical manual.

A fifteen to thirty minute introductory talk was presented at the beginning of the practical. This covered a small amount of theoretical background and a run down of the instructions. At this point students were expected to start on the practical since all specimens and material would already be provided. Students had access to their own microscope, but specimens and

microscope slides were often shared. The instructor and student assistants were available throughout the practical to assist students should they experience any difficulty.

Student assistants appointed by the department were senior students who had a background in Life Sciences. They attended a pre- practical session where they were informed about the practical details. The instructor gave a complete run down of the practical for the specific day and worked through the whole practical with them. They were also expected to do a certain amount of reading and preparation on their own, to be able to be of assistance to the first year students. The student assistants were also responsible for marking of the practicals from a memorandum provided by the instructor. The practical marks were accumulated and counted 25% of the final marks of a module. Students also needed a sub-minimum of 50% in a practical module in order for them to pass the specific Life Sciences module.

The question that needed to be answered was: What was the life science practical experience? What were students getting out of all of this, given their diverse background and expectations? The department of Botany at the University of the Western Cape was training Botanists, they were teaching them what they thought were essential skills and concepts. Were students in fact benefiting from all of this? In order for us to find out whether the goals set out were achieved, and whether the assumptions made were valid, or how many students benefited and how many did not, we needed to find out what the first year Life Science experience was.

CHAPTER 2: LITERATURE SURVEY

2.1 INTRODUCTION

Practical work forms an important part of science. The laboratory appears to be the place most teachers and lecturers expect the scientific experience to take place. This scientific experience involves students learning to formulate hypothesis, making assumptions designing and executing investigations, drawing conclusions from data, mastering concepts and skills in order for them to engage in a meaningful laboratory experience. Despite this expectation it seems that we generally do not succeed in getting the laboratory to be the experience we would want it to be.

Laboratory work involves a great deal of time and effort from both staff and students, and the return of knowledge is poor (Kirschner and Meester, 1988). The purpose of laboratory work is often to reinforce knowledge that the student already has, or to teach concepts. Practical work is often not a cost-effective way to teach concepts, since it is often a single demonstration and the time does not allow for any further investigation. Kirschner and Meester (1988) took a critical look at what was going on in laboratories in higher science education. They did not imply that practical work was not important, but rather, that the skills and knowledge gained from it were small in comparison to the time and effort spent to gain this knowledge. Experiments are costly in terms of time and resources and cannot be considered an economical and efficient means of achieving concept information. Often laboratory work only verifies knowledge the student already has and this eliminates the motivation to investigate. Time is

often wasted on trivial experiments and students forget these processes and techniques in a day (Kirschner and Meester, 1988). The other problem is that often too much work is expected from students in too little time. Assessment is often not done on time and students do not receive feedback for it to be meaningful.

Lemmer, Lemmer and Smit (1996), investigated the background of first year physics students at the university of Namibia. The students who enrolled at this university were students who came from schools where very little practical work was done, or schools that did not have science laboratories that were adequately equipped. They also looked at a variety of practical skills(library usage, experimental design, drawing conclusions from data) of these students. These were compared with Australian pupils in their third last year of school. The Australian pupils in general outperformed the Namibian students on an average of about 10 percent. This was a clear indication that these students were not prepared for first year practical work. The categories where the Namibian students were outperformed most, were library usage, experimental design, and drawing of conclusions from data.

The general pattern in the literature divides practical experience into two categories. They are the "structured laboratory" versus the "unstructured laboratory." The former refers to the type of practical where recipe-type experiments are done, practicals are linked to theory and practical manuals are provided. The instructor and student assistants are available to assist students throughout the practical. The latter refer to the type of practical which is more student-directed. Here students are expected to formulate hypotheses, make assumptions, design and execute investigations and write up a report at the conclusion of the practical session. The instructor and student assistants primarily play an advisory role.

2.2 THE STRUCTURED LABORATORY.

It appears that students arrive at tertiary institutions with a poor background knowledge of practical work. They have either been at schools where they did no practical work, or practical work was not done properly. Students have not developed the basic practical skills at high school. At tertiary institutions, lecturers then end up with the immense task of teaching these skills as well as teaching science (Tamir 1977). In schools, teachers are often not adequately equipped to teach in the science laboratory. This causes students to arrive at university with a backlog. Tamir felt that what students learn in the laboratory can be improved by improving teaching in the laboratory.

A tremendous amount of time, effort and finances are invested in practical work and it is often found that the returns are not worth the input. Researchers are continuously looking for ways to improve and get more from practical work. Poole and Kidder (1996), investigated the integration of practical work and lecture with the aim of connecting students to real-life experiences. They suggested that the formal lecture and laboratory period be replaced by a combined period which included a structured practical session as well as lecture. Once students

have learnt about something in theory, they were given the opportunity to experience it practically almost immediately. When an evaluation of this method was done, the majority of students responded that they enjoyed this method of teaching and that "science done the right way, is both rewarding and fun." The teaching was redesigned to include a lecture, laboratory and discussion. Laboratory exercises became an integral part of lectures. This in the end alleviated the problem of disconnectedness between laboratories and lectures. The second idea

was the redesign of the practical report. Students were expected to write up a traditional type of report. The last section of the report was supposed to include connections between the lecture and the laboratory. This exercise forced students to think logically and scientifically about the lecture and practical experience. Students were given no guidelines for this section, which allowed them to reflect on the whole learning process, in the end gaining much more from it. In the case of traditional laboratories, where the practical takes place some time after the theory was done, a lack of connection between theory and practical was often experienced. This caused students to see practical work as boring and meaningless. However, on the other hand, the integration of practical work and lectures immediately connected concepts and also connected life experiences. When asked to evaluate the course, the majority of students rated the practical as better than any of the other practical sessions. This experience would be a structured type of practical, where a strong link between practical and theory was established. The problem with this experience would be that concept teaching would take preference to skills training.

Johnstone and Wham (1982) observed that the investigative type of laboratory is very demanding. It expects that a number of skills are applied simultaneously. These skills involve background knowledge of the subject, laboratory technique, and the skills to formulate hypotheses. They suggest that this overload should be decreased and students should be given the opportunity to master these skills individually, before expecting them to apply them simultaneously. The dilemma is that the problem really starts at school level, where it is assumed that teachers have the basic skills to teach effectively in laboratories, when the only model they often have is their own practical experience as students. The implication is that students arrive at the university without having mastered these basic skills and it is often

assumed that they have (Johnstone and Wham, 1982). Students are then virtually overloaded with an expectation of knowledge and skills.

Johnstone and Letton (1990), investigated the impact that workload had on students' laboratory performance. The research was done in the Chemistry laboratory. Students had to write a diary of their experiences in the laboratory. The general outcome of this exercise was very negative. On further investigation it appeared that this negative attitude was linked to a specific set of practicals. It was in fact linked to the Physical Chemistry practicals. These practicals seemed to have a large amount of theoretical knowledge which was seen by the teachers as necessary for the Physical Chemistry practicals. The practical expected that the student interprets the experiment on the basis of theoretical background. At the report writing stage, once again the student needs knowledge from the theory as well as the practical, to write a coherent report. The researchers suggested that the design of the experiments and manuals created the overload that students were experiencing. In order to change this, the manual needed to be rewritten.

Lunetta and Tamir, (1979), did research on matching laboratory activities with teaching goals. The skills they considered important, involved developing attitudes and skills consistent with the work of scientists and understanding scientific relationships, concepts and models. The development of so-called higher cognitive processes on which much of the science is based, which is hypothesizing, predicting is also deemed important. It is therefore important to decide whether any given practical lesson will contribute to achieving these goals. The dilemma is also that the traditional type of practical does not allow for the development of these skills.

More practical work does not necessarily increase interest in science. The practical work which is offered should be interesting and stimulating. Often an emphasis is placed on skills development, while in fact a lack of skills can cause a barrier to learning. In fact, skills are necessary to engage in laboratory work successfully (Hodson, 1990). Only skills of value should be pursued, and these skills should be developed to a satisfactory level of competence. There seem to be about five main reasons why teachers want students to engage in practical work. These include motivation for science, stimulating interest and enjoyment, teaching of laboratory skills, scientific knowledge, insight into scientific method, and to develop 'scientific attitudes.' These aims are very often not reached, because children lack the basic skills to engage in any meaningful experience in the laboratory.

Tamir (1977), noted that laboratories should be a place where students are engaged in hands on activities. He investigated what was happening in high school and college laboratories. He felt that what was seriously wrong, was what he called a post-laboratory session, which was missing in most college laboratories. He saw this as a serious omission since this was the phase where developing and practicing of intellectual skills, conceptualization and deeper understanding of theories could take place. Although there seemed to be a great awareness of investigative laboratories, the study showed that in most cases the traditional type of approach was still followed. Students are given recipe-like instructions and all that is expected of them is to follow instructions.

Kyle, Penick and Shymansky (1979) noted that the laboratory should be the place where students engage in the process of investigation and inquiry. They discovered that although the main purpose of the laboratories was to develop students to investigate and develop procedural

skills, the data showed that just more than one third of the laboratory time was spent on investigation. Pre and post laboratory discussions were not specifically planned into the practical sessions. It was thus clear that practical work in most college laboratories was still done in a recipe-like fashion and students were in fact not learning science, but were learning about science. They were not given the opportunity to learn about process and science. Students were also spending a lot of time listening to the instructor. It was clear that students spent most of their time in the laboratory confirming facts and theories, gathering correct data, instead of exploring, investigating, testing and explaining.

Germann, Haskins and Auls, (1996), researched a number of activities from reviewed manuals at nine high schools. The laboratory investigations were evaluated for science process skills, in order to ascertain the degree to which laboratory manuals promote inquiry. The study showed that the majority of high school biology laboratory manuals are structured and provided detailed instructions. The manuals gave no opportunity to students to pose questions or to formulate hypotheses. A change toward an inquiry type of practical work would mean that laboratory manuals would need to be rewritten.

Research done by Watson, Prieto, Dillon (1995) on whether practical work contributed to students' understanding of combustion, revealed that most students failed to gain any more knowledge about combustion. The students used in the study were exposed to different styles of teaching and learning. The idea that came out was that although a lot of time was spent on practical work, it did not alter their understanding of combustion. They felt that more time needed to be spent on providing better quality practical work. The type of practical work was of a traditional type where concept teaching was the main emphasis, and skills training were

not an issue.

According to Gunstone (1991) in Watson et.al.(1995), for practical work to have a serious effect on students' theory construction, and linking concepts, they need to spend more time interacting with ideas and basically spend less time interacting with apparatus. The result is that students are not able to link laboratory work effectively with theory. This once again emphasizes the dilemma that educators have in terms of skills and concepts training.

Educators are faced with the terrible dilemma of skills versus concept teaching. It almost seems inevitable that the one or the other will be neglected. When skills are trained, there is often not sufficient time in the program to teach concepts as well. Many students also often arrive at universities with an immense lack of practical exposure. This makes it difficult for educators to decide on the specific type of practical work to offer. The structured laboratory did not give students the opportunity to really investigate and apply knowledge. Since concept teaching often formed the basis of the practical lesson, skills training was neglected. This highlights the fact that the problem experienced in terms of first year practical work is not isolated, but rather widespread, and educators would always have to compromise in some way with regards to skills and concept teaching.

2.3 THE UNSTRUCTURED LABORATORY.

The unstructured laboratory allows students the freedom to develop higher cognitive skills (Janners, 1988). This type of practical often allows for the development of a variety of skills and concepts are learnt although it is not the main emphasis.

Janners (1988) investigated the dilemma of the dual role science teachers have as 'disseminators of information and teachers of scientific process and methodology'. She looked at the idea of the student-directed laboratory, being one way of teaching science process. This type of laboratory differs from the traditional laboratory in that it is student-directed and the investigations more accurately simulate the process of scientific investigations. Students are virtually given mini research projects which would give them much more opportunity to learn about scientific inquiry and investigation. The response from students was very positive and they generally found the laboratories interesting and challenging. This method allowed them to be exposed to discovery and accepting responsibility.

Another interesting idea was researched by Tichenor (1997). She had the idea that laboratories needed to become student designed. She mainly focused on getting students engaged in scientific investigation and reasoning, to allow them to discover the complexity of scientific knowledge, through interpreting and evaluating data, developing skills such as reading and analyzing information, by allowing students to work independently. The method used implies promoting the concept of dependence on scientific enterprise, and teamwork, by creating problem solving activities that include group research. This method also implies extra work for the lecturer or instructor involved in the form of consultation time. This type of practical work encourages independent work as opposed to a student's reliance on the instructor as in the case of the traditional type of practical work.

Leonard (1983) investigated the use of inquiry approach for general biology practicals at the university. Practical work appears to be an important part of many science courses and

appears to be the only opportunity for students to really learn science as opposed to "learning about science." Practical work, especially the unstructured type of laboratory, allows science to become real to students. The inquiry approach, which forms part of the unstructured laboratory, demands that students use their initiative regarding procedures and available resources. The sample of students used in the study was first years who did not have anything except their school experience to compare the specific method with. Leonard recognizes that there are specific skills that should be developed and these include critical thinking, independence in learning, an increased demand on students' use of discretionary resources, and scientific inquiry skills. In the light of this, he deems it important that students be given the opportunity to engage in these kinds of activities instead of only following instructions and answering questions.

Case (1980) did a study with non biology major students doing a general biology course. One part of the sample of students involved in this study did the conventional type of practical, while the other part of the sample did an auto-tutorial. The auto-tutorial students attended three fifty-minute lectures for the week and the auto-tutorial, which consisted of slide- tape modules, which they could complete in their own time. One weekly practical session was assigned, which could be completed at their own pace. A student assistant and instructor were available to assist them with problems, and a printed practical manual, with procedures and questions was given to them. It was found that students generally felt that they could succeed because they were given sufficient time and opportunity to complete the work. Students also appeared to enjoy being responsible for their own learning. This caused them to be more motivated. These factors were linked to enrollment for the course and retention of students for the course, which proved that by using the auto-tutorial, more students were retained for the course.

The unstructured laboratory appears to offer more of a challenge to students, although it places a larger burden on educators in terms of planning. It leaves a lot to the students own responsibility and it definitely appears to be much more challenging to students. Students are required to have skills which could hamper their enjoyment of the practical when they do not have these skills. The unstructured laboratory can only become a reality if students have acquired the necessary skills to interact with the equipment in the laboratory. It would be unrealistic to try and implement the unstructured laboratory at a first year level, since many students lack the skills and maturity to work in an environment as this.

2.4 STRUCTURED VS. UNSTRUCTURED LABORATORY.

Educators would always be left with the choice between structured and the unstructured laboratory. The choice is not always easy, especially in the case of first year students, when the specific practical background of the student is often not known.

Kozma (1982) looked at the impact of structure in the design of the practicals and student aptitudes on performance and attitudes toward practical work. He suggests that high ability students appear to be more motivated toward their practical work than low ability students. These low-ability students, appear to prefer more structure in the practical laboratory, as opposed to high ability, low anxiety students. There also appeared to be a difference in the attitude toward practical work, of high ability students who also have higher anxiety levels. These students appear to perform the same way that low ability students do. The high ability students, generally seemed to prefer the challenge of the low structured laboratory, where

experimental design was left to the student.

Spears and Zollman (1977) investigated the influence of a structured versus an unstructured laboratory on students understanding of the process of science. The structured laboratory was the traditional lab where students were given instructions, while in the unstructured laboratory the experimental design was left up to the students. The results showed that generally students needed more background information and experience to be successful in the unstructured laboratory. In the structured laboratory where students did experiments that had been done by scientists before proved to teach students much more of the processes of science. Especially for first year students, it appears that they need a structured experience and training in scientific process before they can understand the process and benefit from the unstructured laboratory experience.

Raghubir (1979) did an experiment with grade 12 pupils to see how they would respond to a laboratory -investigative approach as opposed to a laboratory-lecture approach. The latter would fall into the category of high structured laboratory, where students are guided through the practical, doing "cookbook " experiments. The laboratory-investigative approach involves students formulating hypotheses, making assumptions, being exposed to the process of science. The results of the study show that students preferred the investigative approach more. They gained higher scores for the cognitive factors: formulating hypotheses, making assumptions, designing and executing investigations, and a host of others. The investigative approach led to a greater understanding of science, and the information retention was greater. Students achieved better doing the investigative type of practical. The traditional type of practical did not allow students the opportunity for self initiated and self-directed study.

In an article about the learning environment in Chemistry and Biology laboratories, Hofstein, Cohen and Lazarowitz (1996) investigated students' perceptions of actual and preferred laboratory learning environment. The model that was used was an inquiry-based one. They observed that laboratories were given a central and distinctive role in science teaching. There are in fact many benefits to using and learning from laboratory activities, however, there are often factors which influence the learning experience in laboratories. It appeared that students wanted teachers to offer more support in the laboratory. They found that students want the environment to be cohesive, experiments to be more open-ended, a clearer link between practical and theory, activities to be more organized and they expected rules to be clearer.

Another interesting aspect of laboratory work is the skills that students are exposed to. Beasley, (1979) and Swain (1974) said that the objectives relating to the acquisition of laboratory psychomotor skills seem reasonable and desirable. Psychomotor skills are necessary to use apparatus such as analytical balance, pipette and burette. The mental practice of the manipulative skills required for the satisfactory completion of laboratory experiments offers a method whereby psychomotor learning may be reinforced. Any experiment would need to be analyzed for inherent laboratory skills. Lecturers also need to evaluate which skills are necessary and important. It appeared that cognitive skills were regarded more important by supporters of the inquiry- approach, while manipulative skills, were regarded more important by supporters of the traditional-approach.

Most science courses are laboratory-based. Indications are that laboratory exercises are often non-productive and frustrating for students. In a survey done by Vella (1987) students at times responded at the end of the practical that they did not learn anything. This feeling probably

follows from the way in which practical classes are constructed and presented. Students are expected to follow recipe-like instructions, which does not allow any opportunity for their own initiative. According to Vella(1987), practical exercises are supposed to be models of how scientific knowledge is constructed, or how new knowledge relates to or finds meaning in existing knowledge. The Vee heuristic is a method of teaching by which students have to find things out for themselves. This method was developed by Gowin (Novak and Gowin, 1984). It is supposed to help teachers and students to clarify the nature and purpose of practical work. The Vee represents the two sides of knowledge production, i.e., conceptual knowledge and methodological knowledge. These two sides focus on the question which would be the object of the experiment. There needs to be a balance between the two sides which can be achieved through pre laboratory instruction, the students understanding exactly what is expected of them, and a post-laboratory discussion. The lack of a balance between these elements often renders the laboratory experience meaningless.

Wood (1990) investigated student experience in the Biochemistry undergraduate laboratory. He felt that the aims of practical work should be to teach manual and observational skills, to improve the understanding of the methods of scientific inquiry, problem solving skills and a professional attitude. The practicals offered to the students did not offer the opportunity to develop these skills. He suggests a transfer to more open-ended type of practical work, so that students would get the opportunity to develop these skills.

There would probably always be the dilemma of a choice between the structured and the unstructured laboratory. It would appear that the choice would not always be an easy one, since there are certain factors that need to be considered, when making this choice. Literature shows

that for example low ability students are more comfortable doing a structured practical, while this also preferred by high ability students who suffer from high anxiety (Munch and Lawrence, 1984). The choice is also affected by the specific backgrounds that students come from. The specific aims of the practical program would also determine the type of practical lesson which will be offered in the end.

2.5 STUDENTS ATTITUDE TO PRACTICAL WORK.

Different factors affect students' attitude toward the practical experience. Students and teachers seem to have different expectations in terms of the practical experience and this often leads to problems. Very often the aims that are set out by the teacher or instructor are not met because of an attitude or expectation on the part of the student. Students come from different practical backgrounds and they enter into different courses with a variety of goals in mind.

Ericson and Ellet (1990) looked at students taking responsibility for learning. In this article he refers to work done by Fenstermacher in 1986. Fenstermacher argued that student activities, such as reciting, practicing, reviewing, checking, locating sources, assessing materials, directly cause student learning. This implies that students are responsible for their own learning. Ericson and Ellet suggest that he should have included perceiving, recognizing and thinking, for the analysis to fit all ages of students. Teachers are concerned about student learning, which is supposed to cause changes in students. He (Fenstermacher) however maintained that teacher activities do not cause students to learn, it is rather the students' own activities that cause them to learn. Teacher activities bring about student activities, but it does not cause learning. If one relates this to the laboratory situation, it is clear that students will learn once

they are given the opportunity to interact with apparatus, or ideas.

According to Akinsola (1986), there are a variety of factors that appear to impact on student attitudes. Research was done in the Chemistry laboratory and the researcher tried to find out whether there were any factors that would cause students to have either a negative or a positive attitude toward the laboratory work. It appeared that student's attitude toward Chemistry as a subject correlated with their attitude toward the laboratory. This was followed by students participation in laboratory activities. The time allocated for laboratories also correlated positively with students attitude toward the laboratory, while the experience of the Chemistry teacher was not significant. Students' attitude toward Chemistry as a subject appeared to be the most important factor determining attitude toward the laboratory. Students' participation was the second factor, and this in fact corroborates previous research in which student involvement in hands-on activities resulted in a more positive attitude toward science. The other factor which was investigated was the location (rural, suburban and urban) of school and the experience of the teacher, which was not significant.

Gayford (1988) looked at aims, purposes and emphasis in practical biology, investigating teachers' attitudes. He looked at four different aspects:

1. How important was experimental work in practical work?
2. Teacher attitudes toward certain aims of practical biology and how this changed.
3. Did the aims relate to the emphasis they claim to place on these aims?
4. The differences between teachers who prepare pupils for practical exams and those who use teacher assessment of practical abilities.

Experimental and problem solving abilities were ranked lowest of all, especially by those teachers who prepared pupils for practical exams. Great importance was placed on using practical work to reinforce theory. This type of approach often emphasizes concept teaching, and skills training is very often neglected. This could also lead to overload of students, since the type of practical work would assume students to have certain skills which in many cases are absent. Since the concepts take priority over skills, students are often left frustrated by having to learn too many new things at once.

2.6 EXPECTATIONS

When practical lessons are drawn up, student expectations are often not considered. In fact it is an unknown factor, which does not play a role in the planning of practical laboratories.

Lynch and Ndyetabura (1983), looked at how teachers and pupils' perceptions of practical work can differ. It was quite clear that what teachers deemed as important was not necessarily seen as equally important by pupils. In the same way, what pupils saw as important was not seen as equally important by the teachers. Teachers felt that skills and technique training were very important, while the theory practical links were also regarded as quite important. Making observations and interpreting them was also regarded by teachers as important aims of practical work. Pupils wanted to see a link between theory and practical work and regarded this as very important. The teachers' responses were much higher than the student responses, implying a mismatch in expectations.

Boud, Dunn, Kennedy and Thorley (1980) investigated how aims of practical work were

perceived by a variety of groups. The groups that were interviewed were practicing scientists, graduates, and undergraduates. The three groups appeared to agree on what they thought to be the most important aim of practical work. The undergraduates thought that the link between practical work and theory was important while it was not regarded as important at all by the other two groups. The students seemed to agree with the fact that skills training were an important component of practical work, but they seemed to favor the idea of seeing practical work and theory linked.

Munch and Lawrence (1984) investigated the effectiveness of grouping of laboratory students on selected educational outcomes. Students were grouped according to their formal reasoning skills. The first group consisted of students of more or less equal reasoning ability. The next group was a mixed group, with mixed abilities. The last group, was grouped together on the basis of student choice. The outcome was that grouping did in fact affect the educational outcomes. The students in all three groups showed an increase in knowledge, regardless of their reasoning abilities. They also showed an increase in reasoning ability. All the students perceived the classes as difficult, but satisfying. In the post tests, the homogeneous group scored the highest, followed by the heterogeneous, with the student choice group scoring the lowest. The authors in fact suggest, that grouping students, on the basis of reasoning ability is beneficial.

2.7 SUMMARY AND CONCLUSIONS

The literature gives a wide variety of perceptions and preferences regarding practical work. If one considers student expectation when they arrive at the university, as well as their exposure

to practical work, one is left with a very difficult choice as to what type of practical work would benefit students most.

The literature emphasizes a variety of expectations from practical work. In the structured laboratory, it is suggested that the purpose of practical work should be to reinforce knowledge the student already has and to teach concepts. The exercise however is often futile since this type of exercise involves a single demonstration relating to a specific concept. This type of practical involves students performing recipe book experiments. Students also often lack the skills which are necessary for interaction with apparatus which very often causes an overload for students, since they have to synthesize knowledge and skills.

There are many students who arrive at the university completely unprepared for what lies ahead for them. Despite this, these students still have to fit into and cope with the program which is prepared for them. When we look at the variety of types of practical programs that have been tried and tested over the years, it is clear that educators want the practical experience to be a meaningful one. The structured and unstructured laboratory which have been described and researched by a number of researchers. Each approach (structured or unstructured) seems to have its advantages and disadvantages.

Considering the time and finances invested in practical work, and the returns do not appear to be worth the effort (Poole and Kidder, 1996). For this reason various ways have been designed to make the effort worthwhile. The integration of the lecture and practical, made the practical experience a much more real experience, in terms of connecting practical and theory. This proved to be a good way of teaching concepts, while skills training could not be fitted in.

The investigative type of laboratory is very demanding in terms of the expectation of knowledge and skills. It is often assumed that students have the basic skills for a meaningful interaction in the laboratory. The reality is that in fact, workloads impacted on students performance in the laboratory. It is often a theory overload in the practical which affected students negatively.

The matching of laboratory activities and teaching goals was regarded as important in developing the skills thought important for meaningful interaction in the laboratory. However the problem is that the traditional type of practical concentrate on teaching concepts, and the skills needed for the practicals are assumed already mastered. It would be to students advantage if a limited number of skills applicable to the level of study were developed, instead of a multitude of skills, which is often not necessary at the specific level of study. These skills would have to be determined for each course. When skills are absent, it causes a barrier to learning. Skills are necessary for successful laboratory work. One of the main things that hampered learning in the laboratory was the absence of a post laboratory session where practicing of intellectual skills could take place. Often a lot of emphasis is placed on manual skills and cognitive skills are neglected.

It is therefor important that more time are planned into the practical for pre and post laboratory discussions. This will allow for the development of cognitive skills. There was also no time allowed for exploring, investigating, testing and explaining. Investigation in the way practical manuals were drawn up and concluded showed that they were like recipe books and students only had to follow instructions. Practical manuals needed to be rewritten to accommodate different types of approaches

The question then remains of whether skills training should take priority over concept teaching. On the question on whether practical work contributed to their understanding of concepts, the literature shows showed that their understanding was not altered sufficiently. It would appear that the practical laboratory was not the best place to reinforce concepts. The literature suggests that for practical work to actually have an effect on their theory construction, students need to spend more time interacting with ideas and less time interacting with apparatus.

Science teachers play a dual role, being disseminators of information and being teachers of scientific process and methodology. They are always trying to find the best way to teach both. The student-directed laboratory appears to be the best way of teaching both. The mini research projects that students were involved in appeared to be a very stimulating experience to students. This type of approach give students the opportunity to investigate, they are exposed to discovery and they are forced to take responsibility. Another idea was based on group research. Here students were expected to take responsibility. Other researchers echoed this idea and suggested that the inquiry type of laboratory would give students the opportunity to practice the skills to really learn science instead of only learning about science.

The literature reveals that educators everywhere have a problem regarding the ideal balance between teaching skills and theoretical concepts in practical work. The situation at the University of the western Cape is not unique. However there seem to be a clear indication that students benefit more from the inquiry type of practical. This however is only possible if students have the necessary skills to interact in the laboratory.

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

The aim of this research is to ascertain the factors that influenced students learning experience in practicals. It therefore was important to hear what students were saying about their learning experience and what students have to say about what is happening in practicals. In order to do this without leading students in their response, we had to find a way which would encourage a spontaneous, non threatening kind of response. For this reason, students were asked to write reflective journals at the end of each practical lesson to relate their experience of the practicals. It was assumed that as far as possible students would give their honest opinions.

3.2 THE REFLECTIVE JOURNAL.

According to Beveridge(1997), reflective journals are records of students learning. Students are supposed to keep a record of their learning experience and progress. Journals also give students practice in self expression. It gives them the opportunity to find personal connection to the class material they are studying, it provides a place for them to think, learn and understand course material, to collect observations, responses and data. It also gives them practice in writing(Slate 1987).

Journal writing has also been used in professional development, where teachers have kept journals for reflection, analysis and self- evaluation.

The way the reflective journals were used in this study, involved students reflecting at the end of each practical on how they experienced the practical. The responses were anonymous and voluntary. Students also reflected on a variety of issues and not necessarily on the actual practical experience. They reflected very critically about certain aspects, and the reflective journal eventually became an outlet for many of them to complain about things they did not enjoy or appreciate in the course.

The student numbers for the life science's course in 1997 were 320. The sample was about 50% of the class and specifically the complement of the class that was taught by the researcher during the first term. The idea of letting students write reflective journals were to give students an opportunity to write down their unbiased experiences in practicals- what they were doing and how they were experiencing this. Students were asked to write these journals at the end of each practical lesson. The feedback during this time ranged between 30% and 60%.

The comments from these reflective journals were all written down. Similar comments were grouped together. Initially very broad categories were formulated, but eventually these categories were narrowed down to the twelve which was used in the questionnaire.

These are some comments from these journals: Comments such as these led to the category on workloads.

1. *"The practical were interesting, but it was to long."*
2. *"It becomes quite tiring with so many drawings."*
3. *"The practical were very interesting, but it was very long and some students could not finish."*

4. *"Too much too do, too little time. It is not worth it if we have to rush to finish."*

5. *"It was too long and boring."*

6. *"Too many drawings involved."*

7. *"I do not benefit from the pracs. They are to long."*

8. *"Yet again, not enough time to learn anything. Everything had to be rushed to finish on time, but interesting none the less."*

9. *"The prac had too many drawings to do and too little time. None of the drawings I did sunk in because I had to do it so fast. I disliked the practical."*

10. *"You are giving us too many drawings in a short space of time."*

11. *"It is worthwhile preparing for practicals."*

12. *"I was not well prepared and did not enjoy the practical."*

13. *"Tests after practicals are a problem."*

14. *"The drawings were difficult, I did not know what was expected."*

15. *"I did not learn anything, the drawings are too complicated."*

The following are comments which constituted the category on physical conditions:

16. *"The venue is not appropriate- too hot."*

17. *"Lab too hot and crowded."*

18. *"The class is too big."*

Some of these comments however also refer to how students valued the practicals, in terms of interest, or enjoyment. Comments such as these would also have contributed to the category on value of practicals.

19. *"I found the practical altogether interesting, but rather long. Not too sure*

what was expected."

20. *"The lesson was informative. I learnt a lot about cells. The time however was limited so we had to rush through the practical."*
21. "*The practical were very interesting, the time was very limited, more time would be more appropriate."*
22. *"I enjoy the practicals thoroughly, even though I am bit rushed. The hands on method helps me remember things better, and also helps in relating to the work when I study."*
23. "*I found the practical interesting, but long. I was not too sure what was expected."*
24. *"Prac was not interesting at all."*
25. *"Prac was a great learning experience and challenging as well."*
26. *"Practical was interesting and informative."*

Students complained about not understanding instructions, or what was expected in the practicals. The following comments led to the category on manual and instructions:

27. *"The instructions were sometimes very vague."*
28. *"It was very confusing, the instructions on how to do the prac was not completely clear."*
29. *"The practical were good. The instructions were made very clear."*
30. *"It was quick and easy. The instructions were clear and I had no problems with the practical."*
31. *"The practical were very interesting. The instructions were clear and*

understandable."

32. *"The instructions were clear which made the practical quite enjoyable. The practical ran smooth and were understandable."*

The following comments constituted the category on the relationship between practical and theory.

33. *"This was a learning experience, but bit late. I feel the practical should be run in correspondence with the lectures, because we did most of these things in the first weeks of lectures."*

34. "*Practicals do not coincide with theory."*

35. "*The prac was very enlightening. I fail to see the relevance of the prac in relation to the theory."*

36. *"The link between theory and practicals made me understand better*."

37. *"Practical not relevant to lectures."*

38. *"I was not sure how to do everything and it was very difficult to find the demmies."*

39. "*I found it a waste of time. I don't see the relevance of it to my course or how it will benefit me."*

The category on group work and copying was derived from comments such as these.

40. "*The practical were very disorganised and it was too long. I could not even do the practical myself, I had to copy most of my work, because I could not finish in time."*

41. "*Prac was OK but too much to cope with. I mostly copied the work, because*

there wasn't enough time to go through all the specimens."

42. "*The practical were very long and boring -in the end people just copy from each other, because time will have run out and we are forced to finish as soon as possible. In my opinion Life science practicals are just there for copying things you don't know and don't understand*"

43. "*The prac was very long and we are not able to complete the entire prac by ourselves. We end up copying towards the end when there is not enough time.*"

The category on the educational support was created on the basis of the following comments.

44. *"The [1]demmies are not helpful and a bit more structure would be appreciated."*

45. *"I was not sure how to do everything and it was very difficult to find the demmies."*

46. *"The demmies were not able to help."*

47. *"The demmies were very helpful."*

48. *"The demmies were not helpful."*

49. *"The demmies are too strict."*

50. *" The demmies could not answer the questions."*

51. *"Demmies are eager to help students understand the work."*

52. *"Demmies make fun of us instead of helping us."*

53. *"Demmies did not know the work."*

54. *"Demmies are unfriendly."*

55. *"Demmies are confusing us."*

[1] *'Demmies' was the term that students used to refer to student assistants.*

A category on microscopes and microscope slides were constituted from the following comments.

56. "*It was just a bit too long and the slides were all in use, so you could not exactly finish fast. I think more slides are required.*"

57. "*Shortage of slides wasted time, delays we could not afford.*"

58. "*It was not clear. What we were supposed to draw and the specimens were hard to find under the microscope.*"

59. *"Not enough specimens to work from."*

60. *"Sometimes I can't finish drawings from the microscope because it took so long to, go about fixing the microscope, putting it in correct focussing."*

61. "*Last week's prac was having many drawings of which are not clearly seen on the microscope.....it seems we could get zero in our practicals if we fail to adjust the microscope.*"

62. *"I struggled with the focussing"*

63. *"I could not see anything on the microscope."*

64. *"The practical were fine, but long, maybe due to the fact that for most students it was a first exposure to microscopes."*

65. *"I don't like microscope work."*

66. *"We need more microscope slides."*

67. *" We need more time for learning about the microscope."*

68. *"Microscope work was fascinating."*

69. *"There were not enough slides."*

70. *"We want better slides please."*

71. *"I did not enjoy slide work."*

72. *"The slides were not clear."*

73. *"I am getting used to the microscope."*

74. *"I was not familiar with the microscope."*

75. *"The practical were very interesting, because at lower level schools we just used to see the microscope, but now we are using it ourselves."*

76. *"I was not sure what was expected."*

The category on the instructor was included because of the following remarks.

77. *"The instructor was too authoritative."*

78. *"The instructor was approachable."*

79. *"The instructor works too fast"*

80. *"The instructor is concerned with the students."*

81. *"The instructor not helpful."*

82. "*The instructor and the assistants were very friendly and helpful.*"

83. *"I would like my instructor to have more people to help her, because in some other questions I was confused and I was not attended to immediately.*"

84. "*The instructor was helpful."*

85. *"The instructor too fast."*

The category on marking included remarks of inconsistency and unfairness in mark allocation.

86. *"I did not like the marking by the demmies."*

87. *"The marking was unfair."*

88. *"Mark allocation was unfair."*

89. *"My marks were too low."*

90. *"Marking was not done on time."*

91. *"Marking was fair."*

92. *"I got good marks."*

93. *"I was not happy with my marks."*

Due to the researcher's relationship to these students, they were very spontaneous in their responses in the reflective journals. The researcher was presenting the practicals during this time and managed to build up a very close relationship with the students, since one on one interaction forms a big part of practical lessons. At the end of practical lessons the researcher would take time to chat to the students about their studies as well as personal things.

3.3 THE INTERVIEWS.

Some of the comments in the reflective journals were vague or very general. Students for example made comments such as: "practical was boring", or "practical was interesting." In order for the researcher to clarify these comments it was decided to interview some students. Questions were asked to ascertain what students meant by terms such as 'boring', interesting', 'long practicals' and difficult practicals. The interviews were recorded on audio cassettes. A sample of eighteen students was chosen on the following criteria. A printout of the first semester results was taken and was divided into mark categories from students passing with A symbol to E symbols. Three students in the category below 45%, two students in the category between 45% and 50%, five students in the category between 51% and 60%, three in the category between 61% and 70%, three in the category between71% and 80% and two in the category above 80% were chosen. The interviews were transcribed. See appendix 3.

3.4 THE QUESTIONNAIRE

The students in the first year Life Science class in 1998 came from a similar cross - section of schools where conditions were the same in terms of what was experienced the previous year. It was therefor assumed that the students would have been exposed to the same background in biology teaching and practical work. It was thus assumed, that the problems, which was highlighted during data collection, in 1997, would also be experienced by the 1998 students.

In 1998 a questionnaire was drawn up to administer to the first year students. The aim of the questionnaire was to find out whether the issues which were highlighted the previous year were general things our students experienced.

The questionnaire was therefore drawn up based on the issues that were raised the previous year. The categories which were created from the data previously collected, namely the reflective journals and interviews were used as the framework. Questions were drawn up in each of these categories to get more information on each of these categories. Two hundred and fifty-nine questionnaires were handed out and 220 were completed and returned.

The first category was the biographical profile of the students. Questions were asked to determine the degree students were registered for, the school they matriculated from, the year they matriculated, their practical exposure at school, whether the school had microscopes and whether they were allowed to use those microscopes. The rationale was to determine whether previous exposure to practical work had any influence on students perception of practical work at a university. The degree students registered would possibly influence the way they value a

specific practical session.

The category on workloads included questions about where students lived, how they traveled to university, which suburb they lived in and whether they had any tests after practical sessions. The rationale behind these questions was to determine whether these factors influenced students' perception of the length of practical sessions, since this was expressed in the interviews. The other questions in this category, dealt with the adequacy of the time allowed, the difficulty of the practical lesson and the elements that could influence this and whether students prepared before coming to the practicals. During interviews, students linked these elements to the fact that they could not manage to complete the practicals in the allocated time.

