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Looking Closely at Teachers who Prepare for Museum Visits

Mpho Shadrack Mosabala

A research report submitted to the Faculty of Science, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the Degree of Masters of Science

Abstract

Although other research has addressed some features of successful school group visits to museums, such as preparation and follow up and emphasis on first-hand experience, there has been little research on the practices being used by the teachers who take their classes to the museums. I examined how teachers from five schools conducted their visits to one of four museums (Scibono Discovery Centre, HartRAO, Johannesburg Planetarium or Adler Museum) with their learners. The case study involved observing the five teachers before, during and after the visit and interviewing them before and after the visit. The data were analysed using communities of practice theory to determine the practices of the selected teachers. An in-depth analysis of the five teachers' interviews and observations was done both for the rich data it provided and for triangulation purposes.

The analysis shows that three teachers had what was described as task-oriented preparation while the other two had learning-oriented preparation. One teacher preparation was also described as not directly about the visit. The analysis further shows that four teachers were observed to have no interaction with their learners in some instance. Three teachers had learning oriented interaction with their learners at the museums. Three teachers were also observed controlling the behaviour of their learners. Furthermore, the analysis shows that the purposes and objectives of the field trips as given by teachers were for entertainment, edutainment, curriculum, interactive, career and tradition. Lastly, teachers follow up activities were described as either task-oriented or learning-oriented. The study shows that some teachers are old timers while others are newcomers in the community of teachers who take their classes to the museums.

Keywords

Museum

Field trip

Communities of Practice

Legitimate Peripheral Participation

Informal learning

School visits

Declaration

I declare that this research report is my own unaided work. It is being submitted for the degree of Master of Science in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

_____

(Signature of candidate)

29th day June 2009

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The teachers and their learners who participated in the study, without you this study would not have been a success. Thanks. Kea leboha.

Last but not least, I wish to express my sincerest thanks to my wife Phihlo for the sacrifices she made, to my friends, Bati, Bonang, Mojalefa and Tatolo who supported and encouraged me throughout this academic journey. I am proud of you.

Dedication

To my late grandmother, ‘Malimakatso Mosabala. Standing on your shoulders I was able to see farther than I would on my own.

To Phihlo Pitjeng-Mosabala, Kata Mosabala and Toka Mosabala for their love, support and sacrifices.

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Abbreviations

HartRAO…….. Hartebeesthoek Radio Astronomy Observatory

GDE……Gauteng Department of Education

NASA……..National Aeronautics and Space Administration

CSIR…….Council for Scientific and Industrial Research

CoP ……..Community of Practice

FRD……Foundation for Research Development

NRF…….National Research Foundation

MST…….Department's Mathematics, Science & Technology

USA…….. …..United States of America

Chapter 1: Introduction

1.1 Introduction

Science visits to museums form part of school programmes in most countries including South Africa. Between 2000 and 2005, 75% of the visitors who went to both Sci-Bono Discovery Centre and the Planetarium and 89% to Hartebeesthoek Radio Astronomy Observatory (HartRAO) were school groups (Lelliott, 2007). According to the Johannesburg Planetarium 2008 statistics the numbers of their school group visitors have been increasing since 2002 and this could be the case with other centres. Table 1.1 below shows the statistics from 2002 to 2006.

Table 1.1: Number of school visitors at Johannesburg Planetarium.

Year	2002	2003	2004	2005	2006
Number of visitors (Learners and Teachers)	60014	61357	68823	69477	70258

My study focuses on what Falk and Dierking (2000) have generally termed museums. These are man-made venues that are open to the general public, have an educational agenda, generally contain objects, displays or interactives through which information or appreciation is expressed, and which tend to care about whether they are visited. Museum in this broad definition includes all type of museums, nature centres, aquaria, zoos, planetaria, visitors' centres of parks, botanical gardens, arboreta, to name the most important ones. These institutions have something in common in that they serve teachers and learners on field trips, but not exclusively. In fact their educational philosophy and pedagogy might often be quite different from school (Falk & Dierking, 2000). Consequently, museums' interests in school field trips are somewhat different from those of teachers. While many do their best to enhance learners' learning experiences by extending and complementing classroom teaching and by integrating their offerings into the school curriculum or by aligning such offerings with standards (Anderson & Zhang, 2003), they also pursue an institutional interest, namely to introduce learners to institutions for non school learning and thus to win them as potential visitors in future. However, the field trips conducted by teachers are

often merely extensions of classrooms within the context of an informal learning environment. The term field trip has not been defined extensively in the literature. The definition used in this research is adapted from Michie (1998). A field trip is a trip arranged by the school and done for educational purposes, in which the learners go to places where the materials of the curriculum may be seen and studied directly in their real situation. Bamberger and Tal (2006) use the terms 'field trip' and 'museum visit' to refer to educational school trips in their study. The same two authors use the term 'museum visit' in Bamberger and Tal (2008). Griffin (1994; 1998; 2004) used the term 'museum visit'. However, in my study these terms are used interchangeably.

