CHAPTER 4

RESEARCH FINDINGS AND REFLECTIONS

4.1 INTRODUCTION

As indicated in Chapter 1 the purpose of this study is to determine whether critical reflection as a learning strategy can successfully be integrated in the education of health science practitioners. The data obtained in this study will be used to explain the role players‘ opinions, views and experiences with regard to reflective practice and the keeping of a reflective journal. This chapter lists the main findings exposed during the reflective practice phase and substantiates them with findings from the literature.

4.2 RESEARCH FINDINGS OF THE PILOT STUDY

This section deals with the responses generated by the pilot study questionnaire, as discussed in 3.7.1.

Reflections of the researcher with regards to the seven questions/statements included in the pilot study questionnaire are discussed in the next section.

The different sectors the respondents are working in

The ratio in general is 1:9 between participating staff (academic and clinical) and students.

Understanding of terminology with regard to concepts of reflective practice

Critical reflection as a learning strategy in radiography education is most probably under-utilised, resulting in 47% of role players not having an understanding of the relevant concepts. Therefore at least half of the role players in the radiography education context have no idea of what the value of such a learning strategy might be.

Reflection has the value to improve the effectiveness of learning

Although a percentage of respondents indicated little understanding of the research field of reflective practice, 26 % of them are capable of foreseeing that this alternative learning strategy might add value to the effectiveness of their learning.

Opportunities to reflect on experiences to enhance effective and lifelong learning

The learning environment for radiography education consisting of an academic and work-integrated clinical component allows enough opportunities to integrate an alternative learning strategy such as critical reflection to enhance lifelong learning.

Tools/strategies/methods that might be useful to facilitate reflection

The fact that nearly two thirds of the respondents (62 %) could list different ways and means of reflective practice, is perhaps motivation for staff members to be even more creative in facilitating transformative learning.

The necessity of role players in radiography education to be involved in the process of reflection

The majority of the respondents are of the opinion that all stakeholders should be involved in the process of critical reflection.

Factors contributing to the current lack of utilising opportunities of reflective practice in radiography education

Positive response to transformative learning with regard to metalearning (83%) and critical reflection as a priority for effective learning (61%) was received. Workload pressure (75%) and the perception that reflection is hard work (47%) are not conducive to effective and lifelong learning. Obtaining technical skills is one dimension of radiographic competence but 36% of the role players regard the holistic approach of critical reflection more important. This proves that the apparent negative attitude of respondents towards change (transformative learning) is probably due to the lack of knowledge and experience of reflection as a learning strategy.

Opportunities for students to think about their own personal development

Only 21% of the respondents regard opportunities available for students' reflections about their own personal development as insufficient (see Table 3.13 for the influence of workload on facilitating reflective practice).

4.3 RESEARCH FINDINGS OF THE WEEKLY OBSERVATIONS DONE DURING THE 10-WEEKS OF REFLECTIVE PRACTICE

When interpreting the data analysed, the researcher realised that it was necessary to divide the observed information documented by the observers (academic and clinical staff members and the researcher) during the reflective discussions according to the codes in positive as well as negative aspects.

Positive aspects

From the documented observations over a 10-week period the following positive aspects regarding reflective practice became evident. The coding detail of the positive observations is RPOS 04, RPOS 05, RPOS 06, RPOS 11, RPOS 14, RPOS 15, RPOS 16, RPOS 17, RPOS 18 and RPOS 22.

Researcher reflections

The value of working together in a learning group, supporting one another and sharing learning experiences, was a catalyst in terms of motivation, building individual confidence and encouragement. An essential aspect is that the

students need to plan properly to create more time to reflect more deeply and more critically.

Negative aspects

The following aspects for development have been identified. The coding detail of the negative observations is RPOS 01, RPOS 02, RPOS 03, RPOS 04, RPOS 07, RPOS 08, RPOS 11, RPOS 12, RPOS 13, RPOS 19 and RPOS 20.

Researcher reflections

The following aspects were observed during the reflective learning discussion groups (10-weeks):

- The time available in the learning programmes for reflective practice is currently not adequate.
- Sensitivity with regard to the students' learning style preference is lacking in the education of radiography students.
- It seems challenging and problematic to experiment with new/alternative learning strategies.
- The attitudes and willingness of senior students to be more flexible in their learning styles are meaningful.
- Critical reflection within a group in the academic and clinical setting resulted for some students to feel uncomfortable.
- Students also lack the skills to express themselves verbally and to acquire the discipline of documenting reflections on a regular basis.

- An alternative learning strategy such as critical reflection can be successfully included in existing learning programme outcomes, especially from the first year of study.
- Students need to be orientated in a proper, detailed session regarding the positive outcomes and effectiveness of this strategy.

4.4 RESEARCH FINDINGS ON THE STRUCTURED FOCUS GROUP INTERVIEWS

This section deals with the responses generated by the focus group interviews conducted according to the selection criteria indicated and the detail of the structured focus group interviews outlined in sections 3.5.3 and 3.7.3.

The influence of reflective practice on the development of students

The responses are represented in Figure 4.1.

As many as 79% (SI 1.1 & ACSI 1.1) of all the focus groups (students, academic and clinical staff) indicated that they regard reflective practice as a contributing factor to their own development. Only 17% (SI 1.2 & ACSI 2.1) of all the respondents were uncertain whether the outcome of the 10-week period of reflective practice could be assessed. As few as 4% (SI 1.3 & ACSI 3.1) of all the

respondents said that reflective practice did not add any value to their own personal development.

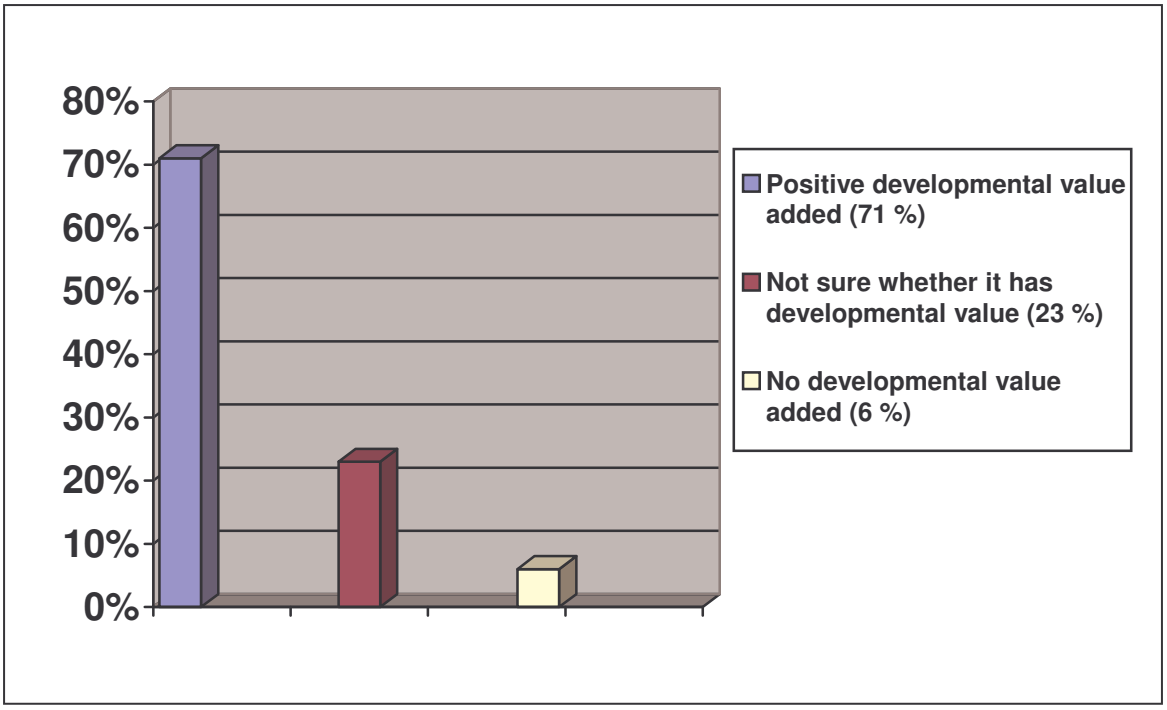


Figure 4.1. The opinion of the students regarding the influence of reflective practice on their own development

Personal value gained by staff members, through the weekly reflective practice observation sessions

The responses are represented in Figure 4.2.

A small percentage (14%) of staff (ACSI 2.2) said that they had not really gained any value as a role player in radiography education, from these observation sessions. All in all 86% staff members (ACSI 2.1) indicated that they had

definitely personally gained value from observing the reflective group discussions on a weekly basis.

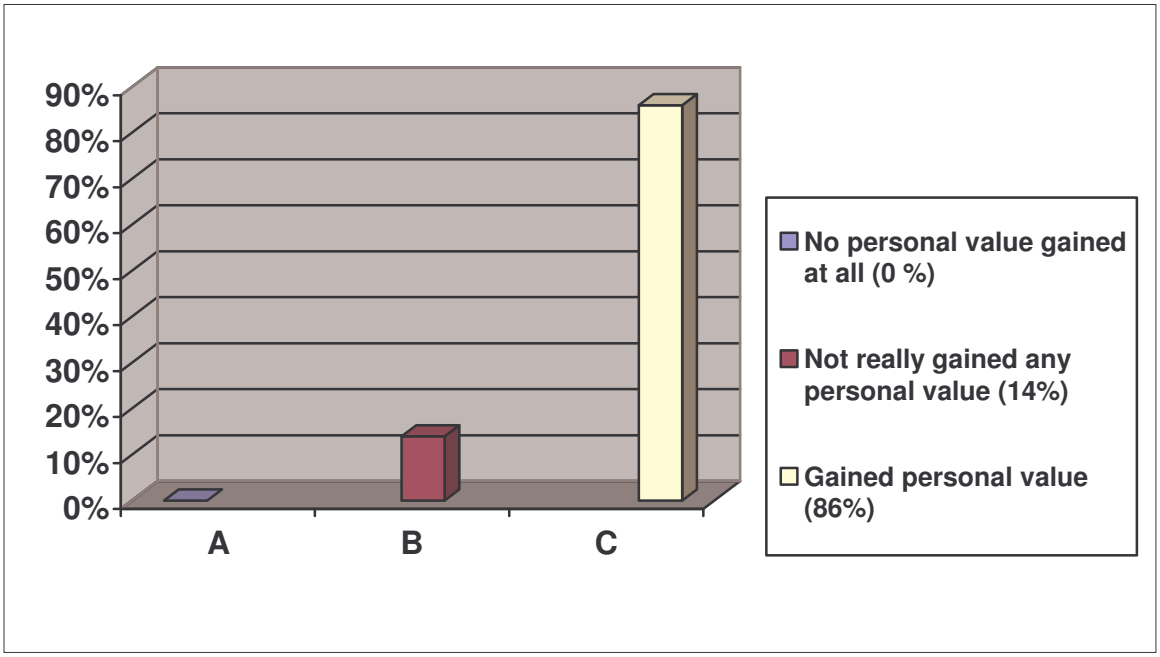


Figure 4.2. Value gained by staff members through observing reflective discussions