The next category was on the relationship between practicals and theory. This was included because students commented that they liked the fact that it was linked or they thought that a certain practical lesson was a waste of time and had no relevance to the course. The following questions were asked:

- Is a link between practical and theory important?
- Is it important that practicals and theory should coincide?
- Was the theory well represented in the practicals?
- Did practical work in any way help you to understand theory better?

The category on the manual and instructions was included to clarify issues concerning the quality of the manual as well as student's expectations about a manual. During the interviews and in the journals students complained that instructions were not clear or that they were

confused. The following questions were asked:

- Do you expect the lecturer to repeat everything that is written in the manual?
- Why is the manual provided?
- What do you expect from a manual?
- What makes instructions unclear?
- Comment on the quality of the manual?

The category on the value of practicals was included to determine the value students attached to practical work. The following questions were asked to clarify this. Students were given the opportunity to state their opinions about each practical.

- In your opinion, how important were the practicals you have done?
- What elements made the practical important?
- In your opinion how useful were the practicals?
- What elements made the practical useful?
- In your opinion how interesting were the practicals?
- What elements make a practical interesting?

The following category covered the physical conditions. Questions were asked to clarify this:

- What is a good size for a practical group? (Number of students)
- Did you ever find the laboratory too crowded?
- Did you ever find the laboratory too hot?
- Did you ever find the wearing of a labcoat disturbing?
- Health and safety regulations require that you wear a labcoat during practicals. Should you be expected to wear a labcoat when it is so hot?

The category dealing with group work and copying was included to try and illuminate the reasons students copied or preferred to work as groups. The following questions were asked:

- Did any of the practicals allow for group work?
- Did you prefer group work to working on your own?
- Did you engage in group work even if the practical did not allow it?
- Do you think that you benefitted from group work?
- What benefits did you derive from group work?
- Did your group work involve copying?

The category on educational support was included and asked questions about the efficiency of student assistants as well as their sufficiency. It was also necessary to clarify whether students realized their personal role in the learning process.

A category on microscopes and the microscope slides aimed at clarifying the sufficiency of specimens and students ability to handle microscopes. The following questions were asked:

- Did you master the use of the microscope?
- Was your student assistant familiar with the microscope?
- Comment on the availability of microscope slides?
- Comment on the quality of microscope slides used in the practical?
- To what extent do you think your own skills affected the clarity with which you saw the specimen?

The category on the instructor was aimed at clarifying any problems concerning the instructor. The following questions were asked:

- Was the instructor concerned with your needs?
- Was the instructor helpful?
- Did the instructor provide clear explanations?
- Was the instructor well prepared for practicals?
- Did the instructor explain concepts clearly?
- Did the instructor state objectives clearly?
- Could the instructor be consulted when needed?

Unhappiness with marking and mark allocation was dealt with, in the category called marking. A question was asked about the fairness of marking.

In the reflective journals, students also took the liberty to inform us of the kinds of things they wanted to see in the practicals and therefore the last category of the questionnaire did just that.

3.5 THE ANALYSIS

The analysis of the questionnaires was done by using the statistical package SPSS. Each category was used to create a different variable. Categories that allowed for comments were entered as a separate variable. The researcher lumped the comments into very broad categories, to allow for these to also be analysed by the programme. Frequency tables were done from this. Cross tabulations of variance were done, using SAS, to ascertain relationships between different problem areas which was identified.

CHAPTER 4: STUDENT EXPERIENCES OF PRACTICAL WORK

4.1 INTRODUCTION

During the first year of data collecting there was a need to hear what the students felt and therefore data collecting was done in the form of reflective journals. The journals were completed by the students at the end of each practical and they had to give their opinions and feelings about the practical just completed. The number of responses varied from week to week and so did the length of the responses. At the start the response received was in the region of 30% and sometimes as high as 80%. Issues students complained about also varied from week to week. To clarify these issues, the questionnaire was drawn up (Appendix 1). The questions asked in the various categories were to validate the issues which were raised in the journals. Similar types of responses were grouped together to make up the twelve categories in the questionnaire.

In this chapter, I will present the frequency tables and graphs of the questionnaire, administered in 1998 that illustrate the responses of the students in the questionnaire, the interpretation and discussion.

4.2 BIOGRAPHICAL PROFILE

During the data collection phase, through the journals and interviews a picture of a wide range of practical experiences emerged. Major issues during one week would become less important

the next week, while new issues would emerge from time to time. It was clear that what was important to one student was not necessarily so for other students. One could assume that the diversity in the experiences could be related to the differences in academic background and personal circumstances of the students. The first section of the questionnaire was drawn up to determine the biographical profile of the first year Life Sciences student population in terms of their interest, experience of practical work and effort to get to university and home.

Students enrolled for the Life Science course were registered for different degrees and were at different levels of study. The degrees included Science, Science Education, Dietetics, Occupational Therapy and Human Movement Studies. The students registered for science degrees are at first, second and third year level. The majority of students were registered for first year Bachelor of Science degree. (Table 1).

TABLE 1:FOR WHAT DEGREES ARE YOU PRESENTLY REGISTERED?

CURRENT DEGREE	PERCENTAGE
B Sc1	83
B Sc (Ed)	14
DIETETICS	38
B Sc111	5
BA (HUMAN MOVEMENT STUDIES)	9
B Sc11	5
B Sc. (OCCUPATIONAL THERAPY)	99

Many of the B. Sc. students would continue with Dentistry, Pharmacy or Medicine, while others would go on and major in Botany, Zoology, Biochemistry, Microbiology or Physiology. Although these students were registered for a common course, Life Science, they seemed to

have different interests.

Students were drawn from a wide variety of schools, from across the country as well as internationally. The international schools included Maun Secondary School in Botswana, Lester B Pearson college in Canada, and the United World college of the Adriatic. The two hundred and seventeen students who responded to the question came from one hundred and seventy-three different schools, an average of 1,2 students per school. The matriculation dates varied from as far back as 1974 to 1997, with the majority of students having completed a matric in 1997 (55%) (Table 2).

TABLE 2: WHAT YEAR DID YOU MATRICULATE?

MATRIC YEAR	%	MATRIC YEAR	%
1997	555	1989	14
1996	202	1988	18
1995	83	1987	9
1994	41	1984	5
1993	32	1979	5
1992	14	1978	5
1991	9	1974	5
1990	5		

From Table 1 and 2 it was clear that the students in the Life Science course were a heterogeneous group who brought a variety of experiences with them. One would expect that these differences in experience would impact on how students experienced the university at large and more specifically their practical work in the Life Science course.

The majority of students (54,1%) in the Life Science course had practical experience of some kind. The range of practical work that students had been exposed to included microscope work, experimental work, fresh specimens and field work. Many students had been exposed to microscopes and many had been allowed to handle them. Some schools had microscopes but teachers did not allow students to handle them or did not even set them up for students to view slides. The experience of students varied from students individually doing practical work to students working in groups, to students being observers while teachers performed the practical experiment. Others only watched videos of practical work. Some students have been exposed to the whole range, including microscope work, experimental work, field work and fresh specimens, while others had perhaps only done one type of practical work (Figure 1).

KEY:

OT: OTHER

FS: FRESH SPECIMENS

MC: MICROSCOPE

FW: FIELD WORK

EX: EXPERIMENTS

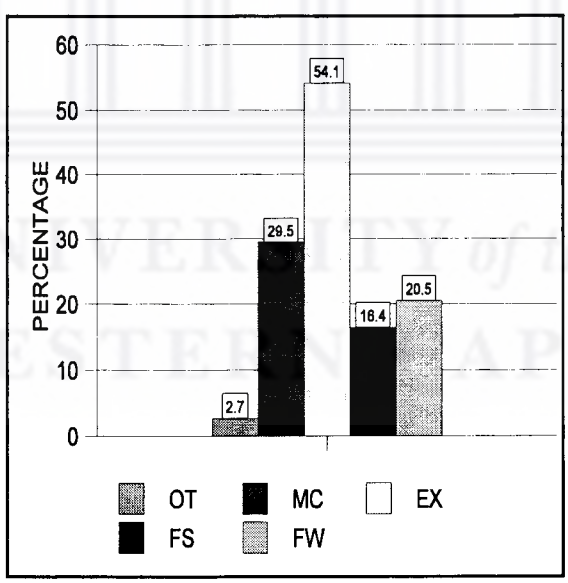

FIGURE 1: DIFFERENT TYPES OF PRACTICAL WORK AT SCHOOL.

From the comments that students made it also became clear that the field work students did were mainly Geography excursions and the experimental work involved mainly Chemistry

experiments (Appendix 2). The hypothesis was that this prior experience of practical work at school would have influenced and impacted on their experience of the practical work at a university.

Less than 40% of students indicated that they had not done any kind of practical work. This lack of experience influenced the experience of those specific students in the practical laboratory. Further this included that students would have had a different attitude toward practical work and would possibly also find the practical work more difficult than those with prior practical experience.

The majority of students (64,7%) lived off campus and traveled to the university. Nearly 34% of students made use of public transport, whilst 17,3% and 11,4% made use of private transport and lift clubs respectively (Figure 2).

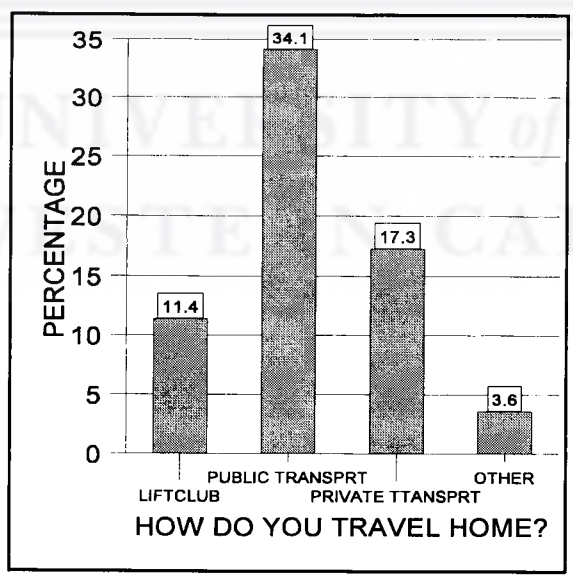

FIGURE 2: MODES OF TRANSPORT

The interviews indicated that students who made use of public transport to commute between the university and home felt more pressurized to complete the practical work as soon as possible than those living in residence or making use of private transport. One student commented:

> *"Yes you would now rush to get done, because you would not know when you are going to get a taxi. The taxis from Bellville to Belhar are very scary."*

Another student responded:

> *"I take a taxi and a train and a ten minute walk home."*

Students who used public transport often had to make use of two to three different modes of transport to get home. Besides that, students often had to walk long distances from these drop off points to get to their homes. Traveling on public transport in the Cape Flats area becomes extremely dangerous after a certain time in the evenings. The possibility existed that this pressure negatively influenced students' attitude toward their practical, causing them to rush through practical lessons and not benefitting optimally from it. A student who lived in the residence would presumably have a more relaxed attitude and would be able to concentrate and get the most out of the practical. It could also be assumed that students who traveled with private transport did not experience the same kind of pressure to complete their practical lessons as those who used public transport or lift clubs. Students in lift clubs were possibly traveling with students in other faculties who had to wait on them to get done. This kind of situation placed pressure on the students that influenced their performances in the practical.

4.3 WORKLOAD.

During data collection it was revealed that the workload in certain practical modules was a major problem to some students. Here are some comments from the interviews:

> *"Yes they were long. Sometimes we didn't understand the work. Most of the people just copy from each others to get home."*
>
> *"Yes, like every Tuesday and Thursday we are writing a test. Now you find that you are pressurized to finish and now the time is long and again the test, and it is like confusion in your mind. You are thinking about what you are going to write and again the practical are long. I think if we didn't write tests, the time would have been fine."*

While considering workloads, different aspects were considered, namely the length of practicals, the difficulty of the practicals, the elements that made practicals difficult and whether or not students prepared before coming to practicals. The majority of students (57% for practical four to 77,6% for practical 1) found the time allowed for practicals were adequate. The percentage response in this category varied over the different practicals indicating that all students did not experience this the same (Figure 3).

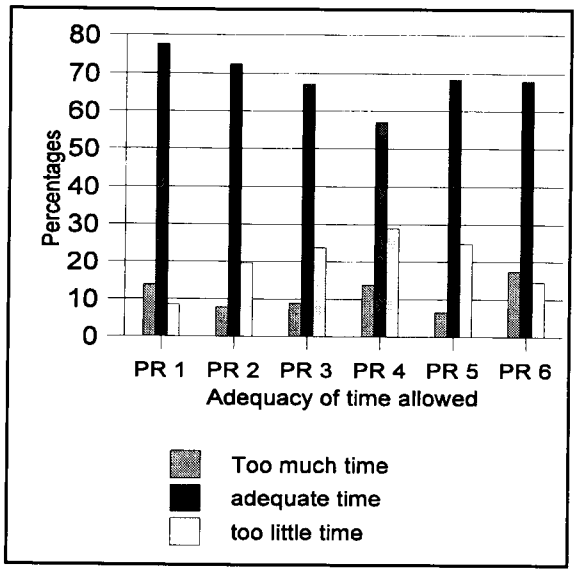

FIGURE 3: ADEQUACY OF TIME ALLOWED

Less than 30% of students found that the time allowed for practicals was too little. Practical four had the most students saying that time was too little. This practical was an excursion to the Kirstenbosch Botanical Gardens and one could speculate that the reason for this response was that students enjoyed the outing and wanted to stay longer. It is also possible that the time spent traveling there and back decreased the time that could have been spent at the gardens. Practical three had about 23% students saying that time was too little. This practical dealt with cells and tissues, the making of wet mounts and drawing of plant and animal cells. The common sense assumption would be that the students who had little or no prior hands-on experiences of practical work would be the ones who felt that the time was too little. This will be further explored in chapter five.

The majority of students felt that practicals were average or easy. Practical 2 which was the

introduction to the microscope had the most students (20%) saying that it was difficult (Figure 4)

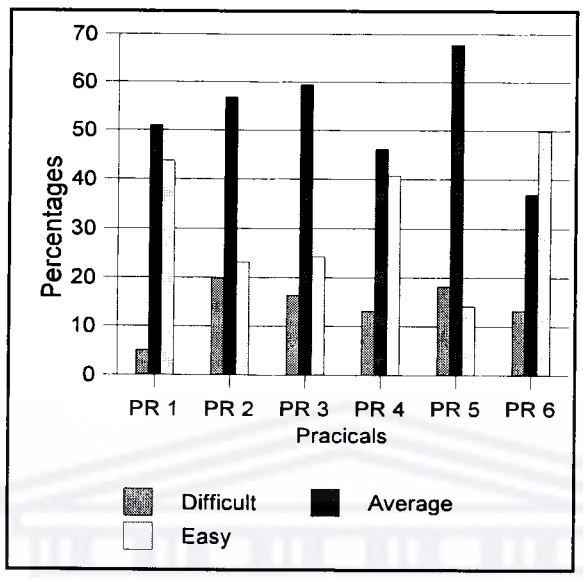

FIGURE 4: DIFFICULTY OF PRACTICALS

Prior experience in practical work would possibly have caused students to be more at ease: practical 2, practical 3 and practical 5 which dealt with microscope work, cells and tissues, making of wet mounts, viewing slides under the microscope and making of diagrams from these cells. Students who did similar practical work at school level would probably have had an advantage over those who had no prior experience.

When considering the elements that made practicals difficult, the majority of students found that background was the main factor (Figure 5). It made sense that students with prior experience had an advantage over students with none and would find practicals easier than those with no prior practical experience. Instructions and contents were the other two elements that caused practicals to be difficult.

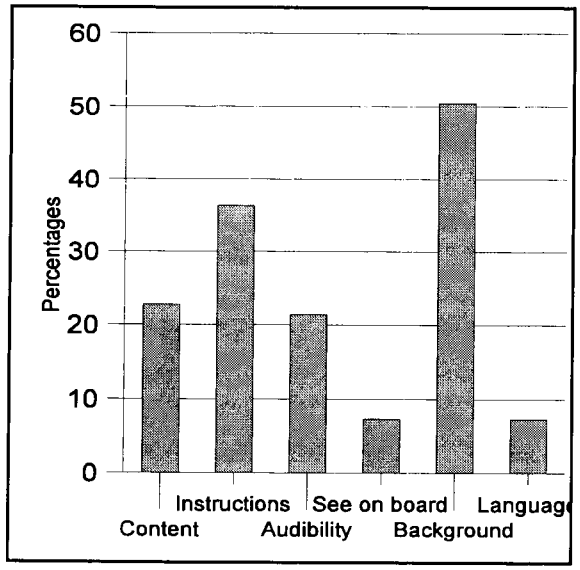

FIGURE 5: ELEMENTS THAT MADE PRACTICALS DIFFICULT

The interviews suggested that students in general realized that preparing before coming to the laboratory had a definite advantage. The results from the questionnaire confirmed this. The majority of students did some preparation before coming to practicals (Table 3).

TABLE 3: DO STUDENTS PREPARE FOR PRACTICALS.

FREQUENCY/ PERCENT	DO YOU PREPARE FOR PRACTICALS
ALWAYS	74/213 34,7
SOMETIMES	127/213 59,6
NEVER	12/213 5,6

Thirty five percent (35%) always prepared, while nearly 60% prepared sometimes. Students related that they were able to complete the practical in less time, when they prepared, than

when they did not prepare. Preparing also made the practical somewhat easier since students had a background to the work being covered in the practical. This was related to students finding that instructions and contents made practical lessons difficult. When preparation was done, students often understood the instructions better, since this meant that they read over this before coming to the laboratory.

On the other hand some students found that language made the practicals difficult. This tied in with the comment that contents and instructions made practical lessons difficult. Although the nature of the "language problem" was not explored in this study, it was assumed that if students were doing a subject in a second or third language, they would take longer than students whose first language was the same as the instructions. Preparation would also be much more difficult in this instance, since the language would be a barrier.

Sixty seven percent of the students had tests after practical sessions in the afternoon. Practical sessions ended at 17h00 and tests were scheduled to start at 17h05. This seemed to impact on how students perceived the time allowed for practicals. On the specific days that class tests were scheduled to take place after practicals, students related that they were under a lot of pressure and found that they could not concentrate optimally on their practical work. This caused students to rush through practicals or copy to get out of the laboratory. This at times led to the perception that time was not adequate for the practical.

> "*Yes, because if it came to the tests after practicals, and it was a long practical, then we just wanted to get out of the lab in time for our test and we would end up copying.*"
>
> "*Every Tuesday and Thursday we are writing tests and now you find that you are*

pressured to finish"

Even though it was minority of students who were saying that time was not sufficient for practicals (20%)and that practicals were difficult (14%) time appeared to affect these students and caused them not to get the maximum out of practical sessions.

4.4 PRACTICAL AND THEORY RELATIONSHIP

The relationship between practical and theory (what was taught in lectures) involved two related but separate aspects. Firstly there was an attempt to reinforce theory in practicals. This was described as a link between practical and theory. The second aspect was an attempt to present practicals exactly at the same time the theory was dealt with, in lectures. This implied that students would on the same day or in the same week do the practical of the topics dealt with, in theory for that week. Students referred to this aspect as the theory and practical coinciding.

During data collection, in the interviews and reflective journals, students indicated that they wanted to see a definitive relationship between practical work and theory. Students wanted to see that what was done in theory was repeated and reinforced in practicals. They also indicated that they wanted practical work and theory to coinciding. The results clearly show this (Table 4).

TABLE 4: IS A LINK BETWEEN PRACTICAL AND THEORY IMPORTANT AND SHOULD PRACTICAL AND THEORY COINCIDE?

RESPONSE CATEGORY	FREQUENCY /PERCENT	
	LINK BETWEEN PRACTICAL AND THEORY IMPORTANT	SHOULD PRACTICAL AND THEORY COINCIDE
YES	201/215 93,5	188/202 93,1
NO	14/215 6,5	14/202 6,9

In the interviews, students indicated that they could see that there was an attempt at linking practicals and theory, but they found it a problem that practicals and theory did not coincide in terms of time. Students reflected, that they wanted the practicals to be relevant to the degree they were registered for. Some students therefore expressed the feeling that certain practicals were a waste of time as they had no relevance to the specific degree they were registered for, so to them the work was irrelevant irrespective of whether there was a link between theory and practical. It was however clear that students looked for a relationship between practicals and theory and often found one, even if none existed. Students expressed the need for practicals to reinforce the work done in lectures. The assumption was that learning would be easier when the work done in lectures was also done practically. The results from the questionnaire supported this feeling since 93,5% of students agreed that a link between practical and theory was important (Table 4) and 93,1% agreed that practical and theory should coincide (Table 4). Students expressed their views on the link between theory and practical as follows:

"We could see that we did the stuff in class. Like we could see and it helped us."

Another student commented this way:

"Yes, most of the time there was a link, but you know, we covered the theory two weeks ago, because the practicals are like a bit behind, or the practicals are a bit in front. I think there was a benefit. For argument sake if you never did the theory and now you're just thrown into the practical, it's like it doesn't matter what practical you are doing. The practicals are supposed to be for your benefit. The whole reason for the practical is so you can see the practical side of theory, and there is no use seeing the practical side of the theory if you haven't seen the theory. So in that sense it's like a benefit and also even though the theory and practical are not done in sequence, even if you have done the theory like two weeks ago, the memory is still fresh."

Students also had the general perception that theory was well represented in practicals (Table 5).

TABLE 5: WAS THEORY WELL REPRESENTED IN PRACTICALS?

FREQUENCY PERCENT	PR 1	PR 2	PR 3	PR 4	PR 5	PR 6
YES	152/212 71,7%	141/215 65,6%	150/214 70,1%	126/215 58,6%	140/211 66,4%	158/216 73,1%

They also seemed to agree that the practicals helped them to understand theory better. It was quite clear that students expected a link between practical work and theory. Their main reason was that it would help them understand the theory better.

Three practicals lessons were presented which did not directly relate to the theory done in the first term. They were the practical on the microscope, which dealt with teaching of microscope

skills, the practical on measurement and units and the excursion to Kirstenbosch Gardens.

From the comments it was clear that students expected a relationship between and theory.

4.5 MANUAL AND INSTRUCTIONS.

A manual was provided to students to assist them in preparing before coming to practicals. Quite a large percentage of students (32%) expected the lecturer to repeat everything that was written in the manual (appendix 2, p.67). This was an indication that a certain number of students had not realized their responsibility as university students. These could also be students who had no prior experience of practical work and therefore also did not realize what was expected from them.

A large percentage of students complained that instructions were badly drawn up and comprehension problems made instructions unclear. Nearly 14% of students said that a language problem made instructions unclear (Table 6). This percentage represented 30 students out of 220 who responded to this question, which was equal to a normal third year class. These students were non-English speaking students. Students who prepared indicated that following the instructions were much easier once they had read it through before coming to the laboratory.

One student commented:

> *"Yes, when you come in the practical, you know what is expected from you and you know what is happening. It also takes less time when you prepare."*

Another student responded this way, when asked whether preparing affected the time spent in a practical laboratory:

"I'd say very much so, besides working much faster, I did not have to ask the lecturer or demmie to assist me or explain a certain part to me, I could take it on my own and not use anybody else's help. I could work on my own."

TABLE 6:WHAT MAKES INSTRUCTIONS UNCLEAR?

	LANGUAGE	COMPREHENSION	INSTRUCTIONS	HEARING/SIGHT PROBLEM
FREQUENCY	30/220	66/220	115/220	36/220
PERCENT	136	30	523	164

Despite the fact that all students were in possession of a manual, not all students prepared for practicals. At the beginning of each practical a pre practical talk was given to introduce students to the background of the topic to be dealt with, in that specific practical. The lecturer explained the instructions and tried to get everybody to understand what was expected in the practical.

Most students agreed that the reason why the manual was provided, was to prepare before coming to the practical laboratory, or to provide guidance through the practical. Here are some comments:

"A manual is supposed to give guidelines and instructions."

"A manual is supposed to give instructions."

"A manual is for us to prepare from."

Many students expected the manual to have more background information than it presently had. Some students commented that they wanted the manual to have answers to the questions covered in the manual so that it could also be used as a reference source. This seemed to indicate that students did not know how to go about researching answers, and wanted everything at their fingertips. It was also possible that these students had not yet accepted responsibility for their own learning.

These results were possibly an indication that the instructions were badly drawn up and that the students did not understand what was expected. Perhaps the manual was not as efficient as was expected. Comments about the quality of the manual varied from *"diagrams were not clear,"* while others said that there were not enough diagrams. Only 18,5 % of students actually commented on the text, saying that either the flow of the text was not good or the language was incoherent or that the text was not clear. It appeared as if students expected the manual to be like a very comprehensive textbook.

4.6 THE VALUE OF PRACTICAL LESSONS.

In the reflective journals students often used vague terms to describe their experience of the practicals. The picture that emerged was that students generally found practical sessions interesting and the majority enjoyed them. It was however difficult to determine what was meant by an unimportant or boring practical lesson. The interviews gave an indication that difficult implied that the students often were not clear about the expectation of the practical, or that they did not understand the instructions. 'Boring' meant that they generally did not know what to do and assistance was not readily available. Students who planned to continue with

Dentistry or Pharmacy or Medicine or even students registered for Occupational therapy often did not see the relevance of a certain practical session to the specific degree they were registered for. One student commented:

"I don't see the relevance of these practicals to my course."

Another student commented:

"It was interesting, but I don't see the relevance of it to Occupational Therapy."

"I do not see what Life Sciences have to do with the discipline that I am in."

"I found it a waste of time. I don't see the relevance of it in my course or how it will benefit me."

It could be assumed that students' perception of the importance of a practical session was based on their interest. The majority of students found practicals important. The importance of the practical seemed to be linked to the fact that it verified the theory (appendix 2, p 7). Importance was also related to student needs and whether they thought they benefitted from the practical (Table 7).

TABLE 7: THE VALUE OF PRACTICALS

FREQUENCY PERCENT	PRAC 1	PRAC 2	PRAC 3	PRAC 4	PRAC 5	PRAC 6
IMPORTANCE OF	158/213	205/217	207/217	142/218	209/217	153/219
PRACTICALS	74,2	94,5	95,4	65,1	96,3	69,9
USEFULNESS OF	166/212	201/215	198/217	138/217	199/216	154/218
PRACTICALS	78,3	93,5	91,2	63,6	92,1	70,6
INTEREST OF	92/207	173/211	173/212	134/212	171/210	115/212
PRACTICALS	44,4	82	81,6	63,2	81,4	54,2

The majority of students regarded the practicals as useful. The usefulness of practicals was linked to exposure to instruments, relevance to everyday life, whether it could be applied to other subjects, relevance to the theory and the marks that they score. Table 7 indicates that students generally perceived the practicals that were related to theory to be more useful than those not directly related to theory. Practical 1, 4 and 6 had slightly higher negative responses than the others. These practicals did not directly relate to theory. Practical 1 dealt with measurements and units and had a negative response of 21,7%. This practical aimed at introducing students to different metric units and conversions. Practical 4 was the excursion to Kirstenbosch Gardens and had a negative response of 36%. This practical was not directly related to theory and aimed at introducing students to nature and nurturing in them a love for nature. Practical 6 was a video on mind mapping and covered study methods. This practical had 29% of students responding negatively.

Practicals were regarded as interesting when students felt in control of what they were doing. Here are some comments:

"The involvement we have in the practical, so we understand what we are doing and not just doing it for the sake of doing it."

"When you follow and understand the practical, that makes it interesting."

"When I manage to get positive results."

"*You should know everything when the practicals are finish."*

The comments seemed to indicate that understanding, knowing what you were doing, proper explanations, and shorter practicals were the elements students associated with an interesting practical session. Enjoyment, challenge, seeing and learning new things and the attitude of the

instructor and assistants also seemed to influence students' perception in this category. The following are some comments students made in the questionnaire:

"I had learnt something new and saw it for the first time."

"Seeing things for the first time, working with equipment for the first time."

"The person who is conducting the practicals should be understanding."

"Cooperation and understanding of what is going on"

"Understanding what you are doing, how it applies to life, scientific facts."

The majority of students seemed to find most of the practicals interesting although practical 1, 4 and 6 received a fairly high negative response (55,6%, 36,8% and 45,8%) (Table 7). These practicals were also the practicals regarded by more students as less useful. It would appear that interesting practicals were also experienced as more useful. The reason why practical one had such a high negative response could possibly be because most students were already familiar with the work and regarded it as repetition and boring. Practical 6 was the video on mind mapping and it could be that by this time students had established a study method and were not interested in hearing about other methods.

4.7 PHYSICAL CONDITIONS.

Some students commented in the reflective journals that they found the laboratory unbearably hot at times. They also complained that they found it crowded and that working space was not sufficient. The results from the questionnaire showed that the majority (65%) of students found the laboratory too hot (Table 8). Quite a large percentage found the laboratory too crowded (Table 8).

TABLE 8: PHYSICAL CONDITIONS

FREQUENCY PERCENT	YES
DID YOU FIND THE LAB TOO CROWDED?	97/210 46,2
DID YOU EVER FIND THE LAB TOO HOT?	140/214 65,4

The laboratories were prefabricated buildings, which accommodated seventy students comfortably. In the middle of Cape Town summers, it became quite unbearable in a prefabricated building with seventy students. Here are some comments:

"The practical were very confusing and too long. It was tiring considering the heat."

"I felt that the heat had a role in making the practical stuffy and hot."

4.8 GROUP WORK/ COPYING.

The majority of students indicated that practicals allowed for group work, while there was only one practical in this specific module where group work was required (Table 9). The majority of students also preferred working in groups (Table 9) to working on their own. The majority of students engaged in group work (Table 9) and it was clear that the majority of students felt that they derived a certain benefit from this.

TABLE 9: GROUP WORK AND COPYING.

FREQUENCY PERCENT	YES
DID PRACTICALS ALLOW GROUP WORK?	154/210 73,3
DID YOU PREFER GROUP WORK?	181/217 83,4
DID YOU ENGAGE IN GROUP WORK?	115/218 52,8
DID YOU BENEFIT FROM GROUP WORK?	191/215 88,8
DID GROUP WORK INVOLVE COPYING?	47/210 22,4

The comments seemed to shed some light on the benefits that students derived from group work. Students found that the opportunity to discuss and formulate answers and the sharing of information helped them to understand the work better. Here are some of the comments that were made in the questionnaire:

"Having someone to discuss the work with and formulate answers."

"Sometimes you don't understand the work and your friend can help you."

"Having a partner to discuss work gives you a more clear understanding about the work and what is required from you."

"Clearer understanding of the concepts and procedures."

The reasons given for copying were the length of practicals, tests after practicals and a shortage of microscope slides and specimens. The results from the questionnaire however

contradicted this, since nearly 80% of students did not copy and the reasons mentioned previously for copying, did not feature at all (Table 9). Students were quite open about copying as illustrated by the following excerpts from the journals and interviews:

"Copying is involved, because some of the questions and diagrams are too difficult to answer."

"We are not copying. We write what we have discussed as a group."

"We compared."

"If we are unsure of an answer, we discuss among ourselves."

"We copied because in the laboratory the lady is rushing you to get finished."

The comments on the questionnaire contradicted the comments from the journals and interviews. This aspect of group work and copying need to be investigated further.

4.9 EDUCATIONAL SUPPORT.

The practical program received support in the form of student assistants. Student assistants were trained to assist first year students during their practical. This support took on many forms such as explaining concepts to students when they did not understand and also guiding students through instructions when they were unclear. Student assistants were paid to perform this duty and were allocated at a ratio of one assistant per fifteen students. Sixty-seven percent (67,6 %) of the students said that student assistants were sufficient to service the various practical groups. This still left 32% of students who did not agree that the service was sufficient.

Because of certain problems and financial constraints, the allocated number of student assistants could not be appointed. The result was that assistants often had to operate at a ratio of one to twenty or thirty students. This resulted in tremendous pressure on the assistants and lots of frustration for students.

The data also reflected that student assistants were not always familiar with the contents of the practicals (Table 10). Most students were fairly clear on what they expected from the student assistants, namely to give direction and assistance when difficulty was experienced.

TABLE 10: WERE STUDENT ASSISTANTS FAMILIAR WITH THEORY?

FREQUENCY PERCENT	WERE STUDENT ASSISTANTS FAMILIAR WITH THEORY?
ALWAYS	55/219 25,1
SOMETIMES	155/219 70,8
NEVER	9/219 4,1

Here are some comments:

"To help students and they should be familiar with the work which is done so that it is easy for them to explain."

"To guide when one is confused or unclear about something."

"They should assist the students and they should know what they are talking about."

"To guide and assist you through the practical."

"They should assist us during the practical."

Students were also fairly clear on what they thought was expected from them, namely not to expect answers from assistants, to be familiar with the work and do the practical.

Student assistants often had a difficult task getting around to everybody to assist them with their problems. Problems could range from students who thought the microscopes did not work, when it was not switched on, to students not having understood the instructions, when all of this had been explained at some point during a practical session.

4.10 MICROSCOPE AND MICROSCOPIC SLIDES.

The microscope was a fascinating piece of equipment to most students and many students in their reflective journals expressed their amazement at the wonder of the world through a microscope. Here are some comments from the reflective journals:

> *"To see bacteria and the organelles of the leaf cells was enlightening. Also, to see cheek cells was interesting."*

Another student commented:

> *"I really enjoyed myself working on the microscope, and for the first time I saw how bacteria look and was very fascinated."*
>
> *"We saw stuff like yogurt, leaves and plants and we don't know what it consists of. By looking through the microscope we could see every detail, not that clearly, because it is so tiny, but it gives you an idea what the things that you see in everyday life consist of."*

Although some students had been exposed to a microscope at school, it was still impressive to

most of them to handle their own microscope. Sixty three percent of the students attended schools that had microscopes, while 36% of them were allowed to use them. Students regularly reflected that they had seen nothing during a practical session, since they could not get their microscope focused. During the interviews, which were carried out during the third term, there were still some students who admitted too not having mastered the use of the microscope (Table 11).

TABLE 11: MICROSCOPES

FREQUENCY PERCENT	YES
DOES YOUR SCHOOL HAVE MICROSCOPES ?	137/217 63,1
WERE YOU ALLOWED TO USE MICROSCOPES?	74/205 36,1
DID YOU MASTER THE USE OF THE MICROSCOPES?	141/219 64,4
WAS THE STUDENT ASSISTANT FAMILIAR WITH THE MICROSCOPE?	194/215 90,2

The results from the questionnaire indicated that 64% of students felt they had mastered the use of the microscope (Table 11). This left 35,6% who had not learnt to use the microscope. This percentage represented 78 out of 219 students who responded. One would expect that the students with prior experience of practical work would have found it easier to master the microscope than those with no prior experience. The microscope used by the first year students is a Leica research microscope with phase contrast. It is not the average microscope used by first year students. Therefore, a great deal of effort was put into familiarizing students with the

specific microscope. There was however the problem that a number of students joined the class several weeks into the course. These students missed out on the practical lesson where the use of the microscope was taught. The fact that some student assistants were not familiar with the microscope also contributed to students not mastering the use of the microscope (Table 11).

The availability of slides and specimens was not mentioned by many students as a problem, but during interviews it became clear that the shortage of specimens, encouraged copying.

Here are some comments from the interviews:

> "*Yes it was, sometimes you finished a slide and you have to wait for another slide to draw or someone else is waiting for something you have.*"
>
> *"Yes sometimes, especially when we were having a test and you find that you need something and someone else has it and now you have to wait."*
>
> *"Shortage of slides was not a problem. We just copied."*
>
> *"We would each do a separate slide and each a different question and then you get the work from the others and that way we all finish up early."*

The results from the questionnaires indicated that 57,4% of students said that there were insufficient microscope slides (appendix 2, p. 10). The rest felt that this was not a problem even if they had to share. When asked to comment on the quality of the slides, whether they were able to see the specimen, 46,9% said it was satisfactory; 51,2% said it was poor quality or that they could not always see; 1,9% of students said that they could not get their microscopes focused or that they could not use the microscope2 (appendix 2, p. 59). This was a clear

indication that the students experienced problems in this area. One could speculate that the students who did not master the microscope were the ones who had problems seeing the specimen clearly since there was no clear indiction whether the problem was skills or quality of the slides. The slides were of commercial origin.

4.11 INSTRUCTOR

A picture emerged that student needs were not being met consistently. One would expect that students who came without any prior practical experience would need more help and support than those who had prior practical experience. The majority of students (70%) responded that needs were met sometimes or never (Table 12). This was an indication that the instructor was kept so busy by some students that other students' needs were not met. Given the shortage of student assistants, the possibility that this actually happened was great. Students generally did not find the instructor helpful and the majority responded sometimes or never, indicating that the majority of students probably rarely received any assistance from the instructor (Table 12). Results also showed that the majority of students did not experience clear explanations from the instructor (Table 12). Weaker students lagged behind and became frustrated. This led to these students not benefitting optimally from their practical sessions. Although the majority of students experienced the instructor to be well prepared, for practicals lessons (Table 12), the majority of students found that concepts were not clearly explained (Table 12). Students missed out on the practical experience as well as in understanding and mastering theory if they did not learn the concepts. Objectives were not always clearly stated, leading to students not being able to measure whether they had achieved the intended goals for the specific practical.

TABLE 12: INSTRUCTOR

FREQUENCY PERCENT	ALWAYS	SOMETIMES	NEVER
WAS THE INSTRUCTOR CONCERNED WITH YOUR NEEDS?	63/211 29,9	126/211 59,7	22/211 10,4
WAS THE INSTRUCTOR HELPFUL?	93/214 43,5	114/214 53,3	7/214 3,3
DID THE INSTRUCTOR PROVIDE CLEAR EXPLANATIONS?	62/213 29,1	138/213 64,8	13/213 6,1
WAS THE INSTRUCTOR WELL PREPARED FOR PRACTICALS?	147/211 69,7	61/211 28,9	3/211 1,4
DID THE INSTRUCTOR EXPLAIN CONCEPTS CLEARLY	66/213 31	132/213 62	15/213 7
DID THE INSTRUCTOR STATE OBJECTIVES CLEARLY	91/213 42,7	106/213 49,8	16/213 7,5

This caused students to miss out on important skills or concepts that were taught, rendering the practical a fruitless effort in the end (Table 12). More than 50% of students felt that the instructor could be consulted when needed. This left nearly half the class responding sometimes and never. This indicated that a large percentage of the students did not always have access to the instructor or might have found that the instructor was not approachable. Considering that these students might have needed to consult with the instructor, these students would have missed out on that enriching experience.