1.2 Why teachers?

My past experiences and my reading of the literature points out that museum visits are most successful when preparation is done before the visit. The constructivism theory of learning puts emphasis on making the connection between what the learners already know and the new concepts they are currently learning. This theory shows the importance of linking the experience learners get at school with that they get during the museum visit. I believe that teachers are the ones responsible for making sure that their learners are able to make connections between school experiences and museum experiences. I therefore consider the teacher to be the main factor in providing suitable learning conditions for the learners. My study partly fits into the model that Griffin (1998) used to guide her dissertation (Figure 1.1).

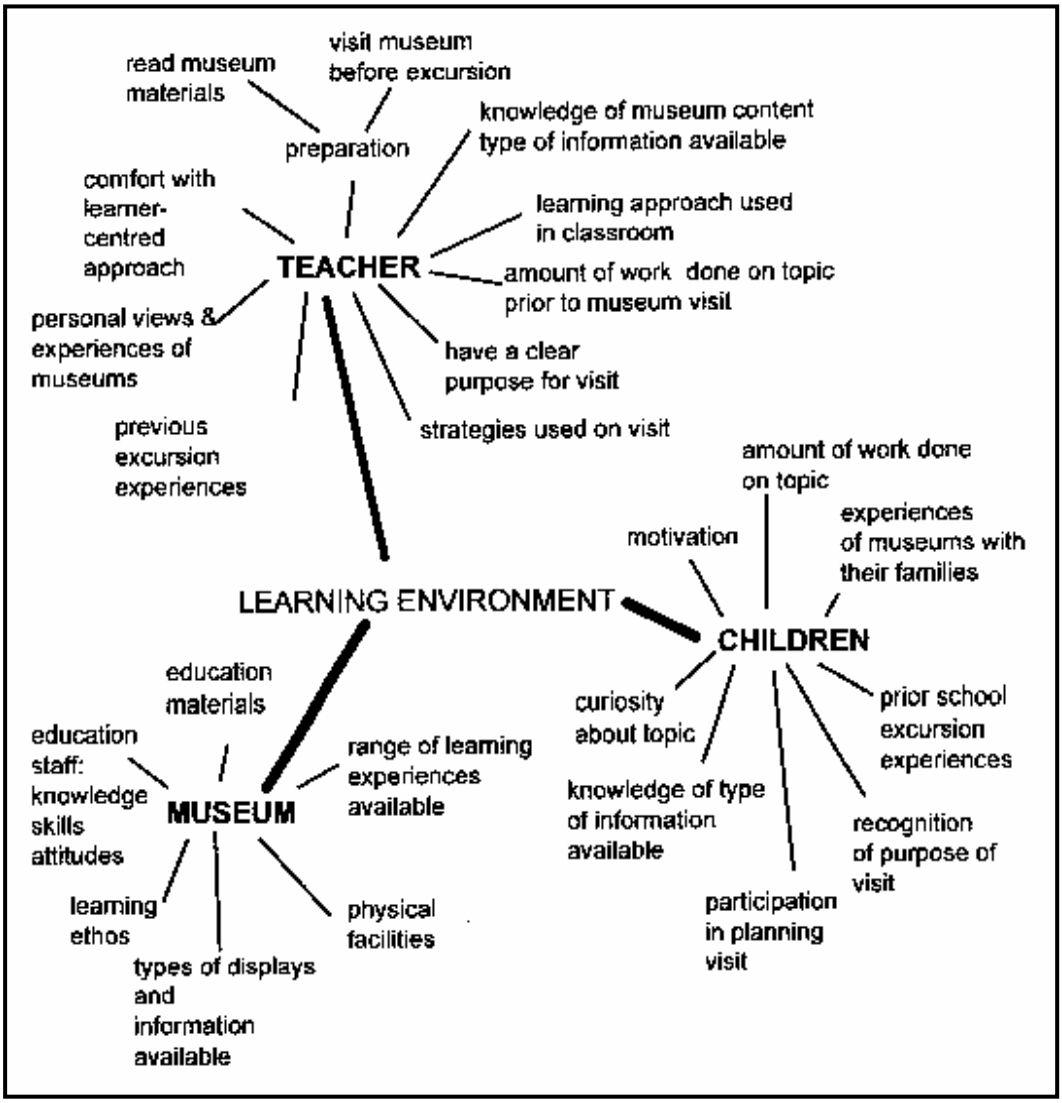

Figure 1.1 Factors which may determine the learning environment for school groups visiting museums (Griffin, 1998: p4).