The discipline of students to documenting their reflections

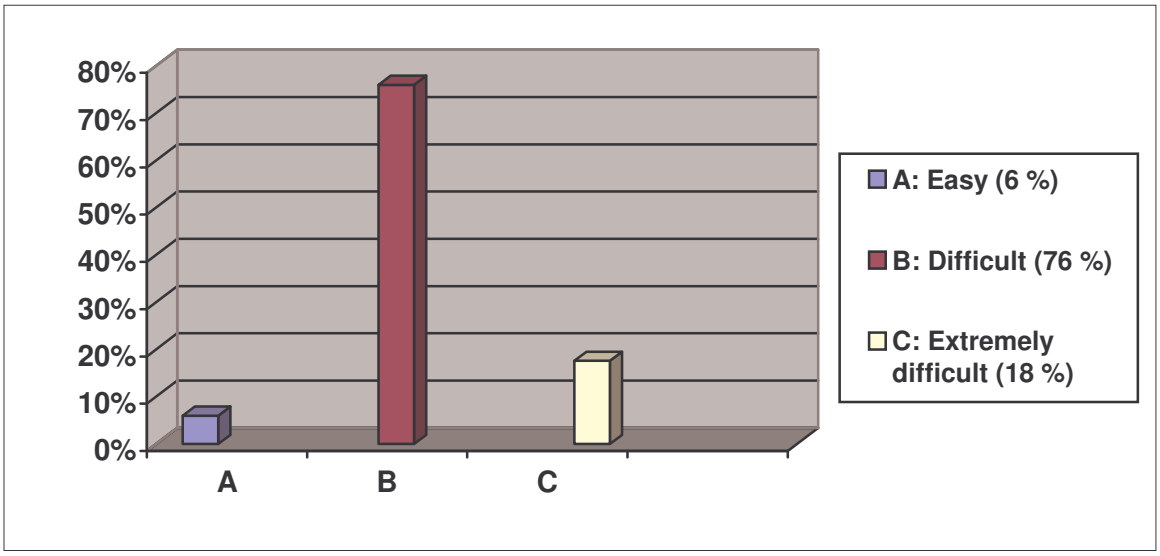


Figure 4.3. The students' discipline to keep a reflective journal

As indicated in Figure 4.3 the majority of the student focus groups indicated that it was a difficult process (76%) to document their reflections (SI 2.2). Furthermore, 18% of the respondents said it was an extremely difficult process to be disciplined to document (SI 2.1) their reflections. Only 6% said that to get into the habit of documenting their reflections had not been a problem (SI 2.3).

Staff members' observation of students dominating the reflective discussion group sessions

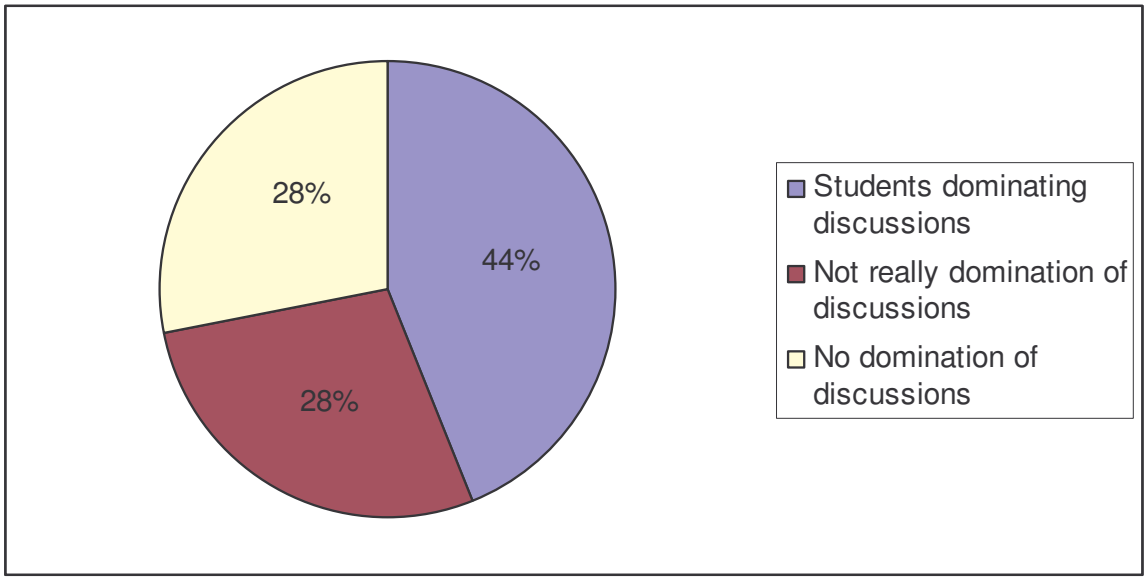


Figure 4.4. Staff members' opinion of students dominating reflective discussions

The breakdown of the staff members who experienced students dominating (ACSI 3.1) the reflective discussions (44%) is provided in Figure 4.4. In total 28% of the staff members are of the opinion that domination of discussions by some students did take place (ACSI 3.2), but with effective facilitation of the situation, students not actively participating were encouraged to participate more. As many

as 28% of the staff indicated that domination of reflective discussions (ACSI 3.3) did not occur.

Difficulties experienced by students in keeping a reflective journal

All students identified difficulties and challenges they were confronted with during the 10-week reflective practice phase in keeping a reflective journal. It was noted that all the students identified a problem area while keeping a reflective journal.

As indicated in Figure 4.5 42% of the students (SI 3.4), lack effective writing skills. 29% of the respondents indicated that to find time during their daily programmes for reflecting and documenting was extremely challenging (SI 3.1).

The student focus groups (SI 3.3) highlighted the fact that to express one's learning experiences and feelings were difficult and time consuming. Only 6% of the students said that they had to plan their daily activities with caution, allowing enough time for critical reflection and journal keeping (SI 3.2).

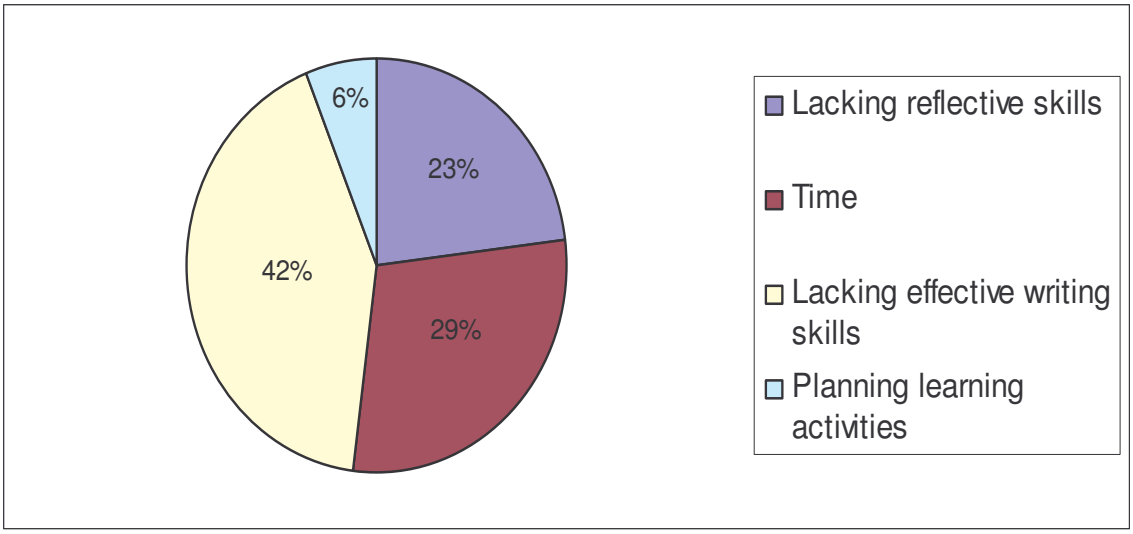


Figure 4.5. Difficulties experienced by students while keeping a reflective journal

The different values students attached to a reflective learning group

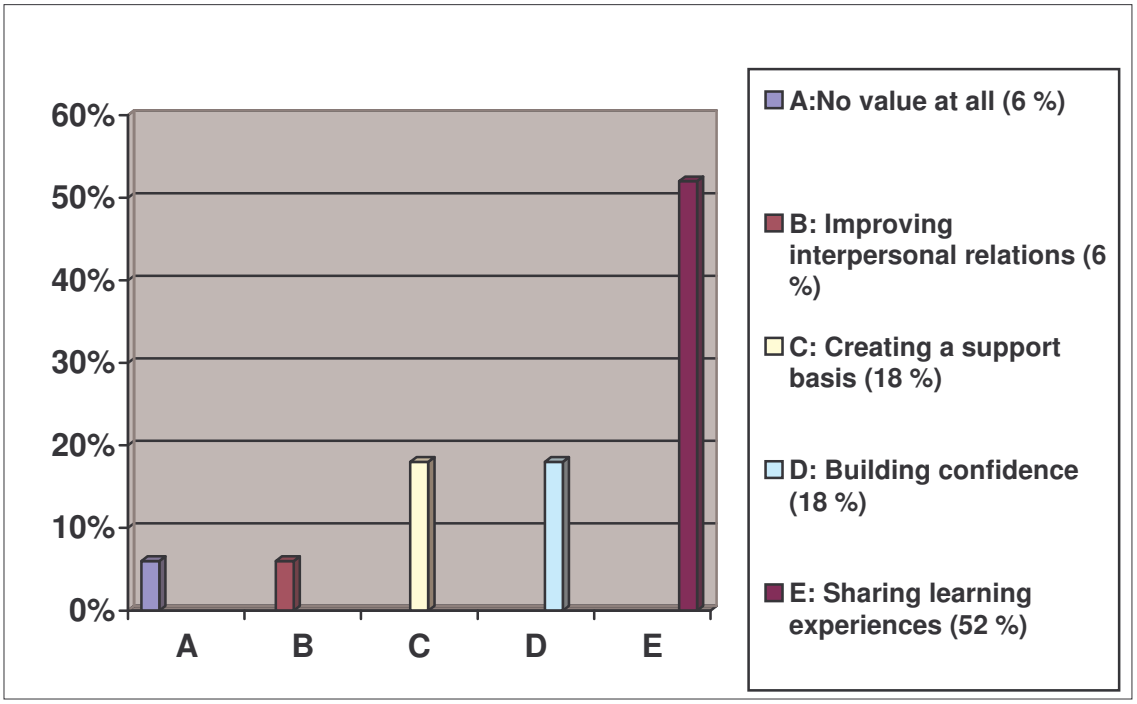


Figure 4.6. Different values students attach to a reflective learning group

In Figure 4.6 the majority of the students 52% (SI 4.1) were of the opinion that by sharing learning experiences, especially experiences from the clinical setting, they were enabled to learn from more available information. This phenomenon contributed towards an 18% increase in confidence (SI 4.2) and a 6% improvement in interpersonal relations (SI 4.4). The value of reflective discussion groups where a support basis has been created (SI 4.3) was indicated by 18% of the focus groups. It is clear to the researcher that different students gained different values from reflective groups.

