

# CHAPTER 4

## RESULTS

This chapter reports on the results gathered with the different instruments. This includes the responses obtained from the questionnaires, the records and statistical analyses of the relationships between responses and records.

This table representing this chapter is arranged into five columns with the main topic on the left and the lower order topics to the right. The main topic is research which is divided into instruments and learner profiles. The instruments are the questionnaire, the records and the relationships between responses and records. The responses from the respondents are represented in table 4.2. The records are divided into test results and criteria for selecting learners which is subdivided into SRS and additional credits. Under the relationship between responses and records is the statistical analysis.

**Table 4.1: Layout of Chapter 4**

Research	Instruments	Questionnaire	Learners' responses	
		Records	Test results	
			Criteria for selecting learners	SRS
				Additional credits
	Relationships between responses and records	Statistical analysis		
Learner profiles				

The data in this chapter is represented both in tabular and in graphic format to allow for individual reader preference as well as numerical clarity.

### 4.1 Research

The research deals with the different instruments that were used for collecting data. The data were used to compile learner profiles.

#### 4.1.1 Instruments

Two instruments were used to collect two sets of data. A third set of data was compiled by combining these two sets of data.

##### 4.1.1.1 Questionnaire

This chapter reports on the results obtained by means of the questionnaire.

##### ➤ Learners' responses

This table is the same as table 3.3. The responses from the respondents to each question are reported in this chapter.

Table 4.2: Layout of the question topics and question groups

Questions on:		Question Groups		
Subject preferences		What is the learner's favourite subsection?		
		What are the reasons for this selection?		
Facilities		What video facilities do learners have at home?		
		What computer facilities do learners have at home?		
		Can learners afford computers?		
L E A R N I N G	T U T O R E D	Lectures	Ratings - How do learners rate their lectures?	
			Attendance	Why do learners not attend lectures?
				Did you leave a lecture or lectures and why?
				Do learners concentrate during lectures?
				Are there too many lectures?
				Are certain lectures more important?
			Presentation - Which is the best way to present a lecture?	
	Practicals - Why do learners not attend or leave practicals?			
	Prescribed book - To what extent is the prescribed book used?			
	Internet - To what extent is the internet used?			
	S E L F	Multimedia computer presentations	Use	To what extent were the computer presentations used?
				Why were the computer presentations not used?
				Why did learners only use some of the computer presentations?
				How much time did learners spend using the computer presentations?
				Were the presentations enjoyable to use?
				Did learners spend more time on histology because of the presentations?
				Did learners help one another with the presentations?
			Evaluation – What was the interface like?	
			Technical aspects - Were there navigational errors and technical problems?	
			Value	Do the learners feel presentations improved recollection?
				Does the learner feel that his marks improved because of the presentations?
				Is a computer presentation better than a lecture?
				Did presentations change the learner's attitude towards the subject?
	Video		How many times did learners watch the video?	
			What problems were encountered?	
	Favourite ways of studying			
	How would learners like their course		Can multimedia replace the traditional course?	
Do learners think multimedia can replace the microscope?				
Do learners prefer computer presentations or video?				
Tests - Is effort rewarded?				

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A description of the results with respect to each of the questions is given. To clarify the results each result is represented in a table and a graph. Pie charts and block graphs are used.

The responses can be divided into two groups:

1. Ratings;
2. Selecting an option.

❖ Subject preferences

The popularity of the different subsections as well as the reasons for being popular or unpopular are tested by means of the following questions.

◆ What is the learner's favourite subsection?

The hypothesis that histology is not a popular subject is tested with this question.

**Question**

Which subsection of anatomy do you prefer most?

**Response**

Instead of rating the different subsections from 1 to 4 as was asked, many learners used the question only to indicate their favourite subsection. This is indicated by the missing frequencies.

From the results an average rating was calculated. For each subsection the rating ( $x$ ) was multiplied by the number of respondents ( $f$ ) choosing that specific rating to give a value ( $xf$ ). These values were then added up ( $\sum xf$ ) and divided by the number of respondents ( $n$ ). This resulted in an average rating for that specific lecture ( $\bar{x}$ ). The closer to one the average rating is the more popular the option was. This method of average rating calculation was also used for other questions and will be referred to later.

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Table 4.3: Example of calculation of average rating for gross anatomy

Rating (x)	Frequency (f)	xf
1	125	125
2	43	83
3	14	42
4	6	24
	188	274 Total

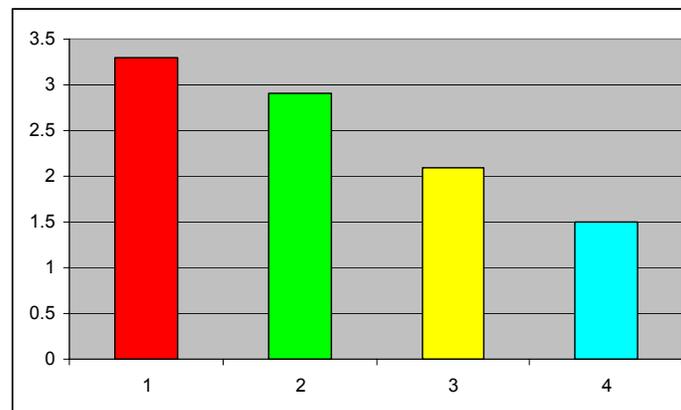
Average rating for Gross Anatomy:  $274/188=1,5$

In the table below the percentage of respondents that selected the different topics as a first choice is also given.

Table 4.4: Subject preferences

Subject	% first choice	Average Rating	Frequency missing
Histology	5	3,3	16
Neuroanatomy	23	2,9	19
Embryology	11	2,1	18
Gross Anatomy	66	1,5	6

Average rating



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From this result it is clear that gross anatomy is the most popular subsection of anatomy, neuroanatomy is the second most popular subsection, embryology the third most popular and histology is the least popular subsection.

◆ What are the reasons for this selection?

This question will determine why certain subsections are more popular than others.

### Question

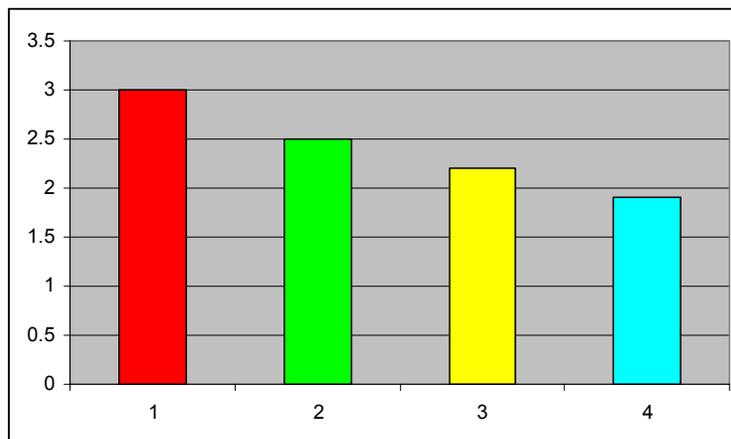
Why do you enjoy this subsection most?

### Response

Table 4.5: Reasons for subject preference

Reason	% first choice	Average rating	Frequency missing
Easier	10	3,0	23
Better presented	16	2,5	18
Relevant to the course	33	2,2	16
More interesting	41	1,9	10

Average rating



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The average rating calculation method was also applied to the results from this question. Many learners used this question just to indicate their first preference as can be seen from the missing frequencies. The main reason for selecting a favourite course was (4) that learners felt that some of the subsections are more interesting, while the second most popular reason for selecting a favourite was (3) that some subsections are more relevant to the medical course. (2) The way in which the subject was presented and (4) the difficulty were the least popular reasons for preferring a subsection above another subsection.

**❖ Facilities**

The questions under this heading will indicate what facilities the learners have outside the university for using multimedia. It will also give some insight into the financial situation of the learners.