Griffin's (1998) model has 3 factors that can determine the learning environment for school groups; teacher, learners (children) and museum. All the three factors are important in learners' learning in museums but I decided to focus more on the teachers and their learners because of my experience about field trips as a learner and later as a teacher. Regarding the learners, the focus of my study is on whether they recognise the purpose of the field trip and whether they are aware of any post visit activity they would do when they get back at school.

Organising and conducting a class field trip is a difficult task, and the common administrative aspects more than often seem to distract teachers from the educational aspects of the field trip (Anderson & Zhang, 2003). Griffin & Symington (1997), for instance, stated that research findings of how to plan and manage field trips to out-of-school learning environments and the observable reality of the field trips have generally little in common. Personal evidence and some research studies indicate that field trips are often under-utilised class outings and not sufficiently integrated into classroom learning (Griffin, 1998).

Teachers may ask for advice from field trips guides, use recommendations from research articles and books (Rennie & McClafferty, 1995) or rely on materials provided by the out-of-school settings, which are typically venue-specific information given when field trip bookings are confirmed. At times they get information from specific field trip related sections on the website of the centre (Rennie & McClafferty, 1995).

1.3 Field trip stages

Planning and implementation of field trips is a process that may take a lot of time. There are many things involved in field trips. These include things like risks and precautions to be taken and rules and regulations of a place to be visited. Other things may include ways of getting to the place visited, what to expect from the visit, and number of visitors that could be accommodated. However, every field trip is likely to go through some stages, and Myers and Jones (2004) summarise these stages into three that are shown on figure 1.2. The components that form the core of my study are curriculum, role of teachers and follow up activities. Below is a description of what each stage is comprised of.

1.3.1 Pre-visit Stage

There are many steps that are taken by schools during the pre-visit phase and these include things mentioned in the previous section (section 1.3). Myer and Jones (2004) summarise these as administration and curriculum. The administrative component involves all of the steps taken by the school or a person in charge to arrange the

logistics of the field trip. These steps may include securing permission from appropriate administration, organizing transportation to and from the field trip location, contacting the field trip location to verify the schedule and activities, and obtaining signed permission slips from parents of learners attending the field trip. Unfortunately, many field trip organizers only focus on administrative concerns during the pre-visit stage of field trip planning. Although the activities of the administration component are important, if organizers only focus on logistics, a major segment of the pre-visit stage is missing and field trips may not be educationally successful (Anderson & Zhang, 2003). Teachers should be concentrating on things that learners are going to learn at the museum. They should be thinking about things like the reasons for the visit, find out what the museum provides and other things as recommended by Braund (2004) (see appendix E).

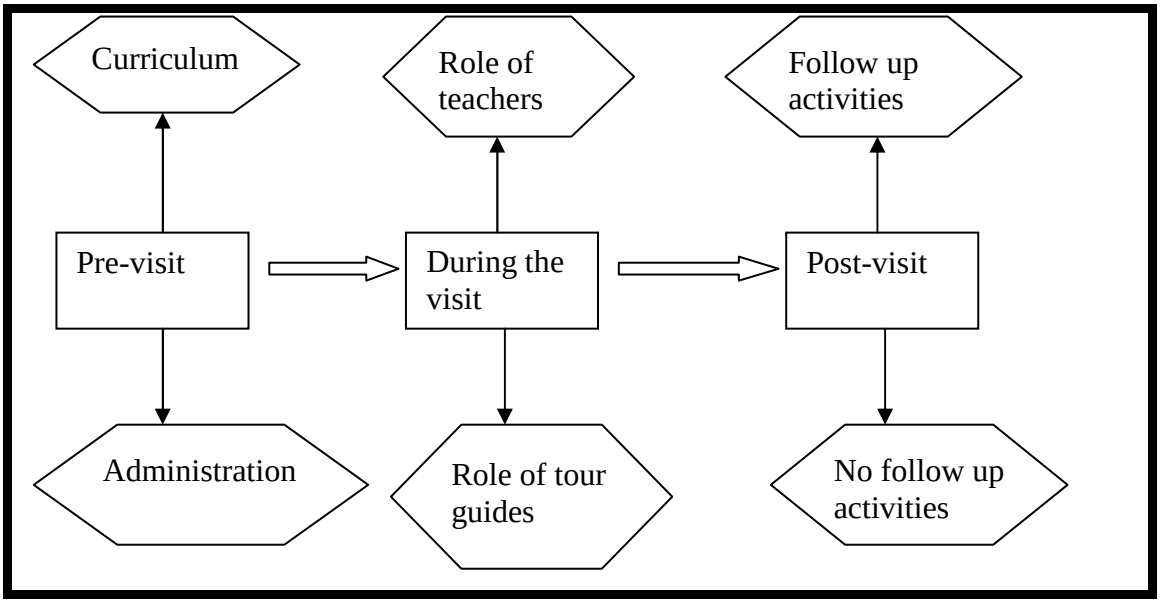

Figure 1.2 Field Trip Planning (adapted from Myers and Jones, 2004).