Sufficient basic reflective skills of students

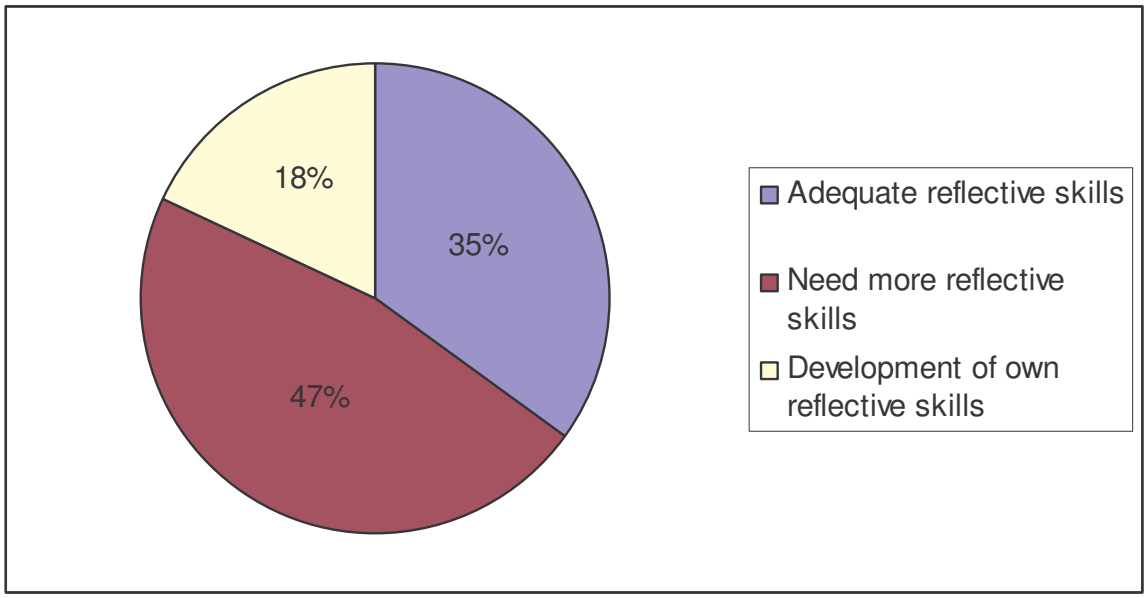


Figure 4.7. Students' basic reflective skills

The responses represented in Figure 4.7 are a pie chart breakdown to indicate whether the students' basic reflective skills are sufficient. In total 47% said that

they needed definitely more knowledge and skills to reflect better and more deeply (SI 5.2), while a further 35% indicated that they felt they had adequate reflective skills (SI 5.1). 18% of the students said that they had developed their own reflective skills in the 10 weeks of reflective practice (SI 5.3).

Students' understanding of the importance to reflect together as a learning group

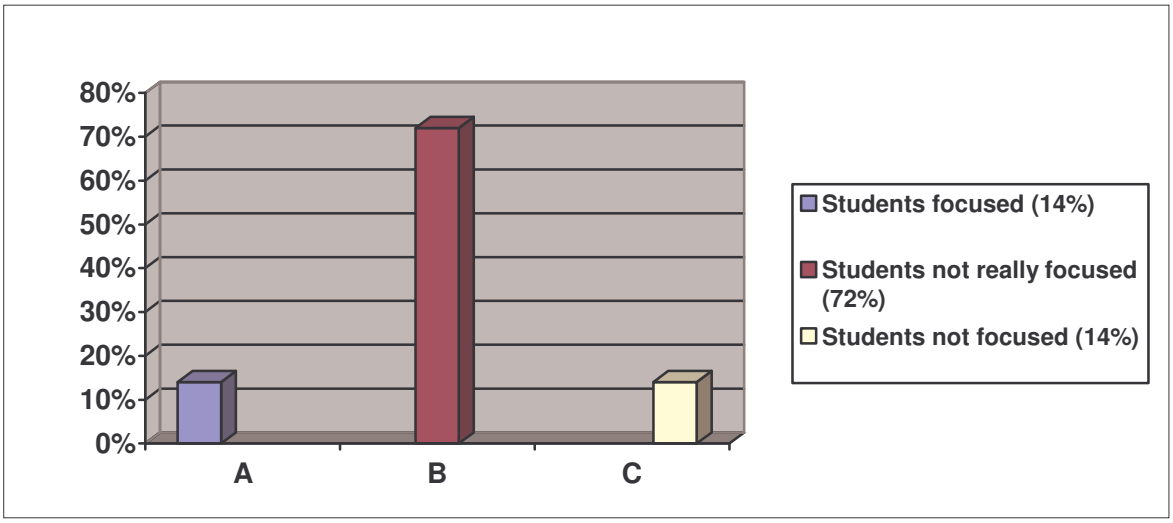
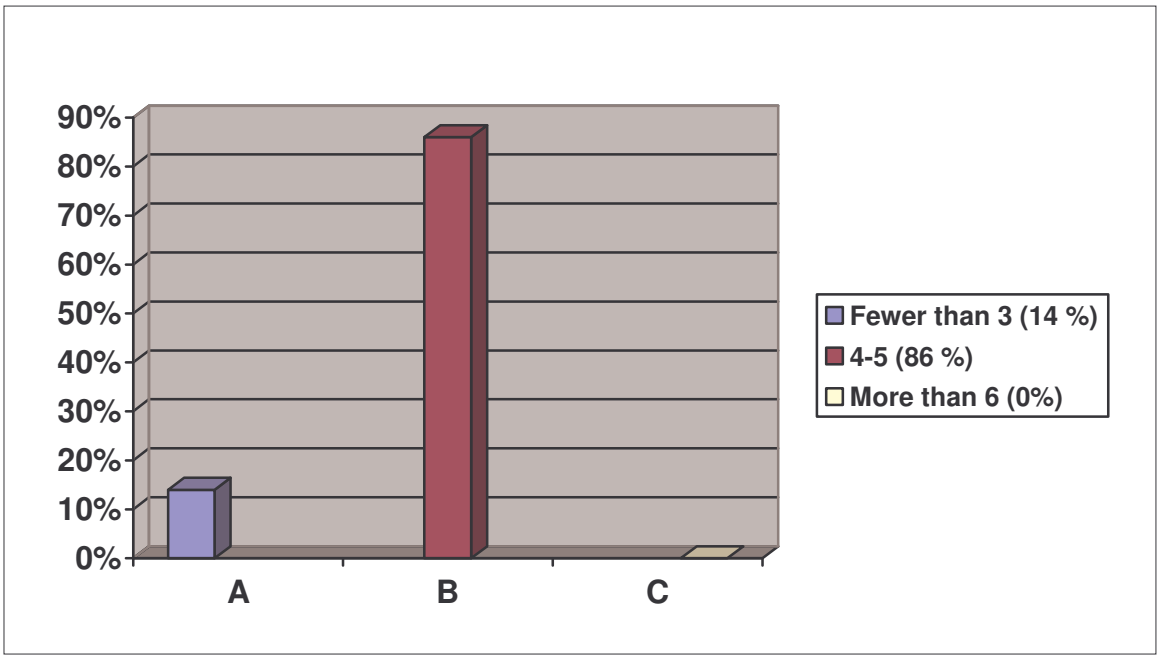


Figure 4.8. Students' understanding of the importance of reflective discussion groups

The staff members' perception and their observations indicated that 72% of the students were not really focused on the importance of group reflections (ACSI 4.2). As few as 14% respectively were either much focused or not even interested at all (ACSI 4.1&4.3). The responses are indicated in Figure 4.8.

Staff members' perspective on the ideal size (number of students) per reflective learning group



F*igure 4.9. The ideal number of students per reflective learning group*

As indicated in Figure 4.9 as many as 86% of the staff members said that the apparent ideal number of students per group to be effective, functional and encourage participation is 4-5 students per group (ACSI 5.2). Only 14% said that fewer than three students per group might be the most appropriate number (ACSI 5.1).

Time available for reflective discussion group sessions

All the respondent students (100%) indicated clearly that there is no time available, especially in the clinical setting, for reflective group discussions (ACSI

6.2) as indicated in Figure 4.10. Radiography education is nationally structured in such a way that cooperative or work-integrated learning forms a large component of the curriculum. The serious shortage of radiographers also contributes to overworked staff and very limited time for anything additional. This is unfortunately not a positive factor in/of transformative learning.

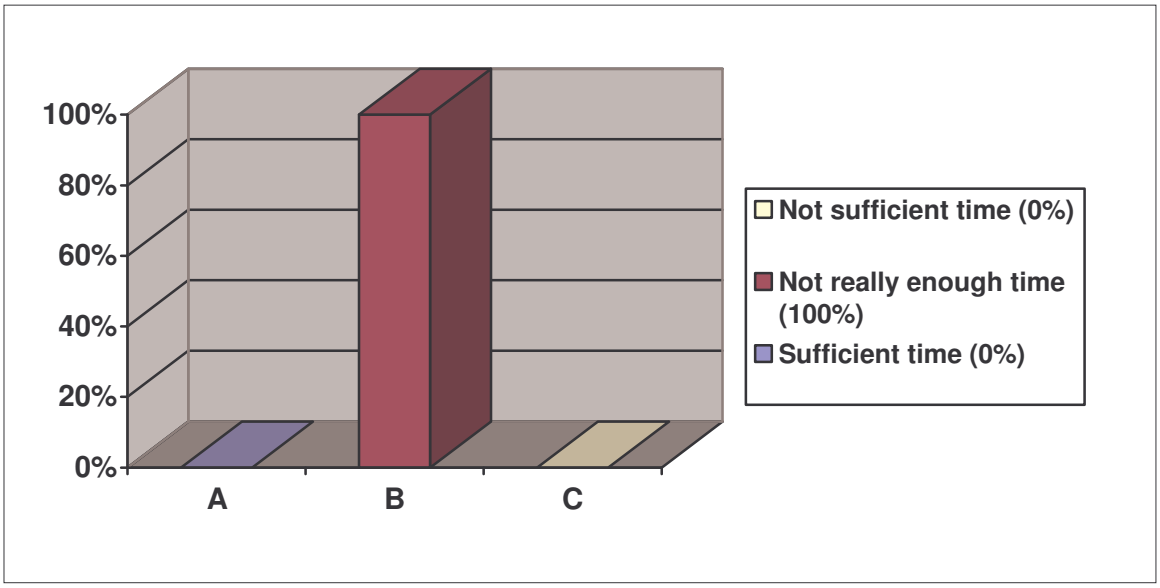


Figure 4.10. Availability of time for reflective discussion groups

The general feedback from the staff members during the reflective learning group discussions regarding the attitude of students towards reflective practice in general

As indicated in Figure 4.11, when the process of 10 weeks of reflective practice was implemented (ACSI 7a.2) the feedback was that students were not really as positive (72%), but they became more positive when realising the value of critical reflection as a learning strategy. The feedback obtained is that 28% of the

respondents were negative (ACSI 7a.3) and 0% of the students were positive (ACSI 7a.1) at the outset of the 10-week phase.