**◆ What video facilities do learners have at home?**

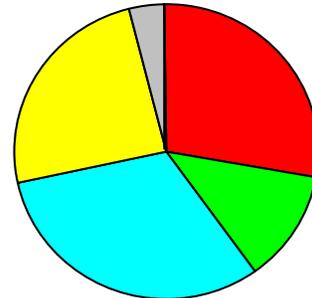
Video facilities that learners have at home will indicate how accessible the video study material is to learners.

**Question**

If you watch the video where do you normally watch the video?

**Response****Table 4.6: Venue for watching video**

Where did you watch the video?	%
In the library	28
In the residence	12
On you own video machine	31
On a friend's video machine	25
On a borrowed video machine	4



72% of the respondents had access to a video machine other than MEDUNSA's video facilities. 31% (52) have their own video machines; the rest have family or friends where they can watch the video. 25 respondents did not answer this question.

◆ What computer facilities do learners have at home?

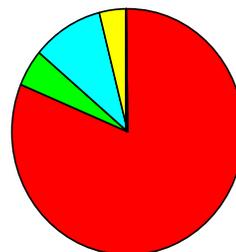
The computer facilities that learners have at home will give an indication as to how accessible the multimedia computer presentations are to learners outside the university.

**Question**

What computer did you use the program on?

**Response****Table 4.7: Computer used**

What computer did you use the program on?	%
MEDUNSA's computer	81
My own Pentium I	5
My own Pentium II	10
My own Pentium III	4



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The majority of learners (81%) were dependant on MEDUNSA's computers. Only 19% of learners used their own computers (5% Pentium1, 10% Pentium II and 4% Pentium III). 29 respondents did not answer this question.

◆ Can learners afford computers?

This question will shed some light on the financial situation of the learners and also whether the availability of multimedia computer presentations would convince the learners to buy a computer.

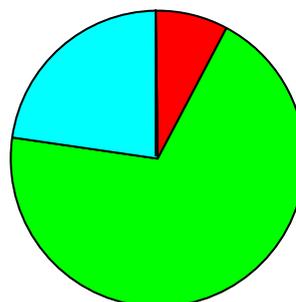
### Question

Can you afford a computer of R5000?

### Response

**Table 4.8: Affordability of computers**

Can afford a computer	%
Yes	8
No	69
If it is worth it will make a plan	23



Only 8% of the learners that answered this question (only two did not reply) said that they can afford a R5000 computer, 23% said that they may be able to get the money but only if it is worth it and 69% of the respondents cannot afford a computer.

❖ Learning

The results of the questions on learning are given under tutored and self learning.

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◇ Tutored learning

The results of instructivist learning that takes place.

□ Lectures

The results under lectures cover the different aspects of lectures.

■ Ratings – How do learners rate their lectures?

This question will indicate what standard the lectures are according to the learners.

**Question**

Rate the presentation of the **LECTURER** for each course component.

**Response**

An average rating method was used to calculate the average rating for each lecture. Only ratings from 1-6 were taken into account because option 7 was for learners that did not attend the lecture.

1 = Outstanding

5 = Bad

2 = Very good

6 = Very bad

3 = Good

7 No comment – I did not attend

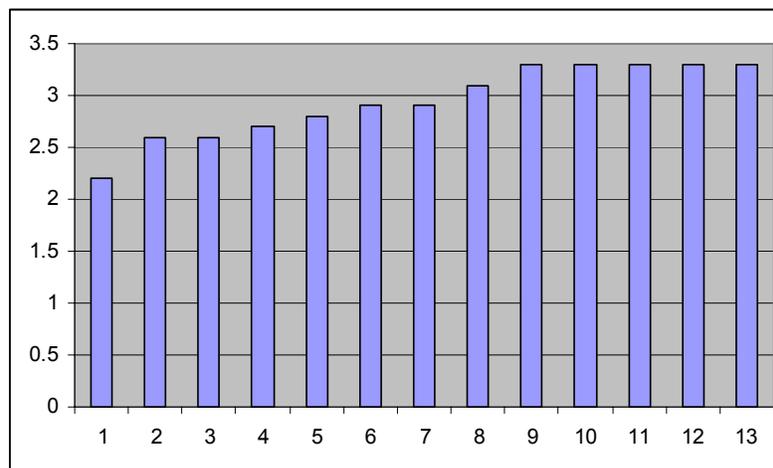
4 = Not good

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**Table 4.9: Average rating of lectures**

1	2	3
Topic of the lecture	Average Rating	Position
Eye histology	2,2	1
Neurohistology	2,6	2
Ear and olfactory epithelium	2,6	2
Tooth development	2,7	3
Soft tissues of the mouth	2,8	4
Muscle	2,9	5
Bone	2,9	5
Cartilage	3,1	6
Epitheliums	3,3	7
Connective tissues	3,3	7
Lymphoid system	3,3	7
Respiration	3,3	7
Vascular system	3,3	7

Average rating



All the average ratings, except for one – the lecture on the eye, lay between 2,5 and 3,5.

Of the 13 lectures six were rated as just below good and seven of the lectures were

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rated as just better than good of which one was rated close to very good.

### ■ Attendance

From the low lecture attendance and because learners often left lectures while in progress it was clear that learners feel that by attending lectures they do not get value for the time they spent.

### ◆ Why do learners not attend lectures?

To solve the problem of low lecture attendance or learners leaving lectures the reason for this behaviour must be determined.

### Question

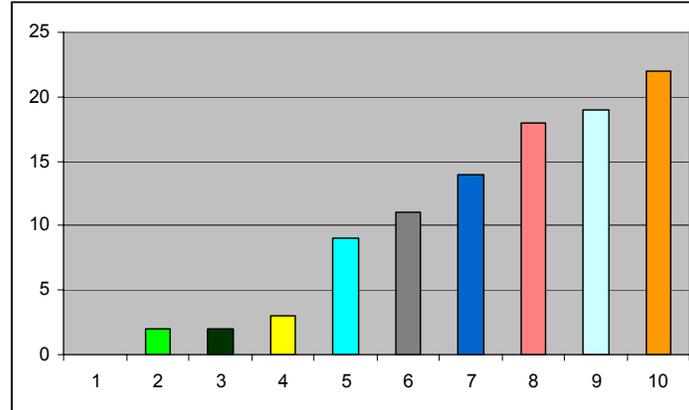
If you **DID NOT ATTEND** or **LEFT** any histology lectures below, please give your **MAIN** reason.

### Response

**Table 4.10: Reasons for not attending or leaving a lecture**

Reason for not attending or leaving	%
I have too many lectures to attend	0
I do not like the topic	2
I would rather put effort into reading gross anatomy	2
I study the prescribed book	3
I study the notes	9
Personal reasons	11
I did not like the way the lecture was presented	14
I use the histology multimedia programs	18
I watch the video	19
I find it difficult to concentrate in class	22

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116 Respondents answered one or more of the questions in this section. The most popular response from the respondents that answered this question was that they do not attend class or leave the class because they struggle to concentrate during the lecture (22%). The second most popular answer from the respondents was that they watch the video instead (19%) while 18% of respondents said that they used the multimedia computer presentations instead. 14% of respondents did not like the way in which the lecture was presented. The rest of the responses are reflected in the table below.

◆ Did you leave a lecture or lectures and why?

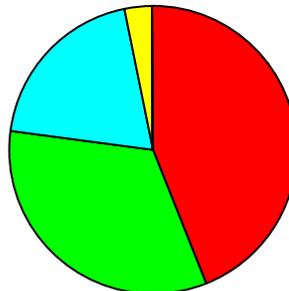
Since learners getting up in the middle of a lecture and leaving the hall is an uncomfortable experience for a lecturer, this question will determine the extent of the problem.

### **Question**

Have you ever left a histology lecture before the end?