1.3.2 During the visit Stage

The second stage of a field trip is during the field trip. Two components are often observed during this stage: the role of the teachers and the role of the tour guides (see figure 1.2). During the visit, the tour guides normally take the learners around and show them displays in the museums. Many of these displays are related to the educational goals of the field trip. This also provides an opportunity for learners and sometimes even their teachers to ask any questions they may have developed during

their exploration time. Teachers sometimes are the ones who take the responsibility of leading their learners around the museums. In cases like that it is important to look at the role of teachers during the visit stage. Even though monitoring and management of the experience is important, monitoring learners learning is mainly the teachers' responsibility. I believe that throughout the field trip, the teachers should be actively involved in teaching/learning activities. Teachers should interact with their learners to help answer questions they might have. They should also initiate discussion with small groups of participants by asking them questions. Most importantly they should function more as facilitators or guides. By playing an active rather than a passive role during the field trip, I believe teachers can increase student interest and learning.

1.3.3 Post-visit Stage

The last stage of a field trip is the post-visit stage. Figure 1.2 shows that at this stage there might be some follow up activities or such activities might not take place. My study is interested in cases where there are follow up activities being done after the visit. During the follow up activity teachers can encourage their learners to share and discuss their experiences during the field trip. This could include sharing and discussing data or results of assigned small group activities as well as sharing feelings about specific aspects of the field trip or overall impressions. The discussion and sharing of experience may help to support newly learned scientific concepts and at the same time help the teachers to spot the misconceptions that learners may bring from the visit (Anderson, Lucas & Ginns, 2000). Chapter Five gives a description of how teachers involved in my study did their follow up activities.

1.4 Aim of the study

The aim of the study is to investigate selected teachers' perceptions about the value and purpose of the visit, how teachers prepare for the visits, what role they play during visits and how they follow up with the class after the visit. The focus is on teachers who prepare for visits and conduct the follow up activities after the visit as research indicates this is the best practice (e.g. Braund, 2004; Rennie & McClafferty, 1996).

1.5 Statement of purpose and research questions

There is a growing interest that learning outside the classroom plays an important part in improving learners' attitude towards science as well improving gain of conceptual knowledge (Rennie & McClafferty, 1995). There are many places that can be used by learners as part of learning outside the formal classroom. Over the past three decades learners have been taken out of their formal classroom into informal learning environments (Lucas, 1999) where they are still supposed to learn concepts that are useful as demanded by the curriculum. The field trips that schools or classes take are to aquariums, zoos, planetariums, libraries, science centres, museums and other such places. South African science learners and their teachers like their counterparts in other countries (discussed in the literature review) visit these out-of-school places. For example the Johannesburg Planetarium statistics given at the beginning of the chapter show that school visits have increased over the past five years.

Like any other out of school activity, visits to museum are believed to contribute to learners' improvement of learning (Donald, 1991; Falk & Dierking, 2000) so these serve to give learners learning opportunities and experiences. Museum visits also improve the attitude of learners towards science (Jarvis & Pell, 2002), and are therefore valued as resources for learning by the schools.

Even though visits to these science centres and museums are regarded as valuable, there is a major concern about how effectively teachers use them to promote learners' gaining of conceptual knowledge and how teachers also try to relate the visits with what learners do in classroom or the curriculum (Griffin & Symington, 1997; Kisiel, 2005). The research shows that teachers often hardly state their objectives for the visits and they often differ in their perceptions (Tal, Bamberger & Morag, 2005). Sometimes teachers do not make proper preparations in order to make sure that learners are focused before they start the visit to museum and that little is done to try and recap on what was done during the visit (Tal et al., 2005). In a case where the teachers are the ones guiding the visit, their agendas and perceptions for the visit are to be considered important because these have direct impact on the learners' experiences and their learning (Kisiel, 2005), hence it is vital to find the roles teachers play during the visit. The study is guided by the following research questions;

- How do selected teachers prepare their learners for a museum visit?
- What role do these teachers play during the visit?
- How do these teachers follow up with the class after the visit?
- What are the teachers' perceptions about purpose and objectives of the visit?