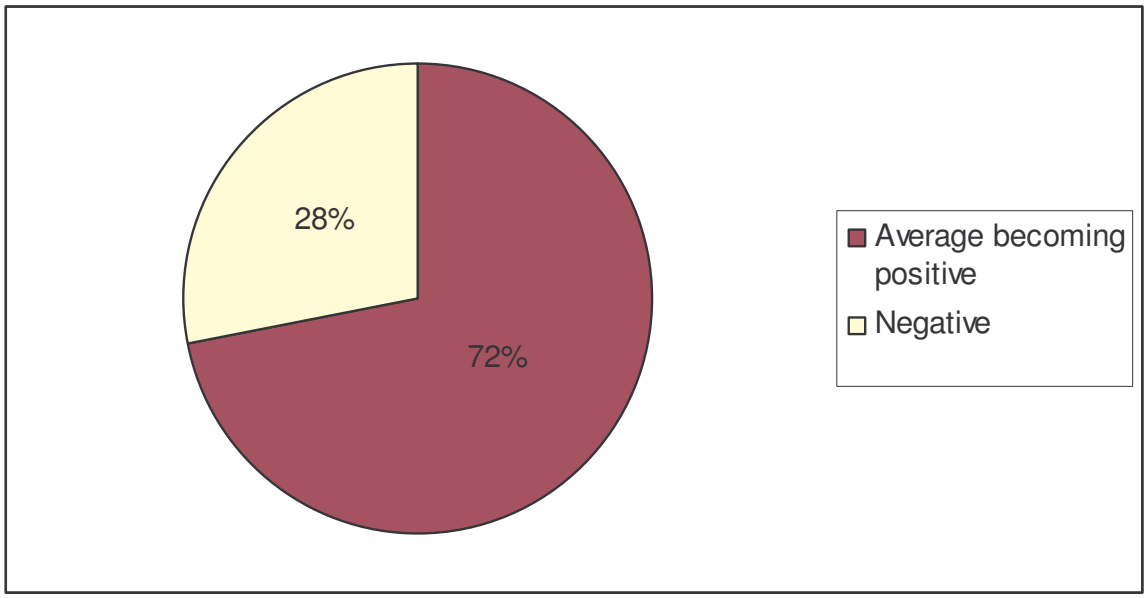


Figure 4.11. The attitude of students towards reflective practice in general

The observations of staff members during the reflective learning group discussions, regarding the students' ability to master the skill of reflection

It was observed that 72% of the students demonstrated the ability to master the skill of reflection relatively well (ACSI 7b.2). Furthermore 14% were very successful in mastering the skill of reflection (ACSI 7b.1). It was observed that 14% of the students did not manage the ability to master the skill of reflection (ACSI 7b.3). The responses as observed during the reflective learning group discussions are indicated in Figure 4.12.

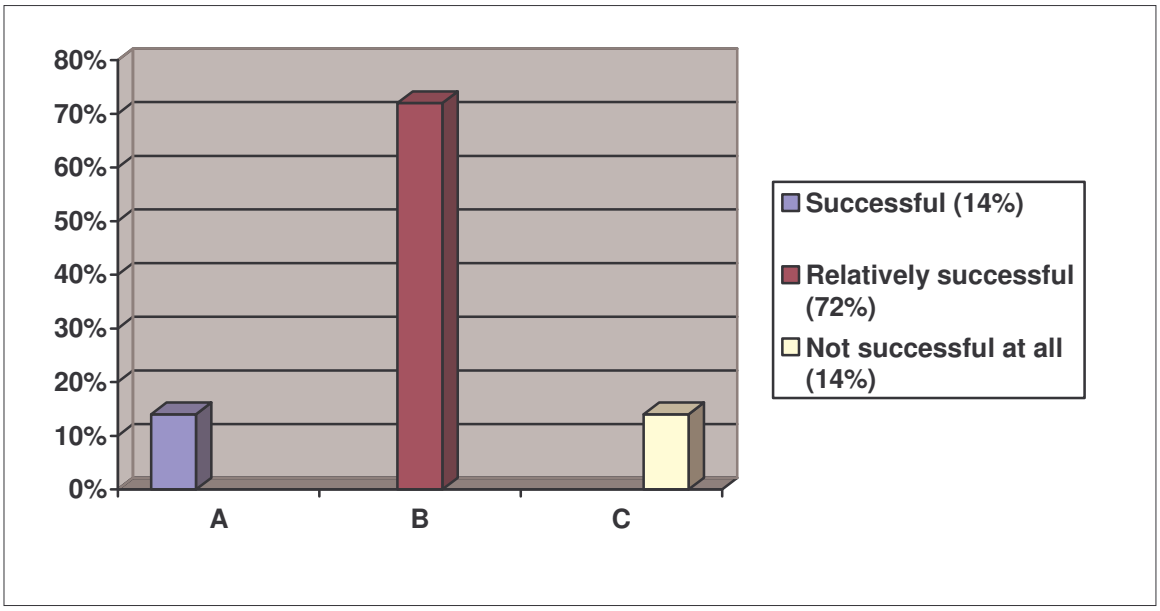


Figure 4.12. The ability of students to master the skill of reflection

Students' discipline to keep a reflective journal

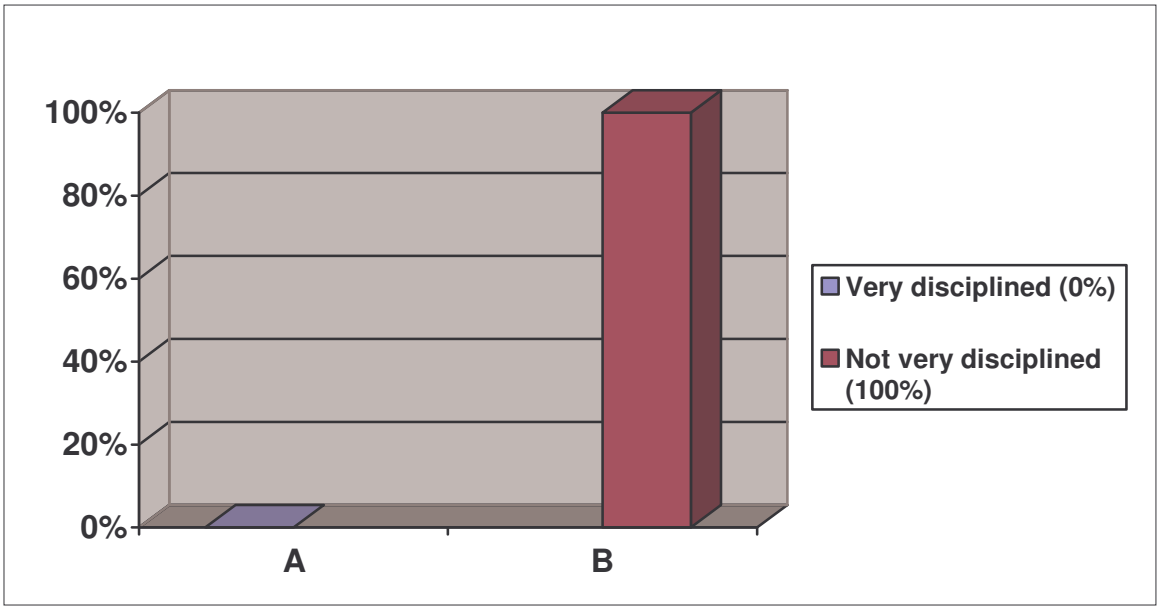


Figure 4.13. The discipline of students in keeping a reflective journal

Figure 4.13 shows that as many as 94% of the students found it difficult or extremely difficult to be disciplined. During the weekly discussions it was noted that in general no students (100%) were much disciplined in keeping a reflective

journal. (ACSI 7c.2) as indicated in Figure 4.13. This is a concerning issue that might be an indicator of the attitude of students in general regarding their motivation for learning and obtaining a qualification.

Students' understanding the importance of the concept of meta-learning

Only 18% of the students (SI 6.1) indicated that it is important that they take responsibility for their own learning while 12% said that they realised through reflective practice that learning is a holistic but personal process (SI 6.3). Only 29% appreciated the fact that reflective practice made them aware of mistakes/faults that can be corrected (SI 6.2). As few as 12% of the focus groups realised that they do have an ability to adapt to alternative learning strategies (SI 6.5). The fact that reflective practice improves planning of learning activities expresses learning experiences in words on paper and builds confidence (SI 6.5), was seen as part of the principles of the concept of metalearning by some of the respondents (29%). The responses are indicated in Figure 4.14.

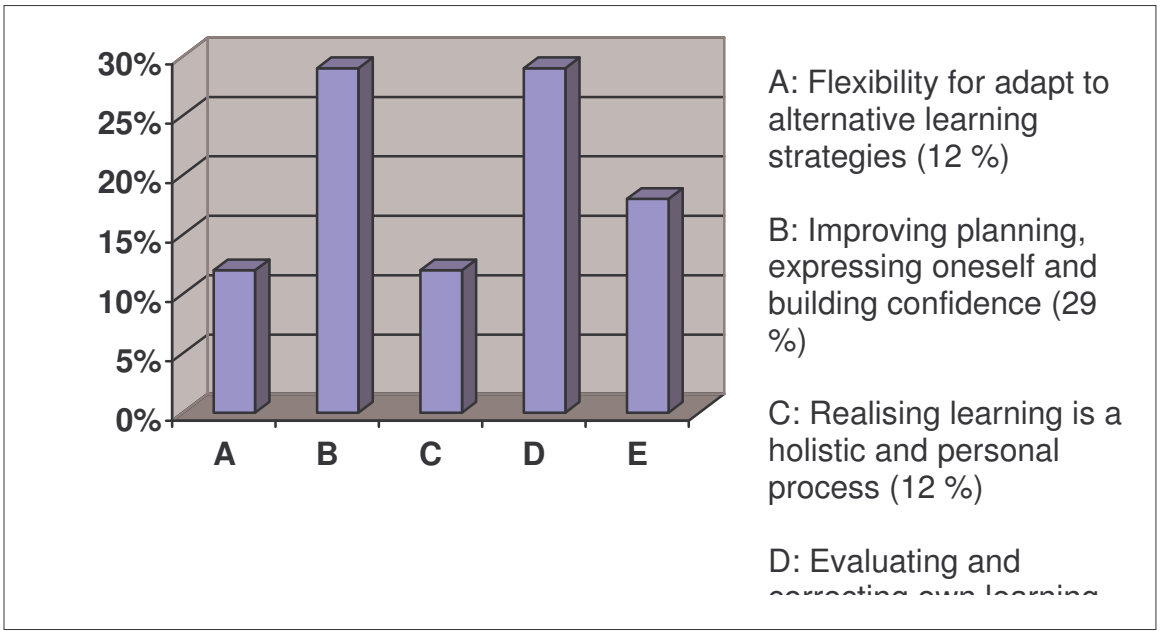


Figure 4.14. Students' understanding of the importance of the concept of metalearning

Students taking responsibility for their own learning as observed by staff members

In Figure 4.15 only 28% of the respondent student focus groups indicated that they realised the importance of taking responsibility for their own learning. As observed during the weekly reflective sessions 58% of the students did not really take any serious responsibility (ACSI 7d.2) and another 14% of the students did not take responsibility for their own learning at all (ACSI 7d.3). Positive feedback was obtained from 28% of the students showing interest and accepting responsibility for their own learning (ACSI 7d.1).