4.12 MARKING.

The marking of practical reports was done by the student assistants from memorandums provided by the instructor. The complaints about marking were very regular and students

regularly expressed unhappiness with things like inconsistencies in marking as well as what some students described as student assistants not knowing their work. Marking was in fact the only way that students received feedback on the work that they had done in the case of practical work.

The majority of students found that marking was fair (53,3%). This left a very large percentage of students not happy with the way reports were evaluated. Comments varied but what came through clearly was that students were not always sure of what was expected from them.

Here are some comments from the questionnaire:

"I think the marking was fair enough."

"When work was presented in a clear and methodical way, and they were correct, marks were fairly allocated."

"Marking was not consistent"

"The marking is not consistent enough."

"The student assistants' marking our scripts seem not to be sure."

"The correct answers for the practical are never given, which makes it difficult for us to know where we went wrong."

"I didn't know what information to write to get more marks."

"They were fair."

Students complained that mark allocations were inconsistent and no indication of where they had gone wrong was given. This could be a reflection on the assistant's unpreparedness.

4.13 SUMMARY

Practical work formed an integral part of the Life Science course. Considering the money, time and effort invested into the course, one would expect it to be a very valuable learning experience for students, yet this research showed that many students did not benefit as they should have.

A biographical profile of the sample showed a diversity of student experiences. This was reflected in the varying responses to questions in the different categories. Students gave a variety of responses to a variety of issues that were dealt with, in the questionnaire. Students came from a variety of schools with diverse backgrounds in practical experience. Students came with different life experiences. Judging from the matriculation dates it was clear that some students had worked a while before coming to the university, while others came straight after matriculating, while still others had perhaps been to some other university before coming to this university. All these factors had an impact on how students perceived their practical experience and affected the way they approached the different challenges that came their way.

When considering the various perceptions of the students toward the workload, it was clear that all students did not have the same experience of the Life Science practical work.

The results in the category involving the practical to theory relationship indicated that students appeared to have a very clear expectation here. Students expected that the work that was done in theory was covered in practical. They also seemed to expect that practical work and theory should coincide in terms of time, in order to allow them to reap the maximum benefit. Their

expectations seemed to overrule sound judgement at times, since they saw a relationship between practical work and theory even if none existed.

Many of our students appeared not to have the emotional or academic maturity to accept responsibility for their own learning. The section on manual and instructions indicated that quite a number of students expected the lecturer to repeat the instructions. Some students also expected much more from the manual than it was presently offering. They were expected detailed descriptions and an appendix with answers to the questions.

The practical lessons were valued positively by the majority of students. It was quite evident that practical lessons were generally perceived as an experience a student wanted to enjoy and learn from. They wanted them to be a challenge and something that would add value to their experience at University. Practical lessons that related more to theory were valued as more important and more useful, complementing the idea that students wanted to see a relationship between practicals and theory.

A vast majority of students were affected by the heat and crowdedness in the laboratories and it impacted negatively on their practical experience. Data reflected that students came from right across the country and even from outside South Africa often still needing to acclimatize to the weather in Cape Town.

The majority of students felt that they benefitted from working in groups. Damon in Lumpe & Staver(1995) confirms that group work allows students to share ideas, confirm their own ideas and reason and discuss theories. According to Johnson & Johnson and Sharan and Slavin in

Lumpe & Staver (1995) group work motivates students to work harder and get better results. Students were clear that they were only discussing and sharing ideas and not copying each other's work. Sullivan in Lumpe & Staver (1995) was quite sure that students could work together as equals and not copy.

Educational support in a way impacted on students experience of the practical lesson. In many cases there were not sufficient student assistants to service a group and other times these student assistants were not equipped well enough to deal with the questions and problems students experienced. Given that our students came from various backgrounds with varying degrees of practical experience student assistance would form a major part of the practical experience.

Students arriving from the various schools had different experiences and exposure to microscopes. Some students came from schools where they had no microscopes while others came from schools where they had microscopes and where they were allowed to use these microscopes. One can assume that those who came from the latter schools had an advantage over those from schools where there were no microscopes. The experiences of these two groups would differ. Where in the first case it would be a new experience, to the latter it would be an enriching experience. To the first group, time and student assistance might greatly influence the experience, while group work could offer support. The shortage of microscope slides appeared to be experienced differently by different students. Some students found that it was a problem while others soon realized that with a bit of careful planning it would not be a problem at all. This reflected once again on backgrounds and practical experience. One can safely assume that the students with prior experience did not find this to be a major problem.

However, it did affect the practical experience of a certain group of students negatively. Some students did not master the use of the microscope and this inevitably impacted negatively on their experience of practicals especially when microscopes were used. Some student commented that they had problems focusing the microscopes, often never getting to see anything, unless a friend or student assistant took pity on them.

The instructor played a part in the practical with regard to guiding and assisting students through the practical. The instructor was also responsible for introducing the topic and tasks to be covered in a specific practical session. How well this was done often determined how well students would grasp what was expected from them. The results showed that some students' experiences were enhanced by the instructor, while others were discouraged.

The way practical reports were evaluated appeared to have a tremendous impact on students' experience of practical work, judging from the comments. Students felt that they were treated unfairly and that student assistants were not equipped enough to evaluate reports. Students also felt that despite the fact that books were marked, there were no clear guidelines about where mistakes were made. Queries were also not always dealt with fairly.

CHAPTER 5: SOME ELABORATIONS OF STUDENT EXPERIENCES

5.1 INTRODUCTION

Many factors impacted on first year students experience of practical work. These factors were discussed in chapter four. The results showed that on average the majority of students perceived practicals to be an important, useful and interesting experience. It was disconcerting to see that a considerable number of students (43) experienced practical work negatively. The specific concerns were that:

- these students did not master the use of the microscope. The microscope is an essential tool in the study of Life Science and senior Biology courses at university and the fact that some students did not master it could impact negatively on their future studies.
- the time allowed for practicals was inadequate. The problem regarding the time constraint was related to internal factors (e.g., practicals were too difficult) or external factors (e.g., where students lived). Depending on the nature of the time constraints, different solutions would be needed.
- students indulged in group work when the practical lessons did not make provision for this. The concern about group work was related to comments in the reflective journals and interviews indicating that students used group work as a disguise for copying.
- practical work was not relevant. The student body enrolled in the Life Science course was very diverse, with diverse perceptions of the value of the practical course. It was necessary to investigate this question further to allow for the development of a practical program which would be relevant to all students.

The cross tabulations that were done to clarify these questions, were:

- where students lived related to their perception of time,
- where they lived related to copying,
- students perception of time related the difficulty of practicals,
- writing of tests after practicals related to copying,
- the relationship between students who mastered the use of the microscope and schools with microscopes,
- the relationship between students who were allowed to use the microscope and those who mastered its use.
- the writing of tests related to copying,
- the relationship between the availability of student assistants and students copying.
- the relationship between where students live, how they travel home and copying.

The following cross- tabulations were done to determine how students valued practical work.

- the importance of practicals related to how practicals and theory coincide,
- the relationship between the importance and usefulness of practicals,
- the relationship between importance and understanding theory better.

This chapter will attempt to give possible reasons and explanations for the various problem areas that were identified.

5.2 METHODOLOGY

In order to illuminate the concerns raised in Section 5.1, cross tabulations of variance were done. The cross tabulations generated three different types of tables which were interpreted as follows: The first type of table that was generated was a cross tabulation between two questions, both with yes-no responses. The following tables are examples of this type: Tables 1, 2, 10, 11, 12, 13. Frequency and row percent were used to describe the relationship between the two questions in some of the tables, while column percent was used for the others, depending on which question was the main one. In the case of the first table, for example, the main question involved students who mastered the use of the microscope.

The second type of table that was generated was a cross tabulation between two different questions which were asked for the six practicals presented. The results were combined over the six practicals. Each practical had a number of responses, for example, practical 1 question one had 210 responses, practical 2, question 1 had 214 responses, etc. The same would then apply for question 2 for each of the six practicals. The responses were totaled over the six practical for each question. The following tables are examples of this type: 5,6 and 9.

The third type of table was generated from a cross tabulation between two questions, but not combined over practicals. In other words, the responses for individual practicals are reflected in the table. Tables 7 and 8 are examples of this.

5.3 THE MASTERY OF THE MICROSCOPE.

Table 11 showed (chapter 4) showed that 35,6% of the students did not master the use of the microscope. From this table it could also be seen that 36,9% of the students attended schools which did not have microscopes. This seemed to indicate that there was a relationship between students who attended schools with microscopes and those students who mastered the use of the microscope. However from Table 13 it was clear that this relationship was not valid.

TABLE 13: RELATIONSHIP BETWEEN STUDENTS WHO MASTERED THE USE OF THE MICROSCOPE AND SCHOOLS WITH MICROSCOPES.

FREQUENCY ROW PERCENTAGE	YES MASTERED USE OF MIC	NO DID NOT MASTER
YES SCHOOL MICROSCOPE	92/136 67,7%	44/136 32,4%
NO SCHOOL MICROSCOPE	47/80 58,8%	33/80 41,3%

The results as reflected in table 13 indicated that having a microscope available at school was not a sufficient condition for the mastery of the use of the microscope at a university. Although the percentage of students who mastered the use of the microscope and who attended schools with microscopes was higher than those students who attended schools without microscopes, the results were not significant (P= 0.19).

The cross tabulation of students who were allowed to use the microscope at school and those who mastered its use at the university, showed a statistically significant relationship (P = 0.01)

(Table 14).

TABLE 14:RELATIONSHIP BETWEEN STUDENTS WHO WERE ALLOWED TO USE MICROSCOPES AND MASTERED ITS USE.

FREQUENCY ROW PERCENT	MASTERED THE USE OF THE MICROSCOPE	
	NO	YES
YES ALLOWED TO USE SCHOOL MICROSCOPES	55/74 74,32%	19/74 25,68%
NO, NOT ALLOWED TO USE SCHOOL MICROSCOPES	73/130 56,15%	57/130 43,85%

What was encouraging though, were that 58,8% of the students who attended schools without microscopes and 56,15 % of students who were allowed to use the microscopes at those schools who had microscopes, mastered the use of the microscope. This result showed that although having access to a microscope at school was advantageous for the mastery of the use of the microscope at the university, it was not a necessary condition.

5.4 TIME CONSTRAINTS.

The results in Chapter 4 show that a small percentage of students found that the time allocated for a practical session was insufficient. This percentage varies from about 9% of students for practical one too as high as 29% for practical 4 (Figure 3, Chapter 4). The interviews and reflective journals seemed to imply a connection between the difficulty of practicals lessons and the time students took to complete them. There was also the implied relationship between where students stayed (and how they got home) and the time practicals ended.

Table 15 shows that of the 218 students who responded to this question, 77 lived in the hostels on the university campus and 141 lived off campus in private homes. The results for the two questions dealing with interest and time respectively, were summed, over the six practicals. For the category of the adequacy of the time allowed for the practicals, a mean of 12,6 was obtained over the six practicals, for students living on campus. A mean of 12,5 was obtained for students living elsewhere. The score of 12,6 and 12,5 for the two groups respectively indicates that students generally felt that the time allowed for practicals was adequate.

TABLE 15:DO YOU LIVE IN RES VS. ADEQUACY OF THE TIME ALLOWED.

	FREQUENCY	MEAN
LIVE ON CAMPUS: TIME	77/218	126
LIVE OFF CAMPUS: TIME	141/218	125

However, the comments from the journals and interviews gave the impression that students did experience time pressure and often resorted to copying to complete practicals in the allocated time. The data in Table 16 also reflects that the students staying off- campus were more inclined to copying. This group made up 34 out of 142 students. This is a significant number considering that only one practical was designed for group work, and it is disconcerting that so many students resorted to copying, when the practical experience is supposed to be a valuable learning experience.

TABLE 16:ABODES VS. GROUP WORK INVOLVING COPYING.

	FREQUENCY/ COLUMN PERCENT	YES - INVOLVED IN COPYING	NOT INVOLVED IN COPYING
1	ON CAMPUS	10/73 13,7%	63/73 86,3%
2	OFF CAMPUS	34/142 23,94%	97/142 68,3%
2.1.	LIFT CLUB	3/23 13,04%	20/23 86,96%
2.2.	PUBLIC TRANSPORT	19/69 27,5%	50/69 72,5%
2.3.	PRIVATE TRANSPORT	10/33 30,3%	23/33 69,7%
2.4.	PARENTS FETCHED THEM	3/7 42,86%	4/7 57,14%

Comments reflect the various groups of students' perceptions of time.

> "*The length of practicals was not a problem, I stay in res and getting home is not a problem.*"

Another student staying in a suburb not far from the university felt this way:

> "*Yes, you would now rush to get done, because you do not know when you are going to get a taxi.*"

It was a concern whether students' perception of time and workload was related to the difficulty of practicals. The data from the reflective journals showed that there were students

who found practicals difficult. The results reflected in Table 17 shows that the majority of students (40,2%) found that the level of difficulty of practical work was average and that adequate time was allowed for practical work. 3,5% found that practicals were average and time was too much, 9,1% found practicals average and the time allowed for practical work was too little, while 6,9% of students found that practicals were difficult and the time allowed was too little.

TABLE 17:RELATIONSHIP BETWEEN STUDENTS' PERCEPTION OF TIME AVAILABLE AND DIFFICULTY OF PRACTICALS.

FREQUENCY OVERALL PERCENT	DIFFICULT	AVERAGE	EASY	TOTAL
TOO MUCH TIME	19 15	45 3,54	81 6,38	145 11,42
ADEQUATE TIME	77 6,06	510 40,16	282 22,2	869 68,43
TOO LITTLE TIME	87 6,85	115 9,06	54 4,25	256 20,16
TOTAL	183 14,41	670 52,76	417 32,83	1270 100,00

Of the total responses, there were 14% of students who said that practical lessons were difficult. Figure 4 in Chapter 4 shows that the percentage of students who found practicals difficult ranged from about 5% for practical 5 to 20% for practical 2. Practicals 2, 3 and 5 were practicals which dealt with microscope work and had the highest percentages of students experiencing it as difficult. Figure 3 in Chapter 4 shows that a small percentage of students found the time too little for the practicals. This ranges from 13% for practicals 1 and 5 to 29%

for practical 4. The possibility seemed to exist that too much was expected in too little time. Data shows that the majority of students appeared to cope with the workload; however it is a concern that there seemed to be a minority of students who were not benefitting from the practicals, because they were not able to complete practical tasks in the time allocated.

From the interviews it became clear that tests written after practical lessons put tremendous pressure on students. Students admitted that they often resorted to all kinds of measures to complete practicals in the allocated time or earlier because of tests after practicals. These measures included copying of tasks, (Table 18).

TABLE 18: THE RELATIONSHIP BETWEEN GROUP WORK AND STUDENTS WRITING TESTS AFTER PRACTICALS.

FREQUENCY/ COLUMN PERCENT	YES TESTS	NO TESTS
YES GROUP WORK	74/138 53,62	38/69 55,07
NO GROUP WORK	64/138 46,38	31/69 44,93

It was possible that because of tests scheduled after practical lessons students felt that the workload was too much for the time allowed.

The data suggests that the majority of students did not have a problem with the time practicals ended, neither did they experience the pressure to get home, even when they traveled with public transport. This however does not eliminate the fact that there were those students who

were affected by the factors discussed, and this in fact did appear to influence their performance in the laboratory. Students related during interviews that they copied or worked in groups because of time. Working together enabled them to complete tasks quicker than when they worked individually. It could be argued that the later the practical would end the later these students would then get home.

Some comments from the interviews:

" I copied because of time."

"Yes, I work from 4h30. If I am in a rush, I copy."

" I think there was not enough time for practicals . It was a lot of work and sometimes we did not finish."

There were approximately 14% of students who experienced practical work to be difficult and the time allowed to be insufficient, too much or adequate. A value for P=0,001 was obtained, indicating that the results were highly significant, and that there were students who, for some reason could not cope with the workload. One could possibly relate this to the fact that some students had no or very little exposure to practical work. The interviews and reflective journals showed that there were students who really battled to cope with the workload. The question that comes to mind is: were the practicals really that difficult, and was the time allowed really not sufficient? What were the real reasons for students to battle with some of the practicals? Why could others cope?

Comments in the reflective journals created the impression that some students found some of the practicals difficult. One student related:

"They are difficult if you don't come prepared, but if you read up and you know what is expected and what's happening, then I find they're okay."

There was also very often the outcry of students that practical sessions were too long or that the time was not sufficient to complete the tasks. The assumption was made that perhaps there was a link between the length of practicals and the difficulty of practicals, implying that difficult practicals were necessarily longer than easier practicals. Students often reflected that practicals took longer when they were uncertain of what was expected or did not understand the content.

Some comments:

"The prac was long, I copied"

"Too much work, too little time."

Figure 5 shows that more than 50% of students found practicals difficult because of background and one can safely assume that it was probably the lack of background. There was also 37% of students who said that instructions made practicals difficult.

When considering the results of individual practicals, it appeared that the practicals involving microscope work, were the ones rated by the most students as difficult. This fact can be related back to the section dealing with microscopes and the percentage of students who mastered the use of the microscope. The results show that there were a number of students who did not master the use of the microscope. One might conjecture that among the students who found practicals difficult and time not sufficient would be of the students who never

mastered the use of the microscope.

5.5. THE VALUE OF PRACTICALS.

The value of the practicals for the purpose of this research was described in terms of importance, usefulness and how interesting it was. Students wanted to see that practical work related to the specific courses they were registered for. Since the student body was so diverse, students often commented in the reflective journals that the practical course was not relevant to the course they were registered for. This fact made it necessary to determine why students perceived practicals the way they did. Table 6 in Chapter 4 shows that the majority of students regarded practicals as important, useful and interesting. Students related the importance of practicals to whether or not it reinforced theory and contributed to the understanding there of. Table 19 shows that the majority of students agreed that practicals and theory should coincide, implying that they preferred to do the practicals at the time the work was covered in lectures. Practicals which were in some way related to the theory were regarded as more important and more useful than practical lessons that had no link with theory taught in lectures.

Despite the fact that some students felt that some of the practicals were unimportant, they still felt that if it was done it had to coincide with theory. The data reflects that the practical theory relationship is regarded very highly by most students.

From the comments in the questionnaires it was clear that students wanted to see that course work was reinforced in practical sessions (Appendix 2). Practical lessons that represented

work which had been covered in theory, had a higher percentage positive response than those that did not. The practicals that were not related to theory were practicals 1, 4 and 6.

TABLE 19:THE RELATIONSHIP BETWEEN IMPORTANCE OF PRACTICALS AND WHETHER OR NOT PRACTICAL AND THEORY SHOULD COINCIDE.

FREQUENCY ROW %		PRAC AND THEORY COINCIDE				
		YES		NO		
		FREQ	%	FREQ	%	TOTAL
PRAC1	IMPORTANT	133/182	73%	11/14	78,6%	144
	UNIMPORTANT	49/182	27%	3/14	21,4%	52
	TOTAL	182	1	14		196
PRAC2	IMPORTANT	173/185	93,5%	14/14	100%	187
	UNIMPORTANT	12/185	6,5%	0	0%	12
	TOTAL	185		14		199
PRAC3	IMPORTANT	175/185	94,6%	14/14	100%	189
	UNIMPORTANT	10/185	5,4%	0	0%	10
	TOTAL	185		14		199
PRAC4	IMPORTANT	116/186	62,4%	9/14	64,3%	125
	UNIMPORTANT	70/186	37,6%	5/14	35,7%	75
	TOTAL	187		14		
PRAC5	IMPORTANT	178/185	96,2%	13/14	92,9%	191
	UNIMPORTANT	7/185	3,8%	1/14	7,1%	8
	TOTAL	185		14		
PRAC6	IMPORTANT	127/187	68%	10/14	71,4%	137
	UNIMPORTANT	60/187	32%	4/14	28,6%	64
	TOTAL	187		14		

The results presented below, in Table 20 shows that students generally thought that the practicals presented were useful and important. The practicals that received the highest scores for importance and usefulness were the practicals which included microscope work. These are practicals 2 which had 90,7% (195/215) of students saying that it was useful and important, practical three had 89,7% (193/215) and practical 5 had 92%(197/214) of students saying that it was useful and important. Comments in the questionnaires indicated that perception of importance and usefulness of practicals were linked to the fact that theory was reinforced in practicals and that the practicals helped them to understand theory better. From the reflective journals it was not always clear when students found practicals important and useful, and it was difficult to ascertain whether a useful practical session was regarded as important or not and whether an important practical lesson was regarded as useful or not.

The data in Table 20 indicates that the majority of practical lessons were perceived as useful and important. The concept of usefulness and importance was clearly linked to the reinforcement of theory in practicals. The practicals which were perceived as less useful and important, were not linked to the theory at all, while practicals that were more closely related to theory were regarded as more important and useful.

TABLE 20: RELATIONSHIP BETWEEN THE IMPORTANCE AND USEFULNESS OF PRACTICALS.

FREQUENCY PERCENT		IMPORTANT		UNIMPORTANT		TOTAL	%
		FREQ	%	FREQ	%		
PRAC1	USEFUL	148/210	70,48%	16/210	7,62%	164	78,10
	NOT USEFUL	10/210	4,7%	36/210	17,14%	46	21,9%
TOTAL		158	75,24	52	24,76	210	100
PRAC2	USEFUL	195/215	90,7%	6/215	2,8%	201	93,49
	NOT USEFUL	8/215	3,7%	6/215	2,8%	14	6,51
TOTAL		203	94,42%	12	5,6%	215	100%
PRAC3	USEFUL	193 /215	89,77%	4 / 215	1,86%	197	91,6%
	NOT USEFUL	12 /215	5,58%	6/215	2,79%	18	8,37%
TOTAL		205	95,35%	10%	4,65%	215	100%
PRAC4	USEFUL	123 /216	56,9%	15 / 216	6,9%	138	63,9%
	NOT USEFUL	18 /216	8,3%	60 /216	27,8%	78	36,1%
TOTAL		141	65,28	75	34,72	216	100%
PRAC5	USEFUL	197 /214	92,1%	1 /214	0,5%	198	92,5%
	NOT USEFUL	10 /214	4,7%	6/214	2,8%	16	7,48%
TOTAL		207	96,73	7	3,27	214	100%
PRAC6	USEFUL	135 /218	61,9%	19 /218	8,7%	154	70,6%
	NOT USEFUL	17 / 218	7,8%	47 /218	21,6%	64	29,4%
TOTAL		152	69,72	66	30,28	218	100%

TABLE 21: THE RELATIONSHIP BETWEEN IMPORTANCE OF PRACTICALS AND UNDERSTANDING THEORY BETTER

FREQUENCY/ OVERALL PERCENT	IMPORTANT	NOT IMPORTANT	TOTAL
YES UNDERSTAND THEORY BETTER	840/946	106/946	946
	65,4%	8,3%	73,68
NO DO NOT UNDERSTAND THEORY	221/338	117/338	338
BETTER	17,2%	9,1%	26,32
TOTAL	1061	223	1284
	82,63	17,37	100

65,4 percent of students agreed that an important practical was one that helped you to understand theory better (Table 21). Students' perception of anything they did, tended to be marks driven. This fact was reflected in the comments. Students felt that a practical lesson based on the theory already covered was easier, and theory was better understood once it was experienced practically.

5.6 GROUP WORK AND COPYING

The Life Science practicals were designed to be completed by the individual. Only one of the practicals allowed for group work. Table 8 in Chapter 4 shows that the majority of students preferred group work (83,4%), engaged in group work (52,8 %) and felt that they benefitted

from group work (88,8 %). Only 22,4 % of students admitted that their group work involved copying. Data from the reflective journals showed that many students copied tasks because of time pressure, tests after practicals or because the work was too much. Data from the questionnaires showed that there were actually not that many students who admitted to copying. However many students engaged in group work even when practicals did not require it. Many students who engaged in group work did it only to copy, (Table 22) while others found that group work gave them the opportunity to discuss the work and formulate their own answers to the questions (Appendix 2).

TABLE 22:RELATIONSHIP BETWEEN GROUP WORK AND STUDENTS COPYING.

FREQUENCY/ ROW PERCENT	COPY	DON'T COPY
GROUP WORK	29/112 25,89	83/112 74,11
NO GROUP WORK	17/97 17,53	80/97 82,47

Many students found that group work gave them the opportunity to get better marks in the practicals. Many students found that they finished practicals earlier when they worked in groups. Group work had various mechanisms, for example, in some groups each person would complete a part of the practical and in the end there would be an exchange of information. The data from the reflective journals and interviews implied various possible reasons for copying.

The shortage of student assistants possibly also led to copying. The data represented in Table 23 shows that students were more likely to engage in group work when there were not enough

student assistants, than when there were enough student assistants.

TABLE 23: THE RELATIONSHIP BETWEEN THE AVAILABILITY OF STUDENT ASSISTANTS (SA'S) AND STUDENTS ENGAGING IN GROUP WORK.

FREQUENCY/ COLUMN PERCENT	ENOUGH S A's	NOT ENOUGH S A's
GROUP WORK YES	30/70 42,86	84/145 57,93
GROUP WORK NO	40/70 57,14	61/145 42,07

The shortage of assistance caused students to possibly rely on peer support when experiencing difficulties. Student assistants are appointed by the university to assist students during their practicals. These student assistants work at a ratio of one student assistant for every fifteen students. Table 23 shows the relationship between the availability of student assistants and students' involvement in group work. The table shows that nearly 60% of students who said that there were not enough student assistants engaged in group work. 42,86% students who said that student assistants were enough, still engaged in group work. One can safely assume that group work appeared to be of some benefit to students considering that student assistants were not enough, peer support proved to be equally effective. The comments made by students certainly support the idea that students definitely benefitted from group work. Students felt that they understood work better after discussing it in the group. Students appeared to understand their personal responsibility and some even said that their marks improved since they engaged in group work.

During the first year tests were often scheduled to take place after practicals in the afternoon. Practicals are scheduled until five o'clock in the afternoon and tests are scheduled to start at 17h05. If students stayed in the practical till five o' clock, it meant that they would have to rush to the test venue to get there on time. In the reflective journals students objected to this, complaining that they were not able to concentrate on the practicals as they had wanted to. Students subjected to this kind of timetable, when interviewed, often admitted that they resorted to all kinds of measures to complete the practical lesson in as little time as possible. Of the students interviewed, a number of them indicated that the writing tests after practicals were a problem and caused a lot of pressure on them during practicals. One of the students commented:

> "*Usually you take your time and you do your practical to the best of your ability, but if you are writing a test you just want to do anything, even if you have to copy from someone. Just as long as you complete the practical and hand it in.*"

Students found that they could not concentrate on the practical lesson and only had the test on their minds. These students would then resort to copying tasks in order for them to get out of the practical session and at the test in time(Table 24).

TABLE 24: THE RELATIONSHIP BETWEEN WRITING TESTS AFTER PRACTICALS AND STUDENTS COPYING

FREQUENCY/ ROW PERCENT	YES COPY	NO COPY
YES TESTS	33/136 24,26	103/136 75,74
NO TESTS	13/65 20	52/65 80

Students do not really need a reason to copy and copying of tasks will carry on even if there is no reason to do so.

5.7. SUMMARY.

The data show that the majority of students appeared not to be affected by time, irrespective of where they lived. From the interview data however there were some students who related that the length of the practicals did affect them, and that they definitely experienced pressure to get done. The fact that the questionnaire data does not reflect this could be explained in terms of the fact that the instructor in fact omitted certain portions of the practical when it appeared as if a practical lesson would finish after the allocated time. This would in fact reflect that students did not necessarily manage their time better, but in fact that they had less work to complete than the previous year.

The relationship between interest and time appears to be just as noteworthy. The data from the questionnaire once again shows that there is no difference in the way the off campus group and

the on campus group perceived practicals. However the interview data reveals that students found long practicals boring, or less interesting. Long practicals appeared to be those practicals which kept the majority of students busy for the full three hours, causing them to leave the laboratory after 5 p.m. , which was the official time for practicals to end. Long practicals were regarded as boring, as were those practicals where students found they did not understand the content or the instructions. This inevitably led to them spending more time and finishing up later. Students soon realized that this kind of problem could be solved by preparing, as some of them indeed related. The lack of a significant difference in the perceptions of interest related to time can be related to the fact that the instructor shortened the practicals on noting that the majority of students would spend more than the allocated time on it.

Students generally related the importance of practicals to the fact that it reinforced theory and that it contributed to their understanding of the theory. This resulted in the fact that practicals that did not directly relate to theory received a lower score than those that in some way related to theory. Students generally appeared not to value very highly the coincidence of practicals and theory. One could easily deduce that the fact that practicals which were related to the theory were of greater importance than the actual coincidence in terms of time.

Usefulness and importance of practicals seem to carry the same weight with students. Practicals were both important and useful, when it reinforced the theory and contributed to their understanding of the theory. Comments in the questionnaire supported this idea.

Difficulty of practicals appeared to be related to students understanding of what was expected from them. When they were not clear on this issue and whoever they asked could not help, this

inevitably led to them spending more time on the specific practical. The questionnaire data reflects that students generally found practicals of average difficulty, meaning that they were able to manage them. One could also assume that they generally knew what was expected and understood the instructions well. Only about 7% found practicals difficult and did not have enough time.

The interviews revealed that transport impacted on students perception of time allowed for practicals in the sense that if a practical ended after 17h00 students would reach home after dark, especially during winter. Many of them would have to walk from drop-off points and this was often not safe for them. Students revealed during interviews that they resorted to various measures to make sure that they left the laboratory before 16h30. These measures varied from group work to blatant copying. The results however show that in fact more students living in hostels on campus indulged in copying than those traveling home. Copying could possibly have been encouraged by students not understanding instructions and content as some students commented in the questionnaire. There was also the problem of students not having access to a student assistant, when they had problems and this could also have led to copying.

During interviews, students suggested that writing tests after practicals caused them to resort to copying. The results however showed the opposite, that in fact students with no tests after practicals were more inclined to copying tasks than those who wrote tests after practicals. Students copied tasks for a variety of reasons and did not need a specific reason to do this.

Many students indulged in group work. From the comments in the questionnaire it was clear that they believed that they reaped some benefit from this. A cross tabulation was done in an

attempt to see if there was any relationship between the availability of students assistants and group work. One could assume that student assistants were not all that available since about 60% of students who were involved in group work said that student assistants were not enough.

Many students mastered the use of the microscope, despite the fact that many of them had not handled a microscope before. There were, however, still a small percentage of students who completed the course without having mastered the skill of working with a microscope. Of this, a small percentage would have missed the practical lesson dealing with the microscope, while the rest probably just never managed to learn the skill, whatever the reason might have been.

CHAPTER 6: SUMMARY & CONCLUSION

6.1 INTRODUCTION.

In Chapters 4 and 5 a number of problem areas regarding practical work of the first year Life Science course were discussed. What came through very clearly was that the present practical course does not meet the needs equally of the entire student body enrolled for this course. This implied that certain changes would have to be made in order for this to happen. The research showed that the student body was diverse in needs and expectations.

6.2 A COMPOSITE VIEW OF THE FIRST YEAR PRACTICAL EXPERIENCE.

One of the concerns raised in the previous two chapters (section 4.4; 4,6 and 5.5) related to students' expectations of a practical and theory relationship. In the literature we see that in an experiment done by Poole and Kidder, (1996), they integrated the practical work with the lectures. This meant that the practical and the theory were related as well as coincided. Students enjoyed this experience. Denny, (1986) reflected that practical work should have four main objectives. One of them should be the building of knowledge and the understanding of facts. This implies that the theory component of practical should always be there. Students want what they do in practicals to relate to the work they will be examined on. Boud, Dunn, Thorley, (1980) surveyed a group of pupils who expected to see a link between practical work and theory and also wanted to learn skills. According to Kirschner and Meester, (1988) the

laboratory then becomes the place where theoretical concepts are taught. This would be when a theoretical concept is demonstrated practically. The fact is though that a single practical is not always enough to teach a specific concept, and since so many students lack the specific skills to do the practical the concept is often lost. This appears to be a poor return of knowledge when one considers the cost and effort put into practical work. A practical - theory relationship should not be considered at the cost of the necessary skills training.

The practicals were rated by the majority of students as valuable. Students generally regarded practicals as important and useful. The importance and usefulness were related to whether or not practical lessons verified the theory taught in lectures. Kozma, (1982) suggests that the value of practicals can be enhanced by adapting instructional strategies. Things such as the stated objectives, specific examples, getting students to respond, improving feedback, can contribute to students' performance and satisfaction in the laboratory. Tamir, (1989) also suggested that students will learn much more in the laboratory if they are taught better, implying that teachers or instructors should be better equipped to teach practical classes. He also suggested that pre and post laboratory discussions will enhance the student experience in the laboratory.

It was not possible to draw any conclusions from the data generated by this research, on why some students did not master the use of the microscope. A possible explanation could be related to the type of microscope used in first year practicals. As alluded too in chapter 4, the microscope used was a Leica research microscope which is a binocular microscope with phase contrast. The amount of information pertaining to the operation of the microscope, and the amount of information needed to see and interpret a microscope slide could be too much for

these students to process. Johnstone and Letton (1990) showed that in Physical Chemistry practical lessons students suffered from information overload which impacted negatively on their experience of the practical. The same might be true in this case. A possible way of addressing this problem would be to introduce students to a simpler microscope in the first practical lesson. Once they are familiar with the basic operation of the instrument, they could progress to a more complex microscope. This is something that would need to be further investigated.

The marking of practical reports was a big problem to many students. Students generally felt that marking was unfair, while not getting marked reports back on time was also a problem at times. For a practical to be valuable, feedback needs to done in a way which will enhance the practical experience. Kozma, (1982) saw this as a main strategy to improve performance and satisfaction in the laboratory. Students normally used to have to wait a week to receive feedback, and at the time of feedback they are already busy with something else. A possible way of solving this would be to evaluate practicals on the same day they are done. This would possibly mean a redesign of the practical to incorporate marking at the time of the specific practical. This would possibly also mean decreasing the workload. Tamir, (1977) noted that in the traditional type of laboratory too little time was spent on investigating and drawing conclusions. He suggested that the inquiry type of laboratory would be better for college and university students. This type of laboratory led to a post-practical discussion which gave students the opportunity to draw conclusions and for conceptualization. Such a framework would mean that the student would be able to evaluate in his/her mind the activities of that specific practical session. This also meant that instructors should do a shorter pre-lab session.

Educational support forms a critical component of the practical program. Presently financial constraints have caused the university not to appoint the optimal number of assistants. This causes a breakdown on the support system and places tremendous pressure on the resources available. Possible solution to this would be to design pracs in such a way that students do not have to rely so much on this kind of support. In the literature there are several examples of studies that were done on student-designed laboratories which did not make use of assistants in the way it is presently did at UWC (Raghubir, 1979).

The research showed that students preferred group work to working individually. It also became evident that group work was a disguise for copying of tasks. This was alarming, since a part of the practical mark contributed to the semester mark and exam mark. In the light of this, copying was a dishonest practice. Lumpe and Staver (1995) noted that group work could be to the students' advantage, since it was a strong motivational tool which increases achievement and performance. This was clearly illustrated by comments that students made. A possible way of addressing this problem would be to increase student assistance, since this was one possible cause of copying. The other variable that needed to be removed was the writing of tests after practical lessons. Decreasing the workload would possibly alleviate the problem since students often commented that they copied because of too much work and too little time.

A minority of students experienced that practical lessons were too long or that the work was too much for the time allowed. Although this impacted on a small number of students, it was disconcerting that there were students who missed out on the practical experience because of this. Earlier in this chapter, I refer to the fact that a shortage of assistants and the writing of tests after practicals possibly added to the burden. Also referred to earlier in this chapter is the

mastery of the microscope which also added to this. Johnstone and Letton(1991) referred to as an information overload which basically points to the fact that laboratory instructors often expect too much in too little time.

The points mentioned above all seem to point to the fact that the practical course is not suited to the needs of the student body enrolled in the course. It all directs towards a redesign to accommodate the students who are left behind, those who are not benefitting from the practical program. It would seem that a possible solution would be to lower the general expectation in terms of the workload. This will address several of the other problem areas as well. It would also benefit the student body to invest more in terms of student assistance and this could be in the form of finances and training.

Students complained about the instructor. The reality was that students have certain responsibilities towards their own progress as students. Many students did not prepare before coming to practicals which caused them to lag behind in terms of what was expected in the laboratory. Many students who said that they did prepare did not have a problem with the practical work, and found that they were able to proceed with the practical without much assistance. Tamir (1989) noted that perhaps the instructors were not trained well enough to teach effectively. The only teaching experience laboratory instructors often had were their own experiences as students, which one could question whether it was enough. Presently the instructors who teach practical classes are not the same ones who teach the theory. There are also different instructors who teach different practical modules. Then there are also post graduate students who are at times asked to teach practical modules. A possible way of solving this problem is to eliminate the inconsistencies in the practical program. Perhaps one

person could be appointed to work closely with the person teaching theory and who will be able to teach all the practical modules.

The worst comments relating to the practical manual, was that the instructions were incoherent. Figure 5 shows that 37% of students felt that instructions made practicals difficult. This could be interpreted as instructions in the manual as well as instructions physically given by the instructor. Beside this, students felt that the manual was not offering enough in terms of information. Students needed to realize that a manual is not a text book and that for the purpose of reference students needed to learn to use their text books. It might also just be a worthwhile effort to revise the practical manual.

6.3 CONCLUDING REMARKS.

Many Science Educationists saw practical work as an important part of learning sciences. Pupils should get first-hand practical experience in laboratories in order to acquire skills in handling apparatus, to measure and illustrate concepts and principles. It is unfortunate that practical work often did not offer more than this and students are rarely given the opportunity to do investigative work in laboratories.(Woolnough and Allsop,1985).

Practical work is generally done to verify theory. This involves knowledge accumulation. There is the suggestion that students should be given the opportunity to learn science by doing science. They should be given the opportunity to apply what they have learnt, to enable them produce new knowledge. This supports the fact that a theory background is necessary for a student to interact meaningfully in the laboratory, but that the laboratory is also the place

where knowledge can be produced. However skills are equally important for this interaction in the laboratory and it would appear that a healthy balance between skills and knowledge is necessary for this relationship to develop. Hodson,(1990) noted that practical work should stimulate curiosity. He felt that skills are necessary to engage in laboratory work successfully. Inadequate skills acted as a barrier to learning.