1.6 Rationale

My experience as a student and later as a teacher has taught me that there is a common practice of taking learners to field trips. This forms part of the school culture practiced every year. It is also true that not every teacher and learner gets a chance to visit museums every year but many of them do. As a student, sometimes we would be told in advance what we were going to do at a destination area. But there were times when we as learners only found out which topic was related to the visit when we arrived at the venue. However, it is worth mentioning that concepts that formed part of the visit were easily remembered even some time after the visit. Visits have lasting impact on learners and this includes strong memories of what it is done in the museums (Rennie & McClafferty, 1995; Falk & Dierking, 1997; 2000).

Preparations for visits and the visits themselves are both time consuming and financially demanding in that they take school time for lessons and they demand both parents and the school to pay out some money. Of most interest is the fact that the visits can be valuable for learning. Teachers are the ones proposing and leading in making sure that these visits take place and become successful. Teachers are the ones responsible for making choices as to which science centre or museum is to be visited. In most countries they probably do this with the guidance of the curriculum which means that the visit is meant to supplement what is done in classroom (Tal, 2001; Tal et al., 2005). Because teachers are the ones in charge of these visits, either through organising the field trips or preparing learners for the visit, helping them during the visit and trying to recap on the visit when getting back to school, it therefore worth finding how they are involved in these visits.

Much research has been done on informal learning. Most of the studies were done outside South Africa in countries like Canada, Australia, United States of America, Singapore, Israel, Germany and United Kingdom. The findings of my study will help in determining how teachers in South Africa can better prepare for visits, do post visit activities and how they can improve on their involvement during these visits. This is therefore the motive behind my interest to do the study. In the chapter that follows I look at the research into museum visits, what the findings are and how those are related to my study.

1.7 The organisation of the research report

Chapter 1: This is the introduction which covers why I chose teachers, the aim, the statement of the purpose, research questions, rationale and limitations of the study.

Chapter 2: Here I selectively review the relevant literature of informal learning which forms the background to the study. I also introduce the theoretical framework of communities of practice which forms basis of my study.

Chapter 3: This chapter focuses on the research methodology, the sample and instruments used to collect the data and how the data was collected. This chapter also addresses the issues of ethics and rigour.

Chapter 4: This chapter presents the results.

Chapter 5: This chapter focuses on the discussions of the findings.

Chapter 6: This chapter focuses on conclusions, reflections and implications of the study.

Chapter 2

Literature Review and Theoretical Framework

2.0 Introduction

The learning and teaching of science takes place in a variety of environments: in the formal teaching-learning classroom, in the science laboratory, or in an informal setting (e.g. outdoors). Informal learning applies to learning of science that occurs outside the four-walled traditional or formal classroom. There is a belief that science learning hardly occurs and develops from a single experience for instance schooling only, rather it is cumulative, emerging over time through multiple human experiences including experiences in museums and schools (Dierking, Falk, Rennie, Anderson & Ellenbogen, 2003). When there is inadequate classroom resources and limited time for enquiry-based science, it often makes sense for teachers to look for alternative ways of support to maintain a strong classroom science curriculum (Kisiel, 2006). One possible set of resources includes the informal science institutions within the community such as science centres, natural history museums, zoos, aquaria, and natures centres (Kisiel, 2006). All these institutions are collectively referred to as 'museums' in my study.

Museums are viewed by teachers to be among our greatest institutions for learning. "They are places in which society comes together" and conserves visible records of social, scientific, and inventive activities: "in which it supports scholarship that deepens and broadens knowledge; and to which people of all ages turn to extend their understanding of history and society to increase their cultural scope and explore scientific phenomena" (Leinhardt & Crowley, 1998: p. 2). Much research has been done on informal learning in countries like Canada, Australia, United States of America and others. Such studies include how museums support learning (Rennie & McClafferty, 1995; Anthony & Subramaniam, 2004), their effect on learners' attitude (Jarvis & Pell, 2002, 2005; Smist, Archambault & Owen, 1994), nature of learning in museums (Griffin, 2004), effect of prior knowledge and interest on museum visitors learning (Falk & Adelman, 2003) and others. Few studies looked at the role of teachers during the museum visits (Cox-Petersen, Marsh, Kisiel & Melber, 2003; Anderson & Zhang, 2003; Tal, Bamberger & Morag, 2005 and Lelliott, 2009).