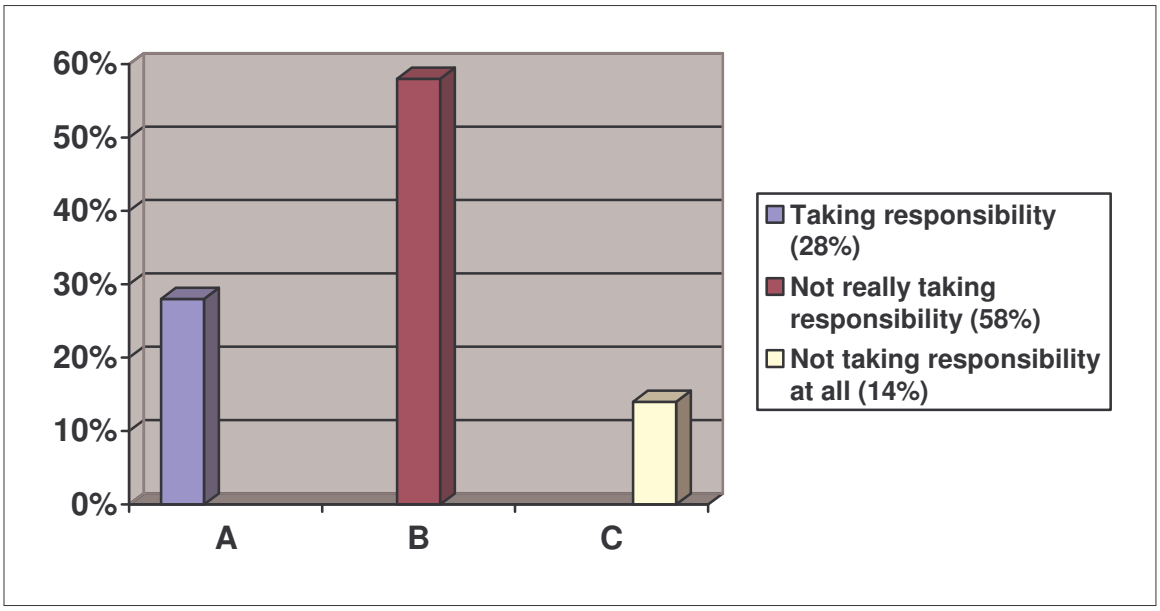


Figure 4.15. The responsibility of students to take responsibility for their own learning (metalearning)

Reflective learning groups providing a forum where learning experiences can be shared

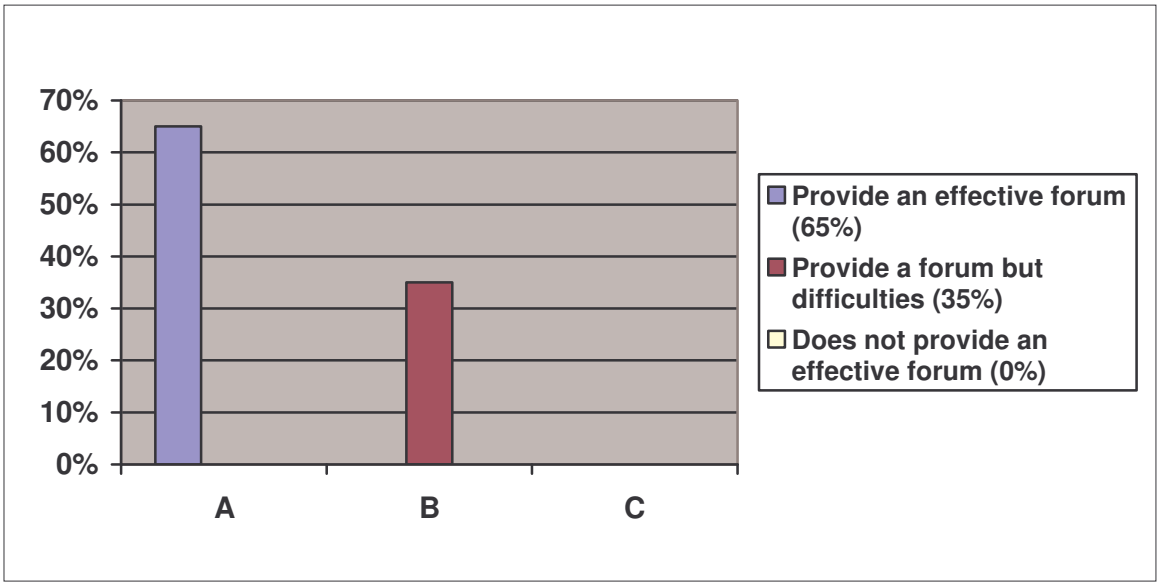


Figure 4.16. Reflective learning groups act as forum where learning experiences can be shared

The majority of the student focus groups (65%) said that reflective learning groups could act as an effective forum for sharing learning experiences (SI 7.1). Furthermore, another 35% of the respondents indicated that it is the case, but added that they had experienced minor difficulties with the reflective learning groups, such as differences in language and learning styles (SI 7.2). According to the researcher the conclusion to the abovementioned is that reflective learning groups can be an effective forum for sharing learning experiences within the radiography context.

Opportunities available for sharing personal reflections during the reflective discussion group sessions

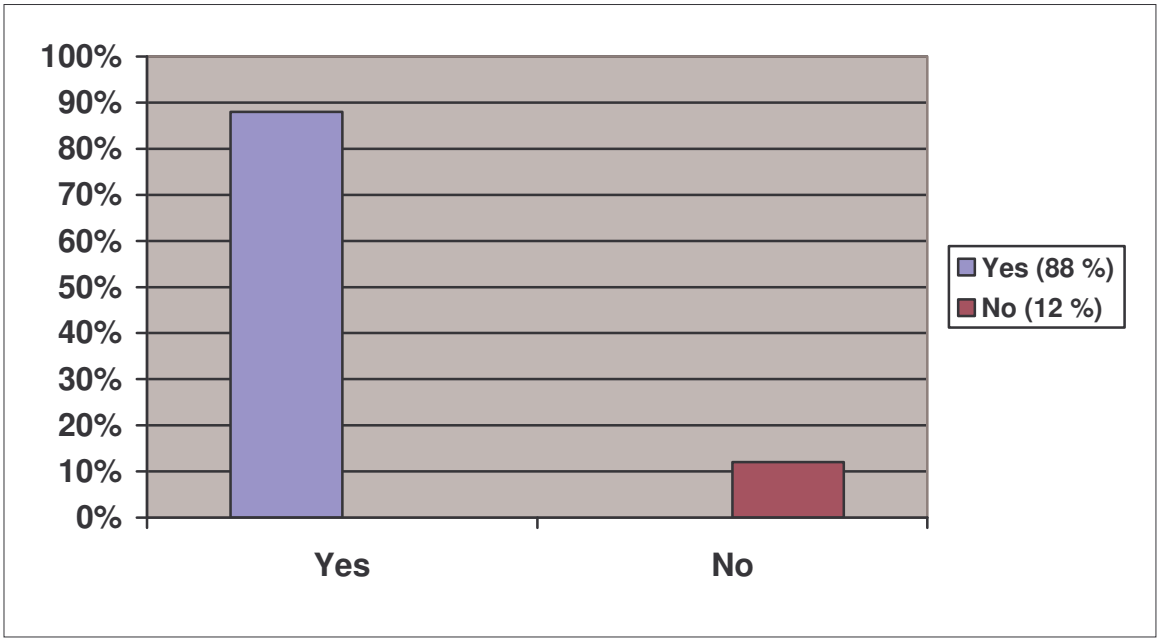


Figure 4.17. Sufficient opportunities to share personal reflections

In Figure 4.17 an overwhelming 88% of the student focus groups said that there were ample opportunities to share personal reflections within the group (SI 8.1),

some with the provision that it was out of free will. Only 12% said that there was no time during the weekly reflective discussions to share personal reflections (SI 8.2)

Observing proof of growth in the students' motivation and ability to reflect deeply

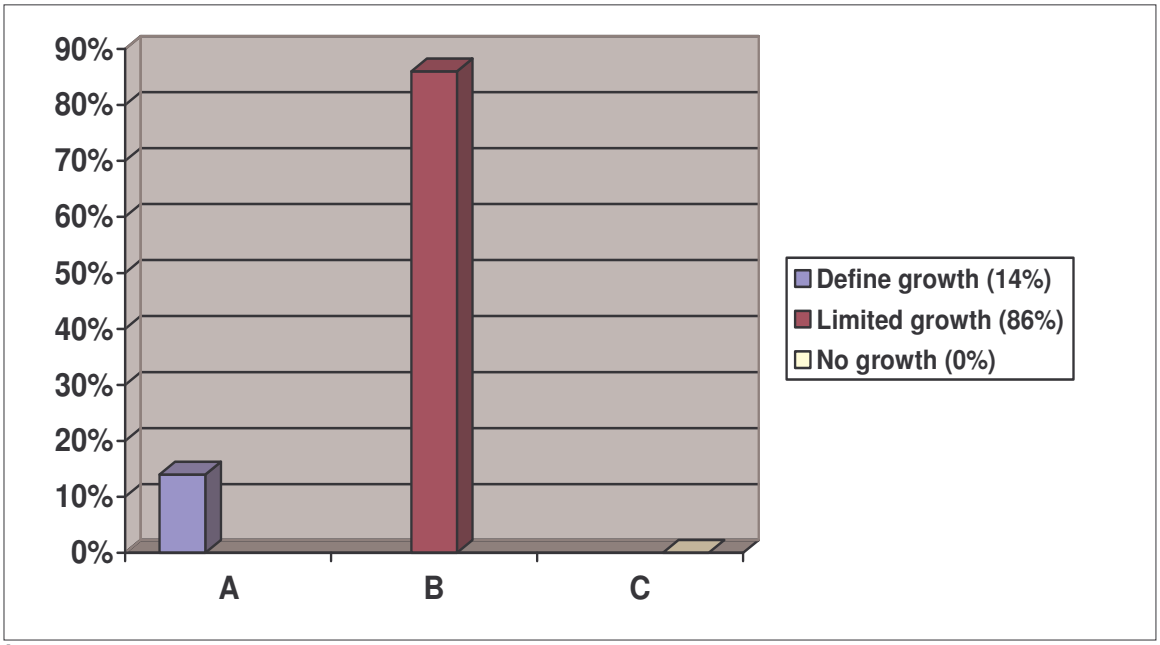


Figure 4.18. The students' growth in motivation and the ability to reflect deeply

The respondent staff members and the researcher observed 14% definite growth in motivation and ability to reflect more deeply (ACSI 8.1) by students and 86% limited growth (ACSI 8.2). A more positive process started (although slowly) to develop over a period of time where students maybe starting to realise the value of critical reflection in terms of their own learning.

Outstanding aspects regarding reflective practice as a process as observed and experienced by the other role players

In total 44% of the respondents as indicated in Figure 4.19 regarded the reflective process as a tool for quality control purposes (ACSI 9.3). Critical reflection as a learning strategy was seen by 28% of the respondents as having positive outcomes (ACSI 9.2). Furthermore, 14% of the respondents regarded reflective practice as an opportunity to share learning experiences (ACSI 9.1) and to improve communication within the specific reflective learning group (ACSI 9.4).