**Response****Table 4.11: Leaving lectures**

Leaving lectures	%
Never left	44
Left once	33
Left regularly	20
Left every lecture	3



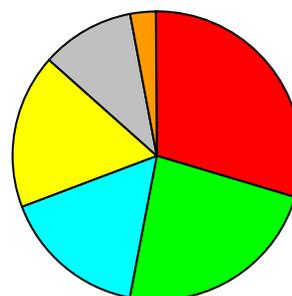
The response to the question about leaving the lecture before the end resulted in 44% of the respondents indicating that they never left a lecture before the end, 33% saying that they left a lecture once, 20% saying that they left lectures regularly before the end and only 3% stating that they left every lecture before the end.

**Question**

If you did leave a histology lecture, or lectures, before the end which of the following is/are applicable?

**Response****Table 4.12: Reasons for leaving lectures**

Reasons for leaving lectures	%
Loss of concentration	31
Became bored	24
Too long	17
Use computer presentations + video	18
Use book and notes	11
The lecturer	3



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The most selected reason, given, for leaving a lecture before the end was loss of concentration (31%). The second most selected reason was that learners became bored with the lecture (24%). The next two most selected reasons for leaving a lecture was that the lecture was too long (17%) and that learners decided to rather look at the video or multimedia computer presentations (18%). Very few (11%) decided to go and study the notes or textbook on their own. The lecturer as a reason for leaving the lecture was only chosen by 3% of the respondents.

◆ Do learners concentrate during lectures?

Concentration problems were thought to be a factor in lecture attendance. This hypothesis was tested by means of the following question.

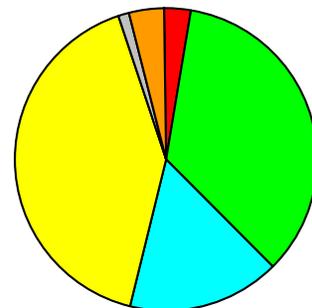
### Question

Are you unable to concentrate during lectures?

### Response

**Table 4.13: Concentration during lectures**

Concentration during lectures	%
Never	3
Sometimes	35
Only when listening to certain lecturers	16
When the lecture gets too long	41
Never during the first lecture	1
Only when I have not had enough sleep	4



From the respondents that answered the question only five (3%) reported no problems with concentration. Most learners (41%) indicated that they have concentration problems when the lecture gets too long. The second group (35%) indicated that they can concentrate throughout some of the lectures. The third group (16%) feels that their

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concentration problems are caused by certain lecturers. Only 1% said that their concentration problems only start after the first lecture and 4% blamed their concentration problems on not enough sleep. 15 respondents did not answer this question.

◆ Are there too many lectures?

Low attendance may mean that there are just too many lectures and that the learners cannot cope. This question aims at shedding light on this issue.

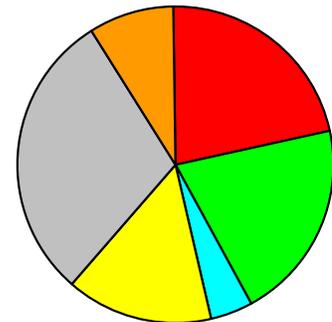
### Question

Do you think you have to attend too many lectures?

### Response

**Table 4.14: Number of lectures**

<b>Do you have to attend too many lectures</b>	<b>%</b>
Yes – Too much to absorb	22
No – want longer breaks	20
No problems with concentration	4
Shorter lectures – self study	15
Some lectures should be replaced by multimedia computer presentations	30
All lectures should be replaced by multimedia computer presentations	9



When a solution to this problem was offered 22% of students suggested fewer lectures with a reduction of information. 20% of learners want longer breaks between lectures. The biggest group of learners (54%) feels that a form of self-study should replace some lectures. The second biggest group (30%) indicated that multimedia programs should replace some lectures while 15% did not indicate a specific way of self-study. Few learners (9%) think that multimedia programs should replace the whole course. 18

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learners did not answer this question.

◆ Are certain lectures more important?

This question was asked to see whether learners perceive the availability of histology multimedia as a reason for not attending lectures.

### **Question**

Which lectures do you think are vital and cannot be missed?

### **Response**

**Table 4.15: Lectures that cannot be missed**

Topics	%
Gross anatomy	84
Embryology	42
Histology	32
Neuroanatomy	61
Lectures can be caught up later	4

This is a question where learners could choose more than one option (the percentages do not add up to 100%). The percentages are comprised out of a total of 194 respondents. The majority of respondents (84%) think that gross anatomy lectures cannot be missed (only 16% think that gross lectures can be missed) while histology is the subsection that most learners, 68% think can be missed. Only 4% of learners think that lectures can be caught up afterwards. Embryology and neuroanatomy lectures are seen as essential by 42% and 61% respectively.

### **Question**

For what reason(s) should these lectures not be missed?

**Response****Table 4.16: Reasons for not missing lectures**

Reasons	%
The information cannot be found anywhere else	11
The lecturer clears up difficult concepts	74
The lecturer gives useful tips for the test	24
The lectures are enjoyable	29
My sense of duty does not allow me to stay away	21

This is a question with multiple options (the percentages do not add up to 100%). The percentages are comprised out of a total of 194 respondents. The main reason why learners attend lectures is because the lecturers clear up difficult concepts (74% attend lectures for this reason while the remaining 26% do not see this as a reason for attending lectures). Only 11% think that the information given by the lecturer cannot be found anywhere else (89% reckon they can obtain the information from another source). 29% of learners enjoy lectures and 21% attend lectures because of a sense of duty. 24% of learners say that attending a lecture is important because the lecturers give tips.

■ Presentation – Which is the best way to present a lecture?

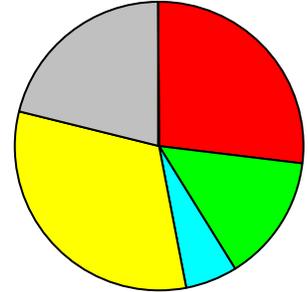
If the response to this question is positive it can be used as motivation for more lecturers to use data projectors in their lectures.

**Question**

How would you rate a lecture given with the aid of a computer and a data projector?

**Response****Table 4.17: Presentation of lectures**

Lecture given with the aid of a data projector	%
Better than a traditional lecture	27
Not as good as the traditional lecture	14
The same as a traditional lecture	6
Some are better while others are not	32
I wish all my lectures were given in this way	21



The response on this question by 20% of the respondents was negative. These respondents think that a lecture given with the aid of a data projector is the same (6%) or not as good as a traditional lecture (14%).

A group (32%) felt that it can be better while a group of 48% think that using a data projector is a better way of presenting a lecture than the traditional way.

□ **Practicals – Why do learners not attend or leave practicals?**

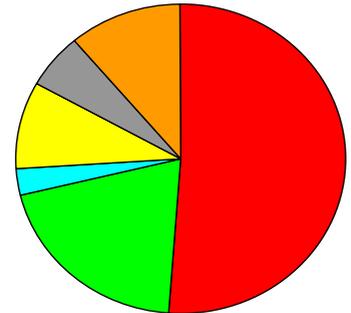
This question tries to determine if the availability of multimedia had something to do with the fact that some learners did not attend practicals.

**Question**

If you **DID NOT ATTEND** or **LEFT** any practicals please give your **MAIN** reason.

**Response****Table 4.18: Reason for not attending or leaving practicals**

Reason for not attending or leaving the practical	%
I watch the video	51
I study the multimedia computer presentations	20
The practicals are not necessary	3
I have difficulties with the microscope	9
I rather spend the time on gross anatomy	6
Personal reasons	11



77 (40%) of the 194 respondents answered one or more of the questions in this section thereby indicating that they did not attend or left the practicals before the end. Out of 77 learners, 33 (17%) did not attend any practicals while 44 (23%) attended some practicals. The majority of these learners that did not attend all the practicals (39 - 20% of the 194) felt that watching the video provides them with sufficient knowledge for the practical histology test. A smaller group (15 - 8% of 194) indicated that they used the multimedia programs instead of attending the histology practicals. A small group of learners gave other reasons such as personal reasons, problems with the microscope, practicals are not necessary and that they would rather put a bigger effort into the other subsections, for not attending the practicals.