Raghubir, (1979) in his study on the investigative type of laboratory supported the fact that in the laboratory students should get more opportunity to do more investigative practicals which allow them to acquire a greater understanding of science. The traditional type of laboratory is instructor-oriented, giving students little opportunity for acquiring a greater understanding of science.

Considering the above, practical work would have to be changed to incorporate a balance between skills and knowledge. Since we are in the process of training scientists, we should be making a concerted effort to furnish our students with the necessary skills of a scientist: formulating hypotheses, designing and executing investigations, observing carefully, recording data, analyzing and interpreting results and synthesizing new knowledge.

This research was a first attempt to understand the experiences of the students in the first year Life Science practical. The research shows some negative experiences, but also some positive experiences. There is a clear indication that some areas need immediate improvements, while others need further research.

Areas that could be improved immediately are:

- the teaching of the microscope.
- to look at the workload and possibly alter it slightly.
- the revision of the practical manual.

Areas that need to be researched further are:

- The factors that prevent students from mastering the microscope and other equipment in the laboratory.
- A means of assessing how students benefit from practical work.
- The influence that students background has on their experience of first year practical work.
- The theory and practical relationship: Are first year students able to learn science, by doing science.

These are only a few possibilities that could be further explored.

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APPENDIX 1

LIFE SCIENCE'S QUESTIONNAIRE

PLEASE TAKE A FEW MINUTES TO COMPLETE THIS QUESTIONNAIRE. YOU DO NOT HAVE TO IDENTIFY YOURSELF. YOUR INPUT WILL BE APPRECIATED AND WILL BE USED TO IMPROVE THE COURSE.

For what degree are you presently registered? .....

1. Science Practical experience at school:

1.1. What year did you matriculate? .....

1.2. Which school did you matriculate from?.....

1.3. Did you do practical work at school? ☐Yes ☐No

1.4. What type of practical work did you do. ☐Microscope
☐Experimental
☐Fresh specimens
☐Fieldwork
☐Other

1.5. Did your school have any microscopes? ☐Yes ☐No

1.6. Were you allowed to use the microscope? ☐Yes ☐No

1.7. What was your practical experience at school?

.....

.....

.....

2. Workload.

2.1. Do you live in residence (hostel) on campus? ☐Yes ☐No

2.2. If answer to 2.1 is no, how do you travel home? ☐liftclub
☐public transport
☐private transport
☐Other

2.3. In which suburb do you board or live?.....

2.4. Did you have any tests after life sciences pracs? ☐Yes ☐No

2.5. For each of the pracs, comment on the adequacy of the time allowed.

Pr.1. Measurement	Too much time / adequate time / too little time
Pr.2. Microscopy	Too much time / adequate time / too little time
Pr.3. Structure and function of cells.	Too much time / adequate time / too little time
Pr.4. Kirstenbosch	Too much time / adequate time / too little time
Pr.5. Tissues and cells	Too much time / adequate time / too little time
Pr.6. Mindmapping	Too much time / adequate time / too little time

2.6. Rate each of the practical sessions as difficult, average, or easy.

Pr.1. Measurement	Difficult / Average / Easy
Pr.2. Microscopy	Difficult / Average / Easy
Pr.3. Structure and function of cells	Difficult / Average / Easy
Pr.4. Kirstenbosch	Difficult / Average / Easy
Pr.5. Tissues and cells	Difficult / Average / Easy
Pr.6. Mindmapping.	Difficult / Average / Easy

2.7. What elements makes a prac difficult?

- □Content
- □Instructions
- □Audibility
- □Could not see on the board
- □Lack of background
- □Language

2.8. Did you prepare before coming to practicals? Often / sometimes / never

(Prepare: read through prac, familiarize with theory)

3. Prac and theory relationship

3.1 Is a link between practical work and theory important? □Yes □No

3.2.a. Is it important that pracs and theory should coincide? □Yes □No

3.2.b. Why?.....

.....

3.3. Was the theory well represented in the practicals?

Prac1. Measurement	□Yes	□No
Prac2. Microscopy	□Yes	□No
Prac3. Structure and function of cells	□Yes	□No
Prac4. Kirstenbosch	□Yes	□No
Prac5. Tissues and cells	□Yes	□No
Prac6. Mindmapping	□Yes	□No

3.4. Has the practical work in any way helped you to understand the theory better?

Prac1. Measurement	□Yes	□No
Prac2. Microscopy	□Yes	□No
Prac3. Structure and function of cells	□Yes	□No
Prac4. Kirstenbosch	□Yes	□No
Prac5. Tissues and cells	□Yes	□No
Prac6. Mindmapping	□Yes	□No

4. Manual and instructions.

4.1 Do you expect the lecturer to repeat everything that is written in the manual, at the beginning of the practical? □Yes □No

4.2. Why is a manual provided?

.....

.....

4.3. What do you expect from a manual?

.....

.....

4.4. What makes instructions unclear.

□Language problem.

□Comprehension problem.

□Instructions badly drawn up.

□Personal hearing or sight difficulties

4.5. Comment on the quality (layout, enough diagrams included, clarity of text, flow of text) of your practical manual.

.....

.....

5. Value of practical

5.1.a. In your opinion how important were the pracs you have done?

Prac1. Measurement	Important / Unimportant
Prac2. Microscopy	Important / Unimportant
Prac3.Structure and function of cells	Important / Unimportant
Prac4. Kirstenbosch	Important/Unimportant
Prac5. Tissues and cells	Important / Unimportant
Prac6. Mindmapping	Important / Unimportant

5.1.b. What elements make a practical important?

.....

.....

5.2. In your opinion how useful were the practicals?

Prac1. Measurement	Useful / Not useful
Prac2. Microscopy	Useful / Not useful
Prac3. Structure and function of cells	Useful / Not useful
Prac4. Kirstenbosch	Useful / Not useful
Prac5. Tissues and cells	Useful / Not useful
Prac6. Mindmapping	Useful / Not useful

5.2.b. What elements make a prac useful?

.....

.....

5.3.a. In your opinion how interesting were the practicals?

Prac1. Measurement	Interesting / boring
Prac2. Microscopy	Interesting / boring
Prac3. Structure and function of cells	Interesting / boring
Prac4. Kirstenbosch	Interesting / boring
Prac5. Tissues and cells	Interesting / boring
Prac6. Mindmapping	Interesting / boring

5.3.b. What elements make a practical interesting?

.....

.....

5.4. List any outstanding experiences during the practicals.

.....

.....

.....

6. Physical conditions

6.1. What is a good size for a practical group(number of students in the group).....

6.2. Did you ever find the lab too crowded? ☐Yes ☐No

6.3. Did you ever find the laboratory too hot? ☐Yes ☐No

6.4. Did you ever find the wearing of a labcoat disturbing? ☐Yes ☐No

6.5. Health and safety regulations expect that you wear a labcoat during practicals. Should you be expected to wear a labcoat when it is so hot? ☐Yes ☐No

6.6. List any conditions in the laboratory which might have affected you during the practical.

.....

.....

7. Groupwork/copying

7.1. Did any of the pracs allow for group work? ☐Yes ☐No

7.2. Do you prefer groupwork to working on your own? □Yes □No

7.3. Did you engage in groupwork even if the prac did not allow for it? □Yes □No

7.4. Do you think that you benefitted from groupwork? □Yes □No

7.5. What benefits did you derive from groupwork?

.....

.....

7.6. Did your groupwork involve copying? □Yes □No

7.7 Elaborate on 7.6.

.....

.....

8. Educational support

8.1 Would you say that the number of student assistants were enough to service your practical group? □Yes □No

8.2. In your opinon were student assistants familiar with all the theory for a specific practical. Always / sometimes / never

8.3. What in your opinion are the responsibilities of the student assistants?

.....

.....

8.4. What are your personal responsibilities regarding practical work?

.....

.....

.....

9. Microscope and microscope slides.

9.1 Did you master the use of the microscope? □Yes □No

9.2. Was your student assistants familiar with the microscope? □Yes □No

9.3. Please comment on the availability of microscope slides?

.....

.....

9.4. Please comment on the quality of microscope slides used in your practical. Could you see the specimen clearly?

.....

9.5. To what extent do you think your own skills affected the clarity with which you saw the specimen?

.....

10. Instructor.

10.1. Was the instructor concerned with your needs? Always / sometimes / never

10.2. Was the instructor helpful? Always / sometimes / never

10.3. Did the instructor provide clear explanations? Always / sometimes / never

10.4. Was the instructor well prepared for practicals? Always / sometimes / never

10.5. Did the instructor explain concepts clearly? Always / sometimes / never

10.6. Did the instructor state objectives clearly? Always / sometimes / never

10.7. Could the instructor be consulted when needed? Always / sometimes / never

10.8. What kind of assistance do you expect from the instructor?

.....

.....

11. Marking.

11.1.a. Was marking of practicals fair? □Yes □No

11.1.b Comment.....

12. If you could design your own practical what would you include?

.....

.....

.....

APPENDIX 2

ABODE live in residence

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	77	35.0	35.3	35.3
no	2.00	141	64.1	64.7	100.0
	.	2	.9	Missing	
	Total	220	100.0	100.0	

Mean	1.647	Median	2.000	Mode	2.000
Std dev	.479	Variance	.230	Minimum	1.000
Maximum	2.000	Sum	359.000		

Valid cases 218 Missing cases 2

- -

ASSIST assistance from instructor

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
instructions and exp	1.00	95	43.2	54.9	54.9
make us see what we	2.00	2	.9	1.2	56.1
unbiased consultatio	3.00	2	.9	1.2	57.2
patience with studen	4.00	6	2.7	3.5	60.7
make sure people kee	5.00	2	.9	1.2	61.8
be helpful, approach	6.00	17	7.7	9.8	71.7
bethere when needed	7.00	12	5.5	6.9	78.6
explain, speak clear	8.00	1	.5	.6	79.2
explain clearly, not	9.00	13	5.9	7.5	86.7
reliable	10.00	1	.5	.6	87.3
be helpful, give cle	11.00	16	7.3	9.2	96.5
be familiar with pra	12.00	2	.9	1.2	97.7
be helpful and not r	13.00	2	.9	1.2	98.8
check up during prac	14.00	2	.9	1.2	100.0
	.	47	21.4	Missing	
	Total	220	100.0	100.0	

Mean	4.127	Median	1.000	Mode	1.000
Std dev	3.956	Variance	15.647	Minimum	1.000
Maximum	14.000	Sum	714.000		

Valid cases 173 Missing cases 47

BENEFIT did you benefit from grpwork

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	191	86.8	88.8	88.8
no	2.00	24	10.9	11.2	100.0
	.	5	2.3	Missing	
	Total	220	100.0	100.0	

Mean	1.112	Median	1.000	Mode	1.000
Std dev	.316	Variance	.100	Minimum	1.000
Maximum	2.000	Sum	239.000		

Valid cases 215 Missing cases 5

BENEFIT2 what benefits did you derive from groupw

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
sharing of info, hel	1.00	73	33.2	38.0	38.0
getting other people	2.00	45	20.5	23.4	61.5
friend can tell you	3.00	6	2.7	3.1	64.6
get better understan	4.00	19	8.6	9.9	74.5
low marks	5.00	1	.5	.5	75.0
clarification, confi	6.00	3	1.4	1.6	76.6
kistenbosch groupwor	7.00	1	.5	.5	77.1
discuss and formulat	8.00	4	1.8	2.1	79.2
you learn more when	9.00	4	1.8	2.1	81.3
peers can explain be	10.00	21	9.5	10.9	92.2
develops communicati	11.00	3	1.4	1.6	93.8
mixing ideas & getti	12.00	1	.5	.5	94.3
get to know people,	13.00	2	.9	1.0	95.3
sometimes you benefi	14.00	2	.9	1.0	96.4
dont like groupwork	15.00	2	.9	1.0	97.4
it improved my marks	16.00	3	1.4	1.6	99.0
sharing microscope t	17.00	1	.5	.5	99.5
help with microscope	18.00	1	.5	.5	100.0
	.	28	12.7	Missing	
	Total	220	100.0	100.0	

Mean	4.047	Median	2.000	Mode	1.000
Std dev	4.217	Variance	17.783	Minimum	1.000
Maximum	18.000	Sum	777.000		

Valid cases 192 Missing cases 28

COINCIDE prac and theory coincide

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	188	85.5	93.1	93.1
no	2.00	14	6.4	6.9	100.0
	.	18	8.2	Missing	
	Total	220	100.0	100.0	

Mean	1.069	Median	1.000	Mode	1.000
Std dev	.255	Variance	.065	Minimum	1.000
Maximum	2.000	Sum	216.000		

Valid cases 202 Missing cases 18

COMMENT1 comment on quality of manual

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
diagrams not clear	1.00	76	34.5	41.8	41.8
text and diarams not	2.00	17	7.7	9.3	51.1
layout and diagrams	3.00	7	3.2	3.8	54.9
average	4.00	5	2.3	2.7	57.7
not enough diagrams	5.00	5	2.3	2.7	60.4
fine	6.00	33	15.0	18.1	78.6
not enough diagrams	7.00	3	1.4	1.6	80.2
text not good	8.00	11	5.0	6.0	86.3
diagrams unclear, qu	9.00	1	.5	.5	86.8
not enough info of p	10.00	3	1.4	1.6	88.5
diagrams are fine	11.00	2	.9	1.1	89.6
not enough diagrams	12.00	6	2.7	3.3	92.9
layout not good	13.00	3	1.4	1.6	94.5
too many drawings	14.00	1	.5	.5	95.1
diagrams, text, flow	15.00	4	1.8	2.2	97.3
printing poor, conte	16.00	2	.9	1.1	98.4
language incoherent,	17.00	1	.5	.5	98.9
not clear, too many	18.00	1	.5	.5	99.5
text, diagrams uncle	19.00	1	.5	.5	100.0
	.	38	17.3	Missing	
	Total	220	100.0	100.0	

Mean	4.478	Median	2.000	Mode	1.000
Std dev	4.320	Variance	18.660	Minimum	1.000
Maximum	19.000	Sum	815.000		

Valid cases 182 Missing cases 38

COMMENT2 what elements make a prac important

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
instructions, instru	1.00	4	1.8	2.3	2.3
when it reinforce co	2.00	60	27.3	34.5	36.8
relationship with th	3.00	4	1.8	2.3	39.1
to see what we have	4.00	12	5.5	6.9	46.0
well prepared slides	5.00	2	.9	1.1	47.1
preparation and unde	6.00	8	3.6	4.6	51.7
you work with real t	7.00	1	.5	.6	52.3
instructions and tim	8.00	1	.5	.6	52.9
ability of demmies t	9.00	1	.5	.6	53.4
ID of instruments, t	10.00	4	1.8	2.3	55.7
cooperation and unde	11.00	7	3.2	4.0	59.8
the application of k	12.00	13	5.9	7.5	67.2
instructions, clarit	13.00	4	1.8	2.3	69.5
it counts towards ma	14.00	4	1.8	2.3	71.8
pracs help you remem	15.00	3	1.4	1.7	73.6
pracs must contain t	16.00	6	2.7	3.4	77.0
understand ing and s	17.00	1	.5	.6	77.6
it must be interesti	18.00	1	.5	.6	78.2
microscope work	19.00	13	5.9	7.5	85.6
to benefit something	20.00	7	3.2	4.0	89.7
you can do it yourse	21.00	4	1.8	2.3	92.0
microscopy and under	22.00	2	.9	1.1	93.1
new discoveries and	23.00	1	.5	.6	93.7
prac must be well pr	24.00	1	.5	.6	94.3
to understand and re	25.00	2	.9	1.1	95.4
microscopy, study of	26.00	1	.5	.6	96.0
how we relate it to	27.00	1	.5	.6	96.6
based on student nee	28.00	1	.5	.6	97.1
understanding	29.00	1	.5	.6	97.7
prepare you for seco	30.00	1	.5	.6	98.3
if it is asked in ex	31.00	1	.5	.6	98.9
	32.00	2	.9	1.1	100.0
	.	46	20.9	Missing	
	Total	220	100.0	100.0	

Mean	9.598	Median	6.000	Mode	2.000
Std dev	8.293	Variance	68.774	Minimum	1.000
Maximum	32.000	Sum	1670.000		

Valid cases 174 Missing cases 46

COMMENT3 what elements make prac useful

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
instruments, good eq	1.00	4	1.8	2.5	2.5
gives broader knowle	2.00	10	4.5	6.3	8.9
when it coincides wi	3.00	15	6.8	9.5	18.4
relevance to everyda	4.00	14	6.4	8.9	27.2
help you to understa	5.00	30	13.6	19.0	46.2
knowing what is goin	6.00	4	1.8	2.5	48.7
helps to remember th	7.00	5	2.3	3.2	51.9
to learn experimenta	8.00	1	.5	.6	52.5
the way it is presen	9.00	1	.5	.6	53.2
ability to visualize	10.00	4	1.8	2.5	55.7
to be able to apply	11.00	29	13.2	18.4	74.1
groupwork, instr pat	12.00	1	.5	.6	74.7
pracs help you in ot	13.00	8	3.6	5.1	79.7
a good understanding	14.00	4	1.8	2.5	82.3
the marks that you s	15.00	2	.9	1.3	83.5
assist you to get be	16.00	1	.5	.6	84.2
pracs must relate to	17.00	4	1.8	2.5	86.7
relevance of content	18.00	2	.9	1.3	88.0
provide insight to u	19.00	5	2.3	3.2	91.1
microscopy and the s	20.00	11	5.0	7.0	98.1
the labelling of dia	21.00	1	.5	.6	98.7
learning how to use	22.00	1	.5	.6	99.4
drawing what you see	23.00	1	.5	.6	100.0
	.	62	28.2	Missing	
	Total	220	100.0	100.0	

Mean	8.943	Median	7.000	Mode	5.000
Std dev	5.869	Variance	34.449	Minimum	1.000
Maximum	23.000	Sum	1413.000		

Valid cases 158 Missing cases 62

COMMENT4 what elements make a prac interesting

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
you should know the	1.00	4	1.8	2.5	2.5
kirstenbosch	2.00	3	1.4	1.9	4.4
if i get positive re	3.00	1	.5	.6	5.1
when you follow and	4.00	18	8.2	11.4	16.5
microscope work	5.00	14	6.4	8.9	25.3
the way pracs are ru	6.00	2	.9	1.3	26.6
involvement and unde	7.00	3	1.4	1.9	28.5
when it relates to t	8.00	10	4.5	6.3	34.8
seeing and learning	9.00	37	16.8	23.4	58.2
shorter and less int	10.00	1	.5	.6	58.9
seeing things, field	11.00	1	.5	.6	59.5
demmies are short-te	12.00	1	.5	.6	60.1
desire to know more	13.00	1	.5	.6	60.8
visual effects	14.00	2	.9	1.3	62.0
proper explanations	15.00	7	3.2	4.4	66.5
fun things - makes i	16.00	3	1.4	1.9	68.4
relate to what is cu	17.00	2	.9	1.3	69.6
presentation, learni	18.00	6	2.7	3.8	73.4
instructor must be e	19.00	5	2.3	3.2	76.6
doing pracs yourself	20.00	10	4.5	6.3	82.9
understand and get g	21.00	1	.5	.6	83.5
association with eve	22.00	1	.5	.6	84.2
i could not draw	23.00	1	.5	.6	84.8
pracs must be less r	24.00	1	.5	.6	85.4
structure and functi	25.00	1	.5	.6	86.1
language and content	26.00	1	.5	.6	86.7
if you can apply it	27.00	1	.5	.6	87.3
experimental work	28.00	1	.5	.6	88.0
equipment and instru	29.00	1	.5	.6	88.6
i enjoy drawing	30.00	1	.5	.6	89.2
better atmosphere, i	31.00	4	1.8	2.5	91.8
enjoying what you're	32.00	1	.5	.6	92.4
exciting, challenge	33.00	2	.9	1.3	93.7
presentation	34.00	3	1.4	1.9	95.6
better understanding	35.00	5	2.3	3.2	98.7
shorter pracs	36.00	1	.5	.6	99.4
should be related to	37.00	1	.5	.6	100.0
	.	62	28.2	Missing	
	Total	220	100.0	100.0	

Mean	13.241	Median	9.000	Mode	9.000
Std dev	9.545	Variance	91.114	Minimum	1.000
Maximum	37.000	Sum	2092.000		

Valid cases 158 Missing cases 62

COMMENT5 outstanding experiences during pracs

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
to be able to use my	1.00	6	2.7	7.5	7.5
paying for an excurs	2.00	1	.5	1.3	8.8
kirstenbosch	3.00	9	4.1	11.3	20.0
the speed at which i	4.00	1	.5	1.3	21.3
observing things wit	5.00	7	3.2	8.8	30.0
my book was not alwa	6.00	1	.5	1.3	31.3
groupwork is good	7.00	1	.5	1.3	32.5
microscope, measurem	8.00	17	7.7	21.3	53.8
instructor rush to f	10.00	2	.9	2.5	56.3
groupwork and sharin	11.00	1	.5	1.3	57.5
i saw dustparticles,	12.00	1	.5	1.3	58.8
powerfailure	13.00	1	.5	1.3	60.0
preparing own slides	14.00	4	1.8	5.0	65.0
confusion about prac	15.00	1	.5	1.3	66.3
I did not view the	16.00	1	.5	1.3	67.5
when you can benefit	17.00	4	1.8	5.0	72.5
poor marking lead to	18.00	1	.5	1.3	73.8
microscopy and kirst	19.00	6	2.7	7.5	81.3
slides were not cle	20.00	1	.5	1.3	82.5
atmosphere was good,	21.00	1	.5	1.3	83.8
i enjoyed it, but i	22.00	1	.5	1.3	85.0
i could not always i	23.00	1	.5	1.3	86.3
fear, threats from i	24.00	1	.5	1.3	87.5
it provides skills	25.00	1	.5	1.3	88.8
microscope and mindm	26.00	2	.9	2.5	91.3
mindmapping	27.00	1	.5	1.3	92.5
mindmapping and meas	28.00	1	.5	1.3	93.8
pracs not marked	29.00	1	.5	1.3	95.0
mindmapping, kirsten	30.00	1	.5	1.3	96.3
lecture always unfri	31.00	1	.5	1.3	97.5
student assistants n	32.00	1	.5	1.3	98.8
going to kirstenbosc	33.00	1	.5	1.3	100.0
	.	140	63.6	Missing	
	Total	220	100.0	100.0	

Mean	12.038	Median	8.000	Mode	8.000
Std dev	8.818	Variance	77.758	Minimum	1.000
Maximum	33.000	Sum	963.000		

Valid cases 80 Missing cases 140

COMMENT6 availability of slides

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
not enough	1.00	112	50.9	57.4	57.4
fine, enough, not a	2.00	81	36.8	41.5	99.0
average	3.00	1	.5	.5	99.5
sometimes we had to	4.00	1	.5	.5	100.0
	.	25	11.4	Missing	
	Total	220	100.0	100.0	

Mean	1.441	Median	1.000	Mode	1.000
Std dev	.538	Variance	.289	Minimum	1.000
Maximum	4.000	Sum	281.000		

Valid cases 195 Missing cases 25

COMMENT7 was marking of pracs fair

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
marks were good	1.00	5	2.3	3.6	3.6
no comment	2.00	1	.5	.7	4.4
marking inconsistant	3.00	27	12.3	19.7	24.1
marking plain unfair	4.00	17	7.7	12.4	36.5
mark allocation not	5.00	11	5.0	8.0	44.5
demmies not sure of	6.00	5	2.3	3.6	48.2
book not always mark	7.00	2	.9	1.5	49.6
no indication of whe	8.00	4	1.8	2.9	52.6
marking of diagrams	9.00	2	.9	1.5	54.0
methodical work got	10.00	3	1.4	2.2	56.2
almost everybody got	11.00	1	.5	.7	56.9
sometimes not fair	12.00	6	2.7	4.4	61.3
marks deducted unnec	13.00	6	2.7	4.4	65.7
marks are constant-	14.00	1	.5	.7	66.4
not clear about what	15.00	15	6.8	10.9	77.4
fair but strict	16.00	7	3.2	5.1	82.5
mindmapping was not	17.00	4	1.8	2.9	85.4
kirstenbosch prac wa	18.00	2	.9	1.5	86.9
satisfied with my ma	19.00	14	6.4	10.2	97.1
toufiek	20.00	1	.5	.7	97.8
making too strict	21.00	2	.9	1.5	99.3
i dont know	22.00	1	.5	.7	100.0
	.	83	37.7	Missing	
	Total	220	100.0	100.0	

Mean	9.496	Median	8.000	Mode	3.000
Std dev	6.317	Variance	39.899	Minimum	1.000
Maximum	22.000	Sum	1301.000		

Valid cases 137 Missing cases 83

COPYING did grpwork involve copying

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	47	21.4	22.4	22.4
no	2.00	162	73.6	77.1	99.5
	20.00	1	.5	.5	100.0
	.	10	4.5	Missing	
	Total	220	100.0	100.0	

Mean	1.862	Median	2.000	Mode	2.000
Std dev	1.325	Variance	1.756	Minimum	1.000
Maximum	20.000	Sum	391.000		

Valid cases 210 Missing cases 10

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CROWDED lab crowded

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	97	44.1	46.2	46.2
no	2.00	113	51.4	53.8	100.0
	.	10	4.5	Missing	
	Total	220	100.0	100.0	

Mean	1.538	Median	2.000	Mode	2.000
Std dev	.500	Variance	.250	Minimum	1.000
Maximum	2.000	Sum	323.000		

Valid cases 210 Missing cases 10

DEGREE current degree

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Bsc1	1.00	176	80.0	83.0	83.0
Bsc(Ed)	2.00	3	1.4	1.4	84.4
Dietetics	3.00	8	3.6	3.8	88.2
Bsc111	4.00	1	.5	.5	88.7
BA (HMS)	5.00	2	.9	.9	89.6
Bsc11	6.00	1	.5	.5	90.1
Bsc(OT)	7.00	21	9.5	9.9	100.0
	.	8	3.6	Missing	
	Total	220	100.0	100.0	

Mean	1.759	Median	1.000	Mode	1.000
Std dev	1.866	Variance	3.482	Minimum	1.000
Maximum	7.000	Sum	373.000		

Valid cases 212 Missing cases 8

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ELEMENT1 content

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	50	22.7	100.0	100.0
	.	170	77.3	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	50.000				

Valid cases 50 Missing cases 170

ELEMENT2 instructions

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	79	35.9	98.8	98.8
	2.00	1	.5	1.3	100.0
	.	140	63.6	Missing	
	Total	220	100.0	100.0	

Mean	1.013	Median	1.000	Mode	1.000
Std dev	.112	Variance	.012	Minimum	1.000
Maximum	2.000	Sum	81.000		

Valid cases 80 Missing cases 140

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ELEMENT3 audibility

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	47	21.4	100.0	100.0
	.	173	78.6	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	47.000				

Valid cases 47 Missing cases 173

ELEMENT4 could not see on the board

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	16	7.3	100.0	100.0
	.	204	92.7	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	16.000				

Valid cases 16 Missing cases 204

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ELEMENT5 lack of background

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	110	50.0	99.1	99.1
	5.00	1	.5	.9	100.0
	.	109	49.5	Missing	
	Total	220	100.0	100.0	

Mean	1.036	Median	1.000	Mode	1.000
Std dev	.380	Variance	.144	Minimum	1.000
Maximum	5.000	Sum	115.000		

Valid cases 111 Missing cases 109

ELEMENT6 language

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	16	7.3	100.0	100.0
	.	204	92.7	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	16.000				

Valid cases 16 Missing cases 204

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ENGAGE did you engage in grpwork

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	115	52.3	52.8	52.8
no	2.00	103	46.8	47.2	100.0
	.	2	.9	Missing	
	Total	220	100.0	100.0	

Mean	1.472	Median	1.000	Mode	1.000
Std dev	.500	Variance	.250	Minimum	1.000
Maximum	2.000	Sum	321.000		

Valid cases 218 Missing cases 2

FAMILIAR assist familiar with theory

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	55	25.0	25.1	25.1
no	2.00	155	70.5	70.8	95.9
	3.00	9	4.1	4.1	100.0
	.	1	.5	Missing	
	Total	220	100.0	100.0	

Mean	1.790	Median	2.000	Mode	2.000
Std dev	.499	Variance	.249	Minimum	1.000
Maximum	3.000	Sum	392.000		

Valid cases 219 Missing cases 1

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GRPSIZE number of students in group

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
41 to 50	1.00	26	11.8	14.1	14.1
20 to 30	2.00	86	39.1	46.5	60.5
60 to 70	3.00	9	4.1	4.9	65.4
10 to 19	4.00	10	4.5	5.4	70.8
1 to 10	5.00	40	18.2	21.6	92.4
31 to 40	6.00	12	5.5	6.5	98.9
80	7.00	2	.9	1.1	100.0
	.	35	15.9	Missing	
	Total	220	100.0	100.0	

Mean	2.978	Median	2.000	Mode	2.000
Std dev	1.648	Variance	2.717	Minimum	1.000
Maximum	7.000	Sum	551.000		

Valid cases 185 Missing cases 35

GRPWORK did pracs allow grpwork

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	154	70.0	73.3	73.3
no	2.00	56	25.5	26.7	100.0
	.	10	4.5	Missing	
	Total	220	100.0	100.0	

Mean	1.267	Median	1.000	Mode	1.000
Std dev	.443	Variance	.196	Minimum	1.000
Maximum	2.000	Sum	266.000		

Valid cases 210 Missing cases 10

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INSTR1 concerned with needs

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
always	1.00	63	28.6	29.9	29.9
sometimes	2.00	126	57.3	59.7	89.6
never	3.00	22	10.0	10.4	100.0
	.	9	4.1	Missing	
	Total	220	100.0	100.0	

Mean	1.806	Median	2.000	Mode	2.000
Std dev	.606	Variance	.367	Minimum	1.000
Maximum	3.000	Sum	381.000		

Valid cases 211 Missing cases 9

INSTR2 instr helpful

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
always	1.00	93	42.3	43.5	43.5
sometimes	2.00	114	51.8	53.3	96.7
never	3.00	7	3.2	3.3	100.0
	.	6	2.7	Missing	
	Total	220	100.0	100.0	

Mean	1.598	Median	2.000	Mode	2.000
Std dev	.554	Variance	.307	Minimum	1.000
Maximum	3.000	Sum	342.000		

Valid cases 214 Missing cases 6

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INSTR3 provide clear explanations

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
always	1.00	62	28.2	29.1	29.1
sometimes	2.00	138	62.7	64.8	93.9
never	3.00	13	5.9	6.1	100.0
	.	7	3.2	Missing	
	Total	220	100.0	100.0	

Mean	1.770	Median	2.000	Mode	2.000
Std dev	.548	Variance	.301	Minimum	1.000
Maximum	3.000	Sum	377.000		

Valid cases 213 Missing cases 7

INSTR4 well prepared for pracs

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
always	1.00	147	66.8	69.7	69.7
sometimes	2.00	61	27.7	28.9	98.6
never	3.00	3	1.4	1.4	100.0
	.	9	4.1	Missing	
	Total	220	100.0	100.0	

Mean	1.318	Median	1.000	Mode	1.000
Std dev	.496	Variance	.246	Minimum	1.000
Maximum	3.000	Sum	278.000		

Valid cases 211 Missing cases 9

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INSTR5 explain concepts clearly

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
always	1.00	66	30.0	31.0	31.0
sometimes	2.00	132	60.0	62.0	93.0
never	3.00	15	6.8	7.0	100.0
	.	7	3.2	Missing	
	Total	220	100.0	100.0	

Mean	1.761	Median	2.000	Mode	2.000
Std dev	.570	Variance	.324	Minimum	1.000
Maximum	3.000	Sum	375.000		

Valid cases 213 Missing cases 7

INSTR6 state objectives clearly

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
always	1.00	91	41.4	42.7	42.7
sometimes	2.00	106	48.2	49.8	92.5
never	3.00	16	7.3	7.5	100.0
	.	7	3.2	Missing	
	Total	220	100.0	100.0	

Mean	1.648	Median	2.000	Mode	2.000
Std dev	.617	Variance	.380	Minimum	1.000
Maximum	3.000	Sum	351.000		

Valid cases 213 Missing cases 7

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INSTR7 could be consulted when needed

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
always	1.00	106	48.2	51.0	51.0
sometimes	2.00	84	38.2	40.4	91.3
never	3.00	18	8.2	8.7	100.0
	.	12	5.5	Missing	
	Total	220	100.0	100.0	

Mean	1.577	Median	1.000	Mode	1.000
Std dev	.647	Variance	.419	Minimum	1.000
Maximum	3.000	Sum	328.000		

Valid cases 208 Missing cases 12

LABCOAT wearing of labcoat disturbing

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	93	42.3	43.7	43.7
no	2.00	120	54.5	56.3	100.0
	.	7	3.2	Missing	
	Total	220	100.0	100.0	

Mean	1.563	Median	2.000	Mode	2.000
Std dev	.497	Variance	.247	Minimum	1.000
Maximum	2.000	Sum	333.000		

Valid cases 213 Missing cases 7

LABCONDS conditions in lab that might have affect

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
none	1.00	1	.5	.9	.9
temperature, heat or	2.00	27	12.3	24.5	25.5
boring work makes me	3.00	1	.5	.9	26.4
could not hear instr	4.00	1	.5	.9	27.3
lecturer shouts at s	5.00	3	1.4	2.7	30.0
overcrowded, not eno	6.00	3	1.4	2.7	32.7
labcoat	7.00	7	3.2	6.4	39.1
differentiation- som	8.00	1	.5	.9	40.0
to be treated equall	9.00	2	.9	1.8	41.8
light of mics strain	10.00	2	.9	1.8	43.6
lab is stuffy	11.00	1	.5	.9	44.5
could not read on th	12.00	2	.9	1.8	46.4
stud assis harass us	13.00	1	.5	.9	47.3
not enough slides, s	14.00	2	.9	1.8	49.1
improper ventilation	15.00	4	1.8	3.6	52.7
electricity, faulty	16.00	2	.9	1.8	54.5
test on 28 april	17.00	1	.5	.9	55.5
demmies short-temper	18.00	2	.9	1.8	57.3
bad communication	19.00	1	.5	.9	58.2
lab crowded	20.00	2	.9	1.8	60.0
seats are uncomforta	21.00	3	1.4	2.7	62.7
smell of chemicals	22.00	2	.9	1.8	64.5
roy's prac and demmi	23.00	1	.5	.9	65.5
cant use microscope	24.00	1	.5	.9	66.4
instructions not alw	25.00	2	.9	1.8	68.2
heat, and pressure w	26.00	2	.9	1.8	70.0
too few demmies and	27.00	6	2.7	5.5	75.5
microscope work, lab	28.00	1	.5	.9	76.4
introduction to micr	29.00	1	.5	.9	77.3
noise and heat in la	30.00	5	2.3	4.5	81.8
lack of space	31.00	2	.9	1.8	83.6
noise, lack of time,	32.00	3	1.4	2.7	86.4
lab hot and crowded,	33.00	5	2.3	4.5	90.9
microscopes that don	34.00	3	1.4	2.7	93.6
demmies discriminate	35.00	1	.5	.9	94.5
temp, lack of resour	36.00	1	.5	.9	95.5
microscopes not enou	37.00	1	.5	.9	96.4
never knowing where	38.00	1	.5	.9	97.3
shortage of material	39.00	1	.5	.9	98.2
microscopes dont wor	40.00	1	.5	.9	99.1
noise	41.00	1	.5	.9	100.0
	.	110	50.0	Missing	
	Total	220	100.0	100.0	

LABCONDS conditions in lab that might have affect

Mean	16.236	Median	15.000	Mode	2.000
Std dev	12.528	Variance	156.953	Minimum	1.000
Maximum	41.000	Sum	1786.000		

Valid cases 110 Missing cases 110

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LABHOT lab too hot

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	140	63.6	65.4	65.4
no	2.00	74	33.6	34.6	100.0
	.	6	2.7	Missing	
	Total	220	100.0	100.0	

Mean	1.346	Median	1.000	Mode	1.000
Std dev	.477	Variance	.227	Minimum	1.000
Maximum	2.000	Sum	288.000		

Valid cases 214 Missing cases 6

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LINK link between prac and theory

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	201	91.4	93.5	93.5
no	2.00	14	6.4	6.5	100.0
	.	5	2.3	Missing	
	Total	220	100.0	100.0	

Mean	1.065	Median	1.000	Mode	1.000
Std dev	.247	Variance	.061	Minimum	1.000
Maximum	2.000	Sum	229.000		

Valid cases 215 Missing cases 5

MARKFAIR was marking fair

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	112	50.9	53.3	53.3
no	2.00	98	44.5	46.7	100.0
	.	10	4.5	Missing	
	Total	220	100.0	100.0	

Mean	1.467	Median	1.000	Mode	1.000
Std dev	.500	Variance	.250	Minimum	1.000
Maximum	2.000	Sum	308.000		

Valid cases 210 Missing cases 10

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MATRIC_Y matriculation year

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
1997	1.00	121	55.0	55.5	55.5
1996	2.00	44	20.0	20.2	75.7
1984	3.00	1	.5	.5	76.1
1995	4.00	18	8.2	8.3	84.4
1988	5.00	4	1.8	1.8	86.2
1994	6.00	9	4.1	4.1	90.4
1993	7.00	7	3.2	3.2	93.6
1990	8.00	1	.5	.5	94.0
1979	9.00	1	.5	.5	94.5
1991	10.00	2	.9	.9	95.4
1992	11.00	3	1.4	1.4	96.8
1989	12.00	3	1.4	1.4	98.2
1987	13.00	2	.9	.9	99.1
1974	14.00	1	.5	.5	99.5
1978	15.00	1	.5	.5	100.0
	.	2	.9	Missing	
	Total	220	100.0	100.0	

Mean	2.606	Median	1.000	Mode	1.000
Std dev	2.864	Variance	8.203	Minimum	1.000
Maximum	15.000	Sum	568.000		