Within the past few decades, researchers have begun to look more closely at school visits to museums in order to better understand cognitive and affective outcomes as well as factors that are likely to improve the learning experience (Anderson & Lucas, 1997; Bitgood, 1994; Falk & Dierking, 1997; Rennie & McClafferty, 1995). Not only do these studies suggest that museum visits have both positive affective and cognitive outcomes for learners, but they also suggest that certain strategies, such as pre-visit preparation and post-visit follow up, can greatly improve student learning resulting from the visit. Fewer investigations however, have looked at the role of the teacher within the museum visit setting or the strategies used during the visits. Such studies reveal that teachers often fail to link their museum visit experiences to the classroom curriculum and may not always subscribe to an agenda that facilitates student learning within the museum (Griffin & Symington, 1997). Furthermore, it appears that teachers may have intentions to connect visits with their classroom curriculum, but there may be other perceptions or concerns that override these intentions (Anderson & Zhang, 2003; Kisiel, 2005). Thus, although teachers see the museum visit as an important experience in itself, they may not be aware of how best to use these informal learning settings to support learning in their classroom.

2.1 Preparing for museum visits

If the purpose of a field trip is to provide learners with a learning experience, properly preparing learners for the trip and making connections to the curriculum being studied in class are important. Kubota and Olstad (1991) and Falk and Balling (1982) found that the level of novelty learners experience when they enter a museum can affect their initial curiosity and subsequently limit cognitive learning outcomes derived from their visit. Therefore, teachers need to be made aware of this “novelty effect” and use some strategies to reduce the effect of a novel environment on learners learning. These strategies include a preliminary visit by the learners to the place to be visited and formal preview of the exhibits and physical environment in class (Anderson & Lucas, 1997). Other strategies as summarised in Lucas (1999) include making sure the learners have appropriate levels of knowledge about the focus of the visit and providing the learners an opportunity to practice relevant skills before the visit

Even though teachers are often involved in museum visits with their learners, teachers are often not aware of their role in these visits (Kisiel, 2005), they hardly define their objectives and they do not often plan for the visits (Tal et al, 2005). This is likely to have an impact on learners themselves who, in most cases, are taken to museums for learning. Kisiel (2005) argues a teacher's motive for the visit to a museum is likely to have an impact on his or her learners' experience and the prospects of learning in those environments. However, some teachers do plan for visits but most of the time the planning involved is about getting the transport and the cost of the visits (Anderson & Zhang, 2003).

Anderson, Piscitelli, Weier, Everett and Tayler (2002) draw on the significance of pre- and post-visit activities when visiting a science centre. The importance of such activities is that they are likely to support any learning outcomes associated with such visits. Moreover, they would enable the teacher to detect any alternative conceptions that may be created or reinforced during a visit to an informal setting. From a similar perspective, Olson, Cox-Petersen and McComas (2001) and Falk and Dierking (1992) support that preparing the pupils and linking this kind of visit to the curriculum are fundamental issues when this visit is learning oriented. Implementing such activities would prepare learners by providing some prior knowledge that would be of help both during the visit, minimizing the novelty factor and afterwards facilitating new connections made through elaboration of newly gained experiences. In their study, Griffin and Symington (1997) report that, regarding the majority of the teachers they examined, there was rather limited preparation involved and often purely on organizational matters. In addition, no follow up activities took place or they were initially planned but not fulfilled. Karnezou (2005) suggests that the learning opportunities offered in an informal setting, such as a technology museum, pass by without being exploited, because no scheduled activities take place during the visit, pre-visit and post-visit. This is the situation also because teachers do not often acknowledge the need for close cooperation with the museum guide. Griffin and Symington's (1997) findings point out that teachers do not prepare their pupils and as also indicated by Cox-Petersen and Pfaffinger (1998), teachers often impose features and restrictions of a formal learning setting on to an informal one. I suggest that this behaviour shown by teachers can affect the learners' learning as an informal setting is different from a classroom where teachers are normally in charge of everything.

Pre-visit activities provide prior knowledge that can aid in the understanding of experiences at the site (Anderson, Kisiel & Storksdieck, 2006). These preparations are also very important in helping the learners to learn better at the visiting sites. Rennie and McClafferty (1996) consider pre-visit preparation as an important factor that affects the learning during the museum visits. Different aspects of pre-visit preparation are extensively discussed in the literature. Anderson & Lucas (1997) in their study of 75 learners found that it is important for learners to know something about the location before they can commence the visit as this is believed to reduce the learners' level of novelty. Teachers' perceptions about the preparation for experiences at the museum might affect the way they do these preparations. Anderson et al. (2006) found that 60% of the teachers in their study had a belief that it was the museum's responsibility to make the plan of what learners should do at the museum. 32% believed the preparation and the follow up of the visit should be the sole responsibility of the museum. I therefore argue that perceptions are likely to affect the way teachers would make their preparation. Probably teachers would show a commitment in the way they prepare or make follow up activity if they believed it was their responsibility to prepare their learners for museum visits.