◇ Self learning

These results report on learning that the learner does on his own utilizing books, videos, internet and computer presentations.

□ Prescribed book – To what extent is the prescribed book used?

It was noticed during practicals that few learners have the prescribed histology book.

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The learner's opinions on the use of the prescribed handbook are tested by means of this question.

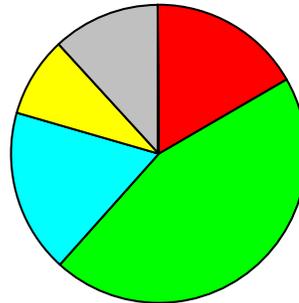
**Question**

Which ONE of the following is true with regard to the prescribed histology book?

**Response**

**Table 4.19: Use of the prescribed book**

Use of the prescribed book	%
I have not read the book	17
Looked up a few things	45
Studied from it	18
Started but gave up	9
Too complicated	12



Only 18% of learners indicated that they studied from the prescribed histology text book. The majority of learners 45% used the book for reference, 12% found the book too complicated and 9% started to use the book but gave up. 17% of learners did not use the book at all. Eight respondents did not answer this question.

Internet – To what extent is the internet used?

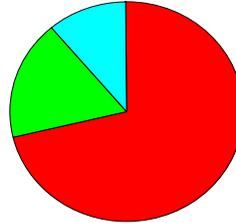
The information gathered from this response will give an indication of the facilities at MEDUNSA and give some indication of the financial status of the learners because internet access is costly. It will also indicate whether learners try to find additional information on the subject.

**Question**

Do you have access to the internet?

**Response****Table 4.20: Internet access**

Internet access	%
No access	71
Yes at MEDUNSA	18
Yes at home	11



Only 57 (29%) respondents out of a total of 194 had internet access. MEDUNSA made internet available to 35 of these 57 learners (18%) while 22 have internet at home (11%). Of these 22 learners 13 have access to the internet via a friend's computer. Only three learners had internet access from more than one source.

**Question**

Did you look and find histology on the internet?

**Response**

Of the 36 learners who looked for histology websites ten found websites that were similar to the programs available to them while seven found websites that were better than the presentations that were available to them.

Multimedia computer presentations

These results report on the various aspects of the multimedia programs that were used.

Use

The questions under this heading will determine the value of the multimedia computer presentations.

◆ To what extent were the computer presentations used?

The responses should show whether the learners regarded the multimedia computer presentations as worth using.

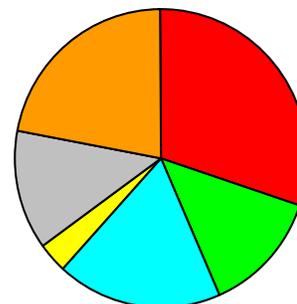
### Question

Did you use the multimedia material that was available?

### Response

Table 4.21: Use of the multimedia computer presentations

Use of the multimedia computer presentations	%
Did not use it	30
Used some of it during Block 1	13
Used some of it during Block 2	18
Used only the multimedia for Block 1	3
Used only the multimedia for Block 2	13
Used it all	22



Only 22% (39) of the respondents used all the multimedia programs that were available. 30% (53 respondents) of the respondents did not use any of it. The rest used the presentations to some extent.

◆ Why were the computer presentations not used?

This question should determine whether learners did not use the multimedia computer presentations because of shortcomings in the programs or lack of facilities.

### Question

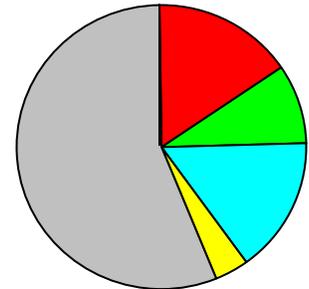
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I did not make use of the multimedia programs available because:

**Response**

**Table 4.22: Reasons for not using the multimedia computer presentations**

Why didn't you use the multimedia computer presentations	%
Do not know about computers	16
Did not know about the programs	9
Did not have time	15
Looked at it but decided it was not worth it (do not need it)	4
The computers were always occupied	57



The most common reason amongst the respondents that answered this question for not using the multimedia computer presentations was because the computers were always occupied (57%). Another 16% did not use the programs because they are not familiar with computers. 15% said that they did not have time to use the presentations while 9% claimed not to have known about the programs. 4% said that they have looked at the programs but decided it was not worth it.

◆ Why did learners only use some of the computer presentations?

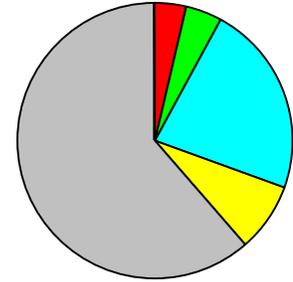
This question should determine why learners may have quitted using the multimedia computer presentations.

**Question**

I used some of the multimedia programs available because:

**Response****Table 4.23: Reasons for not using all the multimedia computer presentations**

I only used some of the multimedia computer presentations	%
I struggled with the computer	4
The computer programs were too difficult to use	4
Some of the programs were good and others were not good	23
I decided it was not worth it (do not need it) after I started to use it	8
The computers were always occupied	62



The most popular reason (62%) for only using some of the multimedia computer presentations is that the computers were always occupied. A number of respondents (8%) decided after using it that the presentations were not worth it while 23% of respondents felt that some of the programs were not good enough. Only 4% felt that the programs were too difficult whereas 4% struggled with the computer. 116 of the respondents did not answer this question.

◆ How much time did learners spend using the computer presentations?

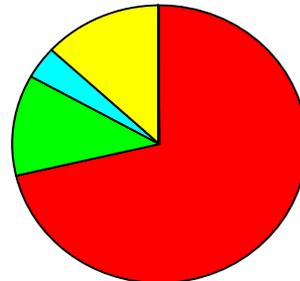
The number of learners using the multimedia computer presentations as well as the time spent by the learners using the programs can be linked to the success of the presentations.

**Question**

How much time did you spend on the histology multimedia?

**Response****Table 4.24: Time spend using multimedia computer presentations**

How much time did you spend on the histology multimedia?	%
2 – 4 hours	71
4 – 6 hours	12
6 – 8 hours	4
More than 8 hours	13



The majority of learners (71%) (41% of the total number of respondents) chose the minimum time option of 2-4 hours. 11% spent 4-6 hours, 3% spent 6-8 hours using the multimedia and 13% spent more than 8 hours on the multimedia. Of the 194 respondents 82 did not respond to this question.

◆ Were the presentations enjoyable to use?

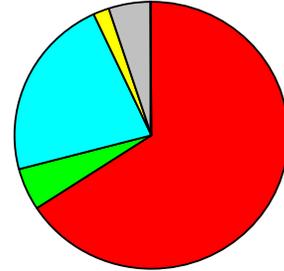
If histology is not popular, study material that is enjoyable to use may improve popularity of the subject.

**Question**

Are the programs enjoyable to use?

**Response****Table 4.25: Enjoyment of using multimedia computer presentations**

Are the programs enjoyable to use?	%
Yes	65
No, I prefer to read the notes	5
No, I prefer to watch the video	22
No, I prefer to read the prescribed book	2
No, but it is better than reading the notes	5



65% of the learners regarded the multimedia programs as enjoyable to use while 22% prefer watching the video. Reading the notes or the prescribed book was chosen by 5% and 2% respectively. 5% said that the programs are not enjoyable to use but better than reading the notes. 27 of the respondents did not answer this question.

◆ Did learners spend more time on histology because of the presentations?

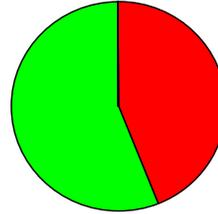
This question links to the previous question because if the multimedia computer presentations were enjoyable to use learners should spend more time using the programs.