Valid cases 218 Missing cases 2

MIC_FAM studassis familiar with mic

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	194	88.2	90.2	90.2
no	2.00	21	9.5	9.8	100.0
	.	5	2.3	Missing	
	Total	220	100.0	100.0	

Mean	1.098	Median	1.000	Mode	1.000
Std dev	.298	Variance	.089	Minimum	1.000
Maximum	2.000	Sum	236.000		

Valid cases 215 Missing cases 5

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MIC_USE did you master use of mic

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	141	64.1	64.4	64.4
no	2.00	78	35.5	35.6	100.0
	.	1	.5	Missing	
	Total	220	100.0	100.0	

Mean	1.356	Median	1.000	Mode	1.000
Std dev	.480	Variance	.230	Minimum	1.000
Maximum	2.000	Sum	297.000		

Valid cases 219 Missing cases 1

MORECOPY elaborate on copying

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
solving problems	1.00	1	.5	.7	.7
discussing and under	2.00	28	12.7	19.0	19.7
blatant copying with	3.00	3	1.4	2.0	21.8
copying helps no-one	4.00	7	3.2	4.8	26.5
we compared answers	5.00	2	.9	1.4	27.9
copied because work	6.00	10	4.5	6.8	34.7
the lady was rushing	7.00	1	.5	.7	35.4
there was input from	8.00	6	2.7	4.1	39.5
discuss and everybod	9.00	52	23.6	35.4	74.8
we had the same idea	10.00	3	1.4	2.0	76.9
helped each other	11.00	5	2.3	3.4	80.3
copied labels from	12.00	3	1.4	2.0	82.3
each member of the g	13.00	2	.9	1.4	83.7
sharing of answers i	14.00	3	1.4	2.0	85.7
we consulted demmies	15.00	2	.9	1.4	87.1
only asked peers how	16.00	1	.5	.7	87.8
sharing microscope a	17.00	2	.9	1.4	89.1
we copied drawings	18.00	4	1.8	2.7	91.8
i have never been p	19.00	2	.9	1.4	93.2
people copied from m	20.00	2	.9	1.4	94.6
copied common result	21.00	1	.5	.7	95.2
copied because of ti	23.00	4	1.8	2.7	98.0
discussed but answer	24.00	1	.5	.7	98.6
copied from textbook	25.00	1	.5	.7	99.3
	55.00	1	.5	.7	100.0
	.	73	33.2	Missing	
	Total	220	100.0	100.0	

Mean	9.000	Median	9.000	Mode	9.000
Std dev	6.697	Variance	44.849	Minimum	1.000
Maximum	55.000	Sum	1323.000		

Valid cases 147 Missing cases 73

OPINION1 responsibilities of student assistants

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
help when you dont u	1.00	145	65.9	70.7	70.7
be familiar with all	2.00	12	5.5	5.9	76.6
give image of whats	3.00	1	.5	.5	77.1
give assistance with	4.00	20	9.1	9.8	86.8
give background info	5.00	1	.5	.5	87.3
observe and explain	6.00	1	.5	.5	87.8
explain what is expe	7.00	4	1.8	2.0	89.8
check if student are	8.00	2	.9	1.0	90.7
be familiar with pra	9.00	11	5.0	5.4	96.1
insight into prac, w	10.00	4	1.8	2.0	98.0
give direction not a	11.00	2	.9	1.0	99.0
be approachable, kno	12.00	2	.9	1.0	100.0
	.	15	6.8	Missing	
	Total	220	100.0	100.0	

Mean	2.400	Median	1.000	Mode	1.000
Std dev	2.754	Variance	7.584	Minimum	1.000
Maximum	12.000	Sum	492.000		

Valid cases 205 Missing cases 15

OPINION2 personal responsibilities

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
prepare	1.00	40	18.2	23.1	23.1
work to the best of	2.00	12	5.5	6.9	30.1
combine knowledge fr	3.00	1	.5	.6	30.6
do the prac	4.00	8	3.6	4.6	35.3
make sure i understa	5.00	2	.9	1.2	36.4
fill in detail	6.00	1	.5	.6	37.0
be cautious with equ	7.00	1	.5	.6	37.6
understand and get g	8.00	9	4.1	5.2	42.8
know my work	9.00	5	2.3	2.9	45.7
understand instructi	10.00	32	14.5	18.5	64.2
be familiar with con	11.00	23	10.5	13.3	77.5
handle equipment cor	12.00	14	6.4	8.1	85.5
folllow instruction	13.00	8	3.6	4.6	90.2
understand theory, c	14.00	6	2.7	3.5	93.6
observe, learn, be p	15.00	2	.9	1.2	94.8
punctual, attend all	16.00	1	.5	.6	95.4
know the microscope	17.00	2	.9	1.2	96.5
pracs were long,i co	18.00	1	.5	.6	97.1
nothing	19.00	1	.5	.6	97.7
take responsibility	20.00	4	1.8	2.3	100.0
	.	47	21.4	Missing	
	Total	220	100.0	100.0	

Mean	7.890	Median	10.000	Mode	1.000
Std dev	5.209	Variance	27.133	Minimum	1.000
Maximum	20.000	Sum	1365.000		

Valid cases 173 Missing cases 47

OWNPRAC what would you include in your own prac

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
more equipment, bett	1.00	6	2.7	5.9	5.9
everything that is i	2.00	1	.5	1.0	6.9
clarity	3.00	1	.5	1.0	7.9
clear diagrams, shor	4.00	4	1.8	4.0	11.9
more assistants, all	5.00	7	3.2	6.9	18.8
better slides, layou	6.00	5	2.3	5.0	23.8
no lab coats	7.00	1	.5	1.0	24.8
discussions	8.00	1	.5	1.0	25.7
greater introduction	9.00	2	.9	2.0	27.7
the work we cover in	10.00	2	.9	2.0	29.7
airconditioning	11.00	1	.5	1.0	30.7
origin of life, biod	12.00	1	.5	1.0	31.7
more groupwork	13.00	1	.5	1.0	32.7
music	14.00	1	.5	1.0	33.7
equality among all,	15.00	1	.5	1.0	34.7
give a break	16.00	2	.9	2.0	36.6
more fieldwork	17.00	5	2.3	5.0	41.6
more demmies, smalle	18.00	8	3.6	7.9	49.5
clear and concise ai	19.00	4	1.8	4.0	53.5
satisfy all students	20.00	1	.5	1.0	54.5
answers, helpfull de	21.00	7	3.2	6.9	61.4
choosing topics for	22.00	1	.5	1.0	62.4
better slides, less	23.00	1	.5	1.0	63.4
more dgrms, summarie	24.00	3	1.4	3.0	66.3
marine excursion	25.00	1	.5	1.0	67.3
preprac tests, do pr	26.00	1	.5	1.0	68.3
active involvement	27.00	2	.9	2.0	70.3
instr who are not ru	28.00	2	.9	2.0	72.3
field trips, make ow	29.00	1	.5	1.0	73.3
disecting animals	30.00	1	.5	1.0	74.3
live specimens, larg	31.00	2	.9	2.0	76.2
demmies who know the	32.00	5	2.3	5.0	81.2
more relevant work	33.00	1	.5	1.0	82.2
would not ad anythin	34.00	6	2.7	5.9	88.1
more groupwork	35.00	2	.9	2.0	90.1
multiple choice ques	36.00	1	.5	1.0	91.1
whats covered in the	37.00	1	.5	1.0	92.1
more animal slides,	38.00	2	.9	2.0	94.1
color diagrams	39.00	1	.5	1.0	95.0
smaller classes, gro	40.00	2	.9	2.0	97.0
computers	41.00	1	.5	1.0	98.0
less quantity, more	42.00	1	.5	1.0	99.0
less microscope work	43.00	1	.5	1.0	100.0
	.	119	54.1	Missing	
	Total	220	100.0	100.0	

OWNPRAC what would you include in your own prac

Mean	19.545	Median	19.000	Mode	18.000
Std dev	12.067	Variance	145.610	Minimum	1.000
Maximum	43.000	Sum	1974.000		

Valid cases 101 Missing cases 119

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PR_OTHER other practical

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	6	2.7	100.0	100.0
	.	214	97.3	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	6.000				

Valid cases 6 Missing cases 214

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PR_TYPE1 microscope

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	65	29.5	100.0	100.0
	.	155	70.5	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	65.000				

Valid cases 65 Missing cases 155

PR_TYPE2 experimental

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	119	54.1	100.0	100.0
	.	101	45.9	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	119.000				

Valid cases 119 Missing cases 101

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PR_TYPE3 fresh specimens

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	36	16.4	100.0	100.0
	.	184	83.6	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	36.000				

Valid cases 36 Missing cases 184

PR_TYPE4 fieldwork

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	45	20.5	100.0	100.0
	.	175	79.5	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	45.000				

Valid cases 45 Missing cases 175

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PRAC1_25 measurement1

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
too much time	1.00	29	13.2	13.8	13.8
adequate time	2.00	163	74.1	77.6	91.4
too little time	3.00	18	8.2	8.6	100.0
	.	10	4.5	Missing	
	Total	220	100.0	100.0	

Mean	1.948	Median	2.000	Mode	2.000
Std dev	.471	Variance	.222	Minimum	1.000
Maximum	3.000	Sum	409.000		

Valid cases 210 Missing cases 10

PRAC1_26 measurement2

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
difficult	1.00	11	5.0	5.2	5.2
average	2.00	107	48.6	51.0	56.2
easy	3.00	92	41.8	43.8	100.0
	.	10	4.5	Missing	
	Total	220	100.0	100.0	

Mean	2.386	Median	2.000	Mode	2.000
Std dev	.586	Variance	.343	Minimum	1.000
Maximum	3.000	Sum	501.000		

Valid cases 210 Missing cases 10

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PRAC1_33 Measurement

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	152	69.1	71.7	71.7
no	2.00	60	27.3	28.3	100.0
	.	8	3.6	Missing	
	Total	220	100.0	100.0	

Mean	1.283	Median	1.000	Mode	1.000
Std dev	.452	Variance	.204	Minimum	1.000
Maximum	2.000	Sum	272.000		

Valid cases 212 Missing cases 8

PRAC1_34 measurement

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	154	70.0	73.7	73.7
no	2.00	54	24.5	25.8	99.5
	11.00	1	.5	.5	100.0
	.	11	5.0	Missing	
	Total	220	100.0	100.0	

Mean	1.306	Median	1.000	Mode	1.000
Std dev	.804	Variance	.646	Minimum	1.000
Maximum	11.000	Sum	273.000		

Valid cases 209 Missing cases 11

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PRAC1_51 measurement

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
important	1.00	158	71.8	74.2	74.2
unimportant	2.00	55	25.0	25.8	100.0
	.	7	3.2	Missing	
	Total	220	100.0	100.0	

Mean	1.258	Median	1.000	Mode	1.000
Std dev	.439	Variance	.192	Minimum	1.000
Maximum	2.000	Sum	268.000		

Valid cases 213 Missing cases 7

PRAC1_52 measurement

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
useful	1.00	166	75.5	78.3	78.3
not useful	2.00	46	20.9	21.7	100.0
	.	8	3.6	Missing	
	Total	220	100.0	100.0	

Mean	1.217	Median	1.000	Mode	1.000
Std dev	.413	Variance	.171	Minimum	1.000
Maximum	2.000	Sum	258.000		

Valid cases 212 Missing cases 8

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PRAC1_53 measurement

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
interesting	1.00	92	41.8	44.4	44.4
boring	2.00	115	52.3	55.6	100.0
	.	13	5.9	Missing	
	Total	220	100.0	100.0	

Mean	1.556	Median	2.000	Mode	2.000
Std dev	.498	Variance	.248	Minimum	1.000
Maximum	2.000	Sum	322.000		

Valid cases 207 Missing cases 13

PRAC2_25 microscopy1

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
too much time	1.00	17	7.7	7.9	7.9
adequate time	2.00	155	70.5	72.4	80.4
too little time	3.00	42	19.1	19.6	100.0
	.	6	2.7	Missing	
	Total	220	100.0	100.0	

Mean	2.117	Median	2.000	Mode	2.000
Std dev	.513	Variance	.263	Minimum	1.000
Maximum	3.000	Sum	453.000		

Valid cases 214 Missing cases 6

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PRAC2_26 microscopy2

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
difficult	1.00	43	19.5	19.9	19.9
average	2.00	123	55.9	56.9	76.9
easy	3.00	50	22.7	23.1	100.0
	.	4	1.8	Missing	
	Total	220	100.0	100.0	

Mean	2.032	Median	2.000	Mode	2.000
Std dev	.657	Variance	.432	Minimum	1.000
Maximum	3.000	Sum	439.000		

Valid cases 216 Missing cases 4

PRAC2_33 microscopy

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	141	64.1	65.6	65.6
no	2.00	74	33.6	34.4	100.0
	.	5	2.3	Missing	
	Total	220	100.0	100.0	

Mean	1.344	Median	1.000	Mode	1.000
Std dev	.476	Variance	.227	Minimum	1.000
Maximum	2.000	Sum	289.000		

Valid cases 215 Missing cases 5

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PRAC2_34 microscopy

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	168	76.4	78.1	78.1
no	2.00	47	21.4	21.9	100.0
	.	5	2.3	Missing	
	Total	220	100.0	100.0	

Mean	1.219	Median	1.000	Mode	1.000
Std dev	.414	Variance	.172	Minimum	1.000
Maximum	2.000	Sum	262.000		

Valid cases 215 Missing cases 5

PRAC2_51 microscopy

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
important	1.00	205	93.2	94.5	94.5
unimportant	2.00	12	5.5	5.5	100.0
	.	3	1.4	Missing	
	Total	220	100.0	100.0	

Mean	1.055	Median	1.000	Mode	1.000
Std dev	.229	Variance	.052	Minimum	1.000
Maximum	2.000	Sum	229.000		

Valid cases 217 Missing cases 3

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PRAC2_52 microscopy

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
useful	1.00	201	91.4	93.5	93.5
no useful	2.00	14	6.4	6.5	100.0
	.	5	2.3	Missing	
	Total	220	100.0	100.0	

Mean	1.065	Median	1.000	Mode	1.000
Std dev	.247	Variance	.061	Minimum	1.000
Maximum	2.000	Sum	229.000		

Valid cases 215 Missing cases 5

PRAC2_53 microscopy

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
interesting	1.00	173	78.6	82.0	82.0
boring	2.00	38	17.3	18.0	100.0
	.	9	4.1	Missing	
	Total	220	100.0	100.0	

Mean	1.180	Median	1.000	Mode	1.000
Std dev	.385	Variance	.148	Minimum	1.000
Maximum	2.000	Sum	249.000		

Valid cases 211 Missing cases 9

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PRAC3_25 structure and function of cells1

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
too much time	1.00	19	8.6	8.9	8.9
adequate	2.00	144	65.5	67.3	76.2
too little time	3.00	51	23.2	23.8	100.0
	.	6	2.7	Missing	
	Total	220	100.0	100.0	

Mean	2.150	Median	2.000	Mode	2.000
Std dev	.553	Variance	.306	Minimum	1.000
Maximum	3.000	Sum	460.000		

Valid cases 214 Missing cases 6

PRAC3_26 strcuture and function of cells2

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
difficult	1.00	35	15.9	16.3	16.3
average	2.00	128	58.2	59.5	75.8
easy	3.00	52	23.6	24.2	100.0
	.	5	2.3	Missing	
	Total	220	100.0	100.0	

Mean	2.079	Median	2.000	Mode	2.000
Std dev	.633	Variance	.400	Minimum	1.000
Maximum	3.000	Sum	447.000		

Valid cases 215 Missing cases 5

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PRAC3_33 structure and function of cells

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	150	68.2	70.1	70.1
no	2.00	64	29.1	29.9	100.0
	.	6	2.7	Missing	
	Total	220	100.0	100.0	

Mean	1.299	Median	1.000	Mode	1.000
Std dev	.459	Variance	.211	Minimum	1.000
Maximum	2.000	Sum	278.000		

Valid cases 214 Missing cases 6

PRAC3_34 structure and function of cells

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	165	75.0	76.0	76.0
no	2.00	52	23.6	24.0	100.0
	.	3	1.4	Missing	
	Total	220	100.0	100.0	

Mean	1.240	Median	1.000	Mode	1.000
Std dev	.428	Variance	.183	Minimum	1.000
Maximum	2.000	Sum	269.000		

Valid cases 217 Missing cases 3

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PRAC3_51 structure and function of cells

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
important	1.00	207	94.1	95.4	95.4
unimportant	2.00	10	4.5	4.6	100.0
	.	3	1.4	Missing	
	Total	220	100.0	100.0	

Mean	1.046	Median	1.000	Mode	1.000
Std dev	.210	Variance	.044	Minimum	1.000
Maximum	2.000	Sum	227.000		

Valid cases 217 Missing cases 3

PRAC3_52 structure and function of cells

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
useful	1.00	198	90.0	91.2	91.2
not useful	2.00	19	8.6	8.8	100.0
	.	3	1.4	Missing	
	Total	220	100.0	100.0	

Mean	1.088	Median	1.000	Mode	1.000
Std dev	.283	Variance	.080	Minimum	1.000
Maximum	2.000	Sum	236.000		

Valid cases 217 Missing cases 3

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PRAC3_53 structure and function of cells

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
interesting	1.00	173	78.6	81.6	81.6
boring	2.00	39	17.7	18.4	100.0
	.	8	3.6	Missing	
	Total	220	100.0	100.0	

Mean	1.184	Median	1.000	Mode	1.000
Std dev	.388	Variance	.151	Minimum	1.000
Maximum	2.000	Sum	251.000		

Valid cases 212 Missing cases 8

PRAC4_25 kirstenbosch1

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
too much time	1.00	30	13.6	13.8	13.8
adequate	2.00	124	56.4	57.1	71.0
too little time	3.00	63	28.6	29.0	100.0
	.	3	1.4	Missing	
	Total	220	100.0	100.0	

Mean	2.152	Median	2.000	Mode	2.000
Std dev	.638	Variance	.407	Minimum	1.000
Maximum	3.000	Sum	467.000		

Valid cases 217 Missing cases 3

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PRAC4_26 kistenbosch2

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
difficult	1.00	28	12.7	13.1	13.1
average	2.00	99	45.0	46.3	59.3
easy	3.00	86	39.1	40.2	99.5
	30.00	1	.5	.5	100.0
	.	6	2.7	Missing	
	Total	220	100.0	100.0	

Mean	2.402	Median	2.000	Mode	2.000
Std dev	2.013	Variance	4.054	Minimum	1.000
Maximum	30.000	Sum	514.000		

Valid cases 214 Missing cases 6

PRAC4_33 kirstenbosch

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	126	57.3	58.6	58.6
no	2.00	89	40.5	41.4	100.0
	.	5	2.3	Missing	
	Total	220	100.0	100.0	

Mean	1.414	Median	1.000	Mode	1.000
Std dev	.494	Variance	.244	Minimum	1.000
Maximum	2.000	Sum	304.000		

Valid cases 215 Missing cases 5

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PRAC4_34 kirstenbosch

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	142	64.5	66.0	66.0
no	2.00	73	33.2	34.0	100.0
	.	5	2.3	Missing	
	Total	220	100.0	100.0	

Mean	1.340	Median	1.000	Mode	1.000
Std dev	.475	Variance	.225	Minimum	1.000
Maximum	2.000	Sum	288.000		

Valid cases 215 Missing cases 5

PRAC4_51 kirstenbosch

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
important	1.00	142	64.5	65.1	65.1
unimportant	2.00	76	34.5	34.9	100.0
	.	2	.9	Missing	
	Total	220	100.0	100.0	

Mean	1.349	Median	1.000	Mode	1.000
Std dev	.478	Variance	.228	Minimum	1.000
Maximum	2.000	Sum	294.000		

Valid cases 218 Missing cases 2

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PRAC4_52 kirstenbosch

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
useful	1.00	138	62.7	63.6	63.6
not useful	2.00	79	35.9	36.4	100.0
	.	3	1.4	Missing	
	Total	220	100.0	100.0	

Mean	1.364	Median	1.000	Mode	1.000
Std dev	.482	Variance	.233	Minimum	1.000
Maximum	2.000	Sum	296.000		

Valid cases 217 Missing cases 3

PRAC4_53 kirstenbosch

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
interesting	1.00	134	60.9	63.2	63.2
boring	2.00	78	35.5	36.8	100.0
	.	8	3.6	Missing	
	Total	220	100.0	100.0	

Mean	1.368	Median	1.000	Mode	1.000
Std dev	.483	Variance	.234	Minimum	1.000
Maximum	2.000	Sum	290.000		

Valid cases 212 Missing cases 8

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PRAC5_25 tissues and cells1

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
too much time	1.00	14	6.4	6.6	6.6
adequate	2.00	146	66.4	68.5	75.1
too little time	3.00	53	24.1	24.9	100.0
	.	7	3.2	Missing	
	Total	220	100.0	100.0	

Mean	2.183	Median	2.000	Mode	2.000
Std dev	.531	Variance	.282	Minimum	1.000
Maximum	3.000	Sum	465.000		

Valid cases 213 Missing cases 7

PRAC5_26 tissues and cells2

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
difficult	1.00	39	17.7	18.2	18.2
average	2.00	145	65.9	67.8	86.0
easy	3.00	30	13.6	14.0	100.0
	.	6	2.7	Missing	
	Total	220	100.0	100.0	

Mean	1.958	Median	2.000	Mode	2.000
Std dev	.568	Variance	.322	Minimum	1.000
Maximum	3.000	Sum	419.000		

Valid cases 214 Missing cases 6

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PRAC5_33 tissues and cells

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	140	63.6	66.4	66.4
no	2.00	71	32.3	33.6	100.0
	.	9	4.1	Missing	
	Total	220	100.0	100.0	

Mean	1.336	Median	1.000	Mode	1.000
Std dev	.474	Variance	.224	Minimum	1.000
Maximum	2.000	Sum	282.000		

Valid cases 211 Missing cases 9

PRAC5_34 tissues and cells

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	162	73.6	74.3	74.3
no	2.00	56	25.5	25.7	100.0
	.	2	.9	Missing	
	Total	220	100.0	100.0	

Mean	1.257	Median	1.000	Mode	1.000
Std dev	.438	Variance	.192	Minimum	1.000
Maximum	2.000	Sum	274.000		

Valid cases 218 Missing cases 2

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PRAC5_51 tissues and cells

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
important	1.00	209	95.0	96.3	96.3
unimportant	2.00	8	3.6	3.7	100.0
	.	3	1.4	Missing	
	Total	220	100.0	100.0	

Mean	1.037	Median	1.000	Mode	1.000
Std dev	.189	Variance	.036	Minimum	1.000
Maximum	2.000	Sum	225.000		

Valid cases 217 Missing cases 3

PRAC5_52 tissues and cells

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
useful	1.00	199	90.5	92.1	92.1
not useful	2.00	17	7.7	7.9	100.0
	.	4	1.8	Missing	
	Total	220	100.0	100.0	

Mean	1.079	Median	1.000	Mode	1.000
Std dev	.270	Variance	.073	Minimum	1.000
Maximum	2.000	Sum	233.000		

Valid cases 216 Missing cases 4

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PRAC5_53 tissues and cells

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
interesting	1.00	171	77.7	81.4	81.4
boring	2.00	39	17.7	18.6	100.0
	.	10	4.5	Missing	
	Total	220	100.0	100.0	

Mean	1.186	Median	1.000	Mode	1.000
Std dev	.390	Variance	.152	Minimum	1.000
Maximum	2.000	Sum	249.000		

Valid cases 210 Missing cases 10

PRAC6_25 mindmapping

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
too much time	1.00	38	17.3	17.4	17.4
adequate	2.00	149	67.7	68.0	85.4
too little time	3.00	32	14.5	14.6	100.0
	.	1	.5	Missing	
	Total	220	100.0	100.0	

Mean	1.973	Median	2.000	Mode	2.000
Std dev	.566	Variance	.320	Minimum	1.000
Maximum	3.000	Sum	432.000		

Valid cases 219 Missing cases 1

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PRAC6_26 mindmapping2

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
difficult	1.00	29	13.2	13.2	13.2
average	2.00	81	36.8	37.0	50.2
easy	3.00	109	49.5	49.8	100.0
	.	1	.5	Missing	
	Total	220	100.0	100.0	

Mean	2.365	Median	2.000	Mode	3.000
Std dev	.706	Variance	.499	Minimum	1.000
Maximum	3.000	Sum	518.000		

Valid cases 219 Missing cases 1

PRAC6_33 mindmapping

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	158	71.8	73.1	73.1
no	2.00	58	26.4	26.9	100.0
	.	4	1.8	Missing	
	Total	220	100.0	100.0	

Mean	1.269	Median	1.000	Mode	1.000
Std dev	.444	Variance	.197	Minimum	1.000
Maximum	2.000	Sum	274.000		

Valid cases 216 Missing cases 4

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PRAC6_34 mindmapping

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	157	71.4	73.0	73.0
no	2.00	58	26.4	27.0	100.0
	.	5	2.3	Missing	
	Total	220	100.0	100.0	

Mean	1.270	Median	1.000	Mode	1.000
Std dev	.445	Variance	.198	Minimum	1.000
Maximum	2.000	Sum	273.000		

Valid cases 215 Missing cases 5

PRAC6_51 mindmapping

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
important	1.00	153	69.5	69.9	69.9
unimportant	2.00	66	30.0	30.1	100.0
	.	1	.5	Missing	
	Total	220	100.0	100.0	

Mean	1.301	Median	1.000	Mode	1.000
Std dev	.460	Variance	.212	Minimum	1.000
Maximum	2.000	Sum	285.000		

Valid cases 219 Missing cases 1

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PRAC6_52 mindmapping

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
useful	1.00	154	70.0	70.6	70.6
not useful	2.00	64	29.1	29.4	100.0
	.	2	.9	Missing	
	Total	220	100.0	100.0	

Mean	1.294	Median	1.000	Mode	1.000
Std dev	.456	Variance	.208	Minimum	1.000
Maximum	2.000	Sum	282.000		

Valid cases 218 Missing cases 2

PRAC6_53 mindmapping

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
interesting	1.00	115	52.3	54.2	54.2
boring	2.00	96	43.6	45.3	99.5
	5.00	1	.5	.5	100.0
	.	8	3.6	Missing	
	Total	220	100.0	100.0	

Mean	1.472	Median	1.000	Mode	1.000
Std dev	.554	Variance	.307	Minimum	1.000
Maximum	5.000	Sum	312.000		

Valid cases 212 Missing cases 8

PRAC_EXP type of practical experience

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
microscope, observed	1.00	6	2.7	5.2	5.2
nutrition experiment	2.00	4	1.8	3.5	8.7
chemistry and physic	3.00	2	.9	1.7	10.4
biology experiments	4.00	5	2.3	4.3	14.8
botanical eperiments	5.00	4	1.8	3.5	18.3
limited or no pracs	6.00	1	.5	.9	19.1
chemistry and biolog	7.00	2	.9	1.7	20.9
only observed teach	8.00	11	5.0	9.6	30.4
labelling insects, d	9.00	1	.5	.9	31.3
mixing chemicals	10.00	4	1.8	3.5	34.8
looked at leaves	11.00	1	.5	.9	35.7
dicot flower, food t	12.00	3	1.4	2.6	38.3
viewed prepared slid	13.00	1	.5	.9	39.1
school had no equipm	14.00	1	.5	.9	40.0
groupwork, discussio	15.00	1	.5	.9	40.9
first observe teache	16.00	2	.9	1.7	42.6
not sufficient, but	17.00	4	1.8	3.5	46.1
teacher encouraged u	18.00	1	.5	.9	47.0
experiments	19.00	7	3.2	6.1	53.0
skipped most lessons	20.00	2	.9	1.7	54.8
test for starch	21.00	1	.5	.9	55.7
viewing specimens wi	22.00	5	2.3	4.3	60.0
only winter school,	23.00	1	.5	.9	60.9
pracs occasionally o	24.00	1	.5	.9	61.7
foodtests and dissec	25.00	1	.5	.9	62.6
prepare wet mounts,	26.00	2	.9	1.7	64.3
bacterial cultures,	27.00	1	.5	.9	65.2
viewed videos of exp	28.00	1	.5	.9	66.1
mics only for demons	29.00	1	.5	.9	67.0
chem, bio, physics	30.00	2	.9	1.7	68.7
fieldtrips	31.00	1	.5	.9	69.6
experiments and live	32.00	2	.9	1.7	71.3
did not do bio at sc	33.00	2	.9	1.7	73.0
looked at plant cell	34.00	1	.5	.9	73.9
physics pracs	35.00	1	.5	.9	74.8
did everything ourse	36.00	1	.5	.9	75.7
excursions, watching	37.00	1	.5	.9	76.5
plasmolysis	38.00	2	.9	1.7	78.3
mainly looked at pla	39.00	1	.5	.9	79.1
made models or do es	40.00	1	.5	.9	80.0
pracs done as groupw	41.00	1	.5	.9	80.9
poor facilities, lac	42.00	1	.5	.9	81.7
viewing slides & exp	43.00	2	.9	1.7	83.5
explored area outsid	44.00	1	.5	.9	84.3
thermometer, tempera	45.00	1	.5	.9	85.2
did no pracs	46.00	3	1.4	2.6	87.8
chem, excursions, pr	47.00	2	.9	1.7	89.6

PRAC_EXP type of practical experience

not plentiful, but i	48.00	1	.5	.9	90.4
disections, physics,	49.00	1	.5	.9	91.3
volume,density, solu	50.00	1	.5	.9	92.2
group experiments	51.00	1	.5	.9	93.0
pracs without superv	52.00	2	.9	1.7	94.8
disections, mic work	53.00	1	.5	.9	95.7
only 2 mics which we	54.00	1	.5	.9	96.5
not always allowed t	55.00	1	.5	.9	97.4
one mic, observed te	56.00	1	.5	.9	98.3
was in charge of lab	57.00	1	.5	.9	99.1
looked at plants out	58.00	1	.5	.9	100.0
	.	105	47.7	Missing	
	Total	220	100.0	100.0	

Mean	22.426	Median	19.000	Mode	8.000
Std dev	16.777	Variance	281.457	Minimum	1.000
Maximum	58.000	Sum	2579.000		

Valid cases 115 Missing cases 105

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PRAC_SCH pracs at school?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	142	64.5	65.4	65.4
no	2.00	75	34.1	34.6	100.0
	.	3	1.4	Missing	
	Total	220	100.0	100.0	

Mean	1.346	Median	1.000	Mode	1.000
Std dev	.477	Variance	.227	Minimum	1.000
Maximum	2.000	Sum	292.000		

Valid cases 217 Missing cases 3

PREFER did you prefer grpwork

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	181	82.3	83.4	83.4
no	2.00	36	16.4	16.6	100.0
	.	3	1.4	Missing	
	Total	220	100.0	100.0	

Mean	1.166	Median	1.000	Mode	1.000
Std dev	.373	Variance	.139	Minimum	1.000
Maximum	2.000	Sum	253.000		

Valid cases 217 Missing cases 3

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PREPARE do you prepare for pracs

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	74	33.6	34.7	34.7
no	2.00	127	57.7	59.6	94.4
	3.00	12	5.5	5.6	100.0
	.	7	3.2	Missing	
	Total	220	100.0	100.0	

Mean	1.709	Median	2.000	Mode	2.000
Std dev	.566	Variance	.321	Minimum	1.000
Maximum	3.000	Sum	364.000		

Valid cases 213 Missing cases 7

QUALITY could you see specimen clearly

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
satisfactory	1.00	99	45.0	46.9	46.9
poor quality, could	2.00	46	20.9	21.8	68.7
could not always see	3.00	62	28.2	29.4	98.1
microscopes did not	4.00	1	.5	.5	98.6
cannot use microscop	5.00	2	.9	.9	99.5
	8.00	1	.5	.5	100.0
	.	9	4.1	Missing	
	Total	220	100.0	100.0	

Mean	1.891	Median	2.000	Mode	1.000
Std dev	1.015	Variance	1.031	Minimum	1.000
Maximum	8.000	Sum	399.000		

Valid cases 211 Missing cases 9

QUESTION number of questionnaire

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	1	.5	.5	.5
	2.00	1	.5	.5	.9
	3.00	1	.5	.5	1.4
	4.00	1	.5	.5	1.8
	5.00	1	.5	.5	2.3
	6.00	1	.5	.5	2.7
	7.00	1	.5	.5	3.2
	8.00	1	.5	.5	3.6
	9.00	1	.5	.5	4.1
	10.00	1	.5	.5	4.5
	11.00	1	.5	.5	5.0
	12.00	1	.5	.5	5.5
	13.00	1	.5	.5	5.9
	14.00	1	.5	.5	6.4
	15.00	1	.5	.5	6.8
	16.00	1	.5	.5	7.3
	17.00	1	.5	.5	7.7
	18.00	1	.5	.5	8.2
	19.00	1	.5	.5	8.6
	20.00	1	.5	.5	9.1
	21.00	1	.5	.5	9.5
	22.00	1	.5	.5	10.0
	23.00	1	.5	.5	10.5
	24.00	1	.5	.5	10.9
	25.00	1	.5	.5	11.4
	26.00	1	.5	.5	11.8
	27.00	1	.5	.5	12.3
	28.00	1	.5	.5	12.7
	29.00	1	.5	.5	13.2
	30.00	1	.5	.5	13.6
	31.00	1	.5	.5	14.1
	32.00	1	.5	.5	14.5
	33.00	1	.5	.5	15.0
	34.00	1	.5	.5	15.5
	35.00	1	.5	.5	15.9
	36.00	1	.5	.5	16.4
	37.00	1	.5	.5	16.8
	38.00	1	.5	.5	17.3
	39.00	1	.5	.5	17.7
	40.00	1	.5	.5	18.2
	41.00	1	.5	.5	18.6
	42.00	1	.5	.5	19.1
	43.00	1	.5	.5	19.5
	44.00	1	.5	.5	20.0
	45.00	1	.5	.5	20.5
	46.00	1	.5	.5	20.9
	47.00	1	.5	.5	21.4

QUESTION number of questionnaire

48.00	1	.5	.5	21.8
49.00	1	.5	.5	22.3
50.00	1	.5	.5	22.7
51.00	1	.5	.5	23.2
52.00	1	.5	.5	23.6
53.00	1	.5	.5	24.1
54.00	1	.5	.5	24.5
55.00	1	.5	.5	25.0
56.00	1	.5	.5	25.5
57.00	1	.5	.5	25.9
58.00	1	.5	.5	26.4
59.00	1	.5	.5	26.8
60.00	1	.5	.5	27.3
61.00	1	.5	.5	27.7
62.00	1	.5	.5	28.2
63.00	1	.5	.5	28.6
64.00	1	.5	.5	29.1
65.00	1	.5	.5	29.5
66.00	1	.5	.5	30.0
67.00	1	.5	.5	30.5
68.00	1	.5	.5	30.9
69.00	1	.5	.5	31.4
70.00	1	.5	.5	31.8
71.00	1	.5	.5	32.3
72.00	1	.5	.5	32.7
73.00	1	.5	.5	33.2
74.00	1	.5	.5	33.6
75.00	1	.5	.5	34.1
76.00	1	.5	.5	34.5
77.00	1	.5	.5	35.0
78.00	1	.5	.5	35.5
79.00	1	.5	.5	35.9
80.00	1	.5	.5	36.4
81.00	1	.5	.5	36.8
82.00	1	.5	.5	37.3
83.00	1	.5	.5	37.7
84.00	1	.5	.5	38.2
85.00	1	.5	.5	38.6
86.00	1	.5	.5	39.1
87.00	1	.5	.5	39.5
88.00	1	.5	.5	40.0
89.00	1	.5	.5	40.5
90.00	1	.5	.5	40.9
91.00	1	.5	.5	41.4
92.00	1	.5	.5	41.8
93.00	1	.5	.5	42.3
94.00	1	.5	.5	42.7
95.00	1	.5	.5	43.2
96.00	1	.5	.5	43.6
97.00	1	.5	.5	44.1
98.00	1	.5	.5	44.5

QUESTION number of questionnaire

99.00	1	.5	.5	45.0
100.00	1	.5	.5	45.5
101.00	1	.5	.5	45.9
102.00	1	.5	.5	46.4
103.00	1	.5	.5	46.8
104.00	1	.5	.5	47.3
105.00	1	.5	.5	47.7
106.00	1	.5	.5	48.2
107.00	1	.5	.5	48.6
108.00	1	.5	.5	49.1
109.00	1	.5	.5	49.5
110.00	1	.5	.5	50.0
111.00	1	.5	.5	50.5
112.00	1	.5	.5	50.9
113.00	1	.5	.5	51.4
114.00	1	.5	.5	51.8
115.00	1	.5	.5	52.3
116.00	1	.5	.5	52.7
117.00	1	.5	.5	53.2
118.00	1	.5	.5	53.6
119.00	1	.5	.5	54.1
120.00	1	.5	.5	54.5
121.00	1	.5	.5	55.0
122.00	1	.5	.5	55.5
123.00	1	.5	.5	55.9
124.00	1	.5	.5	56.4
125.00	1	.5	.5	56.8
126.00	1	.5	.5	57.3
127.00	1	.5	.5	57.7
128.00	1	.5	.5	58.2
129.00	1	.5	.5	58.6
130.00	1	.5	.5	59.1
131.00	1	.5	.5	59.5
132.00	1	.5	.5	60.0
133.00	1	.5	.5	60.5
134.00	1	.5	.5	60.9
135.00	1	.5	.5	61.4
136.00	1	.5	.5	61.8
137.00	1	.5	.5	62.3
138.00	1	.5	.5	62.7
139.00	1	.5	.5	63.2
140.00	1	.5	.5	63.6
141.00	1	.5	.5	64.1
142.00	1	.5	.5	64.5
143.00	1	.5	.5	65.0
144.00	1	.5	.5	65.5
145.00	1	.5	.5	65.9
146.00	1	.5	.5	66.4
147.00	1	.5	.5	66.8
148.00	1	.5	.5	67.3
149.00	1	.5	.5	67.7

QUESTION number of questionnaire

150.00	1	.5	.5	68.2
151.00	1	.5	.5	68.6
152.00	1	.5	.5	69.1
153.00	1	.5	.5	69.5
154.00	1	.5	.5	70.0
155.00	1	.5	.5	70.5
156.00	1	.5	.5	70.9
157.00	1	.5	.5	71.4
158.00	1	.5	.5	71.8
159.00	1	.5	.5	72.3
160.00	1	.5	.5	72.7
161.00	1	.5	.5	73.2
162.00	1	.5	.5	73.6
163.00	1	.5	.5	74.1
164.00	1	.5	.5	74.5
165.00	1	.5	.5	75.0
166.00	1	.5	.5	75.5
167.00	1	.5	.5	75.9
168.00	1	.5	.5	76.4
169.00	1	.5	.5	76.8
170.00	1	.5	.5	77.3
171.00	1	.5	.5	77.7
172.00	1	.5	.5	78.2
173.00	1	.5	.5	78.6
174.00	1	.5	.5	79.1
175.00	1	.5	.5	79.5
176.00	1	.5	.5	80.0
177.00	1	.5	.5	80.5
178.00	1	.5	.5	80.9
179.00	1	.5	.5	81.4
180.00	1	.5	.5	81.8
181.00	1	.5	.5	82.3
182.00	1	.5	.5	82.7
183.00	1	.5	.5	83.2
184.00	1	.5	.5	83.6
185.00	1	.5	.5	84.1
186.00	1	.5	.5	84.5
187.00	1	.5	.5	85.0
188.00	1	.5	.5	85.5
189.00	1	.5	.5	85.9
190.00	1	.5	.5	86.4
191.00	1	.5	.5	86.8
192.00	1	.5	.5	87.3
193.00	1	.5	.5	87.7
194.00	1	.5	.5	88.2
195.00	1	.5	.5	88.6
196.00	1	.5	.5	89.1
197.00	1	.5	.5	89.5
198.00	1	.5	.5	90.0
199.00	1	.5	.5	90.5
200.00	1	.5	.5	90.9

QUESTION number of questionnaire

201.00	1	.5	.5	91.4
202.00	1	.5	.5	91.8
203.00	1	.5	.5	92.3
204.00	1	.5	.5	92.7
205.00	1	.5	.5	93.2
206.00	1	.5	.5	93.6
207.00	1	.5	.5	94.1
208.00	1	.5	.5	94.5
209.00	1	.5	.5	95.0
210.00	1	.5	.5	95.5
211.00	1	.5	.5	95.9
212.00	1	.5	.5	96.4
213.00	1	.5	.5	96.8
214.00	1	.5	.5	97.3
215.00	1	.5	.5	97.7
216.00	1	.5	.5	98.2
217.00	1	.5	.5	98.6
218.00	1	.5	.5	99.1
219.00	1	.5	.5	99.5
220.00	1	.5	.5	100.0
Total	220	100.0	100.0	

Mean	110.500	Median	110.500	Mode	1.000
Std dev	63.653	Variance	4051.667	Minimum	1.000
Maximum	220.000	Sum	24310.000		

* Multiple modes exist. The smallest value is shown.