Teachers probably organize visits to science centres or museums with the aim of enhancing learners' learning. However, teachers must think about learners' background, their social and physical environment when planning and implementing the visits and follow up activities (Rennie & McClafferty, 1995). They should know in advance what activities their learners are going to be involved in, in the museum and what material they will be given. These will help the teachers to select those activities that are at the cognitive level of their learners and with that information teachers can make the field trip to fit the needs of their current teaching programme (Rennie & McClafferty, 1995). The preparations for the visits are therefore regarded as important by the literature even though very little preparation is done for these visits (Storksdieck, 2001; Tal et al., 2005). Rennie and McClafferty (1995) regard the social context of the visit to be very important in influencing learning and satisfaction of the learners. However, teachers hardly perceive this socio-cultural learning experience. For example Tal et al. (2005) looked at roles and the perceptions of 30 teachers who visited museums and found that teachers were not active with regard to

the visit and were only helping the museum guides with discipline issues. They also found that there was no proper preparation for the visit in school where teachers only reported the technical aspects of the visit like clothing, food and visiting time.

Normally, teachers are not able to choose the time they would like to take the visits. Anderson et al. (2006) found that only about half (54% of 115) of the teachers were able to arrange the visits themselves and the time they would like to do those visits. Anderson et al. argue that the inability to schedule the visits within each teacher's suitable time makes it very difficult for them to link the visits to what learners do at school. Anderson's study also argues that teachers prioritise the school curriculum over the proper preparation of these visits and this looks to be beyond the teachers' control (2006). So time seems to be one of the limiting factors when it comes to preparing and choosing time for museum visits.

2.2 Importance of museum visits

Teachers have different views about the importance of taking their classes to museums. Some of them give reasons like providing first hand experience, stimulating interest and motivation in science, giving meaning to learning and interrelationships, observation and perception skills and social development (Sorrentino & Bell cited by Michie, 1998). Others take their classes there because these are sites for learning, entertainment and practical issues (Falk, Moussouri & Coulson, 1998; Anderson et al., 2006). In Michie's (1998) study, when the secondary science teachers were asked why they were taking the museum visit they gave reasons like;

- Giving the learners hands-on experiences
- Giving learners real life experiences they cannot have in class
- Enhancing learners' understanding
- Improving learners' attitude towards science

Anderson et al. (2006) refer to the situation of having multitude objectives for visiting the museums as a sign that teachers were aware of the rich opportunity provided by the visits. In contrast, Storksdieck, Kaul and Werner (2005) referred to this multitude of objectives as conflicting. So having many objectives is not always a sign of

teachers who are aware of the learning opportunities provided by the museums but it can also show that teachers just give a list of objectives which are not necessarily meant for their visits.

Few researchers have looked at the perception of learners about the visit (Lucas, 2000). However, I believe it is important to find learners' perceptions about the museum visits as they are the ones who are supposed to benefit from the visits. In my study this was done by interviewing three learners from each of the five schools. Lucas (2000), through interview, found that the learners were aware that the visit they were taking was meant for them to learn even though one of them was looking forward to the element of fun in the visit.

Even though some teachers give many reasons for visiting the museums with their classes there are still those who could not give the clear purpose of their visits. Nearly half of the teachers that were interviewed by Tal et al, (2005) were not able to specify the reasons for their visits. This suggests that sometimes teachers take their learners to museums without knowing exactly why they are doing it. Anderson (1998) cited in Lucas (1999) described how teachers seeking to organise class visits to such institutions may also grapple with conflicting objectives in relation to the nature of activities and intended learning outcomes, especially when the teacher's agenda is to use the visit as an extension of lessons presented in a formal learning environment such as a school classroom. It is therefore very important to investigate what objectives teachers have about the visits.