**Question**

Did you spend more time on histology than you would have if computer programs were not available?

**Response****Table 4.26: Time spent on histology because of the multimedia computer presentations**

Did you spend more time on histology than you would have if computer programs were not available?	%
No	44
Yes	56



36 of the 194 respondents did not answer this question. 56% of the learners that answered the question said that the programs made them spend more time on histology than they would have without the programs. For 44% of the respondents the availability of the multimedia computer presentations did not make a difference to the time that they spent on histology.

◆ Did learners help one another with the presentations?

Collaborative learning is desired, this question tests whether there was collaboration between learners while using the multimedia computer presentations.

**Questions**

Was it difficult to get help when you had a problem with the program?

Could your fellow learners help you with a problem?

Did you help some other learner with a problem?

**Response****Table 4.27: Collaboration between computer users**

Help was readily available	70
Help was difficult to get	30
Sometimes obtained help from a fellow learner	73
Always obtained help from a fellow learner	21
Helped somebody else a couple of times	51
Helped somebody else once	21
Never helped anyone	27

Three questions were asked to determine whether learners helped one another with problems. 70% said that help was readily available when encountering a problem while 30% said that help was difficult to get. 73% of users sometimes and 21% always obtained help from a fellow user while 51% of respondents helped somebody else a couple of times and 21% helped somebody else once. 27% never helped anyone.

■ Evaluation – What as the interface like?

The questions under this topic are listed under “Question” in the table below. The percentages indicated comprise those respondents that answered the questions.

**Table 4.28: Questions and responses on aspects of the interface**

Question	Always %	Sometimes %	No %	Did not answer
Acceptability of colours	87		9	73
Acceptability of font type and size	94		6	74
Text readable and easy to follow	66	32	2	73
Pictures and text well laid out	70	29	1	75
Pictures used effectively	78	22	1	74
Is the program easy to use	92		8	76
Instructions clear and easy	72	28		75
Is the navigation easy	79	20	1	79

Questions concerning the interface were grouped together in a table 4.28. On the whole the response to these questions was good, with 73 to 79 respondents who did not answer the questions.

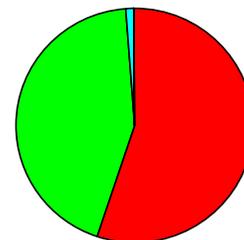
### Question

Were there many errors in the programs that you could identify?

### Response

**Table 4.29: Errors in the multimedia computer presentations**

Errors in the programs	%
No errors	55
Few errors	44
Many errors	1



As far as errors in the multimedia computer presentations were concerned 55% of users found no errors while 44% found a few and 1% found many.

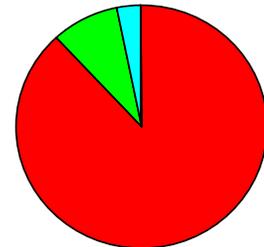
**Question**

Does using the program get easier as you use the program more and more?

**Response**

**Table 4.30: Ease of use of the multimedia computer presentations**

Does using the program get easier as you use the program more and more?	%
Yes, it gets easier	89
No, it is clear from the beginning	9
No, it is still complicated after having used it a couple of times	3



The response to this question consisted of 89% respondents saying yes, while 9% said that it was easy from the start. Only 3% mentioned that the programs were complicated and remained complicated even after regular use. 78 respondents did not answer this question.

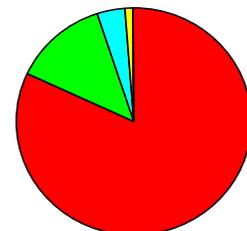
**Question**

Is the use of speech helpful/necessary?

**Response**

**Table 4.31: Multimedia computer presentations and vocal explanations**

Is the use of speech helpful/necessary?	%
Speech is very important in the program	82%
Speech helps but is not that important	13%
I seldom used the sound	4%
Sound is not important and is unnecessary	1%



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The vocal explanations that could be selected were regarded by 82% of respondents as a very important part of the programs. 13% said that it helps but is not that important, 4% said that they seldom used the oral explanations while 1% said it is not a necessary part of the programs. 76 of the respondents did not answer this question.

**Question**

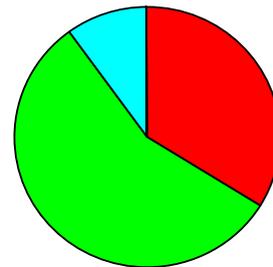
Is the work well explained and is the work systematically explained?

**Response**

The two questions received the following responses:

**Table 4.32: Explanations in the multimedia computer presentations**

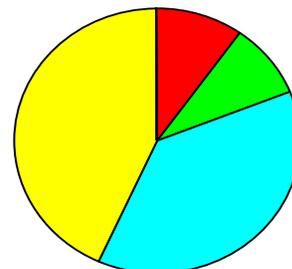
Well explained	%
Always	34
Most of the times	56
Only a few topics are well explained	10
No topic is well explained	0



76 respondents did not answer this question.

**Table 4.33: Systematic explanations in the multimedia computer presentations**

Systematically explained	%
The sequence is mixed up in all cases	10
The sequence is mixed up in some cases	9
The sequence is not bad but could be improved	37
The sequence is correct	43



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78 respondents did not answer this question.

34% of respondents experienced the work as always well explained and 43% experienced the work as systematically explained. 56% of learners that used the programs think that the work is well explained most of the time and 37 % think that the sequence could be improved. Some learners (10%) think that only a few topics are well explained while no learners think that no topics are well explained. 9% of the users experienced the sequence of some programs as mixed up while 10% think that all sequences in the programs are mixed up.

■ **Technical aspects – Were there navigational errors and technical problems?**

To test all the hyperlinks and technical aspects of programs like this is very time consuming and would delay the implementation of the programs. It is easier to implement the programs and to correct errors as they are discovered by the users.

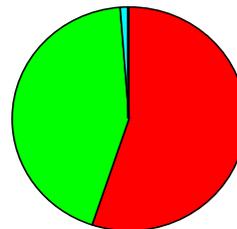
**Question**

Were there navigational errors in the programs that you can identify?

**Response**

**Table 4.34: Navigational errors in the multimedia computer presentations**

Navigational errors	%
No errors	55
Few errors	44
Many errors	1



Navigational errors were experienced by 40% (1% experienced many and 39% a few navigational errors). 60% did not find any navigational errors.

**Question**

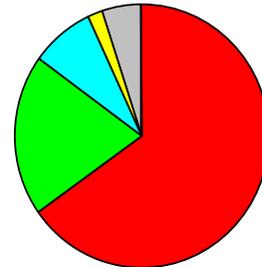
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Were there many technical problems when you used the programs?

**Response**

**Table 4.35: Technical errors in the multimedia computer presentations**

Were there technical errors in the programs?	%
No	65
Program wouldn't run	20
Sometimes a red cross was displayed.	8
The computer often crashed	2
The CD drive wouldn't read the CD.	5



Technical errors had no effect on 65% of the users, while 20% experienced a program that would not run, 8% sometimes came across a red cross displayed on the screen, 2% experienced computers that crashed and 5% of cases the CD drive would not read the CD.

■ Value

The following questions were asked to determine whether the learners see the multimedia computer presentations as a valuable asset in the learning process.

◆ Do learners feel presentations improved recollection?

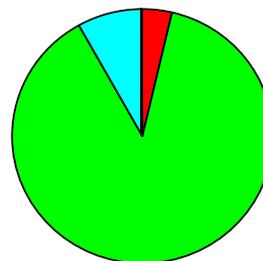
If learners have a perception that multimedia computer presentations improve their recollection it will be a big motivational factor to use the presentations.

**Question**

Do the programs make it easier to remember the work? (Is your recollection better?)

**Response****Table 4.36: Multimedia computer presentations and recollection**

Did the multimedia computer presentations improve your recollection	%
No	4
Yes	88
There is no difference	8



Only 23 respondents did not answer this question. Of the respondents who answered this question 88% agreed that computer presentations improve recollection (88%). Only 8% said there is no difference while 4% indicated that their recollection is not better.