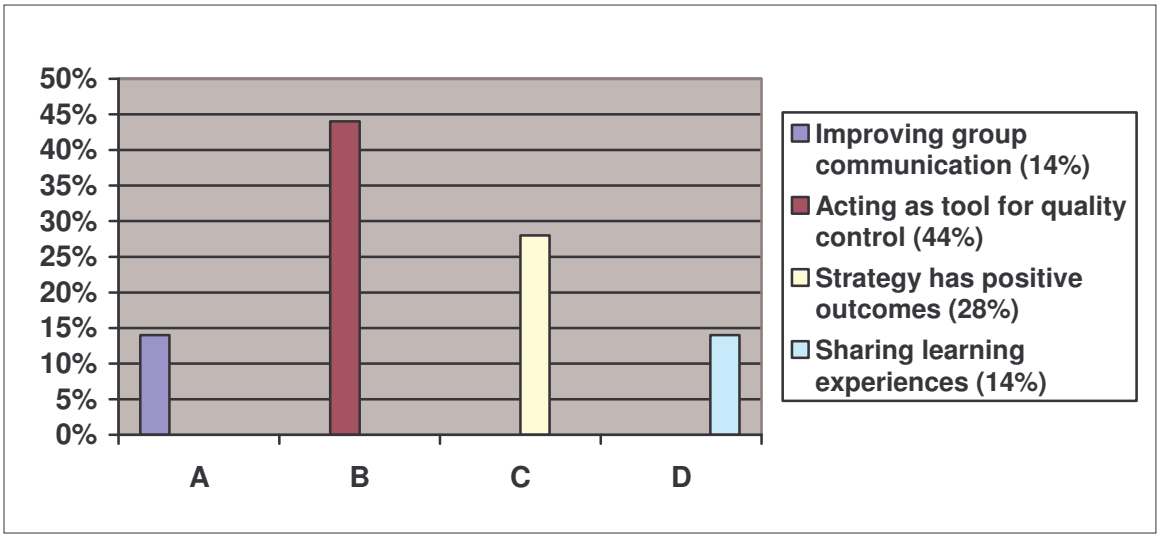


Figure 4.19. Outstanding aspects of the reflective practice process as regarded by staff members

Critical reflection as a learning strategy to indicate evidence of a students' development over time

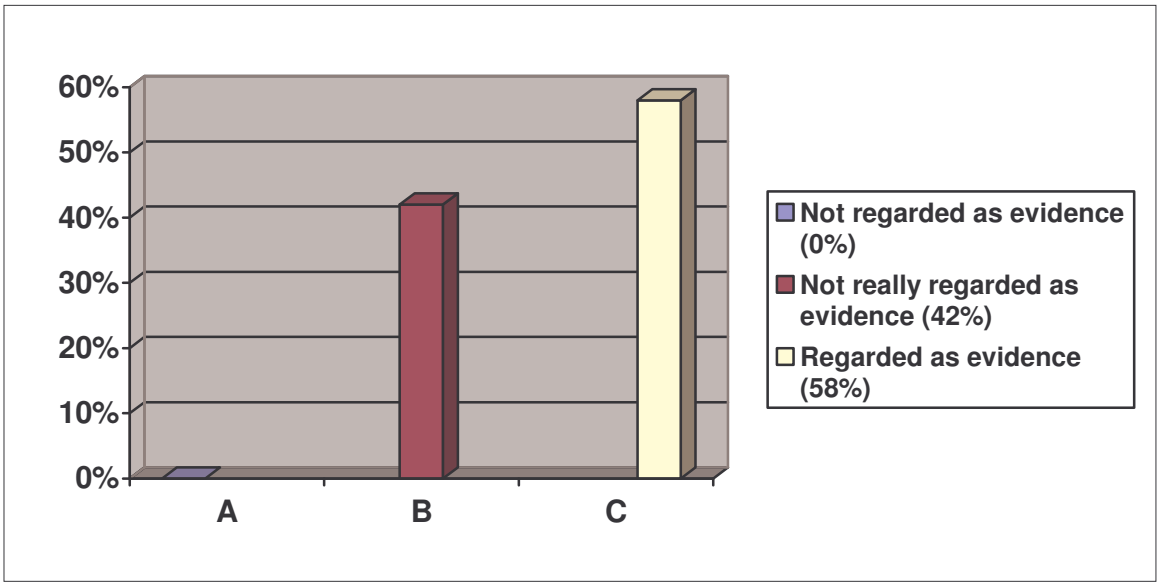


Figure 4.20. Critical reflection indicating evidence of a student's development

Figure 4.20 indicates that there is a difference in opinion on whether reflective practice can be regarded as evidence of a student's development (ACSI 10.1 & ACSI 10.2). As many as 57% of the respondents viewed reflective practice as evidence of a student's development over time. Another 43% of the respondents indicated that it is not really possible to indicate a student's development in reflective practice (ACSI 10.2).

Aspects contributing to the apparent negligence of reflective practice in the context of radiography

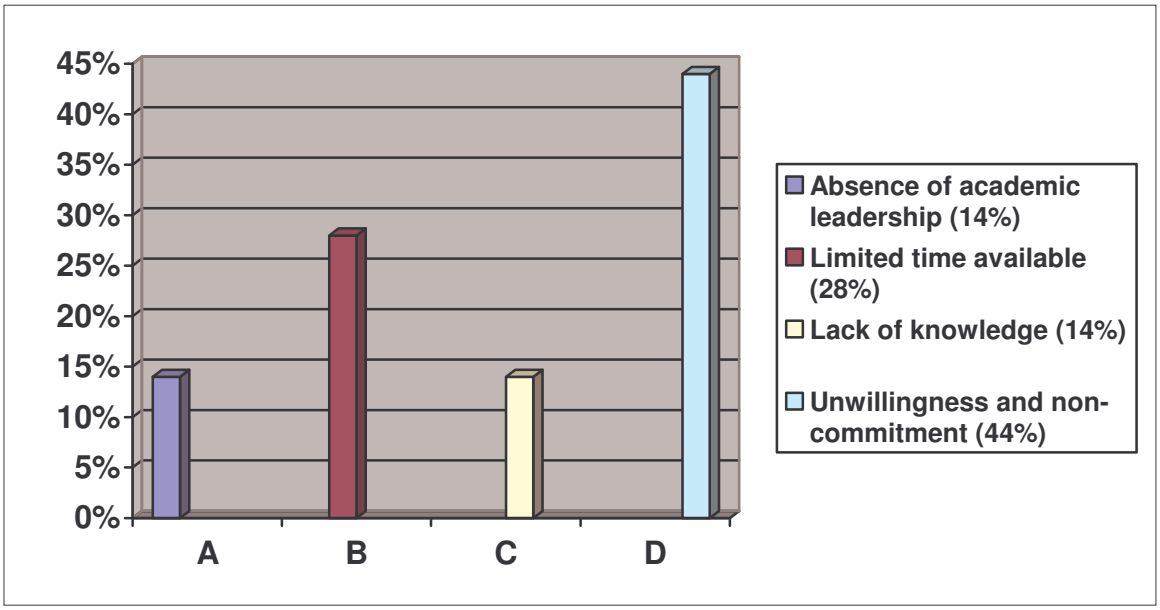


Figure 4.21. Aspects contributing to the negligence of reflective practice in the context of radiography

In Figure 4.21 a total of 44% of the respondents were of the opinion that the absence of commitment from students to investigate alternative learning strategies (ACSI 11.1) contributed to the negligence of reflective practice. Limited time for reflection indicated by 28% of the respondents especially in the clinical setting is due to a shortage of qualified radiographers. Only 14% of the role players in the radiography context (ACSI 11.4) identified the lack of knowledge as a possible pitfall. The absence of academic leadership (14%) regarding the investigation/implementation of alternative learning strategies contributes towards the negligence of reflective practice (ACSI 11.4).

Staff members need to be equipped with knowledge and skills on a regular basis to facilitate reflective practice successfully

All the academic and clinical staff respondents (ACSI 12.1) said that to equip them to facilitate reflective practice in the context of radiography education regular updating of knowledge and skills is absolutely necessary.

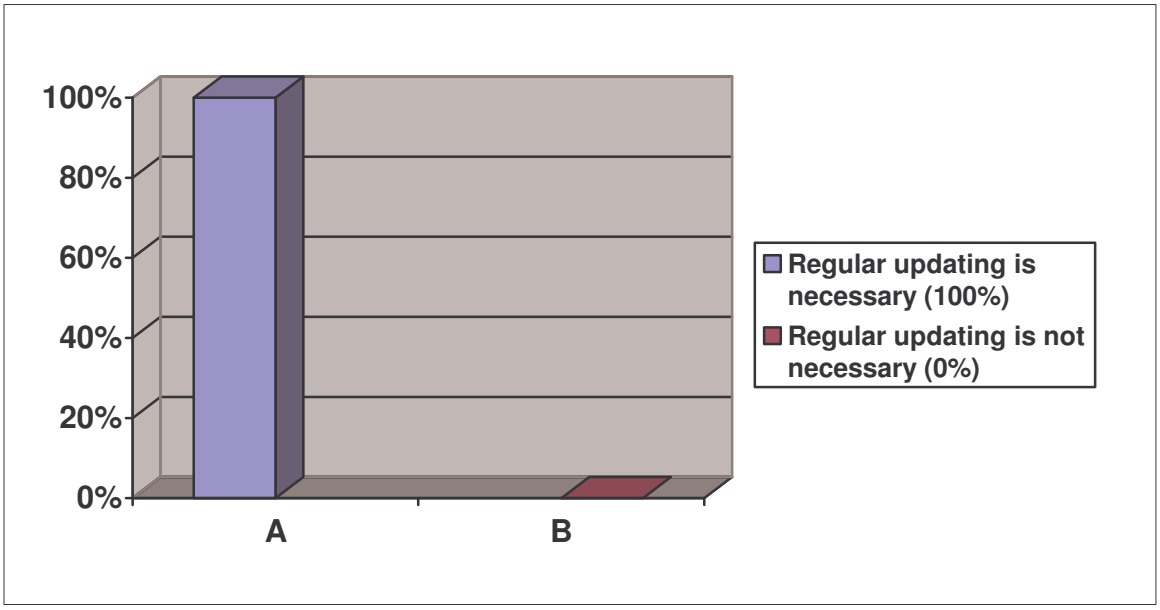


Figure 4.22. Regular updating of knowledge and skills to facilitate reflective practice successfully

The systematic integration of reflection as an integral part of learning activities

All in all 71% of the student respondents said that they would definitely integrate reflective practice as an integral part of their daily learning activities (SI 9.1). As many as 23% of the student focus groups indicated that they were still unsure

and hesitant whether or not to integrate critical reflection as a strategy in their own learning (SI 9.2). Only 6% of the respondents would not consider integrating reflective practice in their daily learning activities (SI 9.3). The responses are indicated in Figure 4.23.