Valid cases 220 Missing cases 0

REASON1 why is it nb for pracs and theory to coi

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
work tested in theor	1.00	1	.5	.5	.5
reinforce lectures-b	2.00	67	30.5	36.6	37.2
demoralizing doing p	3.00	2	.9	1.1	38.3
to know what you are	4.00	8	3.6	4.4	42.6
confused if theory i	5.00	5	2.3	2.7	45.4
to see what you lear	6.00	47	21.4	25.7	71.0
understand more abou	7.00	6	2.7	3.3	74.3
stimulates interest	8.00	1	.5	.5	74.9
pracs are easier whe	9.00	29	13.2	15.8	90.7
broader understandin	10.00	11	5.0	6.0	96.7
in pracs you do thin	11.00	1	.5	.5	97.3
each must have own t	12.00	1	.5	.5	97.8
to see how theory re	13.00	2	.9	1.1	98.9
needs too much time	14.00	1	.5	.5	99.5
need to know how to	15.00	1	.5	.5	100.0
	.	37	16.8	Missing	
	Total	220	100.0	100.0	

Mean	5.350	Median	6.000	Mode	2.000
Std dev	3.167	Variance	10.031	Minimum	1.000
Maximum	15.000	Sum	979.000		

Valid cases 183 Missing cases 37

REASON2 why is manual provided

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
for us to prepare	1.00	62	28.2	29.2	29.2
to familiarise with	2.00	67	30.5	31.6	60.8
to guide the lecture	3.00	1	.5	.5	61.3
guidelines, to help	4.00	11	5.0	5.2	66.5
so we may understand	5.00	1	.5	.5	67.0
background info and	6.00	18	8.2	8.5	75.5
for me to formulate	7.00	5	2.3	2.4	77.8
instructions to give	8.00	13	5.9	6.1	84.0
to read when we don'	10.00	3	1.4	1.4	85.4
to give guidelines a	11.00	4	1.8	1.9	87.3
for reference	12.00	4	1.8	1.9	89.2
should point out mai	13.00	1	.5	.5	89.6
to guide and update	14.00	10	4.5	4.7	94.3
should have workshee	15.00	1	.5	.5	94.8
to know which prac i	16.00	4	1.8	1.9	96.7
to help you when yo	17.00	1	.5	.5	97.2
to make us lost- it	18.00	1	.5	.5	97.6
for guidance	19.00	4	1.8	1.9	99.5
to give instuctions	20.00	1	.5	.5	100.0
	.	8	3.6	Missing	
	Total	220	100.0	100.0	

Mean	4.623	Median	2.000	Mode	2.000
Std dev	4.834	Variance	23.364	Minimum	1.000
Maximum	20.000	Sum	980.000		

Valid cases 212 Missing cases 8

REASON3 what do you expect from a manual

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
theory, ideas	1.00	1	.5	.5	.5
clear precise backgr	2.00	35	15.9	17.7	18.2
pracs numbered, stud	3.00	1	.5	.5	18.7
info about prac	4.00	16	7.3	8.1	26.8
clear diagrams	5.00	4	1.8	2.0	28.8
questions	6.00	4	1.8	2.0	30.8
answers	7.00	2	.9	1.0	31.8
background on theory	8.00	23	10.5	11.6	43.4
more than present on	9.00	3	1.4	1.5	44.9
better understanding	10.00	12	5.5	6.1	51.0
summaries of theory,	11.00	3	1.4	1.5	52.5
step by step info in	12.00	1	.5	.5	53.0
answers at back of m	13.00	2	.9	1.0	54.0
guidelines & instruc	14.00	66	30.0	33.3	87.4
should be clear and	15.00	7	3.2	3.5	90.9
I expect lecturer to	16.00	2	.9	1.0	91.9
help you pass your p	17.00	1	.5	.5	92.4
more detail	18.00	1	.5	.5	92.9
clear explanations a	19.00	6	2.7	3.0	96.0
intro, q's on my opi	20.00	2	.9	1.0	97.0
summary of theory	21.00	3	1.4	1.5	98.5
nothing more	22.00	1	.5	.5	99.0
procedures, diagrams	23.00	1	.5	.5	99.5
less questions	24.00	1	.5	.5	100.0
	.	22	10.0	Missing	
	Total	220	100.0	100.0	

Mean	10.000	Median	10.000	Mode	14.000
Std dev	5.620	Variance	31.584	Minimum	1.000
Maximum	24.000	Sum	1980.000		

Valid cases 198 Missing cases 22

REPEAT lect repeat manual

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	68	30.9	32.1	32.1
no	2.00	143	65.0	67.5	99.5
	12.00	1	.5	.5	100.0
	.	8	3.6	Missing	
	Total	220	100.0	100.0	

Mean	1.726	Median	2.000	Mode	2.000
Std dev	.849	Variance	.721	Minimum	1.000
Maximum	12.000	Sum	366.000		

Valid cases 212 Missing cases 8

- -

SCH_MICR microscopes at school

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	137	62.3	63.1	63.1
no	2.00	80	36.4	36.9	100.0
	.	3	1.4	Missing	
	Total	220	100.0	100.0	

Mean	1.369	Median	1.000	Mode	1.000
Std dev	.484	Variance	.234	Minimum	1.000
Maximum	2.000	Sum	297.000		

Valid cases 217 Missing cases 3

SCHOOL school where matriculated

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Newhaven	1.00	2	.9	.9	.9
Lamplough	2.00	1	.5	.5	1.4
Langa	3.00	2	.9	.9	2.3
St John's College	4.00	3	1.4	1.4	3.7
K M G High(P E)	5.00	1	.5	.5	4.1
Khwezi Lomso (PE)	6.00	1	.5	.5	4.6
Ndlovukazi	7.00	1	.5	.5	5.1
Mmgweni	8.00	1	.5	.5	5.5
Sprinkell Promat Col	9.00	1	.5	.5	6.0
Mampoi	10.00	1	.5	.5	6.5
Bellville-South	11.00	1	.5	.5	6.9
Alberton	12.00	1	.5	.5	7.4
Port Shepstone	13.00	3	1.4	1.4	8.8
Sefika	14.00	1	.5	.5	9.2
PHL Moraka	15.00	3	1.4	1.4	10.6
Woodmead	16.00	1	.5	.5	11.1
Riverside	17.00	1	.5	.5	11.5
Isilimela Langa Comp	18.00	1	.5	.5	12.0
Montebello	19.00	1	.5	.5	12.4
Makgoka	20.00	1	.5	.5	12.9
Vuxeni	21.00	1	.5	.5	13.4
Wingen Heights	22.00	1	.5	.5	13.8
Seke 4(Zimbabwe)	23.00	1	.5	.5	14.3
Georgetown	24.00	2	.9	.9	15.2
Kasselsvlei	25.00	2	.9	.9	16.1
Meridian	26.00	1	.5	.5	16.6
Mbabane Central	27.00	1	.5	.5	17.1
Steynville	28.00	1	.5	.5	17.5
Macassar	29.00	1	.5	.5	18.0
Wittebome	30.00	3	1.4	1.4	19.4
Rosebank	31.00	1	.5	.5	19.8
Cedar	32.00	1	.5	.5	20.3
Stirling(EL)	33.00	1	.5	.5	20.7
Reservoir Hills	34.00	1	.5	.5	21.2
Norman Henshilwood	35.00	1	.5	.5	21.7
Kwa-Komani Comp	36.00	2	.9	.9	22.6
Kensington high	37.00	1	.5	.5	23.0
Marobathota	38.00	1	.5	.5	23.5
Umzinto	39.00	1	.5	.5	24.0
Alphendale	40.00	1	.5	.5	24.4
Trafalgar	41.00	2	.9	.9	25.3
St Andrews	42.00	2	.9	.9	26.3
Milton Mpfumedzini	43.00	1	.5	.5	26.7
Belgravia	44.00	2	.9	.9	27.6
Abbots College	45.00	4	1.8	1.8	29.5
Durban	46.00	1	.5	.5	30.0
Heathfield	47.00	1	.5	.5	30.4

SCHOOL school where matriculated

Dahnhauser	48.00	1	.5	.5	30.9
Fort Malan	49.00	1	.5	.5	31.3
Wynberg Boys	50.00	1	.5	.5	31.8
Bridgeton(Oudtshorn)	51.00	1	.5	.5	32.3
Spine Road	52.00	2	.9	.9	33.2
Harding	53.00	1	.5	.5	33.6
Edu-College Qwaqwa	54.00	1	.5	.5	34.1
Khanyda	55.00	1	.5	.5	34.6
Effingham	56.00	1	.5	.5	35.0
Motse Maria	57.00	1	.5	.5	35.5
Harold Cressy	58.00	2	.9	.9	36.4
Paarl Girls	59.00	1	.5	.5	36.9
Ndzondelelo	60.00	1	.5	.5	37.3
Princeton	61.00	1	.5	.5	37.8
Carlton Van Heerden	62.00	1	.5	.5	38.2
S A Van WYK	63.00	1	.5	.5	38.7
Bethelsdorp	64.00	2	.9	.9	39.6
Fairbain College	65.00	2	.9	.9	40.6
Muizenberg High	66.00	1	.5	.5	41.0
Qaqamba	67.00	1	.5	.5	41.5
Welkom	68.00	1	.5	.5	41.9
Daliwonga	69.00	1	.5	.5	42.4
Sasamala	70.00	1	.5	.5	42.9
Homevale (Kimberley)	71.00	1	.5	.5	43.3
Funda	72.00	2	.9	.9	44.2
Beacon Hill	73.00	1	.5	.5	44.7
St Victor	74.00	1	.5	.5	45.2
D F Malan	75.00	1	.5	.5	45.6
South Peninsula	76.00	3	1.4	1.4	47.0
Grassy Park	77.00	1	.5	.5	47.5
Capricorn	78.00	2	.9	.9	48.4
Mariazell P H S	79.00	1	.5	.5	48.8
Elsies River	80.00	5	2.3	2.3	51.2
Atlantis	81.00	1	.5	.5	51.6
Mfuleni	82.00	1	.5	.5	52.1
Livingstone	83.00	2	.9	.9	53.0
Machabeng	84.00	1	.5	.5	53.5
Zwelihle	85.00	1	.5	.5	53.9
Lehana	86.00	1	.5	.5	54.4
Lekoko	87.00	1	.5	.5	54.8
Nyanga(Transkei)	88.00	1	.5	.5	55.3
Thethe	89.00	1	.5	.5	55.8
Matomela(E C)	90.00	1	.5	.5	56.2
Woodlands	91.00	1	.5	.5	56.7
Islamia	92.00	3	1.4	1.4	58.1
Tsholomnqa	93.00	1	.5	.5	58.5
Vusisizwe	94.00	1	.5	.5	59.0
Thembalabantu (E C)	95.00	1	.5	.5	59.4
St Mark Town Hall	96.00	1	.5	.5	59.9
Settlers	97.00	4	1.8	1.8	61.8
Heather	98.00	2	.9	.9	62.7

SCHOOL school where matriculated

Ravensmead	99.00	1	.5	.5	63.1
Maun(Botswana)	100.00	1	.5	.5	63.6
St Columba's	101.00	1	.5	.5	64.1
Mehlomakulu	102.00	2	.9	.9	65.0
Guguletu Comp	103.00	1	.5	.5	65.4
Matthew Goniwe	104.00	1	.5	.5	65.9
Ligugu	105.00	1	.5	.5	66.4
Promat College	106.00	1	.5	.5	66.8
Mondale	107.00	2	.9	.9	67.7
Thandokhulu	108.00	1	.5	.5	68.2
Sans Souci Girls	109.00	1	.5	.5	68.7
Makaula	110.00	1	.5	.5	69.1
Mesiphathisane	111.00	1	.5	.5	69.6
George	112.00	1	.5	.5	70.0
Pacaltsdorp	113.00	1	.5	.5	70.5
H F Tlou	114.00	1	.5	.5	71.0
Lingelihle	115.00	1	.5	.5	71.4
S M B Tapa	116.00	1	.5	.5	71.9
Nathaniel Pamla	117.00	1	.5	.5	72.4
Sastri College (Durb	118.00	1	.5	.5	72.8
Athlone	119.00	1	.5	.5	73.3
Galaletseng Science	120.00	2	.9	.9	74.2
Luckhoff	121.00	2	.9	.9	75.1
Crawford College	122.00	1	.5	.5	75.6
Setumo	123.00	1	.5	.5	76.0
S E College	124.00	1	.5	.5	76.5
Cambridge College	125.00	1	.5	.5	77.0
Lester B Pearson Col	126.00	1	.5	.5	77.4
Piet Retief	127.00	1	.5	.5	77.9
Florida Park	128.00	1	.5	.5	78.3
Maluti Night School	129.00	1	.5	.5	78.8
Albert Myburgh	130.00	1	.5	.5	79.3
Tikhuni	131.00	1	.5	.5	79.7
Eric Nxumalo	132.00	1	.5	.5	80.2
Kokstad College	133.00	1	.5	.5	80.6
United World College	134.00	1	.5	.5	81.1
Zingisa (EC)	135.00	1	.5	.5	81.6
Dondashe (EC)	136.00	1	.5	.5	82.0
Mahlabathini	137.00	1	.5	.5	82.5
St Boniface (Kimberl	138.00	1	.5	.5	82.9
Hector Peterson	139.00	1	.5	.5	83.4
Kamanelo	140.00	1	.5	.5	83.9
Bulelani	141.00	1	.5	.5	84.3
St Francis College	142.00	1	.5	.5	84.8
Heideveld	143.00	1	.5	.5	85.3
Moeng College	144.00	1	.5	.5	85.7
Mmabatho	145.00	1	.5	.5	86.2
Prestige College	146.00	1	.5	.5	86.6
Schoonspruit	147.00	2	.9	.9	87.6
Milnerton	148.00	1	.5	.5	88.0
Maitland	149.00	1	.5	.5	88.5

SCHOOL school where matriculated

Greytown	150.00	1	.5	.5	88.9
Oaklands	151.00	1	.5	.5	89.4
Westridge	152.00	1	.5	.5	89.9
Greenside	153.00	1	.5	.5	90.3
William Pescod	154.00	1	.5	.5	90.8
Verulam	155.00	1	.5	.5	91.2
Sesiyabonga	156.00	1	.5	.5	91.7
Boiphihlelo	157.00	1	.5	.5	92.2
Thohoyandau	158.00	1	.5	.5	92.6
Kamamelo	159.00	1	.5	.5	93.1
Rocklands	160.00	1	.5	.5	93.5
Plumstead	161.00	1	.5	.5	94.0
Stanger	162.00	1	.5	.5	94.5
Belhar	163.00	1	.5	.5	94.9
La Rochelle	164.00	1	.5	.5	95.4
Rylands	165.00	2	.9	.9	96.3
Cravenby	166.00	1	.5	.5	96.8
Pinetown Girls	167.00	1	.5	.5	97.2
Dirkie Uys	168.00	1	.5	.5	97.7
Kimberley Girls	169.00	1	.5	.5	98.2
Raisethorpe	170.00	1	.5	.5	98.6
Paulus Joubert	171.00	1	.5	.5	99.1
St Brendans	172.00	1	.5	.5	99.5
Siraatul Haq Islamic	173.00	1	.5	.5	100.0
	.	3	1.4	Missing	
	Total	220	100.0	100.0	

Mean	82.051	Median	80.000	Mode	80.000
Std dev	49.101	Variance	2410.900	Minimum	1.000
Maximum	173.000	Sum	17805.000		

Valid cases 217 Missing cases 3

SKILLS did your skills affect the clarity with

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	15	6.8	12.6	12.6
no	2.00	4	1.8	3.4	16.0
can not use microsco	3.00	15	6.8	12.6	28.6
unable to identify s	4.00	3	1.4	2.5	31.1
could not see, neede	5.00	26	11.8	21.8	52.9
had to be familiar w	6.00	9	4.1	7.6	60.5
microscope was not f	7.00	2	.9	1.7	62.2
I have poor vision	8.00	2	.9	1.7	63.9
have school experien	9.00	1	.5	.8	64.7
i know how to use mi	10.00	19	8.6	16.0	80.7
clarity depended on	11.00	21	9.5	17.6	98.3
i find it difficult	12.00	1	.5	.8	99.2
to a large extent	13.00	1	.5	.8	100.0
	.	101	45.9	Missing	
	Total	220	100.0	100.0	

Mean	6.294	Median	5.000	Mode	5.000
Std dev	3.606	Variance	13.006	Minimum	1.000
Maximum	13.000	Sum	749.000		

Valid cases 119 Missing cases 101

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STUDASST enough studasst for group

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	70	31.8	32.4	32.4
no	2.00	146	66.4	67.6	100.0
	.	4	1.8	Missing	
	Total	220	100.0	100.0	

Mean	1.676	Median	2.000	Mode	2.000
Std dev	.469	Variance	.220	Minimum	1.000
Maximum	2.000	Sum	362.000		

Valid cases 216 Missing cases 4

SUBURB suburb where staying

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
Gatesville	1.00	1	.5	.7	.7
Mitchells Plain	2.00	15	6.8	11.0	11.8
Surrey Estate	3.00	5	2.3	3.7	15.4
Guguletu	4.00	1	.5	.7	16.2
Constantia	5.00	1	.5	.7	16.9
Khayalitsha	6.00	6	2.7	4.4	21.3
Belhar	7.00	13	5.9	9.6	30.9
Charlesville/ Montan	8.00	3	1.4	2.2	33.1
Pelikan Park	9.00	2	.9	1.5	34.6
Rondebosch	10.00	5	2.3	3.7	38.2
Glenhaven	11.00	3	1.4	2.2	40.4
Bellville	12.00	2	.9	1.5	41.9
Macassar	13.00	1	.5	.7	42.6
Wynberg	14.00	2	.9	1.5	44.1
Kraaifontein	15.00	2	.9	1.5	45.6
Rylands	16.00	4	1.8	2.9	48.5
Grassy Park	17.00	5	2.3	3.7	52.2
Maitland	18.00	1	.5	.7	52.9
Sea point	19.00	1	.5	.7	53.7
Cravenby	20.00	5	2.3	3.7	57.4
Paarl	21.00	3	1.4	2.2	59.6
Goodwood	22.00	1	.5	.7	60.3
Eerste River	23.00	2	.9	1.5	61.8
Edgemead	24.00	1	.5	.7	62.5
Parow	25.00	3	1.4	2.2	64.7
Kenilworth	26.00	1	.5	.7	65.4
Kuil River	27.00	3	1.4	2.2	67.6
Lotus River	28.00	1	.5	.7	68.4
Atlantis	29.00	1	.5	.7	69.1
Southern Subs	30.00	6	2.7	4.4	73.5
Gugu letu	31.00	5	2.3	3.7	77.2
Bellville-South	32.00	1	.5	.7	77.9
Deep River	33.00	1	.5	.7	78.7
Ottery	34.00	1	.5	.7	79.4
Langa	35.00	1	.5	.7	80.1
Hout Bay	36.00	1	.5	.7	80.9
Northern Subs	37.00	4	1.8	2.9	83.8
Wetton	38.00	3	1.4	2.2	86.0
Ravensmead	39.00	1	.5	.7	86.8
Athlone	40.00	4	1.8	2.9	89.7
Retreat	41.00	1	.5	.7	90.4
Mowbray	42.00	2	.9	1.5	91.9
Newlands	43.00	1	.5	.7	92.6
Claremont	44.00	1	.5	.7	93.4
Walmer Estate	45.00	1	.5	.7	94.1
Plattekloof	46.00	1	.5	.7	94.9
Stellenbosch	47.00	1	.5	.7	95.6

SUBURB suburb where staying

Kensington	48.00	1	.5	.7	96.3
Oranjezicht	49.00	1	.5	.7	97.1
Bishop Lavis	50.00	1	.5	.7	97.8
Woodstock	51.00	1	.5	.7	98.5
Welgemoed	52.00	1	.5	.7	99.3
Durbanville	53.00	1	.5	.7	100.0
	.	84	38.2	Missing	
	Total	220	100.0	100.0	

Mean	19.860	Median	17.000	Mode	2.000
Std dev	14.712	Variance	216.432	Minimum	1.000
Maximum	53.000	Sum	2701.000		

Valid cases 136 Missing cases 84

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TESTS tests after pracs?

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	139	63.2	66.8	66.8
no	2.00	69	31.4	33.2	100.0
	.	12	5.5	Missing	
	Total	220	100.0	100.0	

Mean	1.332	Median	1.000	Mode	1.000
Std dev	.472	Variance	.223	Minimum	1.000
Maximum	2.000	Sum	277.000		

Valid cases 208 Missing cases 12

TRAVEL1 liftclub

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	25	11.4	100.0	100.0
	.	195	88.6	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	25.000				

Valid cases 25 Missing cases 195

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TRAVEL2 public transport

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	74	33.6	98.7	98.7
	2.00	1	.5	1.3	100.0
	.	145	65.9	Missing	
	Total	220	100.0	100.0	

Mean	1.013	Median	1.000	Mode	1.000
Std dev	.115	Variance	.013	Minimum	1.000
Maximum	2.000	Sum	76.000		

Valid cases 75 Missing cases 145

TRAVEL3 private transport

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	38	17.3	100.0	100.0
	.	182	82.7	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	38.000				

Valid cases 38 Missing cases 182

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TRAVEL4 other

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	8	3.6	100.0	100.0
	.	212	96.4	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	8.000				

Valid cases 8 Missing cases 212

UNCLEAR1 language problem

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	30	13.6	100.0	100.0
	.	190	86.4	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	30.000				

Valid cases 30 Missing cases 190

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UNCLEAR2 comprehension problem

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	66	30.0	100.0	100.0
	.	154	70.0	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	66.000				

Valid cases 66 Missing cases 154

UNCLEAR3 instructions badly drawn up

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	115	52.3	100.0	100.0
	.	105	47.7	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	115.000				

Valid cases 115 Missing cases 105

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UNCLEAR4 personal hearing or sight problem

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	1.00	36	16.4	100.0	100.0
	.	184	83.6	Missing	
	Total	220	100.0	100.0	

Mean	1.000	Mode	1.000	Std dev	.000
Variance	.000	Minimum	1.000	Maximum	1.000
Sum	36.000				

Valid cases 36 Missing cases 184

USE_MICR allowed to use microscopes

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	74	33.6	36.1	36.1
no	2.00	131	59.5	63.9	100.0
	.	15	6.8	Missing	
	Total	220	100.0	100.0	

Mean	1.639	Median	2.000	Mode	2.000
Std dev	.481	Variance	.232	Minimum	1.000
Maximum	2.000	Sum	336.000		

Valid cases 205 Missing cases 15

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VAR00001

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	39.00	1	.5	100.0	100.0
	.	219	99.5	Missing	
	Total	220	100.0	100.0	

Mean	39.000	Mode	39.000	Minimum	39.000
Maximum	39.000	Sum	39.000		

Valid cases 1 Missing cases 219

WEARCOAT should you be expected to wear coat

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
yes	1.00	156	70.9	72.9	72.9
no	2.00	58	26.4	27.1	100.0
	.	6	2.7	Missing	
	Total	220	100.0	100.0	

Mean	1.271	Median	1.000	Mode	1.000
Std dev	.446	Variance	.198	Minimum	1.000
Maximum	2.000	Sum	272.000		

Valid cases 214 Missing cases 6

APPENDIX 3

STUDENT 1

R: For what course are you registered this year?

S: B Sc 1.

R: What are you planning to do next year?

S: I am not coming back, I am going to do Kinesiology, that is the study of movement and muscles.

R: What were your marks for the two L S modules like?

S: Average: C for one and D for the other.

R: In the 3 departments who have been running the pracs, did you notice any differences in the way the pracs were run?

S: They were very similar, one complaint I have is the demmies, they are not always well prepared. You ask them questions and they can't always answer you properly. So they're of no help most of the time. So I found that a problem, you struggling and don't know what to do and you can't get help from them either. But otherwise it was very similar in the way it was explained, what to do, very thorough, but sometimes you still need someone to explain a few details to you.

R: Did you find this problem with the demmies right through?

S: Yes through out, it was only at a later stage that one or two where they could explain to you , but there is one who always knows her work, that's Marissa, I don't know her personally , but you could always ask her and she would be able to explain to you.

R: A lot of student complained that pracs were very long, did you also experience this and would you like to comment on this.

S: Yes I did, I think why they say so. It is that usually on a Wednesday it is our full day , 10 periods flat and by the end of the day you still having this long prac , so I think it just seems to lengthen the day even more, some times it was quite lengthy and if you tired. But there were quite a few that was not that long and it was quite interesting too.

R: Did you travel home with public transport?

S: Some of the time and sometimes there was a lift for me.

R: Did you find that this ever affected you in the pracs, the days you travelled home by public transport?

S: Yes it did, because you would now rush to get done, because you would not know when you going to get a taxi. The taxis are very scary from Bellville to Belhar.
It does put a lot of pressure on you , because you're rushing to get done .

R: What time did you normally leave pracs.
4h00, 4h30, and with longer pracs about 4h40, but usually we would have to be done before that and I would rush to be done.

R: Manuals- did you ever prepare for practicals.?

S: I never really did, I would read through my work yes, but I would not really do prep

for pracs.

R: Did you find that it made things easy for you?

S: Sometimes yes, it depended on the work, whether you understood the work or not . If you understood the theory it made it easy to understand when you read through the notes, but otherwise it was okay, it didn't make things so bad.

R: Students often made these vague comments about pracs saying they are boring or interesting or enjoyed, do you want to comment on this?

S: It depends on what the prac is about, like the time we had to look at specimens, those were the interesting ones. Most of the time you had to draw, now I can't draw, but I enjoyed the drawing. What I did not like was the genetics, it was like really head scratching. But it's not only the longer ones that are not so nice, it depends what it's about. The same with the excursions it makes it so much more interesting, so it's not only the length that makes it interesting it is what its about.

R: Did you ever find that the pracs were very difficult?

S: Not really, its only the genetics that I had a problem with.

R: Why did you find the genetics so difficult?

S: Maybe it was because I did not understand the theory, .

R: Did you do okay in the genetics test.

S: I think I did so far. I enjoyed the DNA one.

R: We tried to link the pracs and the theory. Was this obvious?

S: Not always . What made it easy, was that you could use your textbook, but then again not all the questions came directly from the textbook. So it wasn't that obvious. Sometimes it was.

R: When it was obvious, did you find that you benefited from this?

S: Yes I did . When you think back and you related the theory to the prac.

R: Microscopes?

S: I have worked with a microscope before and I found that quite useful when we wrote exam, because then you remember certain things that you do especially when you have to draw what you see from the microscope . But I had a problem with my microscope , I used my friends' and the things that I notice she might have missed and vice versa, its interesting.

R: At the school that you went to, did you have several mics.

S: Not that many- about 3 or three per microscopes and we would work in groups.

R: Would you say that right now you are comfortable with a microscope.

S; Yes, I know how to use one.

R: Would you say that the pracs were generally well organised.

S: Yes they were, like you need to answer one question in order to proceed to the next question.

R: The outings- what was your experience of these outings.

S: I enjoyed that, because it wasn't the boring classroom routine ,where you just sit down and do it, you didn't necessarily have to do what the next one did. There was a variety of examples and different things you could look at and it was nice to be out for a change, like if I go out, I would go to a movie and not to the gardens. So it was nice.

R: And you don't have a problem with doing that kind of prac?

S: No not at all. I prefer that to the classroom routine.

R: Some students complained and said that it wasn't fair to do a prac like that for marks.

S: I think they thought more in terms of fun, they did not want to do any work, so I guess that was the problem. In the class you copy and here you could not exactly just copy.

R: Plant and animal pracs were done together in one prac. Did you have a problem with this kind of thing?

S: No I didn't, because you actually find the relation between the animal and plants.

R: In the zoo pracs , there were about three pracs where you looked at videos and you did a prac afterwards. What was your perception of this kind of prac?

S: I did not really care much for the videos. I think I prefer more to do practical kind of work than to watch a video and then write a test on that as well . It actually gets you nervous, because now you don't take sufficient notes or miss something that you think is not that important and it comes in the test afterwards and you don't know the work . But luckily that was okay and the video wasn't that long and you had time to complete the prac as well, but the long videos, I did not care for.'

R: Genetics pracs seemed to be shorter, what was your experience of this?

S: Well, you see, that's where the copying comes in, so we get it from the previous people, because it was long, but you see what they do in a group is that the one gets the notes from someone else and the whole group has the same notes. I suppose that's why . And after a while the students got tired of writing the journals , they would just write that its interesting or enjoyable and finish.

R: Did you find that a lot of copying went on in pracs?

S: It would be wrong to say no, because suppose everyone just wants to get out as soon as possible and the one then copy from the other and its like a whole chain reaction, so in most cases , yes. It would only take one person to get the work from a previous prac .

R: Were you ever in a group where you had the book from another prac?

S: We wouldn't have the books, but they would ask us what did we do and that . Especially when we had the manual, it was very easy and they would just ask what did you write there and so on so it does happen a lot. In the zoo it seemed that a lot of copying went on , with those very long pracs.

R: Did you ever find that you also copied?

S: Yes, you know there were times that you knew, that its either that or you gonna sit here till who knows what time and not finish the prac at all, because they told us that we cant leave later than 4h30 and we'd start packing up. When it gets to 4h15 and you still got about 4 to 10 questions to do, you get panicky and you get it from someone else. I wouldn't say I did not copy. I was also one of those that sometimes didn't know something or I had too much to cover in a short period of time, I'd also get it from someone else.

R: The demmies, what was your experience of the demmies:helpful, did they know their work?

S: Did not often know their work, but when you ask a question, they would try their best to answer your question. They would try, but it was not always efficient or enough information to go forward. So would end up going from one demmie to another.

R: Demmies racist:

S: Not really- with me it has always just been, when I need help, they help me.

R: Marking, how did you experience the marking?

S: Marking was a bit unfair, because you would work together and you'd have similar stuff, similar amount of things correct and you'd get different percentages and one would get fifty odd and the other person would get sixty odd. That was a bit unfair , because its different demmies marking and they are supposed to be marking from one memo .

R: Did you ever find marks differing by 20% or more?

S: Not where my work was concerned, maybe with the rest of the students , but not with me.

What else I also did not like were those questions that we had, where it was either 100% or nothing, that was a bit unfair , because if you did not know your work, and you get a problem like that it would either be a 100 or 0.

R: Group work, were you ever in a group like that where you had a system working to get through your prac.

S: Yes, like the time where we had to flip the coin and each one had a turn to do something and we worked much quicker.

R: Other than that ,did you ever find yourself working in a group for example 10 slides and each person in your row would do about 2 slides and in the end you would swop drawings?

S: Yes, it speeds up everything and sometimes you can't focus on a specific slide or so and someone else can- so it does make it much easier.

R: So in the end you would not have seen all the slides.

S: Yes, you would only have seen 2 of the 10 if you are in a bench of 5.

R: That was never a problem to you?

S: No, in the textbook, they have the drawings and if you can make out the drawings and maybe compare them to those on the slide, there would not be much of a difference.

R: Would you prefer group work as opposed to working on your own?

S: It depends, because sometimes you get lazy ones in the group where there is only a few who really works and the rest are parasites. But yes I prefer group work.

R: Do you think that is a good system of working?

S: Once again it could be if everyone works together. I think sometimes you also need to work alone. To test your ability. When you always work together you tend to become to dependant on what someone else does and you tend to hold back your own opinion sometimes and you just take for granted that that person is right , I guess you just accept that that person is right and just take that answer without thinking twice , whereas when you work on your own you would have doubts as to whether or not you are making the right decision.

R: Would you say that you would have worked in the same system if you had to have a prac exam at the end of your pracs. Would you still have opted for working in that way?

S: I don't know, I guess then it would be better to work on your own, with group work, everyone has their own way of thinking and interpreting things , so it would be confusing when it comes to a test. I prefer when I do a test that it's my work. With a prac exam it might be better to work as a pair maybe and not as a group.

R: When you worked with a microscope, were you always able to identify the structures under the microscope?

S: Not always, maybe it was to magnified or under magnified, but then it would be my fault, but otherwise there was not a problem with the specimens.

R: Were you always able to put down on paper what you saw through the microscope?

S: Its difficult sometimes, because sometimes you know what you see but you can't explain what you are seeing.

R: And the drawings?

S: It was okay, if you focussed properly, and you have the whole drawing, then its easy.

R: Instructors, did you find that they were most time fairly approachable and concerned with students ?

S: I never really approached them, I would rather go to demmies.

R: Videos were often regarded as a waste of time during pracs, would you agree with this perception.

S: If you have a prac preceding the video, I would say yes, but like you had with the rainforest, that was okay, but not otherwise.

R: Another complaint was that instructions were not always clear: the manual or otherwise, did you ever experience this?

S: Lets say there was things I did not understand, I would leave it out or I would go to my friend and see what she wrote.

R: In the zoo people sometimes found that they did not finish the prac since they were told they had to pack up by half past four. Did this ever happen to you.?

S: Yes but that's when you get it from a friend otherwise it would mean marks down the drain.

R: Lack of specimens often caused problems. Did you also experience this?

S: Yes, because it would delay everything and you have to wait on someone and sometimes you can't continue because you need that one thing in order to continue to the next thing.

I enjoyed the excursions more than the lab prac and I enjoyed drawings.

The pracs were enjoyable, regardless of the length

END

STUDENT 2

R: For what course are you registered?

S: B Sc 1.

R: What are you going to do next year?

S: Next year I want to do chem 2. I don't want to continue in this field . I want to do chem2 and biochem.

R: What were your marks for the two modules of life science?

S: D and F.

R: Between the different departments did you experience a difference in the presentation of the pracs?

S: No, I did not see any difference.

R: Some people complained a lot that the pracs were long , would you like to comment on the length of the pracs?

S: We did too much drawing, we sometimes did fourteen drawing per prac. -It was too much work for three hours. Pracs were too long. We end up not understanding and copying from others. So what is the use of the prac when you copy. We are there to understand what we are doing and not just write down for the marks.

R: What time did you normally finish with your prac?

S: I always left with the last people. I always want to understand what I was doing- going through the labels and asking the assistants. The videos, I did not always see the purpose of doing those videos. Like the last video about the forest and most people were sleeping and the video was boring.

R: Prac manual- we expected you to prepare for pracs before the time. Did you always prepare?

S: Sometimes. You find you do four courses and the work is a lot.

R: When you did prepare, did you benefit prom preparing for pracs?

S: Yes, when you come in the prac, you know what is expected from you and you know what is happening. And it takes you less time when you prepare.

R: In journals students pracs were interesting, they enjoyed or that they were boring, what was your experience?

S: If you understand what you are doing it is very interesting, if there is no linkage, you find it boring, because you dont know what you are doing. But there is a linkage, you know it will help you understand your work, you find it interesting.

R: Contents of pracs, would you say that they were difficult or easy?

S: Some of them were very difficult, especially the biochem part. Some of the pracs, I did not understand what was happening and I end up copying from other guys. One lady brought a book from last year and we just copied from that. Zoology was not difficult, but it was too much work.

We did not understand why we had to know the measurement stuff, so it was boring. I could not understand why I had to know all this stuff of microscope.
Sometimes it can be better if you guys tell us, what we are supposed to know not just to give the prac and say do this and just give a talk.

R: Sometimes we do talk about it, but students don't listen. I did explain , but because it is so new to you , you don't even hear what I am saying?

R: Microscope: was it your first experience in using a microscope?

S: Yes , we had no microscopes at our school.

R: Are you now comfortable in using a microscope?

S: Yes I'm comfortable and I am confident because I know how to use it.

R: Can you explain to someone?

S: Yes I am able to do that.

R: In the last pracs people complained that they had problems with focussing, were you able to manage on your own.