◆ Does the learner feel that his marks improved because of the presentations?

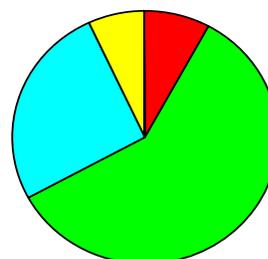
This question links to the previous question because if recollection improves marks should also improve.

**Question**

Did you do better in the topics where programs are available?

**Response****Table 4.37: Multimedia computer presentations and marks obtained**

Did you do better in the topics where programs are available?	%
No	8
Yes	59
Some are better and others not	26
There is no difference	7



Only 29 of the respondents did not answer this question. Of the respondents that did answer this question, most (59%) think that they did better in the topics where multimedia programs were available, while 26% think that they did better in some of the topics where multimedia programs were available. This means that 85% of the respondents felt that the multimedia programs influenced their performance positively. Only 8% think that they did not do better in the topics where multimedia programs were available while 7% think that the multimedia programs did not make a difference.

♦ **Is a computer presentation better than a lecture?**

The answer to this question depends on whether the multimedia computer presentations could convince the learners that they can acquire all the necessary knowledge by using the presentations.

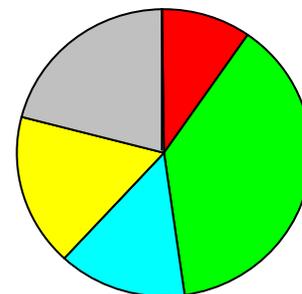
**Question**

A multimedia session done on a computer is better than a traditional lecture.

**Response**

**Table 4.38: Multimedia computer presentation versus a lecture**

<b>A multimedia computer presentation is better than a traditional lecture.</b>	<b>%</b>
No	10
Depends on the lecture	37
Depends on the computer presentation	14
A good computer presentation is better than any lecture	17
A computer presentation is for revision	21



The highest response (47%) here came from the group that feels a good lecture can be

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better than any computer presentation. 21% of the respondents feel that a computer presentation is for revision while 31% (17%+14%) feel that a good computer presentation is better than any lecture. 10% of respondents prefer a traditional lecture to a computer presentation. 28 of the respondents did not answer this question.

◆ Did presentations change the learner's attitude towards the subject?

If the claim that learners do not like histology is true this question will indicate whether there is a chance that multimedia computer presentations can change the negative feeling towards histology.

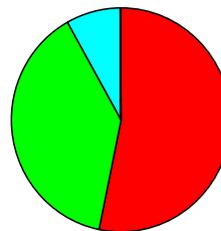
### Question

Did the programs change your attitude (rating of) towards histology? Did it make you enjoy histology more?

### Response

Table 4.39: Multimedia computer presentations and attitude

Did the programs change you attitude towards histology?	%
Yes, a little	53
Yes, a lot	39
No	8



Although histology was not the most popular of anatomy's subsections the ratings for histology was an improvement on the ratings before the study because when asked whether the multimedia programs influenced their attitude (rating) of histology, 92% of the respondents that answered the question replied with a yes of which 53% said a little and 39% said a lot.

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Of the respondents 8% were not influenced by the multimedia computer presentations at all in their attitude towards histology. 36 respondents did not answer this question.

□ Video

The questions under this heading enquire about the use and facilities for viewing the video.

◆ How many times did learners watch the video?

The response to this question will be compared with the marks obtained in the practical tests.

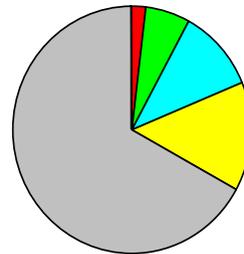
**Question**

How many times did you watch the video?

**Response**

Table 4.40: Number of times learners watched the video

How many times did you watch the video?	%
Once	2
Twice	6
Three times	11
Four times	14
More than four times	67



The majority of learners (67%) indicated that they watched the video more than four times. Only 2% of respondents watched the video only once while 6% watched it twice. 25% of respondents watched the video three or four times. Only four respondents did not answer this question.

□ What problems were encountered?

The results from this question will report on the facilities for viewing videos.

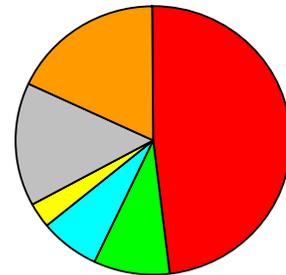
### **Question**

When you watched the video in the library the following applied:

### **Response**

Table 4.41: Video in the library

When you watched the video in the library the following applied:	%
I had problems finding a booking	48
I could easily find a booking	9
The video machines are always in working order	7
The video machines are not always in working order	3
The quality of the video is satisfactory	15
The quality of the video is not always good	18



The main frustration for learners that used the facilities in the library was getting a booking in the library (57%). For a number of respondents (18%) the video quality was a concern while for 15% the video quality was satisfactory. 75 out of 194 respondents did not answer this question. The learners that used their own video facilities are most likely the ones that did not answer this question.

◇ Favourite ways of studying

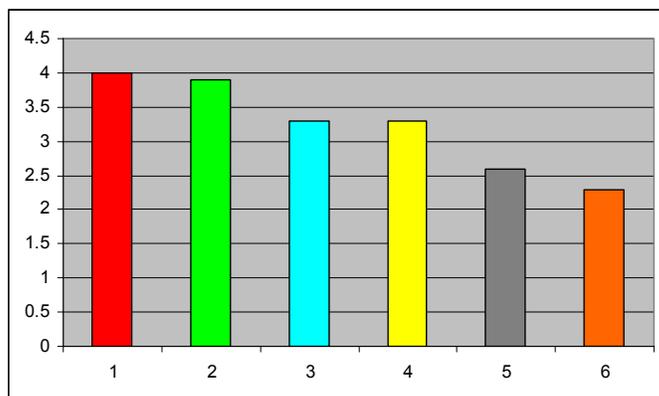
This question compares the traditional ways of studying with the use of new technology in learning.

**Question**

Rate the following from 1 to 6 in terms of your preferred methods of studying histology.

**Response****Table 4.42: Favourite ways of studying**

Method of studying	% First choice	Average rating	Frequency missing
Video	32	2,3	4
Attending lectures	16	2,6	11
Computer Multimedia	21	3,3	10
Notes	16	3,3	16
Practicals	6	3,9	12
Prescribed book	10	4,0	13

**Average rating**

The average rating calculation method was also applied to the results from this question. The responses of the learners indicated that the most popular way of studying histology is by watching the histology video. The second most popular choice of study method is attending lectures, while reading the histology notes and using the multimedia computer presentations are rated the third most popular way of studying histology. The fourth most popular way of studying histology is attending the histology practicals while reading the

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histology prescribed book is the least popular way of learning histology. The multimedia computer presentations was the second most popular first choice for studying histology but also the second most popular sixth choice.

◇ How would learners like their course?

The following questions request input from the learners as to how a future course should be presented.

◆ Can multimedia replace the traditional course?

This question tests the experiences the learners had with multimedia and whether they feel multimedia can replace the teaching done in the traditional way.

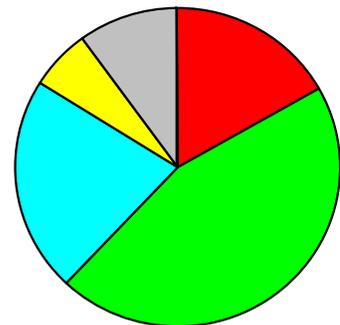
### Question

What is your considered opinion on the histology course and the availability offerings of a multimedia environment?