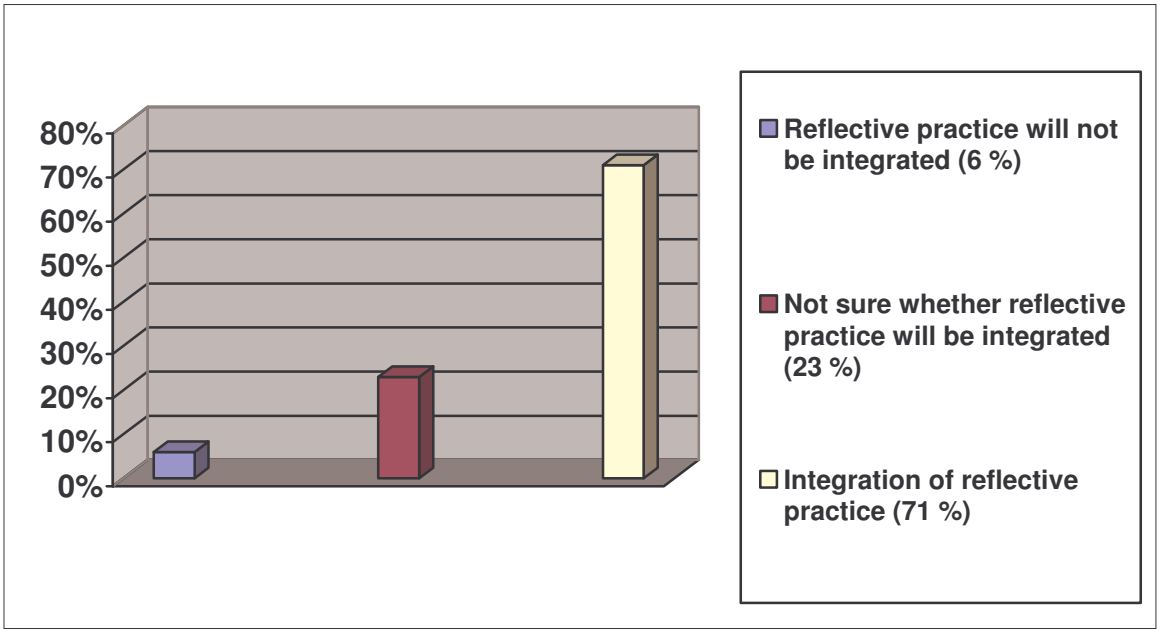


Figure 4.23. Integration of critical reflection as part of daily learning activities

4.5 RESULTS AND FINDINGS OF THE QUESTIONNAIRES

Biographical data of the respondents

The biographical questions served as an introduction and helped to set the respondents at ease to answer the rest of the questions. The tables below (Table 4.3 to 4.7) contain data regarding the position held, institution of higher learning, staff's highest qualifications and professional development of staff.

Table 4.3 indicates that 15 respondents (60%) were academic staff members whereas 10 respondents (40%) were clinical staff members. Slightly more first year students (49%) than second (36%) and third year students (15%) took part in the research. No fourth year students participated.

Position	Percentage
Academic staff	60
Clinical coordinator/tutor	40
First year student	49
Second year student	36
Third year student	15
Fourth year student	0

Table 4.1. Positions held by participants in the context of radiography

Institutions of higher learning

From the eight institutions in this country involved in the education of radiographers, four participated in the research.

Institution of higher learning	Percentages	
	Staff members	Students
Central University of Technology Free State	32	29
Tshwane University of Technology	12	25
University of Limpopo (Medunsa)	40	20
University of Pretoria	16	25

Table 4.2. Institutions of higher learning

There was on average an equal distribution of participating students among the four institutions. Only 3 staff members (12%) of Tshwane University of Technology and 10 academic and clinical staff members (40%) of the University of Limpopo (Medunsa) participated.

Highest qualification obtained by staff members

The academic and clinical staff involved in radiography education that took part in the research have a wide spectrum of qualifications. The researcher wanted to determine whether staff members are appropriately qualified to be involved in the education of students.

Qualification	Percentage
National Diploma Radiography	24
B Rad Radiography	16
National Higher Diploma Radiography	0
B Tech Radiography	16
B Rad (Hons) Radiography	24
M Rad Radiography	8
D Rad Radiography	0
Other	12

Table 4.3. Highest qualification obtained

Six staff participants had obtained basic radiography qualifications (360 credits) and six staff members had obtained qualifications on the 480-credit level (post basic qualification). Three staff members (12%) had obtained higher

qualifications in the discipline of Nuclear Medicine (Radiography) and in Health Education.

Institutions of higher learning involved in staff development programmes

It is accepted that all academic institutions should have a specific department committed to staff development and support.

Statement/Question	Option	Percentage
Offering of staff development programmes	Yes	64
	Not really	24
	No	12

Table 4.4. Availability of staff development programmes

Staff development programmes are offered at 64% of the institutions with 24% not clear about the activities and programmes available to staff to enhance their knowledge and skills. Another 12% indicated that no such staff development programmes are offered. The responses are indicated in Table 4.4.

Staff attendance of programmes regarding new teaching and learning strategies

The attendance of programmes in innovative and transformative teaching and learning strategies by staff members in the past twelve months is indicated in Table 4.5. The researcher wanted to determine whether staff members are informed about the latest trends and strategies regarding teaching and learning.

Statement/Question	Option	Percentage
Attendance of teaching programmes during the last 12 months	Yes	48
	No	52

Table 4.5. Attendance of programmes regarding new educational strategies

More or less half of the staff members (12) attempted to be updated on the latest educational trends; the other half (13) did not attend programmes regarding innovative and transformative teaching and learning strategies.

Respondents' general approach to learning

The researcher's intention with the following ten statements was to determine the general approach of students and staff members towards learning.

S1 – Staff members
S2 – Students

Statement/Question	Percentages			
	Not at all	Disagree slightly	Agree to some extent	Fully agree
I consider myself a lifelong learner				
S1	0	0	12	88
S2	1	5	35	59
Reflective practice is a method for quality improvement				
S1	0	0	8	92
S2	10	18	50	31
Critical reflection facilitates the integration of theory and practice				
S1	0	0	12	88

S2	1	16	54	19
Reflection encourages a holistic approach to patient care				
S1	0	4	12	84
S2	3	15	51	31
Reflection leads to an acceptance of professional responsibility				
S1	0	4	16	80
S2	2	12	42	44
Enhancement of self-esteem occurs through the learning strategy of critical reflections				
S1	0	4	20	76
S2	3	14	52	31
Reflection provides the opportunity for continual re-focusing of work activity				
S1	0	0	0	100
S2	0	10	45	45
The reflective journal is an effective learning instrument				
S1	0	4	40	56
S2	9	29	41	21
When reflecting together, as partners in the learning environment, trust-building increases the effectiveness of reflective practice				
S1	0	4	8	88
S2	4	18	48	30
I consider myself as a “natural” reflector				
S1	0	4	60	36
S2	14	22	42	22

Table 4.6. Respondents’ general approach to learning

Respondents agree (12% and 35%) and agree fully (88% and 59%) that they consider themselves as lifelong learners. This is positive in terms of the fact that all the role players in the radiography context view continuous improvement of competence as an integral part of being a professional.

Overwhelming 23 staff members (92%) reckon reflective practice can be a method for improving quality. Half of the students (50%) agree to a certain extent that reflective practice can be applied in this regard.

Staff members felt strongly about the fact that critical reflection facilitates the integration of theory and practice very well (88%). In total 54% of the students agree about this only to some extent.

A holistic approach to patient care can be encouraged by reflection according to 21 staff members (84%) and 52 students (31%). Staff members are starting to realise the value of reflection as a learning strategy supporting the holistic approach to patient care. After 10 weeks of reflective practice the majority of the respondents acknowledged that reflection leads to the acceptance of professional responsibility. 76% of the staff members admitted that enhancement of their self-esteem occurred through critical reflections. As many as 89 students (52%) acknowledged the importance to enhance the self-esteem.

The opportunity for continual re-focusing was indicated by all 25 staff respondents (100%) and student respondents (45%).

At least 56% staff members in comparison with 21% of the students regarded the reflective journal as an effective learning instrument.

Partners in the learning environment reflecting together can increase trust building within the reflective group as indicated by 22 staff members (88%) and 82 students (48%).

All respondents were hesitant to rate themselves as complete “natural” reflectors (42% and 60% respectively).

The researcher is of the opinion that academic and clinical staff members' perspectives, experiences and feelings about the value that can be obtained through the implementation of reflective practice, differ from the view of the students. The reason for this might be the fact that learners are not exposed to the principles, application and benefits of reflective practice at school level.

In general the students were not as positive and enthusiastic about the concept of learning as well as that of critical reflection as a learning strategy in comparison with the staff members. Research is based on the premise that research should lead to change; change should be incorporated into the research process itself. As the period of reflective practice was only 10 weeks, the cycles of action research (planning, acting, and reflecting) should actually continue in which thinking, doing and observing can be interwoven and repeated (spiral-principal). This pre-defined or logically sequential process might then change students’ perceptions and experience of the value of critical reflection and journal keeping.

Furthermore, the fact that only 47 respondents consider themselves as “natural reflectors” convinced the researcher to foster critical thinking and reflection in such a way through different learning activities to contribute towards transformative learning. Critical reflection as a learning strategy stimulates all four quadrants of the brain. (Whole Brain Model Hermann, 1994). The challenge, therefore, to educators is to plan learning strategies, which will vary brain activities so that learners of different preferences may be more inclined to enter into learning events.

Respondents’ perspective on the reflective process

The reason for asking the questions in this section of the questionnaires is to determine the essence of the process of reflection, the most effective way to record reflections and to determine whether critical reflection assists the students in the concept of metalearning.

S1 – Staff
S2 – Students

Questions/Statements	Percentages

		Not at all	Disagree slightly	Agree to some extent	Fully agree
To what extent will reflection simply occur?					
By knowing about it	S1	8	24	36	32
	S2	8	18	43	31
Writing a reflective journal	S1	0	4	40	56
	S2	11	28	43	18
Through clinical supervision	S1	0	12	32	56
	S2	11	20	44	25
Writing a reflective journal encourages …					
a student's own personal development	S1	0	4	16	80
	S2	8	21	40	31
sharing a student's development with others	S1	4	4	24	68
	S2	9	21	41	29
There are many ways of recording reflections. To what extent can the following methods be useful in radiography?					
Portfolios	S1	4	0	24	72
	S2	17	27	39	17
Discussion groups (learning groups)	S1	4	0	24	72
	S2	4	13	47	36
Incident file (clinical)	S1	0	16	36	48
	S2	5	28	49	18
Case study (group work)	S1	0	8	32	60
	S2	6	18	44	32
Feedback is an essential element of the reflective process. To what extent will the following feedback mechanisms be useful?		0	8	52	40
Peer feedback	S1	3	22	50	25
	S2	0	0	40	60
Reports by staff members	S1	6	18	46	30
	S2	0	4	48	48
Self-assessment	S1	4	18	41	37
	S2	4	12	52	32
Group feedback	S1	2	18	48	32
	S2				

To what extent did reflection assist you as a student in constructing meaning from your learning experiences? (metalearning)	S1 + S2	5	21	53	21
The way in which facilitation of reflective practice is done, is most effective when it is …					
one-to-one with a staff member	S1	44	-	-	-
	S2	35			
in a group with a staff member	S1	56			
	S2	65			
The process of reflection is…					
a personal process	S1	32	-	-	-
	S2	37			
a social (group) process	S1	0			
	S2	6			
both	S1	68			
	S2	57			
The best time to introduce/implement reflective practice in the learning programme is …					
as soon as possible	S1	68	-	-	-
	S2	61			
in the first year	S1	20			
	S2	18			
in the second year	S1	0			
	S2	0.5			
in the third year	S1	0			
	S2	0.5			
in the fourth year	S1	0			
	S2	0			
there is no specific time	S1	12			
	S2	20			

Table 4.7. Perspective on the reflective process

After completion of the data analysis with regards to the perspective on the reflective process, and only during the process of presenting the above data in table format the researcher then realised that a minor problem in the structural layout of the questionnaire, resulted in the appearance of the data in table 4.7.