S: Yes I did manage on my own.

R: In our pracs we tried to link pracs with theory, was this obvious and did you benefit from this?

S: Yes I did with some pracs. And when it came up in tests, I remembered because of pracs, like in Zoology, the vertebrates.

R: And the genetic?

S: Yes.

R: Some students felt that pracs were disorganised?

S: This is the first time that I do pracs, and I don't know what I must expect from pracs, I don't know how it is supposed to be, so I have no opinion about it.

R: Did you ever feel that it could have been done better?

S: Yes, like in genetics when it was not explained to us what was expected from us and those times I felt confused.

R: In the zoo pracs copying seemed to have been a major thing?

S: Yes I did copy. This thing of the slides, when they say you must look for the cells, you can't identify those cells , it is very difficult even if you are using your microscope. You don't know, it is very difficult and this thing is new, so they are confusing. It is a problem.

R: Did you ever find it difficult to put down on paper what you see?

S: Many times.

R: Excursions- what was your experience- did you enjoy them?

S: To me it was just an outing- the assistants just gave us the answers. People were playing, they were not participating.

R: Would you say that having outings is bad or is it good?

S: No it is good. It must be organized. If you see the assistants, many of them are the same age group as us- so people don't listen to them- so you should have more mature people to lead the groups.
If you want to listen, others are playing and it becomes disorganized.

R: In the first two quarters we did pracs where plants and animals were done in one prac. Was this ever disturbing ?

S: No it was fine, I had no problem.

R: Bio pracs seemed to be very positive- short. Was this your experience as well?

S: No, I did not understand what was happening there. Maybe I am having a problem with genetics, so maybe it affects me. So I did not enjoy them.

R: Did you sit till late in pracs,?

S: Yes, but sometimes we copied and then I would also leave early.

R: Another comment was that it was like schoolwork?

S: I did genetics in std9 and that was in 1991, so I can't remember. We had a problem with our teachers. They would just dump it on us because they also do not understand. I remember one guy was in std 10 and he was asked to do the genetics with us. So you can imagine. Some of us did not bother to go to these classes. Our teachers just tell us about std 10, they don't tell us about university. So we just worry about what must be done for exams.

R: What was your experience with demmies?

S: No they know their work.

R: A comment that came out was that demmies were racist . Did you ever experience this?

S: It happened to me but I don't know if it was racism. One coloured demmie marked my book and gave me 80% . When I got my book back, I found that one part was not marked, I went to the demmie and complained to a African lady and she then marked my book and gave me 90%. And the other one came and said that it was marked and that I must get 80%. And I did not want a quarrel, and I said that I will take 80%. I don't know if it was racism.

R: Was marking always done fairly in your opinion?

S: Not always. I found out that if you go with a complaint, it makes no difference. They will tell you stories and give you reasons why you won't get that mark or that mark. One time we were working as partners and so I am expecting to get the same mark, so I experienced that it was not so.

R: Were there ever big differences in marks?

S: Yes, like this thing, the coloured guys get 100%, 98% . So what we are asking ourselves why are we getting 66%, we are doing the same thing, is it because they think that they are clever. You will find that all of them will get above 80%. But if it

comes to us , we are getting 55% , 65% and I remember you asking why the coloured guys are getting 98%, 100%, when everybody is doing the same thing.

R: There were certain pracs where you were expected to do group work, do you perhaps want to comment on group work versus working on your own?

S: Group work for me is not a good thing, because it makes people lazy. Sometimes when you working in groups you just get those people who want to copy. I think it is better to work as individuals and it will give people responsibility, each must do his own work. That thing of groups does not work.

R: Did you find that instructors were always concerned.?

S: Channing when we go to him he would say that if you don't understand the work now, it means that you have not attended his class. I always attended all my lectures.

S: Did he then explain to you?

R: No he did not explain.

R: And the others?

S: No the others explain very well.

R: Would you say that it was fair to have outings for marks?

S: I think that in the mind of students you have in your mind that everything you do must be for marks. If it is not for marks you would rather do something else.

R: People complained that textbook did not help in pracs?

S: That was true. Especially the invertebrates, none of the drawings or labels were in the textbook.

R: In the zoo pracs there were pracs with videos included. What are your views on this?

S: It was nice, I had no problems with that.

R: Some people complained that mark was based on only the videos?

S: Yes, low marks. Sometimes it was boring and we were sleeping.

R: People never completed all their pracs?

S: I remember one prac I did not have time to do my label and we were told to leave.

Thank you for your time.

STUDENT 3

R: For what course are you registered?

S: Bsc

R: What were your marks like for the two modules in the first semester?

S: C for both

R: That is quite consistent , I have had a variety of responses

R: There were three departments running the course: zoo, bot, and biochem. Were there any obvious differences in the way that the courses were run, things that stood out as being different from one to the other department?

S: No not that I noticed, not so much- only the test questions.

R: In the first semester the length of the pracs seemed to be a problem- would you like to comment on your experience of this?

S: Yes it was quite long - too many questions that you had to answer for the amount of time

R: How do you travel home?

S: I have a private lift we're not in the same prac class but we get lectures together.

R: We handed out prac manuals and so did biochem, zoo did not, but they put on the notice board .

S: Yes, but I never checked the notice boards, I preferred the book.

R: Did you always prepare for pracs?

S: Not actually, now and then

R: So was prep just reading ?

S: Yes I would read through the prac .

R: At times there were stuff that you could prepare at home, did you ever take advantage of that?

S: Not actually- I would just read through it and come and do it the next day.

R: Did you find that it actually helped when you read through , did you ever find that it benefited you in the prac?

S: Not much, they did explain the work in the beginning and from there you can get a basic idea and from there you just work.

R: In some of the journals -people say things like pracs are interesting, boring, or enjoyed it -what would you comment on this?.

S: Interesting would be when you apply yourself to the prac- work is interesting, or work with models and stuff like that . But then you get the questions and it's quite monotonous to do the questions its boring.

R: Would you say that the pracs were difficult?

S: Yes some were, because you had to think .

R: We as far as possible tried to link the pracs to theory, was this obvious and did you benefit from this?

S: Yes like in the exams it helped-the knowledge that you got from the pracs.

R: The microscope, for a number of students this was actually the first time that they ever seen a microscope or handled one?

S: Yes, me too

R: Are you now confident and comfortable?

S: yes

R: Did you ever find that you battled to see and put down on paper?

S: I am not very artistic, so I struggle to draw, so I just try to sketch.

R: Would you say that the pracs were generally well organized ?

S: Yes, its just the last few.

R: Anything else that you would want to comment on regarding the last pracs?

S: interesting no it was okay.

R: For the first semester we had 2 excursions one to kirstenbosch and one up Lions Head, what was your experience regarding these excursions?

S: nice to get away from campus

R: Would you say that it's a good idea to include these kinds of pracs?

S: Yes I actually like it

R: We've actually done plant and animal pracs together - for example we looked at plants and animals in one practical , was this disturbing?

S: No I did not have problem with this, they are linked.

R: In the zoology pracs you did the video where you had to do a little test

S: No, it wasn't so nice you had to like jot down the points and do the answers afterwards.

R: What about the fact that you had to do a prac afterwards as well?

As far as I understood the evaluation of the whole prac was based on the video questions?

S: Yes you had to listen to this guy and you also did not know which points to jot down

.R: The videos was regarded as a waste of time by a lot of students, was this your perception as well ?

S: It was okay to watch them, but the questions afterwards, that wasn't so nice.

R: A general comment about the genetics pracs were that they were much shorter, was this your perception as well?

S: Yes, because you enjoy the work , its interesting and nice.

R: A lot of the student said that they were better than the first pracs, what were better about them?

S: There wasn't so much questions, and we did more of a practical, you did not still have to look in a textbook, it was like more applying the work on a practical level.

R: Students also commented that the genetics was more like school work ?

S: Yes it was easier, because we did it at school, not very much, but yes.

R: In the Zoo pracs students actually admitted that they copied, were you ever part of copying?

S: Yes , some of the questions

R: I know the pracs were very long and you had lots of drawings to do.

S: Yes, we like confirm in the group, answer and ....

R: Did you divide the work in the group?

S: No we would like take a question and each one come up with a answer and we just confirm it.

R: Did you ever have this thing that each person gets a drawing to do and in the end you combine the effort ?

S: No.

R: The demmies , what was your experience of the demmies?

S: They knew there work and they were helpful.

R: Always?

S: Not always, but most of the times.

R: Did you ever experience confusion because of what demmies said?

S: Yes, a few times.

R: There were actually some comments about some demmies being racist, did you ever experience any of this?

S: Not actually.

R: Marking , how did you experience this.

S: Each one had their own method- for the same work people would get marks that differ-it was very unfair and some times the mark would differ in a big way.

R: In your group , did you ever find that he the marks differed much ?

S: Yes and we would have the same answers.

R: Would you say that group work is a good thing

S: Yes, because you actually get a chance to share ideas with each other, we should actually do it a lot.

R: Would you say that you prefer group work to working on your own?

S: Yes

R: Instructors- were they generally approachable and concerned about the students.

S: Yes, all of them.

R: Were there ever any problems that you experienced.?

S: No.

R: Were they always clear, hear what they were saying, not speaking clear.?

S: No.

R: Students often complained about instructions in the manuals not being clear.

S: Yes there was times in the yellow book - you read the text and you still have to look for answers.

R: Was the textbook of any help?

S: Not for drawings, some.

The textbook helped with the theory side of the practicals.

R. Did you bring your textbook with?

S. Yes.

R. Students found that they enjoyed the Zoo pracs very much because of exposure to live specimens?

S: Yes, it was the drawing of it that was a problem and the labelling of it you find at the end it takes a bit longer to find all the labels. And like with the microscope as well.

R: Students often found that specimens for pracs were not enough.

S: Not really.

R: Would you say that you enjoyed working with a microscope?

S: Yes.

R: People found that doing pracs on a Wednesday were quite heavy, did you also find this?

S: Not actually, I had tuts.

STUDENT 4

R: For what course are you registered this year?

S: B Sc1

R: What are you planning to do next year?

S: Dentistry or medicine.

R: What are your marks like for the two LS modules?

S: Two A's.

R: Three departments presenting pracs, have you noticed any differences in the way pracs were presented.

S: Yes there was a differences-microscope pracs, some of them were to long for us to complete and after that we had to write tests, so we would just write anything and we just rushed and did anything and handed in.

R: Which of the pracs were the longest?

S: It was pracs where we had a whole list of tasks to do with the microscopes, paramecium etc. if the department know that we are writing a test then they should try and make the pracs a bit shorter so that we can finish in time.

R: Would you say that this affected your ability to do well in tests?

S: Not the ability to do well in the test, but the prac-because ususally you take your time and you do you prac to the best of your ability, but if you are writing a test you just wanna do anything even it you have to copy from someone, just as long as you do the prac and hand it in.

R: So did you find yourself sometimes copying because of this?

S: Yes, because if it came to the test with the prac, and it was a long prac, and we just wanted to get out of the lab in time for our test and we would end up copying and not doing it .
I normally do all my pracs when I am not having a test, but when we were writing a test I just wanted to get out of the lab..

R: Do you have your own transport home?

S: I stay in res.

R: Other pracs did you find them very long?

S: No , they were good timing.

R: What time did you normally manage to finish?

S: I take my time when I do my pracs because I don't have to rush to get home, because I stay in res, but I normally finish by half past four.

R: Did you generally prepare for pracs before the time?

S: If we were given material to prepare from, I did , but sometimes we were not.

R: Did you find that you benefited from preparing?

S: If you prepared then you knew exactly what was happening in the pracs. And sometimes they did not give us any prep material and you just had to come there and start from scratch.

R: In my section there were questions that you could complete at home and also for the genetics pracs there were sections that you could complete at home?

S: The genetics pracs were nice, because it was stuff that we did in our lectures, so it helped us in our tests.

R: Did you complete some of the work at home?

S: I did the stuff that I knew at home and the stuff that I did not know, I asked the demmies in class.

R: The demmies, did you find them to be generally helpful?

S: They were helpful, but sometimes there was confusion because one demmie would say one thing and the other demmie would say another thing.

R: How did you deal with this?

S: I just wrote what I thought what was right.

R: There was another comment saying that demmies were racist, did you ever observe anything like that or were you ever subject to this?

S: No.

R: Vague comments saying pracs were interesting or boring or enjoyed them would you like to comment on this?

S: Interesting I guess if you understood the prac and you knew the work, you would find the prac interesting. Boring would be long and difficult, but I can't really relate to comments like that.

R: As far as possible we tried to link pracs to theory, was this at all obvious?

S: You could see this term that we did the stuff in class. Like we could see the stuff that we did in zoology, it helped us and even the genetics.

R: For a number of students this was the first time that they encountered a microscope, was this so for you?

S: No.

R: At the school where you were how many microscopes did you have?

S: No, I was in Natal university last year and we worked with microscopes.

R: And at the school.?

S: No, we did not have any access to microscopes.

R: Are now comfortable with a microscope?

S: Not really, I still play around with them.

R: Will you be able to explain to anybody how to work with a microscope.?

S: I don't think so , because I just move it until I can see the picture clearly.

R: Would say that pracs were generally well organized?

S: Yes, it was well organized, but I had one problem like our prac, some times you the prac with the person next to you and you end up getting such a low mark and the other person gets such an extremely high mark for exactly the same work , and I found this very unfair . Because it happened that for the exact same work someone else would get 90% and I would get 70%.

R: Did you ever try to address this problem?

S: Yes, I approached the demmie about this and she said that she does not like giving A's because I would make the student feel to good and they would not strive for better .

R: Did you accept this as an answer?

S: I didn't want to accept this but I had no choice.

R: So you never took it any further than that ?

S: I did not know how to take it further.

R: Did this happen all the time or only sometimes.?

S: No, only sometimes. It happened to quite a number of other people in class too.

R: We've had a couple of outings in the first term, what was your experience of these?

S: I remember the one where we went to Signal hill, its different from just sitting in class and doing what we do in class.

R: Would you say its okay to have these excursions as part of pracs?

S: Yes it is okay, but the excursions had hardly anything to do with classwork.

R: Plant and animal pracs were often done together in one prac, did you ever find this to be a problem.?

S: No, I don't think so.

R: Did you find that it was helpful in any way?

S: Yes it was, but I think like especially for the pracs, you have to understand what happens like if you have to read the textbook and before you go to the prac to have an idea of the prac. Most students don't go and read their textbook , they wait until the test comes and when you go for your practical and you did not read then its like new to you .

R: In the zoo you had these pracs where you had the video and the pracs . What is your opinion of this kind of prac. ?

S: I liked them, I found them interesting and on top of that it was a prac.

R: The genetics pracs seemed much shorter- was this your experience as well.?

S: I found the genetics pracs nice because from all the sections in LS I enjoyed genetics most, because the other stuff was like swotting , while in genetics you could understand your work and apply it like in the problems.

R: Students complained that the pracs were difficult?

S: They were difficult if you don't come prepared , but if you read up, then you know what is expected and what's happening then I find they okay.

R: Did you find any of the pracs difficult?

S: I think the microscope pracs to me were the most difficult pracs.

R: Why?

S: I don't know, because sometimes you can't identify what in the mic with what you looking for and that was difficult.

R: Did you also it a problem to draw what you saw through the microscope?

19: Sometimes, like I drew what I saw but sometimes I could not identify the things that I needed to label on the diagram.

18: Did you ever find that any of the pracs reminded you of schoolwork?

S: Not really.

R: In the zoo pracs people often said that they copied because of work pressure, was this your experience as well?

S: Yes. When I knew I didn't have enough time to complete the prac, then only.

R: Group work support. Were you ever part of group work.?

S: We didn't really have anything that we had to do in the group . Yes in the microscope pracs I worked with the person next to me.

I prefer working on my own.

R: The instructors, were they most of the time approachable?

S: There was only who was insulting and you could not approach him you would be to scared It was our last instructor, he insulted the students and that wasn't nice.

R: Videos were often regarded as waste of time would you say that is a fair comment.

S: The work, it gave us a better understanding of the work we had covered in class.

R: It was often said that the instructions were not clear or that the information was not sufficient. Did you experience this?

S: There were times that I had to ask the demmies to explain . The manuals were good.- that at least gave us an opportunity to prepare.

R: The fact that specimens were sometimes not enough, was this a problem to you?

S: Not really , because once I finished one slide I would just go on to any other slide, I did not do it in order.

STUDENT 5

R: For what course are you registered this year?

S: I'm registered for occupational therapy-BSc.

R: What were your symbols for life sciences?

S: E for zoo and the same for botany as well.

R: Differences in presentation in the various sections.?

S: To me there wasn't actually a major difference I wont be able to say . It did not affect me in any way as such, if you know what I mean, because to me the practicals were the easier side of the course. Compared to the theory side, but I enjoyed the practicals

R: Regarding the length of the practicals.?

S: Some of the practicals were longer than the others, but if we finished at 3.30, it was easy but the minute it got to 4h00, we became more tired and you became - you did not worry anymore what you were doing, you had to get done, some people did not finish the prac because they wanted to leave early .

R: Do you think that was so for all pracs?

S: No not for all.

R: I know that in Zoo there were quite a number of students who did not complete pracs, I know this from speaking to demmies.There seem to have been a problem with the zoo section, you were forced to finish 5h00

S: Yes, people became frustrated , they did not worry what they were doing.

R: It was quite amazing. In zoo people tended to think that the journals was an outlet, I picked up a lot of frustration in this time, now I don't know whether the frustration was there even when I taught the course or whether it just came on in that time. When bio was teaching, I saw it mellow out again.

S: No. Like especially with the course that we are doing, a lot of us feel that we don't need LS as such because what are we going to do with plants and that and that is where we become very frustrated sometimes.

R: Concerning prep for pracs. We expected students to prepare for pracs and in my pracs there were actually certain things that you could do at home

S: We preferred that, I didn't know when they put up on the board, a lot of us don't still

have time to come and look at the board , but we preferred to do some things at home, so when you go into the class then its not such a lot for you to do and that way you would also get done earlier and we also knew what was going on .

R: So I take it you prepared for prac?

S: Yes we all did, especially when we did not prepare the night before, then on a Wednesday, the morning we go out on different visits and say we finish by 11, then we have that time to prepare and that's when we all sit and work out together and when we don't have a manual, we would become very frustrated.

R: Would you say that you benefited from preparing before the time?

S: Yes we did.

R: In the journal, comments that came out a lot was things like pracs are interesting, enjoyed, boring and long.

S: Because pracs were long and people did not know what was going on, then they find it boring .

R: What was your experience?

S: Only time I found it boring was when I did not know what was going on and also when you sitting there and you ask anyone what's going on and they also don't know and half of them also did not know and that's the time when you become frustrated and the time is going on, and that's the time that you finished at 5h00 .

R: Would that be times that you did not prepare or were the pracs just difficult?

S: I dont think that the pracs were really difficult. I think the most difficult part that we found was the part with those sketches, the graphs and that stuff.

R: We tried to link pracs to theory and was this obvious?

S: Yes, but some of the pracs I know then the lecturer used to come in and he would say, well if you were in my class then you'd know what was going on and half of the people were never in the lectures , so that half never used to know what was going on. But yes we understood after a while and yes it did help a lot especially in genetics when we had to work out the punnet squares and we knew what was going on.

R: The microscope was a new experience for a number of students, was this so for you?

S: No, I did work with a microscope before, like one microscope for a group of students.

R: Are you now comfortable in using a microscope ?

S: Yes, I can work with it easily, I am much more confident.

R: Did you in any way experience a problem with poor specimens or a lack of specimens?

S: A lack of specimens yes, because people were always waiting for the others, and I think that was more the problem.

R: What was your experience of the outings?

S: It was actually very nice, it makes you feel more at ease and you learn as well as enjoy yourself. So I actually enjoyed that. It was actually my highlight as well .

R: Some students said that they did not see why they had to go on the outing or why they had to do it for a mark?

S: No I that was not O T students , because afterwards we still said no it was nice, I actually learnt something and there was no pressure.

R: Did you see the absence of excursions in the zoo section as a lack or did it not bother you?

S: No.

R: Animal and plant pracs together in one practical-was this a problem, did you have any preference regarding this .or any comment regarding this?

S: No I don't think we found it as a problem, it was very unusual that you had to scrape from the cells of your cheek, but, no it was not a problem. I think we could handle it, we actually enjoyed it it was like every week it was like something different, you did not always know what to expect, so in that sense it was enjoyable and we preferred it that way.

R: And it did not bother you that animals and plants were done together, even in zoo and it wasn't confusing in any way?

S: No, and if we were confused we would like ask you and you could explain it to us so that we could understand.

R: One major headache seemed to have been the video and ordinary prac done together in one prac- like the way the zoo dept did it. Did you have a problem with this?

S: No, I think the most important part of that was that the video was time consuming for us, after a while you get tired when it s to long and then you just leave everything, I think that the only problem, it wasn't that much, that we thought of it as two pracs.

R: People commented that the bio pracs were very much like schoolwork, the other

comment was not a prac it was a tut.

S: I didn't see it as a tut , I think it helped us understand what was going on much more than what was happening in tuts. For us O T we didn't always have tuts, we started having tuts towards the end of last semester so it helped us a lot and we did not see it as a tut, we saw it as a prac.

R: One comment that came out as the frustration of a lot of students was : I was pressed for time, so I copied, and I don't feel good about myself or I copied because of the lack of specimens, was that your experience as well?

S: No, I wont say our group copied , we help each other . We like work together on a certain section and consult with the others to see if its right .

R: In what way did you work together ?

S: Some of us perhaps didn't understand what was happening and then one would explain and the other would find out and then we all would go over it together and in that sense we would then find out whether it is right or not.

People would spread the work - yes we sometimes did that.

R: What was your reason for doing this?

S: I suppose when we had to do the drawings and everything was put together and everybody had to stand together and a lot of us couldn't see and we like say you do that and you start there and then we'd meet back at the table and it was easier that way and it was less time consuming.

R: If I understand you lets say I am at this table and there is five specimens an twenty people have to draw them , there is no that each one will do his own work?

S: Yes if you standing in front and you draw from the one in front of you..

R: One prac in botany where it was required of you to work together and I know there were other pracs where you were required to do teamwork, did you prefer this above working on your own?

S: Yes, we never did work on our own, but in groups of two or more, yes I prefer working in a team.

R: Lets say you are doing applied practicals, how would your teamwork work? Would you copy or would each one do his own work and than consult?

S: Yes we would do that, each one would take a few slides and after a while we would

swop slides again and when we finish we would consult to check whether it is right and we'd do the same with labels. We'd work out the labels together as well.

R: Would you say that you as far as possible tried to do your own work in pracs ?

S: Yes, sort of , I won't say my own work if I was working in a group.

R: If other people were not there you'd still be progressing?

S: Yes.

R: For labels in zoo pracs , people complained that the textbook was not enough?

S: Yes, because the drawings of the specimens were not in the text book so we would not know what was going on .

R: Did you enjoy working with the microscope?

S: I don't know, I won't say that I hated it , I think it was one of the easy parts of the pracs, so yes I would say enjoyed it.

R: Did you ever find it difficult to put down on paper what you saw through the microscope?

S: Yes I did, but that is where my partners would come in and say no no and they would show me how to do the right thing.

R: Demmies ?

S: Yes they were helpful, they would explain over and over till we would understand .

R: Would you say that they knew there work?

S: Yes, they knew.

R: Racism on part of demmies did you ever observe any of this and were you ever subject to this.

S: No I really would not say that there was any incident to substantiate that , no they were never rude or any thing to any of us.

R: Type of comment linked to this was : black students say that coloured students are favoured above them and then coloured student says that there is a kind of favouritism which he also regards as racism. And for example mixed demmies- black demmies favour black students and coloured students have their click.

S: No we never had that problem, if we needed help we would put up our hand and any demmie would come and help. So no we never had that problem.

R: The marking, was the marking always fair and was it consistent.?

S: It was always consistent, but when we'd work together and we got the same work and I would have 95% and that person would have 75%, in that way it wasn't consistent, but I guess it was the way in which the different demmies perceive the work. We never really found this to be a problem.

R: That was also something people linked to racism.

STUDENT 6

R: For what course are you registered this year?

S: B Sc 1.

R: What are you planning to do next year?

S: If all goes well, I want to do Pharmacy. Last year I wasn't able to collect all my courses so this year I have to collect those I don't have.

R: What were your marks like for the two modules of LS.

S: I got a sub, I didn't do too well.

R: Between the various dept who were running the pracs did you notice any differences in the presentation that was outstanding?

S: I was more interested in Botany than in Zoo. Maybe in Zoo sometimes you don't finish everything and there is so much, sometimes you don't grab everything or you don't do everything and then you loose marks.

R: Students have complained a lot about the length of the pracs . Would you like to comment on this?

S: Yes, like every Tuesday and Thursday we are writing and now you find that you are pressured to finish and now the time is long and again the writing and it is like confusion in your mind you are thinking about what you are going to write and again there the prac is long.I think if we didn't have tests, the time would have been fine.

R: So you're stay in the res and getting home is not a big problem?

S: NO.

R: We handed out prac manuals, did you prepare from these prac manuals?

S: Yes it was helpful, because before you come you already have an idea of what you going to do.

R: Did you find that you always prepared ?

S: Not always.

R: On the days that you did you prepare , did you find that it was helpful and that you completed your prac much quicker?

S: Yes , it was.

R: I've received vague comments from people saying pracs are interesting, they enjoyed it,

they are boring, would you perhaps like to comment?

S: When they say it is boring, its like when they don't understand. You can't enjoy something that you not really confident about. So maybe when they say they enjoy they know what's going on, they know how to tackle it and if maybe even if they understood the work in class now you can apply what you have learnt in the lectures, so maybe if you did not even understand the lectures, you can enjoy.

R: We've tried to link pracs and theory, was it obvious?

S: When we were doing the genetics I really saw that they were linked, and it was good and I benefited from that.

R: Microscopes, are you comfortable when using a microscope.?

S: Not yet, it's not clear when I put the slide there.

R: Do you know how to use it properly?

S: I can't say.

R: When you look at something are you able to see what you supposed.

S: No, I always have to call the demmies.

R: And when you must draw what you must see, are you able to do that?

S: No, it's a struggle, it is not easy.

R: Did you find any of the pracs very difficult?

S: Yes, like when you have to draw all that stuff, and they use charts to draw things, it was very confusing. And the one with the food web, was very confusing, not so difficult but confusing.

R: When you say confusing, what do you mean?

S: I did not always understand the theory.

R: Did you enjoy the excursions, do you think its a good thing to have as part of the pracs?

S: Yes, even if we answer the questions that you give us, like you discuss and you hear from others what they think and you compare and you learn again. And you see the thing practically.

R: Plant and animal pracs were done together, did it ever bother you that we did it that way?

S: No, I don't think so. Now you can see the differences, like you look at the plant cell and the animal cell and you see them together.

R: In the Zoo pracs, you looked at the videos, and you had a prac afterwards.

S: The video part, you can't hear everything, some of the words are not clear, and you had to answer the questionnaire and for a certain time and it is not easy to listen and think what was the question, it is not easy to grasp everything and write answers, because even we are having marks from the questions and not from the prac. So now it was really not fair. Because now we did the prac but it was not part of the marks.

R: Did you get very low marks for the pracs.?

S: Very low marks. It was not fair to still have a prac after the video, because the main prac was the video, since the marks were for the video. I thought that they were going to compile the two marks, but no, it was only for the questions.

R: The genetics pracs seemed to be much shorter than the other pracs, was this your experience as well?

S: Yes.

R: Some students said that the work that you covered there was very much like school work.

S: No, I don't remember doing that at school.

R: In the Zoo pracs students said that they copied a lot, did you also find that you copied a lot?

S: If I was working with someone, if I maybe did not do everything on time then maybe I did copy, but other times, I do my own thing.

R: The demmies, were they helpful, could they answer your questions?

S: Yes, they were helpful, they would come and explain if it's a drawing, they draw for you or maybe if we're doing the graphs, they show you the skill.

R: Demmies racist?

S: I don't know, but sometimes you'll feel that you just have to accept that you have low marks, and more or less you have done the same thing as some other coloured guy but in the end they have more marks than you or sometimes they will go to the demmies and demand more marks from them , but I would not do it. No, I would not say that it was racism.

R: The marking: Do you think it was done fair?

S: Sometimes it was unfair, sometimes you feel that you need marks for this , the way you

did it and even if you compare with the others .

R: If you did feel like that, did you ever go and speak to the demmies ?

S: No.

R: Group work, how did the two of you work together?

S: There was this one time when we had to cut some things that time I asked my friend from the res how she did it and so I had already done it . So when we work together, I explain to her and I finished before her and I just helped her to finish.

R: Do you prefer group work to working alone?

S: I think group work is better, because sometimes when you are alone, you think you are doing the right thing and then you doing the wrong thing or maybe you taking a long way only to find out there is a short way, so if you working together you can share ideas.

R: Students felt that the videos were a waste of time.

S: Yes I agree, because you don't grasp everything and when you get to the question it is almost as if you forgotten the thing and even when you take notes .

R: Some students felt that the instructions were not clear . Did you ever find that there was confusion because the information was not enough?

S: If I ever find that I did not understand or that I found something difficult, I would ask the demmies and they would explain to me.

R: Another complaint was that the specimens were not enough- slides or fresh specimens. Did you find that this caused delays in your work?.

S: Yes, sometimes, especially when we were having a test and you find that you need something and someone else has it and now you have to wait.

R: Did you find that at times you perhaps did not complete your whole prac?

S: Yes there was a time.

R: Did this affect your mark?

S: Yes.

END

STUDENT 7

R: For what course are you registered?

S: Occupational therapy, first year.

R: So are you going on with that next year.

19: Yes.

R: What were your marks like in the first semester?

S: B and C.

R: Would you want to comment on any differences in the presentation by the different departments who presented the LS course?

S: The prac where we had to put together the DNA and RNA strands, it was so practical and it makes you remember the work. Microscopes also helped a lot. This guy that we had now for ecology, and the attitude there was not too good. He puts you down.

R: A lot of first years commented that the pracs were long, was this your experience as well?

S: There was a lot of work to be done and you had to rush to get done and it was exhausting. You have to work fast and it still feels as if you're not getting enough done in that time. Too much work in to long a space of time , to little and yet to long. It is a drain on you.

R: Would you say that the three hours was too long?

S: Yes for a one way, unless they can have like a break in the middle where you can do something else, like discussion or something, if you do the same thing for so long, you become fidgety and frustrated.

R: You do pracs on a Wednesday, what do you do before pracs?

S: We have from 8.30 till lunchtime we have clinical practice, intensive working in hospitals or nurseries. And we come back like midway through lunch time . And we don't start on time. And the last bit is where we really work.

R: We handed out manuals and we expected students to do preparation , so did you prepare for pracs?

S: Sometimes . I noticed that the only time I prepared for a prac was when I enjoyed the lecture. And if I found it interesting. I enjoyed genetics. Our class would work

together and we would discuss the work. The booklets were very helpful and I definitely benefited. When we had the prac where we had the pages were stuck on the tables, I did not enjoy that and we all just copied. Everybody's books were on the pages. It directly related to the theory.

R: In some journals students made vague comments saying pracs are boring, interesting, enjoyed, would you like to comment on this.

S: When the pracs are long it drains you, so long might not always be boring, because a long prac could be very challenging, microscopes were fun as well, I enjoyed that as well. In lectures it was abstract, it was ideas floating around . When you in the prac and doing it, it's different, because each one has his own microscope and slide. Sometimes you couldn't find what you must find, but eventually with help you get it. For me to remember things, you must see it. And I have to figure out my own logic as to what is happening and why. And for me the pracs do that.

R: As far as possible pracs were linked to theory ?

S: Yes but sometimes the pracs came before the theory .

R: I know, but it is difficult to get them completely in sinc.
Was it obvious that we tried to link the two and did you benefit from it?

S: Yes, I think you could pick up that the theory was run in the prac.

R: Was this obvious right through the prac?

S: No , I don't think so.

S: Excursions were also fun, other than just having formal lectures and work . The excursions break away from the formal setting. You get to know the others. And that jelling makes things fun, because if you know you got someone you can talk to even while you're working , it acts as a distraction, it not so stressful, not so draining on you, as if you sitting here, isolated in your little box of your own creation, doing your work, thinking, fine and work and that's it. At the first excursion, people really start talking they got to know each other and from there the atmosphere in the class, was different. We were not only with each other, now we were talking to everybody. And we're learning from each others ideas as well. There is one guy in the class , I did not know him at all and we met on the bus and after that when it comes to exams we sit together and we toss ideas at each other and that is how we revise.

R: Did you not mind that there was a worksheet that had to be completed?

S: No. It was a lot of group work and you don't mind .

It was a creative way of teaching and we were enjoying the benefit of it. It also made things more real .

R: Microscopes: was this your first experience with a microscope?

S: I have used a microscope, one for a class of 34 and you never touched it.

R: So are you now confident in using the microscope.

S: Yes, I can actually focus on my own.

Yes, I can operate it now.

R: Would you say that pracs in general were well organized ?

S: Yes, but the demmies knew what they were doing , but not everybody was able to convey what they wanted to. They couldn't always relate to what they were saying, it was do this, do that and the instructions were not always very clear . The manuals were clear.

R: Did you ever experience any kind of favouritism, maybe not personally, but even observed.

S: No, that didn't happen. The demmies would explain to everybody. If you were confused, you just needed to get their attention . Those who did not ask were sometimes left to their own devices. So it was a matter of you making the effort to get their attention.

R: There was a comment about racism, did you ever observe anything like this.

S: No, I didn't.

You could approach anybody and they will help you.

R: Plant and animal pracs were done together, was this in any way disturbing?

Doing that stuff together, was more beneficial than doing that stuff separate, because you could compare. And you could see okay, plant cells have cell walls and this one doesn't . With the zoo they had the algae and the animals. They did a lot of drawings, that was weird and the demmies were very helpful. The one was telling us about her own experiences and telling us about the animals and stuff. We had to draw the stuff, I can't draw to save my life.

R: What did you do, did you copy?

S: No, there I was also brilliant, I used to fiddle with the stuff, but I did my own work. It was more fun to do it than copying from a textbook.

R: Some student actually admitted to copying, there reasons were the amount of work or, a lack of specimens.

S: I did not copy, but I was very forceful to see what was going on, for example the pine stuff, it was stuck on the wall and everyone was blocking your way. And I fought my way into the middle and went to sit flat down in the middle and then I could work.

R: What about availability of specimens?

S: Sometimes, but you could adapt to that, because if you see everybody is rushing for the first specimen , don't start by the first specimen, start at the other end. So it is up to you. The same happened with the slides, if you looking for a slide you just can't find one, but what we did was to hop from microscope to microscope or we'd work in the row. Each one would get a slide and then we just swop seats or slides in the row. When we did some of the drawings, we could not find the labels. And we really had to rely on the demmies and you had to ask. The textbook did not have the labels . Some of the demmies felt that we had to research the labels . But it is impractical for us, you are never gonna do the stuff again, you do it for a term and its finish. Maybe if they got a booklet with all the goggas and stuff, with labels, they did it in previous years, because I went to find it, in the lecture notes.

R: Did you ever find that the pracs were difficult?

S: Not in a pract, in a lecture yes. The pracs were more of a challenge. If you don't get it you get someone to help you . So the pracs were not over my head, although I know that some of my friends did find some pracs quite difficult. But even with them, you just had to explain again.

R: Did they just find it difficult because they did not understand it or were they not bold enough to ask for help?

S: I think they just did not understand it , because if they didn't understand the lecture they would not be able to follow.

R: Do you remember the pracs with the videos and a pract after that?

S: Yes. I didn't like the videos. They were too long and it was uncomfortable. There we had one TV and everybody was sitting around there and we didn't know the questions

before hand , or they d given it to us for a few minutes and took it again so you couldn't refer to it and by the time they took it back you never even read it , so when they took it in you were not prepared for the questions . So that just added to make it bad.

R: Do you perhaps have any opinion about the fact that you still had to do another pract after that?

S: I think I did the drawings first and then the video, so that wasn't that bad. I don't like the video before . I can 't really say that I liked the videos. Some of the information just did not seem very relevant. And they were too long.

R: The genetics pracs seemed to be much shorter than the other pracs?

S: Yes it was more fun, we cut out and color in . The lectures were so abstract but the pracs made it fun. If you sit and color in you don't consider it as work.

R: It was also said that the genetics pracs were like schoolwork.

S: I enjoyed it. If you got the basics it's easy. Here they also copied a lot.

R: Marking- has it been fair in your opinion?

S: I won't complain, I got nice marks. I think our pracs were marked very fairly. Our group always got nice marks and it was consistent.

R: Favouritism?

S: For most part their was no hassles.

R: Group work- did you enjoy group work or do you prefer working on your own?

I work well on my own, but if it is a lot of work I prefer working in a group. We subdivided our group-so even though we work as a group, everybody is not doing the same thing. But with the question we try to share it around. We all throw ideas together and that helps a lot.

R: Would you say that you prefer working on your own?

S: No, I like group work and each person has a portion of work.

R: Don't you think that copying happened in that case?

S: It depends on the people and their understanding of the work and whether the group delegates to the different people. It is totally up to the group dynamics.

We did copy with our ecology. Pages were pasted on benches where people were working. We could not see what was going on and that is why we copied. It was impractical to paste it on the benches.

R: Students said not enough information was given in the manuals as well as from the front?

S: No, I can't understand why they would say that.

Not all demmies come around and check what you are doing..

Some people are left unattended. Demmies are also sometimes intimidated by what they think the students know.

R: Is there anything you want to comment on in general?

S: I think the pracs were well organised. They knew what they wanted us to know. There was sometimes a shortage of hand outs - about three to one sheet.

R: Did you ever not finish your prac

S: no.

R: Did leaving late ever bother you?

S: Yes, because I work, from 4h30. And if I rush, I would sometimes copy..

STUDENT 8

R: For what course are you registered?

S: B Sc.

R: What were your marks for the two modules in the first semester?

S: C & D.

R: Between the different departments who presented the LS pracs, were there any differences in the way things were done, that was outstanding to you?

S: There were differences because, firstly, they are different people responsible for the different departments, they like that presented differently, some lecturers like wanted more practicality , more group work involved and others said no you have to work on your own , and you may not communicate with others and others say feel free to communicate, so there was a great diversity.