### Response

Table 4.43: Replacing the traditional histology course with a multimedia course

Should a multimedia course replace the histology course	%
Replace it completely	17
Lectures and practicals should support a multimedia course	45
Lectures should support a multimedia course	22
Practicals should support a multimedia course	6
Multimedia should only be additional for the ones interested	10



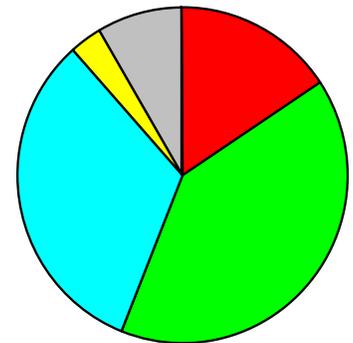
The majority of learners (45%) feel that histology multimedia should be supported by

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practicals and lectures. 22% would like histology multimedia to be supported by lectures and only 6% feel that multimedia should be supported by practicals. A group of 17% feel that histology can be changed into a multimedia course while 10% feel it should only be available to the ones interested. 28 respondents did not have an opinion on this issue.

**Table 4.44: Response of learners that had used all the multimedia programs**

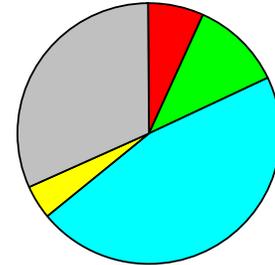
Should a multimedia course replace the histology course	/39	%
Replace it completely	6	15
Lectures and practicals should support a multimedia course	15	38
Lectures should support a multimedia course	12	31
Practicals should support a multimedia course	1	3
Multimedia should only be additional for the ones interested	3	8



The opinion of the 39 learners that used all the multimedia programs should therefore carry more weight. Their responses are however similar to the overall response. Only six (15% - 17% for the whole group) of the learners that used all the multimedia are of the opinion that multimedia can replace the histology course. The overwhelming opinion of this group is that multimedia should be supported by lectures and practicals (15 respondents out of the 39 = 38%, 45% in the whole group). The learners that want multimedia to be supported by only lectures are 12 (31%, 22% in the whole group). Only one of this group felt that the multimedia should be supported by practicals and three felt that multimedia should be additional only for the ones interested.

**Table 4.45: Other responses of the learners that want the histology course to be replaced by a multimedia course**

<b>Multimedia should replace the histology course</b>	<b>/28</b>	<b>%</b>
Did not reply on the use of multimedia	2	7
Did not use the programs at all	3	11
Started using the programs during block 2	13	46
Stopped using the multimedia after block 1	1	4
Used all the multimedia	9	32



What was the exposure of the learners that are in favour of replacing the histology course with a multimedia course? There were 28 respondents that indicated that they want a multimedia course to replace the traditional histology course completely. Of these 28 learners two did not answer the question on the use of the multimedia course while three did not use the programs at all. Most of these learners started using the programs during block two (13) while only one stopped using the programs after block one. Nine learners used the all the programs.

◇ Do learners think multimedia can replace the microscope?

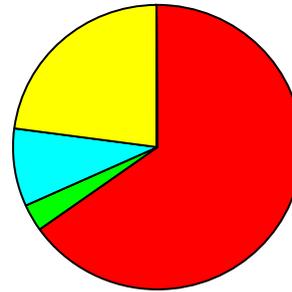
Many learners have already abandoned the microscope. The answer to this question should indicate if the general feeling is that the microscope has become obsolete.

### **Question**

Is the multimedia on a computer better than using a microscope?

**Response****Table 4.46: Multimedia computer presentations versus the microscope**

Is the multimedia on a computer better than using a microscope?	%
Much better	65
Not better	3
The same	9
The computer can completely replace the microscope	23



Of the respondents 87% felt that looking at histology slides on a computer screen is much better than looking at slides under a microscope. Only 3% felt that it is better to look at slides under the microscope and 9% felt that there is no difference. 22 respondents had no opinion on this question.

◇ Do learners prefer computer presentations or video?

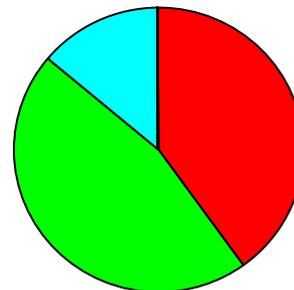
One would hope that the learners would choose the interactive computer presentations above the video that requires no effort but from the literature we know that learners choose the medium that requires the least effort (Heidger et al, 2002).

**Question**

Do you prefer a video to an interactive computer presentation?

**Response****Table 4.47: The video versus the multimedia computer presentations**

Do you prefer a video to an interactive computer presentation?	%
Yes, I would prefer to use videos as an additional way of studying histology	40
I would like to watch the histology video in addition to computer presentations	46
Videos are not necessary when you have interactive computer presentations	14



The highest number of respondents (46%) would prefer to have computer presentations and videos available while 40% prefer videos to computer presentations. 14% feel that videos are no longer necessary if they have computer presentations available. 19 respondents did not answer this question.

❖ Tests – Is effort rewarded?
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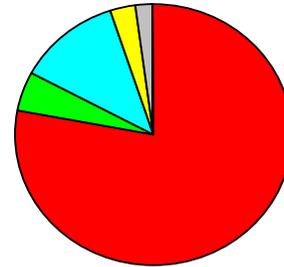
In a subject where subsections compete for the learner's study time, the answer to this question will indicate whether learners spend the necessary time studying histology.

**Question**

If I put in a big effort into practical histology:

**Response****Table 4.48: Reward for effort in practical histology**

If I put in a big effort into practical histology:	%
I will do well	77
I may still fail	5
I will only get an average mark	12
I rather put in a big effort into the histology theory	3
I rather spend the time on gross or embryology	2



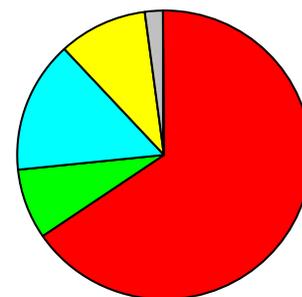
The perception of 77% of the learners is that a big effort in practical histology will result in good marks. Only 12% think that after a big effort you may only get an average mark, 5% think that you may still fail, 3% would rather spend time on histology theory and 2% would rather study gross anatomy instead of practical histology. Eight respondents did not answer this question.

**Question**

If I put a big effort into the theory of histology:

**Response****Table 4.49: Reward for effort in the theory of histology**

If I put in a big effort into the theory of histology:	%
I will do well	66
I may still fail	8
I will only get an average mark	15
I rather put in a big effort into the practical histology	10
I rather spend the time on gross or embryology	2



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The learners (66%) felt that big effort in histology theory is rewarded with high marks. 15% felt that that this effort will only result in an average mark. 10% think that it is better to rather put an effort into studying practical histology than theory, 7% think that one can still fail in spite of a big effort in studying histology theory while 2% think it is better to spend the time studying another subsection of anatomy. 16 of the respondents did not answer this question.

#### 4.1.1.2 Records

From the 194 respondents that answered the questionnaire 53 wanted to remain anonymous and did not fill in their identification (anatomy) number. Of the 141 respondents with whom the questionnaire could be linked to an individual only 75 had complete records (except for two for which we could not trace the SRS ratings). It was therefore decided to use only these 75 learners for the purpose of calculating averages and relating answers in the questionnaire to marks obtained in the different tests. Of these 75 learners, only six were dental (BDS II) learners and the rest were MBChB II learners. The parts of the courses that were used for this study were exactly the same for the two courses at the time of the study. The respondents from the two courses were therefore treated as one group.

#### ➤ Tests results

The following table contains the test results obtained during the two tests that were written at the end of the two blocks that were included in this study. On the left are the particulars of the tests and concomitant marks and on the right the class average appears.

**Table 4.50: Test averages**

The test	Average %
Written histology /60 (multimedia computer presentations available)	38
Written histology /30 (multimedia computer presentations not available)	34
Practical histology /55 (multimedia computer presentations available)	48
Practical histology /25 (multimedia computer presentations not available)	56
Written – gross anatomy /210	63
Practical – gross anatomy /220	55

#### ➤ Criteria for selecting learners

The different selection criteria that are used to select the learners for the medical and dental courses at MEDUNSA are given here.