It is interesting that the frequencies expressed as percentages are distributed equally between knowing about it, writing a reflective journal or through clinical supervision. Staff members though, are of the opinion that reflection occurs by keeping a reflective journal (56%) as well as through clinical supervision (56%) in the clinical facility (work place). In comparison the students are much more uncertain about when reflection will simply occur (43%).

Students once again are not sure whether writing a reflective journal encourages one's own development or sharing it with others. (40%) while staff members feel strongly that writing a journal (80%) and sharing it with others (68%), encourage a student's own development.

According to staff members the following methods can be used in radiography to record reflections: portfolios (72%), discussion learning groups (72%), incident files (48%) and case studies (60%). Students (26%), however, are on average of the opinion that the abovementioned methods can be used successfully.

Feedback forms an essential part of the reflective process. Respondents are not convinced that mechanisms such as peer feedback (40% & 25%), reports by staff members (60% & 30%), self-assessment (48% & 37%) and group feedback (32% & 32%) are effective and sufficient.

Students are of the opinion that facilitation of reflective practice is most effective when done in a group with a staff member (65%). Staff members also feel that facilitation of reflective practice in a group is more effective than on a one-to-one basis (56%).

Most of the respondents (staff 68% and students 57%) indicated that they had experienced reflection as a personal process that is complemented by a group dimension or social process.

Staff (68%) and students (61%) are quite convinced that the best time to implement reflective practice at higher education level is as soon as possible after commencement of the learning programmes.

Student respondents are of the opinion that reflection assisted them to some extent in constructing meaning from their learning experiences (53%).

It is clear from the data regarding the reflective process that reflections must be recorded in such a way that it will assist the student to construct meaning from learning experiences. This process of reflective practice must be introduced as early as possible in learning programmes in the first year of study and feedback needs to be more effectively facilitated in a group. Finally, it was evident that reflection is regarded as a process that is characterised by a personal and a group dimension.

Respondents' perspective on critical reflection as a learning strategy (academic and clinical staff)

This section of the questionnaire was about the perceptions, experiences and opinions of the participants with regard to critical reflection as a learning strategy. The questions and statements for staff and students are different, but in essence the outcome to be reached was the same.

Statements	Percentages			
	Not at all	Disagree slightly	Agree to some extent	Fully agree
Staff members' responsibility (role) in creating an open and supporting atmosphere for reflective practice	0	0	12	88
The sensitivity of staff members towards diverse learning styles of students	0	0	52	48
The creation of equitable learning environments for students by staff members to develop their own reflective skills	0	0	56	44
Reflective practice can be a method for evaluating the purpose of instruction	0	0	28	72
Reflective practice can be a method for evaluating the effectiveness of instruction	0	4	12	84
The assessment policy of the training institution does make provision for reflective assessment methods	0	8	52	40
A reflective journal can be a method to assess whether a student is learning effectively	0	4	32	64

Staff members need to be alerted to the difference between personal disclosure and evidence of reflective practice	0	4	24	72
Staff members lack reflective skills	12	16	40	32
Time available in the learning programmes for reflective practice is sufficient	8	20	32	40
Resistance experienced by staff members after the implementation of reflective practices	12	20	48	20
Staff members' perspective on aspects which have an influence on reflective practice:				
• Cognitive ability of the student	8	12	20	60
• Willingness to engage in the process of reflective practice	0	0	16	84
• The influence of orientation to change	0	0	36	64
• Inconsistency of measuring the outcomes of critical reflection	8	8	24	60
• Language skills of the student	12	12	28	48
• The promotion of discourse	4	8	40	48
After 10 weeks of reflective practice, staff members reflect on:				
• the increase effectiveness as a professional practitioner;	0	0	20	80
• assistance to students to learn effectively;	0	0	36	64
• facilitation of planning instructional activities;	0	8	48	44
• change initiation to the existing practice;	0	0	40	60
• better understanding of students' learning style preferences	0	8	32	60
Critical reflection as a learning strategy has had more success in the:				
lecture room	48	0	0	0
clinical setting	52	0	0	0

Table 4.8. Academic and clinical staff members' perspective on reflection as a learning strategy

The staff respondents indicated that academic and clinical staff needs to take responsibility to create an open and supporting atmosphere (88%) for reflective practice.

Reflective practice can be a method to evaluate the purpose of instruction (72%) and its effectiveness (84%). Staff members need to create equitable learning environments (56%) and be sensitive to differences in learning style preferences (52%).

According to the data the participating institutions do provide, at least to a certain extent (92%), methods for reflective practice in their assessment policies.

As many as 68% of the staff that had already implemented reflective practice (to a certain extent), experienced slight resistance to it. This can be due to the fact that the concept of critical reflection as a learning strategy has not yet been widely implemented. Another possibility is that the spiral effect of action research should continue so that its application and value can be proved to all concerned.

Staff respondents (64%) indicated that a reflective journal can be utilised to assess effective learning and 72% said there must be an alertness of personal disclosure and evidence of reflective practice (72%). Only 40% of the staff felt the time available for reflection is not sufficient. Timetables and clinical work

schedules need to be compiled with a view to allow more time for reflective practice.

Staff members feel to some extent that they lack reflective skills; another 32% are of the opinion that they really need updating on reflective skills. Notwithstanding their apparent lack of reflective skills, the success of reflective practice is still acknowledged in the lecture room (48%) and in the clinical setting (52%).

According to the staff respondents, aspects such as cognitive ability (60%), the students' willingness to engage in the reflective process (64%), language skills (48%) and the promotion of discourse (48%) may influence reflective practice.

A change in learning strategies (60%) and the inconsistency of measuring the outcomes of reflective practice (60%) have a negative influence on reflective practice as such.

After the 10-week implementation period of reflective practice, the staff members' reflections were positive and an increase in effectiveness of staff (80%) and the facilitation of instructional activities (60%) was visible.

As many as 60% of the staff respondents did acquire a better understanding of learning style preferences. Assistance and support of students (64%) can also be a contributing factor (44) towards reflective practice.

Respondents' perspective on critical reflection as a learning strategy (students) incremental

Statements/Questions	Percentages			
	Not at all	Disagree slightly	Agree to some extent	Fully agree
Students experience the process of reflection and journal writing as progressive	8	35	36	21
The implementation of the reflective journal as a learning method is challenging	5	22	38	35
Students experienced the feeling of "ownership of learning" by completing a journal	11	32	37	20
The reflective journal assists students to "make sense" of what they learn	7	25	39	29
Personal progression could be noticed after a period of time	11	29	36	24
Students feel comfortable about students and staff members who might read or look at their journals	23	25	28	24
Students need to realize the importance to be more flexible in their approach to learning	6	21	44	29
A more comprehensive orientation regarding journal writing and reflective practice could have made life easier.	4	31	44	21

Students' reflections are regarded as deep rather than superficial	5	21	49	25
Critical reflection is regarded as a "personal awareness discovery process"	9	16	47	28
Students are taken to higher levels of reflection by keeping a journal	10	26	36	28
The successful managing of "making sense" in the light of past and future experiences	5	21	45	29
To what extent do the students reflect critically with:				
integrity	1	11	54	34
openness	3	15	51	31
commitment	4	25	37	34
fear	18	35	37	10
compromise	7	29	44	20
defensiveness	10	29	48	13
not one of the above	60	12	15	13
Letting go of my familiar learning methods during the 10 week reflective practice period left me rather…				
anxious	25	30	32	13
uncomfortable	19	26	28	27
struggling	16	27	31	26
satisfied	17	33	34	16
excited	25	38	25	12
uncertain	16	29	34	21
hopeful	15	28	31	26
Aspects regarded as positive after the period of reflective practice (10 weeks):				
increase in learning motivation	8	17	48	27
recognising individual progress	6	18	52	24
enhancement of confidence	8	22	41	29
increase in learning independence	8	22	38	32
During self-confrontation, I managed communicating with myself …				
easily	42	-	-	-
sometimes problematic	48			
difficult	10			

Communicating with peer group members on a weekly basis was experienced as: open and relaxed challenging and difficult	 73 27	 -	 -	 -
Engaging in the writing task of keeping a journal was: very easy challenging and difficult	 30 70	 -	 -	 -
The time spent per week by students reflecting on learning experiences: • Reflecting in a journal 10 minutes 20 minutes more than 30 minutes • Documenting and writing in the journal 10 minutes 20 minutes more than 30 minutes • Participation in reflective learning groups: 15 minutes 30 minutes more than 30 minutes	 57 33 15 56 22 11 11 56 32 12	 - - -	 - - -	 - - -

Table 4.9. Students' perspective on reflection as a learning strategy

In total 33% of the students did not experience reflective practice as progressive but personal progression could be noticed after a period of 10 weeks of reflective practice.

Students experienced keeping a reflective journal as challenging (73%), although 48% of the students felt uncomfortable about students and staff reading their journals.

Students (to some extent) agreed that reflective learning and keeping a journal assisted them in making sense of what they had learnt (68%). Only 20% of the students experienced the feeling of ownership of their learning.

As many as 73% of the students realised that they needed to be flexible in their learning approach and 75% of the students regarded reflection as a “personal awareness discovery process”.

Students (74%) were of the opinion that a more comprehensive orientation towards reflection would have been a great help. Keeping a journal proved to students (74%) that they could take their reflections to a higher and deeper level over time.

Students did not critically reflect while keeping a journal with integrity (34%), openness (31%), commitment (34%), but with fear (10%), compromise (20%) and defensiveness (13%). Firstly students need to be better orientated regarding the principles, value and benefit of this alternative learning strategy before they will be committed to this process of transformative learning.

After the period of reflective practice the respondents regarded the following aspects as positive: increase in motivation for learning (73%), recognising individual progress (76%) and enhancing confidence (70%).

Student respondents sometimes found communicating with themselves during the self-confrontation phase problematic (48%); a further 10% of the students found it difficult. Human beings never like the mirror image where one is confronted with reality. It was challenging and difficult for students (70%) to engage in the writing task of keeping a journal.

Students utilised twenty minutes and less to do reflection on learning experiences per week. In total 56% of the respondents took 10 minutes to document/write in the journal, with 22% taking 20 minutes. On average a further 15 minutes per week were spent reflecting together as a learning group (56%). In total 32% of the respondents spent 15 minutes on participating in a reflective learning group.

4.6 CONCLUSION

This chapter provided the data obtained by means of the pilot study questionnaire, observations, structured focus group interviews and the final questionnaires. Staff members observed the 10-week period of reflective practice where students had to keep a reflective journal and attended weekly reflective learning groups.

The objective of the research process was to determine whether critical reflection as a learning strategy could be of value in the radiography teaching and learning

environment as well as to all the role players involved in this process. Different methods of analysis were utilised to make sense of all the qualitative and quantitative data obtained.

The next chapter aims at discussing the findings, draws conclusions and makes recommendations.