R: Length of practical?

S: Pracs were very long. I feel its mainly being in the first semester and people they not used to having pracs in the first place and the idea of ending 5 o'clock is like by the . 5' o clock is like an estimate of when you should end, and most people end earlier .I did not have a problem. I don't feel that it was long in that sense. I had my own transport home, so I'm talking from my point of view. I think everyone could cope with the work.

R: Did you often prepare for practicals?

S: I ll be honest, I did prepare for practicals, but there were times that I just read over it before I came to practical or I still did not read over the prac and I still understood , even in those pracs that I did not read over. Basically even in the introduction when the lecturer stands in front, all you have to do is listen and understand, like when the lecturer says start and you go and talk to your friend , - not everyone starts right away and people have their conversations and the lecturer, I think it was the biochemistry, had to continuously come around and say I mean one person wasn't even doing work and five minutes later he was still at the same place and having a conversation .

R: The time when you did prepare , did you find that helped you more than other times

when you did not - did you find yourself working faster those times when you did prepare?

S: I' d say very much so, besides working much faster, I didn't have to maybe ask the lecturer or demmie to assist me or explain a certain part to me, I could like take it on my own and not use anybody else's help, I could like work on my own.

R: People would say pracs are boring, or interesting or they enjoyed pracs. Would you like to comment on that?

S: I can give you an example like some times when I wrote comments it was interesting and I like mean it as in the fact where you could work individually and you could work group work and you had to pack things in and not just here's a question write it down and , there's like a difference to the other pracs and , its different from a routine kind of practical and also sometimes reflected ,also with the marking system. The fact that there are different demmies marking the scripts, a couple times when you did group work, you work inevitably is going to be the same because you discuss your answer before you write it down and a couple times when I got my book back and I compare my marks with the person I did my prac with , because it was marked by different demmies, the marks were different. Both those demmies, they didn't correlate with each other and I don't even know how they get the mark in the end, because the amount of ticks doesn't even make sense. That's why I always used to have a problem with the marking system and the way things are marked . I feel when the demmies mark, they must all come to one room because I've noticed also when I have LS tuts there's always been a demmie sitting at the back marking .

R: Were there often big differences ?

S: .Some times when I did approach the demmie, they would say, that maybe you have expressed yourself, you've said it in your words and one may have made more sense than the other. My one friend once got 96% and for the same prac I got 66% and that's like a difference of 30%. And the demmie did not want to change my mark, because there was no signature on it and she said she did not mark my paper , I thought that irrespective that she could still see. Things like this should not happen it should be sorted out before time. Some students will just accept it, I'm a person I want to know that the mark is the right mark, where some people will say, 66 is above 50

and I'm happy. But you see the end result is when it comes to end results and you DP and that then 66 and 96 , that difference is really going to make a difference. Sometimes it can make a difference between passing and failing. And that shouldn't be at the expense of a student.

R: I've often realized that those kinds of inconsistencies in marking often relates to the demmies own background knowledge on the subject. How did you find the demmies in general when you did ask for assistance, were they able to answer your questions.

S: Yes and no. I can give an example, in the section on genectics, there was one complicated cross where I wasn't to sure of it and I asked one demmie and she showed me one method to do it and I understood and as I went deeper into the problem , I got confused again and I asked another demmie and that demmie told me no who told you to do it this way and this is wrong and then I was confused , and then eventually the second demmie was right and the first one was wrong. And another thing also, I think the demmies are prepared for the pracs, but again concerning the marking, they don't sit with the textbook and they sit ticking and crossing.

And also the the fact that students kinda look up at the demmies because they are demmies, you automatically think and expect that they know more than you, because you know, how else do they become a demmie. I don't know they become demmies, maybe you have to put your name forward, or a lecturer asks you, I don't know, or maybe you have to have certain credits in your second year or whatever . People just when a demmie tells you something , just accept it , because they are supposedly more learned .Some people also , a demmie must be like a teacher, must tell the people in detail, from this step, this happens and why this happens .

R: Would you say that any of the pracs were very difficult?

S: Actually I did find one prac very difficult, but I can't remember which one .

R: Could it have been some of the genetics pracs ?

S: I just remember that I finished very late, I think I was one of the very last people to leave. I had to constantly seek help and ask demmies what was going on and everything.

R: We tried to link theory and prac, was this obvious?

S: Yes, most of the time there was a link, but you know, we like covered the theory two

weeks ago, because the pracs are like a bit behind or the pracs are a bit in front. They were never really in sequence, but you could see that there was a link.

R: Do you think that you benefited from that link?

S: I think there was a benefit, for arguments sake if you never did the theory and now you just thrown into the practical its like it doesn't matter what practical you doing . The practicals are supposed to be for your benefit so the whole reason for the practical is so you can see the practical side of the theory, and there is no use seeing the practical side of the theory if you haven't seen the theory. So in that sense I feel its like a benefit and also even though the theory and pracs aren't done in sequence even if you've done the theory like two weeks ago, that memory is still fresh.

R: The microscope seemed to have been a first for a number of students, was this so for you?

S: It's not actually a first for me, I am familiar with microscopes and things, but not all microscopes are the same so in that case you still have to learn and adapt and learn .

R: Were you allowed to personally handle microscopes at your school.

S: We actually had to know the certain parts of the microscope, but not like at varsity level, basically you had to just look at a simple slide and you didn't have to prepare a slide and all that.

R: Do you think you are now comfortable with using a microscope?

S: Yes.

R: When you do microscope work, I know some students have a problem when the lecturer is explaining, are you able to relate it to the slide?

S: Its like, most of the time when you can't get the microscope in focus and you can't get to look at what you supposed to look at. Then you try to make out from the drawing on the board, and the drawing on the board is just an outline of what you supposed to see, I felt students can get a first hand look when you use the TV's, because once you know more or less where the vacuole is and where other items in the cell are, it would have been easier if you used that system more often. And sometimes , you know I sit quite far to the back .

R: I've found that students sometimes find it difficult to put down on paper what they see through the microscope, have you ever experienced this kind of thing.

S: Basically I asked demmies , so they explained to me.

R: Did you enjoy the outing and just generally how you experienced them?

S: I almost missed the first one, it's something totally different its like you not at varsity, it's a totally different feeling, the surroundings are different, It was good.

R: Animal and plant pracs together, was this a problem?

S: It was fine.

R: Videos and pracs together?

S: What I don't like is - I couldn't make out what he was saying and you don't know which parts to write down . You don't pick up on other important stuff, you miss finer detail . And the fact that you still had to do a prac afterwards.I was surprised. But the timing was good, no it wasn't too bad.

R: The genetics prac seemed to have been much shorter was this your experience also.

S: The reason why I say yes, was because it wasn't like looking up answers and like where you sit with a textbook .

R: Were Genetics pracs like schoolwork?

S: Yes it was similar to schoolwork although a bit more in depth .

R: Group work can you explain to me how you group operated.?

S: We not only a group when it comes to practicals, we know each other very well and, we talk about things casually and it takes the pressure off things.

R: Did you find that you often copied in the group?

S: The fact that we were so many in the group when one or two came up with an answer and the answer sounded right to us, we all accepted that as the right answer and then if it's a short answer then there is not many ways in which you can change the answer, and then lecturers would tell you that you have the same answer.

R: And when you had slides to draw? Did you also exchange drawings in that way?

S: Sometimes some of the guys in the group would feel that they won't finish on time and then to save each other the extra hassle we would each do a separate slide and then each a different question and then you get the work from the others and that way, we all finish up early.

R: Would you say that you benefited from this kind of group work?

S: Sometimes there were things that I kinda missed out on, but in the aspect of theory

related to practical, some of the stuff that we did in the prac although it related to theory you didn't do that particular aspect of the pract in the theory and inevitably you look at the aspect that you writing test and exams and in exams you not going to be asked to draw something you see on a microscope, there's no practicality involved, so when I did copy, you subconsciously understanding what you are doing . I felt it wasn't like a big hassle or something to me, there was no need for me to really go in depth to find out, because there is no link to the practical.

R: Would you say that the instructors were always approachable and concerned with the students?

S: I'd say they were always, except for the one lecturer, he from the start he was a bit moody, the students couldn't say one word out of line and he would get angry and when the students didn't understand he would say why are you asking a stupid question and another lecturer would say don't be afraid to ask a question . And you put off from the word go. And when you ask a question he would say, you didn't prepare for the prac or why are you talking to the next person .

R: Videos were often regarded as a waste of time, would you agree with this?

S: I'd say in a way that it was, not a waste of time, but, the aim would be to understand questions. They were lengthy and students couldn't concentrate for that long and . And a video is long and you have to listen to everything. That is also why students say that the pracs were boring .

R: Did you ever find that the instructions were unclear or caused confusion?

S: The only prac where I was unclear was the one with the RNA and DNA where you had to cut and paste. The prac manual did not explain it properly. And for that prac I did not prepare. I just felt it wasn't explained well.

R: Did the slides and specimens cause delays?

S: It wasn't a problem for us because we worked together and you know . I think that if you worked on your own, it would have been a problem . You had to wait for slides and there were more slides to look at than questions to answer. And a drawing for every slide. And sometimes you did not know what labels to put down and ....

R: Did you bring your text book to pracs

S: No .

R: Did you use a textbook in pracs?

S: Yes

R: Was it of any use?

S: Yes, for the drawings, but not even all the drawings are in the textbook. I think you should look at the marking. The lecturers must explain more in depth in the pracs. If you act positive towards students, it helps a lot.

STUDENT 9

R: For what course are you registered.

S: B Sc 1.

R: What are you planning to do next year?

S: Microbiology and Biochemistry.

What are your marks like for the first semester for L S?

D and C.

R: Between the departments that was presenting the practicals, did you observe any differences in the way the pracs was presented?

S: No I didn't observe any differences.

R: Student complained about the length of the pracs, do you perhaps want to comment on this?

S: I also think that it was not enough time for the pracs. It was a lot of work and sometimes we didn't finish- I think the time was very short.

R: Would you say that the work was too much for the amount of time?

S: Yes.

R: We handed out manuals , we expected students to prepare for pracs- did you always prepare for pracs?

S: I always prepared for the pracs I think that it also help me . The pracs of the zoology dept, I did not like them, it was too much work . Maybe if the class was not that big , maybe the time would be okay.

R: Did you find that the size of the class was a disturbance?

S: Yes for some pracs, like the ones we did for the zoology dept.

R: Students say that pracs are interesting, boring, enjoyed them. Do you perhaps want to comment?

S: I always saw the work that I had to do was necessary, so I always do my best and I wouldn't say it was boring. And when I finish the prac, I always want to see that I obtain something. Every prac that I did it was something new to me, so I enjoyed it.

R: In most cases we tried to link the pracs to the theory, was this obvious.

S: Yes you can see that it's a link but not that obvious. And sometimes the pracs did not

require that you know the theory.

R: When you did find there was a link, did you benefit from it?

S: Yes, I benefited quite a bit. I think most of the pracs , even if you know your theory, I think you must know what is happening in the prac and do it well.

R: Microscope was new to most students, was this so for you as well?

S: Yes.

R: Did your school have microscopes?

S: They had microscopes, but we were never given a chance to use them.

R: Do you think you are comfortable with the microscope?

S: I've been in the process of learning to use it, but I don't think that I'm totally confident.

R: Would you say that pracs were generally well organized?

S: Yes. You are given material before the time to prepare so you can know what to expect. That made the pract very easy and there was no waste of time- just go into the prac.

R: Questions in prac manual that you could do at home, did you ever do that at home?

S: I did sometimes.

R: In first term two outings- what was your experience of these outings?

S: I enjoyed them. It was not just for educational purposes, it was also for a nice time. I really enjoyed it.

R: Would you say it's a good idea to have those kinds of pracs?

S: Yes I would say it's a good idea.

R: Did you find it problem that you had to pay or that you had to do a prac?

S: I think it was good to also see what you have learnt. And the issue of money- its not a problem, students always find the money.

R: Animal and plant specimens in one pract, was this ever a problem to you?

S: I can say it's a problem, but I can say that you as a student must always do all you can, sometimes its easy to confuse so you must always get the difference of what you are working with.

R: And in terms of the learning experience together?

S: Yes I think there is a benefit.

R: In Zoology you did video and prac together- do you want to comment on those pracs?

S: I remember, the problem I had is just a test. It was okay?

R: Genetics pracs were shorter, do you want to comment on that?

S: Once I remember that I completed the whole prac at home, and I came to prac and copied the answers in my book and went home . They were definitely shorter.

R: Were these prac difficult.

S: No.

R: Some people said that the genetics were like schoolwork.

S: No, I don't remember doing that at school.

R: Students often copied, did you know about this and did you take part.

S: I was aware that there was copying, but I did not like it, because after I do a prac I always like to see that I learn something, so I always want to benefit, I don't feel good about copying. There is no point in me going to a prac and then copying.

R: People work in groups, did you ever work in group?

S: Yes.

R: How did your group work?

S: I prefer to do my own work.

R: Demmies, would you say they were helpful.?

S: Sometimes they answer the questions. Sometimes they also had problems with the work.

R: Students felt they were subject to racism, were you ever subject to this.

S: Yes, but when I get a low mark I see what I did wrong. I won't say I was subject to racism. I've seen that it is when a student gets low marks, that this thing comes up, especially amongst us black students.

R: Do you think marking was done fairly?

S: Yes

R: In some comments students said that marking wasn't fair?

S: If we work together, we won't have the same answers.

R: Would you say that the instructors were always approachable and concerned with the student.

S: Yes. They always prepared to help us.

R: Students found that the videos were a waste of time and could be done some other time, do you perhaps want to say something on that?

S: No, when we done the video.

R: Students complained that instructions were not clear. Not enough info was given. No it was always clear, if I don't understand I go to the demmie.

R: Students complained about number of specimens that were available- slides and specimens.They experienced this as a problem, was this ever a problem for you.

S: Yes it was, sometimes you finish a slide and you have to wait for something else to draw. Or someone else is waiting for something that you got.

R: Did you often bring your textbook along to pracs?

S: No.

R: Did you use a text book in the prac ?

S: Yes.

R: Would you say that the textbook was helpful in the prac?

S: Yes, like sometimes we needed to look in the textbook.

R: Students complained in the Zoo pracs that there were no labels and the textbook also did not help.

S: Sometimes there were diagrams in the lab.

R: You mentioned that sometimes you did not complete your whole prac. Did that affect you mark?

S: Yes

R: Anything else.

S: Maybe they can make the classes smaller

END

STUDENT 10

R: For what course are you registered?

S: B Sc

R: What are you planning to do next year?

S: Biochem and microbiology

R: What were marks for the two two modules?

S: C and D.

R: Between the three departments have you noticed any outstanding differences in the way the pracs were run?

S: The department for the third quarter in the pracs were not the same - some times you work is the same as your partner and the marks is not the same and more different so is there no mechanism to make it fair for all students. Like not knowing the work themselves is at the expense of the students themselves. So how about one demmie mark all the books for one week and so on .

R: Our demmies are also students and work is done in their free time, I think there are ways of dealing with it.

S: Marking was a serious problem for me right through pracs.

R: Students complained about the length of the pracs.

S: No, I stay in res and getting home is not a problem.

R: Did you always prepare for pracs?

S: Not always, sometimes.

R: Did you find that it helped you when you prepared for pracs?

S: Yes.

R: How?

S: I spend less time when I do my prac and I understand better, and I manage to finish early.

R: Vague about pracs saying that they, intereting, or boring, do you perhaps want to comment on this?

S: Most of them were interesting, like one could reap some benefit from them, boring - could be because of time or they were confused.

R: We tried to link pracs to theory, was this obvious?

S: Yes.

R: Did you benefit from it?

S: I thought we had to do the theory first and then te pracs, but sometimes we did the pracs first and then the theory.

R: I found that the genetics pracs were well linked.

S: Yes it was enhancing.

R The microscopes were a new experience for most students, was this so for you as well?

S: Yes.

R: Are you now comfortable with the microscope and will you be able to explain to someone how to use a microscope.

S: Yes.

R: Would you say that any of the pracs were difficult.

S: Yes, the genetics. And the last two.

R: Why?

S: I don't know.

R: Do you understand the work that was done?

S: Yes, for now.

R: Would you say that the pracs were well organized?

S: Most of them , yes.

R: What made some of them not well organized?

S: The demmies were not always well prepared for the pracs.

R: Excursions- what were your experience regarding these pracs?

S: I felt they were worthwhile, I enjoyed them.

R: The fact that you had to do a worksheet was this in any way a problem?

S: No, it was not, since I was liking what I was doing.

R: The plant and animal pracs were done together, was this a problem?

S: No, to me this was fine.

R: Zoo pracs where you had to a video and you did some specimens afterwards as well, would you like to give your opinion?

S: Most video pracs are a bit difficult in this sense that what the person is speaking there is a bit fast for us and sometimes it would be better if afterwards someone can explain to us

what is happening.

R: The fact that you had to do a prac after this video was that in any way disturbing?

S: No.

R: Did this not make the pracs very long?

S: It did , but I won't comment on that, because I did not have any problem.

R: Genetics pracs seemed to be perceived as being much shorter, was this your experience as well?

S: No, I had difficulty as well, so, no.

R: It was said that genetics pracs were much like schoolwork, was this your experience as well?

S: A bit, not entirely, most of it was new to me.

R: Could you relate to the stuff that you did at school?

S: Here and there.

R: People often said that they copied, do you perhaps want to comment on this?

S: What I did with my partner was that we shared work, like I do a part and he will explain to me what he has done and I explain to him what I have done.

R: Would you say that this was of a benefit to you?

S: Yes, because when I did not understand a part he could come up with answers .

R: What was your experience of the demmies?

S: The demmies were fine, but some of them were sometimes a bit disorganised. The problem was with their marking.

R: Would you say that they in most cases knew their work?

S: Yes.

R: Some people complained that some demmies had racist attitudes. Did you observe anything like this?

S: I did not see racism as such, but I did notice that the blacks were marking this way and the coloureds were marking this way.

R: Would you say that you prefer group work above working on your own?

S: Yes I prefer to work with a partner, but also not to much group work , because then you can't contribute significantly.

R: The instructors, were they approachable and concerned about the students?

S: Most of them were.

R: Videos were regarded as a waste of time, do you agree with this?

S: They were not understood as much as they needed to be.

R: Were instruction always clear, and enough information given?

S: No because often we had to call demmies to come and explain.

R: Was this when you did not prepare or did this happen all the time?

S; Mostly when I did not prepare.

R: Did to few specimens, cause problems?

S: Sometimes you want a specimen and there is nothing and you have to do something else

R: Were textbook of no use for the prac?

S: It was of use.

R: The test that you had on the video that you watched?

S: They were difficult, sometimes you leave things out that was important.

STUDENT 11

R: For what course are you registered?

S: B Sc occupational therapy

R: What are your marks for the two LS modules?

S: F and D

R: Between different departments that have been offering life sciences have you noticed any differences in the presentation of the pracs

S: I think the Zoo was much more vague, than the Botany- the Botany way was a easier way of presenting it to us and it was more informative, cause like for one of the pracs we went to the nature reserve that was quite informative for me , it relaxing and the way it was presented it was not like do this, do that as we just observe while you doing it , that was much better for me.

R: There was a lot of complaints about the length of the pracs- too much work, to little time. Would you like to comment on this?

S: I think because of the room as well, the room was very hot , stuffy, but it was a bit rushed so you concentrated more on getting the work done than actually learning something- so it was a bit long. It depends on what type of day you had. If you had an easy day you probably would feel more relaxed and if you had a long hot day and you come to the prac again so overall it was it was very long and you actually concentrated on getting the work done as soon as possible and leaving.

R: You appear very free and easy?

S: It wasn't that bad, if you think of it, you stay here till five and it would just be another day that you stay till five

R: We handed out prac manuals and we expected people to prepare did you prepare for pracs, and did you benefit?

S: I did not always prepare, like the readings, I did not always do the readings, but from the manuals, that definitely helped, even if you just take fifteen minutes to read over it, it will definitely help you, it does help.

R; Did you find that when you did prep that you got through the pracs quicker?

S: Maybe not so with the longer pracs, but I did understand better what was going on and it does help a bit

R: In some of the pracs there were parts that you could do at home?

S: Yes I did finish a few things at home if you think of it that if you go through you will learn and if you don't understand you just read through Starr and Taggert and you go to the manual and it will help you.

R: In the journal students make comments like pracs are interesting, enjoyed or boring . What is your idea of this?

S: IT does seem that the interesting ones were the short ones. I found genetics very interesting. The long ones were probably the boring ones . I didn't think those were honest opinions of people. As you say it's very vague. They should have written what they felt instead OF SAYING ITS INTERESTING .

R: You said you enjoyed the genetics pracs - do you perhaps want to expand on that?

S: It was actually interesting, cause when you think of a human being you actually think of creation and you amazed by creation and you can actually work it out whether person will look like his mother or his father so if you interested in a subject you will want to learn so that is - I was very interested in that section of the work .

R: A lot of students actually found the genetics very difficult

S: I actually found it very easy and I thought I was going to be up against it but as you go through it you become more interested .

R: In our pracs were linked to theory. Was it obvious and did you benefit from this?

S: Not always , it was not always obvious that there was a link - maybe people went to class and just took notes down and they did not go and do further readings and the stuff was in the text book so I think - there was not like if the textbook should refer to something and especially in the manual or something and then people wouln't that reading up on that prac session and they then did not make that link and sometimes people did not attend lectures and just study from text books and when it comes to prac classes they wonder what's going on.

R: My perception was that in the genetic section there was very much a link between the theory and the prac?

S: Yes definitely- that was obvious

R: And the zoo?

S: Um I think for me it wasn't- I think we did the work more in depth in the pracs than in the

lectures, I felt that way.

R: For many students this was the very first experience of the microscope , was this so for you.?

S: This was my second experience. At the school: we just learnt the different parts of the microscope. How to carry it and so we did not work with the microscope very often. We would have it on this table and we would just look through it and we would not set up the slide and all that.

R: Are you now comfortable and confident in using a microscope?

S: Oh yes, I feel like a doctor.

R: In the last prac, meiosis, I think, a lot of people complained that they had problems with focussing , did you experience any problems in those pracs?

S: Not really,I think if you work it step by step and you follow the guidelines , then you would find it easier , because its very simple to do focussing and that and say you r power is different, if you don't know how to use that, you should just go about it step by step.

R: Some students complained that there was irrelevance in certain pracs, what has come out for example- some of the stuff that I taught you seemed to be irrelevant. Did you experience in any kind in the pracs?

S: There were a few pracs when I said what did I do this for now. But I guess if you don't link between the theory and the pracs then you would probably say, whats happening now.

R: Would you relate this to the fact that you an OT student and you have this attitude towards LS, or was it that it just really did not fit into what you were doing?

S: It actually related to OT and this has nothing to do with OT and why should I do this and so even if you are doing the prac, it creates a negative attitude when you doing the thing and you wonder why ?

R: The excursions? To me it certainly was a hi-lite- My aim was enjoyment, exposing people to nature-Its not often that people take the time to enjoy nature. How did you experience these excursions?

S: IT was great, because you got a chance to get out and I think that is maybe an improvement you can make, get out more rather and let people observe things because I found we went out, we are at ease , more relaxed, and you can observe the things in our surroundings . It was nice to be in the fresh air .

R: Would you say the lack of outings in zoo, was it a problem?

S: IT was okay, but I think that it was a lack .

R: Plant and animal pracs were done together- do you have a problem with this or do you have an opinion about this.?

S: Actually it was good to see the two together 'cause you can compere, say if you study and you wondering what is a plant cell and what is an animal cell . Its actually good to do the two together- its good.

R: Zoology had this thing that they had videos and drawings done in one pract, what was your opinion about this kind of pract.

S: The video was a bit long and there was a lot of information that was on the video that we did not even need to know, we had to listen for finer details in the video, because of the questions, so if you think of it the whole other part of the video is irrelevant, people are just listening for certain things. Instead of listening to the whole video. It was fine that it was done together.

R: Another problem was the fact that you had the test afterwards, only this was reflected as your pract marks.

S: Yes it was a bit unfair- but I am unsure - but I think both mine was marked. The demmies mark differently. Not everybody's had both marked. Some people work in groups or they copy and they got different marks and the demmies mark differently-

R: Was the marking ever a problem?

S: Not really, I guess if I had low marks I would probably have had a problem , but I am satisfied with my mark. It's the way the demmies understand it and the way people write as well , how they put their point across on paper .

R: The genetics seemed much shorter than the other pracs?

S: Yes. Mainly because I was learning, I found it interesting, but I don't think it's the length. Because if you learn the same amount in equal - whether you have a short or long prac, you probably still learn the same amount, but I think the length does play a role in peoples opinions and perceptions.

R: What time did you normally finish?

S: The latest was probably about 5 past 5. That's the regular- if people take taxis, that's when the taxis are there.

R: So you never felt under so much pressure by the time you leave?

S: Not really, there was a bit pressure but there wasn't that pressure, oh no I'm just gonna walk out now, so it wasn't that much. We all pull together in the end you realize what you have to do because you realize you have to forget the negative attitude and get on with the work.

There was a lot of work, squashed into that space of time whereas with the genetics, it was much more spaced we had time to do certain things, it is also the environment.

It also depends on the day , whether they had a busy session in the morning and they hardly have time to eat and then they come again to come and work , so that also plays a role.

R: Along with that went the comments about copying , were you ever part of copying?

S: Yes I think the reasons were not understanding what's going on , so let me just take it down, but I won't say a lot of people copy , I think a lot of people prefer working in groups, than actually working by themselves, it just gives them that confidence. A lot of people might be failing LS and they don't have the confidence to do it alone so I think group work is a better option than individual work, because I think people work better that way, cause in the one prac.

R: Did you participate in group work?

S: In the one section yes, my partner and I we're the two at the back so yes, we always work together, so if he does something wrong I get him .

R: So that is more consultation than copying ?

S: Yes

S: In zoo a lot of copying went on because of lack of specimens and pressure of the work I think that people did not want to pick up the slides and waste time , but I think that if we working groups instead of taking out all the microscopes , just set up two- so if one does not know how to focus, he can show the other one and so maybe you can learn something instead of just setting up the microscope just to show something and then just coping the work. So I think consultation works.

R: You are a very calm guy hey?

R: In your opinion were pracs difficult.I often found people say that pracs were difficult,

S: I dont think it was difficult, everything was in front of you, there wasn't any difficult

work, like if I had problems with the genetics, I would probably have said that it was too long in stead of being difficult, but I *think people think with their emotions -saying* its too long or too difficult - but I think it's the workload and not the difficulty of the work- everything is there - you just have to look for it.

R: Biology pracs were perceived as being very much like school work - did you also see it in that way?

S: A bit more in depth, yes, but basically std 9 work- *I* could not really recall what we had done at school, but yes there is a link between schoolwork and varsity work

R: What was your experience with the demmies were they helpful, unhelpful, could they answer your questions.?

S: Certain demmies were very helpful, others did not seem to know what's going on , so they would ask the other one and the other one would ask the other one. So there were only certain demmies one could actually rely on. They would actually help you . They were well prepared. It seemed that they did the work before , so they knew what was going on , but others would not know what was going on, they would not understand .

R: Certain students perceived some demmies as being racist. Were you ever subject to any of this or did you ever observe anything like this?

S: Not at all, I don't think that is a fair statement to make , because the demmies were there to help everybody and I think that is what they did. Where they could, they did. I never observed any racism in any of the prac classes.

R: Some student would perceive it in the way that some demmies have their favourites, so they spend most of the prac around one or two benches and they are always hovering there , when other people need help they are brushed aside or dealt with very quickly, so as to get back to the favourite spot.

S: Yes that could be a problem- maybe because they are friends with a person, so they will stay that side, because they are chatting while they are giving info , but I don't think its actually racism, but it could be social clicks that are formed

R: Do you think that kind of practice- social behaviour or clicking is fair on other students

who then don't get serviced.

S: Not at all because a student could really be in need and then everybody else finish at 4 and this person then struggles till 5 ,so in that case it is totally unfair on that student to be brushed aside.

R: Were instructors approachable, helpful etc-

S: Prof Channing- a lot of people were intimidated by him . He came around with color blind chart and people were actually to scared to give the answers- and this other guy- he had a attitude where you don't tell me . It was not very nice - it made pracs bad- he was not approachable ,he was like this person and we were lower. We did not want to approach him, because we were scared of being insulted. And it would be disrespectfull to insult him back - we nearly had an incident yesterday in class.

R: Instructor speaks too fast, gives too little information,

S: I think when instructors came in , people were talking, or were not listening - overall instructions were okay, not too fast, it should not have been a problem,

R: The videos generally were regarded as a waste of time, was this your perception as well.

S: Why it was a waste of time was because people were only listening for the questions , but overall the videos are interesting if you just listen carefully , so just because people were listening for certain answers, it was regarded as waste of time. It was actually interesting . Maybe if if was only a video out of interest

R: There was a lot of comments about instructions as such, often students found they were confused because instructions in manual were not clear or instruction from the front was not clear or not enough information was shared to complete prac in allocated time.

S: I think like yesterdays prac, there was an example given and there was an activity a task, but I don't think people knew clearly what to do , so it would be that the manual was unclear and it was not clarified from the front .

R: In zoo section people complained that textbook was not helpful during prac

S: I think there was just different examples used than in textbook - it would elaborate on it and not exactly give the answer- you just had to relate the two.

R: In zoo students found that they could not complete the whole prac did this ever happen to you?

S: No it didn't I think students perhaps got tired and felt let me leave now. But I think there were also people who did struggle, and I think that they did have difficulty in finishing pracs.

R: The slides and specimens- people complained that they were delayed because of the lack of sufficient specimens- was it a problem

S: I think why they were delayed was because we were told to take one slide at a time and people took more - they should just listen and take one slide at a time.

STUDENT 12

R: For what course are you registered for this year.

S: B Sc.

R: What are you planning to do next year?

S: B.Sc 2.

R: What were your marks in the first semester for the two modules?

S: D for both.

R: Were there any differences in the presentation by the different departments that were disturbing or affected you in any way?

S: Demmies were not very helpful.

R: Any other problems with the demmies?

S: No.

R: Would you say they were prepared and knew their work?

S: Yes, some knew their work, but not all of them.

R: In the first semester people complained that pracs were long?

S: Yes they were. Sometimes we didn't understand the work. Most of the people just copy from each other just to get home.

R: We handed out manuals- gave students oppurtunity to prepare before the time. Did you ever prepare?

S: I would just read over the stuff.

R: Was that alway or sometimes ?

S: Most of the times.

R: Often there were sections you could do at home, did you ever take advantage of that?

S: Yes I did.

R: Very vague comments: pracs were interesting, or boring, or enjoyed. Comment?

S: Exactly that.

R: Would you describe a long prac as boring?

S: A long prac was very tiring.

R: How do you travel home?

S: With a taxi.

R: If you stayed in a prac till five would that affect your getting home safe?

S: YES.

R: How far do you walk home?

S: I take a taxi and a train and a ten minute walk home.

R: We tried to link pracs to theory, was this obvious?

S: No, because , some pracs we never did the work in class.

R: Even when the theory was done, could you relate?

S: Yes.

R: Would you say in the places where it did relate, did you benefit from this?

S: Yes.

R: Which sections of the work?

S: Zoology.

R: Microscope- was this the first time you worked with a microscope?

S: No.

R: Are you now familiar with the microscope?

S: Yes.

R: Would you say that pracs were generally well organized?

S: Some were disorganised. The lecturers don't explain what you have to do and you have to ask the demmies. And sometimes they also can't explain to you.

R: Excursions: what was your experience of the excursions?

S: I enjoyed them. I love the outdoors. We go out hiking and walking a lot.

R: Plant and animal pracs were done together, did you have a problem with doing it this way?

S: No it was fine, it was interesting to see the differences.

R: In zoology you did videos and prac ,what was your opinion of this kind of practical?

S: It wasn't good, it was too long, people fell asleep .

R: Were the questions fair in the sense that papers were taken back ?

S: It was a problem.

R: Genetics pracs were shorter?

S: Yes it was.

R: Were any pracs difficult.

S: Yes.

R: Was difficult your understanding, or the person explaining?

S: Mine.

R: Were some Pracs like schoolwork?

S: Yes.

R: Why.

S: Some of the stuff I still remembered from school.

R: In the zoo pracs people copied because of time, would you say that was a major problem?

S: Yes.

R: Did you copy in the group.

S: We copied in the group and from other people.

R: Was it copying from textbooks or just copying.

S: Just copying.

R: Do you want to explain how your copying worked?

S: Sometimes we shared answers, other times we simply just copied.

R: Would you say that copying always went on?

S: Yes.

R: What were the reasons.?

S: Pracs were too long and sometimes we simply just did not understand.

R: Did you ever observe racist attitudes?

S: No.

R: Marking- was it fair?

S: It was fair. We would have the same work and our marks would differ.

R: Group work. Do you prefer group work to working on your own?

S: I prefer group work.

R: Were instructors always approachable?

S: I prefer to speak to my demmies.

R: Videos were regarded as a waste of time, Comment?

S: Yes, they are very boring.

R: Boring in contents or just because you don't enjoy the type of prac?

S: I did not enjoy it. Maybe if you could watch it in your own time.

R: Students said that instructions were not clear, please comment?

S: Yes, sometimes.

R: How did you deal with it?

S: We just copied.

R: Availability of specimens- did you ever perceive this as a problem.

S: No.

Thanks for your time.

STUDENT 13

R: For what course are you regitered this year?

S: B Sc 1.

R: What are you planning to do next year?

S: Pharmacy.

R: What were your marks like for the two LS modules?

S: A and D.

R: Between the departments were there obvious differences in the way the practicals were presented?

S: Botany was very practical.

R: During first semester, people complained that pracs were too long- would you like to comment on the length of the pracs?

S: They seemed to be long, but as the days went by, I became used to them and I learned what was expected and it became better. I was always in the last bunch to leave.

R: We handed out prac manuals, we expected students to prepare for pracs, did you ever prepare for pracs, and did you benefit from this?

S: Yes, I did benefit from preparing. I could compare to the previous questions, try to relate the questions.

R: Did you prepare often sometimes or always?

S: Yes I always prepared from the textbook or from the manual.

R: You could complete some of the work at home, did you ever take advantage of that opportunity?

S: Yes, I read the questions, before I went to the prac. I did not really answer them, but I just got the feeling of what they ask.

R: Students made vague comments saying pracs are interesting, or boring or they enjoyed them. I got the idea that interesting was a short prac, boring was long or not so easy prac. What is your experience in this regard?

S: I rarely use the word boring. Pracs that perhaps require you to draw a diagram of a bird or a frog- that was difficult- because where do you start, but other pracs were interesting.

R: Would you say that some of the pracs were quite difficult or were they okay?

S: Yes, they were okay.

R: We tried to link pracs to theory - was this obvious to you and did you benefit from this?

S: Ja .

R: Did you benefit from it?

S: Yes.

R: The microscope was a first for a number of students and are you now comfortable with using a microscope.

S: No for me it was not a first time.

R: Did you have a number of microscopes at your school?

S: Yes, it was one microscope for a student.

R: Were you allowed to handle it.

S: Yes.

R: Are you confident and comfortable in using a microscope?

S: Yes.

R: Often it is a problem to see what the instructor sees. Did you sometimes experience this?

S: Yes, sometimes.

R: Was it easy to put down on paper what you see through the microscope?

S: Yes, I tried my best. I was just not always sure how to shade or colour the diagrams.

R: Slides and specimens are sometimes a problem in that there was often not enough.

S: I had to plan so I never start where everybody else start and then I collect those that the others return.

R: Student said that pracs were not well organized, did you ever experience this and why was it like that?

S: No, I never had that feeling.

R: Outings, what was your experience?

S: No they were not a waste of time. They were very good. It was just the thing of having to write something. If it was just to look, I would enjoy them more.

R: Would you say that the outing should not be for marks?

S: Yes if we had a prac and we get the specimens in the lab and then we could go out and see them in nature it would be better that way.

R: If you had an opportunity just to go on an outing, would you go?

S: Yes.

R: In pracs plant and animal cells together. Was this ever a problem for you to look at plant and animal specimens together?

S: It was a problem.

R: Zoo dept did a video and prac together, please comment?

S: Watching the videos was good, but for me it would be better if I could watch them again.

R: What did you think about the fact that they took the questions away?

S: It was difficult, because it was difficult to get the answers.

R: Were marks low?

S: Yes the prac marks were not that low it was only the test mark that brought our marks down.

R: Tuesdays test after prac- please comment.?

S: It affected test marks. I am very slow. In the end it was a matter of failing the test or getting a good mark for the prac, so every Tuesday when we wrote a test there was this thing what must I do , must I just go or must I complete the prac.

R: Did you have any tests after any other pracs?

S: On a Thursday.

R: General comment for genetics pracs were that they were shorter, was this you experience as well.

S: Yes we had this manual and you could prepare and the demmies could help you , yes they were easier.

R: Another comment was that it was like schoolwork?

S: I can't remember schoolwork now.

R: Did you come to varsity straight after school?

S: No I had a break of five years.

R: In zoo pracs there was copying because of long pracs? Were you ever exposed to this kind of frustration?

S: They were most demanding, stressful, chaos in the lab. Very confusing. When I m writing the the test I would copy , otherwise I would be failing the test.

R: Did you copy from friends or textbook.

S: From textbook mostly.

R: The demmies - helpfull/ unhelful/ dont know their work, of no use? Comment.

S: Some of them were more confident than others. They were helpful most of the time.

R: A very disturbing comment- racist attitudes of demmies towards students. Were you ever subject to this or did you ever observe this.

S: No.

R: Marking, was this done fairly?

S: Yes,

R: Group work?

S: Yes. There are students who just copy, that is not good. Group work is fine when everybody works.

R: Instructors- were they always approachable?

S: I did not use instructors a lot, I just speak to demmies.

R: Some comments that instructions in manual was not clear or that the instructions were not clarified

enough.-did you find this to be a problem?

S: No .

R: Textbook not helpful, what was your experience here ?

S: I can't say much about that .

R: In zoo pracs people often did not complete whole prac because of time?

S: Most of the pracs I did not complete. Most of the time I would leave out about one drawing.

R: Some people felt that test at end of video was unfair?

S: It was very difficult and you could not get the spelling of names correct.

R: I have covered the questions that I wanted to ask, thank you for your time.