#### ❖ SRS

The SRS ratings of the different learners that were accepted into the medical and dental courses are provided here.

### **Result**

Of the group of 75 learners three learners are from foreign countries and the SRS rating of two learners could not be traced.

The highest SRS rating is 16 which signals distinctions in mathematics and science. The lowest SRS rating with which a learner was selected for the course without additional credits is nine meaning a D for the one subject and an E for the other one. Learners with

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lower SRS ratings were also selected but they had to have additional credits. The average SRS rating is 10.

**Result****Table 4.51: SRS points of learners**

SRS Rating	Number of learners with this rating	Number of learners with this rating without additional credits	Number of learners with this rating with additional credits
16	5	3	2
15	1	1	-
14	3	3	-
13	9	8	1
12	7	5	2
11	8	8	-
10	12	10	2
9	8	5	3
8	2	-	2
7	4	-	4
6	3	-	3
5	3	-	3
4	1	-	1
3	1	-	1
2	2	-	2
<b>Averages</b>	<b>Total learners</b>	<b>From school</b>	<b>With additional credits</b>
	<b>10,48</b>	<b>10,16</b>	<b>8,5</b>

## ❖ Additional credits

Courses or degrees passed or obtained from other institutions were also taken into account when selecting the candidates for the MBChB and BDS course.

## **Result**

A field stating whether a learner has additional credits or not, was added to the data base. A value could not be given to the credits acquired because these credits are often subjectively awarded by the dean. A number of learners are foreign so they do not comply exactly with the requirements.

### **4.1.1.3 Relationships between responses and records**

The statistical analyses done on the relationships between the responses from the questionnaire, the marks acquired in the tests and the information on selection that we have are discussed in this section.

#### **❖ Statistical analysis**

The following results were obtained from the comparisons that were analysed.

To determine whether there is a significant difference between the following groups of information the chi-square ( $X^2$ ) test was used.

Babbie (1992) defines the chi-square ( $X^2$ ) test as a frequently used test of significance. It is based on the null hypothesis which is the assumption that there is no relationship between the two variables in the total population.

The null hypothesis is not rejected at a 5% level of significance if  $p < .05$ . This means that there is no relationship between the two sets of values.

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**The following comparisons were made:**

- **SRS ratings correlated with the total histology mark.**

If the learners with high SRS ratings do better in histology than the learners with low SRS ratings it would mean that the null hypothesis is rejected at a 5% level of significance.

**Result**

Because  $p=0,225418$  which is  $>.05$  the null hypothesis is not rejected at a 5% level of significance which means that there is no significant relationship between the two sets of values, the SRS rating and the marks in anatomy.

- **Learners with additional credits compared to the rest of the learners.**

If learners with additional credits do better in histology than the learners without additional credits it would mean that the null hypothesis is rejected at a 5% level of significance.

If the null hypothesis is rejected at a 5% level of significance it would mean that more experienced learners with other previously obtained qualifications did better in the histology tests than a learner with no other academic qualifications.

**Result**

Because  $P=0,8163$  which is  $>.05$  the null hypothesis is not rejected at a 5% level of significance which means that there is no significant relationship between the marks of the learners with additional credits and the marks of the learners without additional credits.

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- **To determine whether the multimedia computer presentations resulted in higher marks for the users and lower marks for the non-users, the following three sets of marks were compared.**
  - Used none of the multimedia computer presentations
  - Used some of the multimedia computer presentations
  - Used all the multimedia computer presentations

If learners that used the multimedia computer presentations did better in the histology tests than the ones not using the presentations it would mean a rejection of the null hypothesis at a 5% level of significance.

The gross anatomy marks were used as a co-variant. This was done to prevent that the marks of learners who do well in all the anatomy subsections influence the comparison.

If the motivated hard working learners that usually do well were the ones using the multimedia and their marks were compared with the other learners it would give the false impression that it was the multimedia that was the reason for their high marks.

### **Result**

The gross anatomy marks were used as a co-variant. Because  $p=0,0797$  which is  $>.05$  the null hypothesis is not rejected at a 5% level of significance which means that there is no significant relationship between the three groups of values. This means that the multimedia computer presentations did not influence the marks. Users of the programs did not have an advantage over the non-users.

- **The number of times a learner watched the histology video compared to the practical histology mark.**

If the number of times a learner watched the video is directly related to the practical histology mark that he/she gets, the null hypothesis is rejected at a 5% level of significance.

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The responses were divided into two groups.

Learners that watched the video one to four times

Learners that watched the video more than four times.

### **Result**

When the marks of the two groups were compared and the gross anatomy mark was used as a co-variant a p value of 0.1264 was obtained. Because  $p < .05$  the null hypothesis is not rejected at a 5% level of significance which means that there is no significant difference between the marks obtained in the practical test by learners that watched the video one to four times and the learners that watched the video more than four times. This means that watching the video more than four times will not result in a better mark.

- **The histology marks obtained by the learners that indicated histology as their favourite subject compared to their gross anatomy marks.**

If learners that favour histology do better in histology than the ones that do not like histology it would mean that the null hypothesis is rejection at a 5% level of significance.

### **Result**

When the histology marks obtained by the learners that indicated histology as their favourite subject were compared with the marks of the other learners, with the gross anatomy mark as a co-variant a p value of 0.9692 was obtained. This value means that the null hypothesis is not rejected at a 5% level of significance which means that the learners who favours histology did not do better in histology than the learners that prefer the other subsections of anatomy.

- **Practical marks obtained by learners that did not attend the practicals.**

The marks of the learners that never attended a histology practical were traced to see whether learners could pass the histology practical test without doing practical histology, by relying on alternative study methods.

## **Result**

16% (33 out of 194) of the respondents indicated that they never attended a histology practical. The marks for the practical part of histology of 10 of these learners could be traced back. Five of these learners passed the practical test but only one out of the ten passed the histology theory test.

### 4.1.2 Learner profiles

The responses from questions were used to put together the profile of the average MEDUNSA learner.

#### **Subject preferences of the average MEDUNSA learner**

- Prefers gross anatomy and does not like histology.

#### **Study preferences of the average MEDUNSA learner**

- Prefers to study histology by watching a histology video;
- Does not like to study from the prescribed histology book;
- Interacts with his/her fellow learners when using multimedia computer presentations;
- Believes that hard work in histology will be rewarded in the tests.

#### **The average MEDUNSA learner and the internet**

- Does not have access to the internet;
- Is not interested in histology on the internet.

#### **The average MEDUNSA learner and lectures**

- Has left lectures before the end;
- Has problems concentrating during lectures;
- Thinks histology lectures can be missed but not gross anatomy lectures;
- Attends lectures so that difficult concepts can be cleared up;

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- Likes lectures to be given with the aid of a data projector but does not think that lectures given in the traditional way are worse;
- Is satisfied with the quality of the histology lectures.

#### **The average MEDUNSA learner and practicals**

- Attended all the practicals.

#### **How the average MEDUNSA learner would like his course**

- Wants self study to be part of the histology course ;
- Wants a course where lectures are supported by multimedia computer presentations, videos and practicals.

#### **The average MEDUNSA learner's financial situation.**

- Cannot afford to buy his or her own computer;
- Has access to a video machine at home;
- Used a MEDUNSA computer.

#### **The average MEDUNSA learner and multimedia**

- Has the perception that multimedia computer presentations improves: his/her recollection and marks;
- Multimedia changed his/her perception of histology;
- Found the multimedia enjoyable to use;
- Spent more time on histology than he or she would have because of the multimedia programs;
- Watched the video more than four times;
- Prefers to look at tissues on a computer screen rather than under a microscope.

#### **Academic background**

- Has a SRS rating of ten (D in science and a D in Mathematics).