Museum visits can have lasting impacts on learners, with strong memories of both cognitive and social contexts (Falk & Dierking, 1997, 2000). Museums are also supposed to be places where the learner's desire to know is stimulated (Donald, 1991). So it is possible that teachers are using visits to these institutions to stimulate their learners' aspiration for learning. A museum provides an expression of choice in activities and social interaction among the learners (Griffin, 1994). The social interaction is important because what learners can do with the assistance of others can be more suggestive than what they can do on their own (Vygotsky, 1978). Visits to museums can also be used to change learners' attitude towards science (Dean, 1994). However, this in contrast with what Boucher and Allard cited in Donald (1991) found

in their study. They claim that a one day visit to a museum cannot bring a change to attitude for any field of study. Jarvis and Pell (2002) in their study where they looked at the effects of a visit to the National Space Centre in the UK on learners' attitude, found that the visit had improved the attitude of most learners immediately after the visit. However, there were some negative effects on other learners. The improvement of the attitude shown by learners was found to be short-lived since after two months it was at the same level as before the visit and for some learners it was even below the original level. The findings of Jarvis and Pell's study therefore confirm what Boucher and Allard found but contrast Dean's findings. On the other hand Jarvis and Pell (2005) found that if the teachers support their learners by interacting and leading them and also showing some interest during the tour the learners show improved attitude even after two months. Jarvis and Pell (2005) therefore argued that the behaviour of teachers had an influence on learners' attitude. Their study shows the important role that teachers play for learners during the visits.

2.3 Teachers' role at museum

Teachers are commonly the initiators and organisers of visits to museums. It is therefore worth looking at whether there is any specific role they play on the day of the visit especially at the visiting centre. There is relatively little literature about the role that teachers play during a museum visit. Tal et al. (2005) in their study of teachers' perceptions about the visit and their role during these visits, observed that teachers played different roles. There were those who were working in small groups of learners, those who were looking at the exhibits with some learners and those who were just standing quietly behind their learners and those who were chatting to tour guides. Griffin and Symington (1997) also obtained similar results in their study where they were investigating strategies used by class teachers before, during and after the museum visits. However, there were some teachers who were not interacting with their learners but were found chatting to their colleagues outside the visiting areas. This is despite the fact that teachers are needed by their learners so that they can help them get the track of their learning objectives, respond to questions asked by learners and suggestion to extend learners' thinking (Rennie & McClafferty, 1995).

As discussed in the previous section Jarvis and Pell (2005), in the more recent study found that teachers played leading roles in the groups that were formed while they did not in the first study. The results from Jarvis and Pell (2005) showed persistence of improved attitude even after two months of the visit. This was down to the teachers' support during the visit who also demonstrated their interest in the activities they did. These two studies substantiate the importance of teachers playing the leading role during the visits.

The literature suggests that most teachers are not actively involved in the visits their learners make to museums, and view those visits as time when learners are supposed to enjoy themselves and observe exciting things (Tal et al., 2005). Tal et al., (2005) further suggest that the reasons for teachers not being engaged and having this perception about the visits are that teachers are not committed and they do not have time for these visits. The teachers in South Africa are likely to be following the same trend as their international counterparts but there is very little evidence to confirm this. Therefore my study tries to address this gap in the literature and also looks for some best practices which are taking place during the visits.

Sometimes the museum personnel or tour guides are also responsible for the role that teachers are often observed playing during the visit. Teachers are not given chance to interact with their learners at the visiting place. Tal and Morag (2007) observed that the main help that the tour guides asked for which initiated teacher-learners' interactions, was technical, involving arranging the learners in groups, calling them to move to the next activity and keeping them quiet. However, in a few instances in some museum visits teachers were asked about the prior knowledge of their learners but they were still not given chance to take an active role with their learners (Tal & Morag, 2007). The results of Tal and Morag's study show that teachers do not always have the choices of leading the learners in museums.

Cox-Petersen, Marsh, Kisiel and Melber (2003) carried out an investigation to find out how content was conveyed to learners, what learners gained from the visit and how content and pedagogy of a tour complemented the recommendations from formal science documents and informal learning literature. Cox-Petersen et al., (2003) used about 30 schools that visited a museum of natural history. They found that the format

of the visit was different from what the research recommended, which states that educators should act as facilitators of knowledge who also encourage individual inquiry. Cox-Petersen et al. propose a situation where the teachers would be able lead their learners during the tour at the museum.

2.4 Follow up activities

In my study, by the follow up activity I mean a classroom-based activity or exercise specifically designed to enhance learning about a particular topic or phenomenon experienced by learners during a visit to a museum or similar informal learning environment. In practice, there are many forms that a follow up activity may take, and there are many perspectives from which a teacher might develop a follow up activity (Anderson, 1998 cited in Lucas, 1999). A follow up activity may be as simple as a classroom-based discussion or as complex as an extended research project. My view is that follow up activities have the potential to be highly influential and powerful knowledge building strategies when they enable learners to consolidate and enhance their knowledge and understanding in appropriate ways.

Many museum-based studies (e.g. Griffin, 1998; Griffin & Symington, 1997), which have investigated follow up activities that are done after visiting a museum, have restricted such investigations to finding whether teachers do follow up activities or not. Most studies do not look at how the follow up activities are done and hence my study has attempted to investigate this.

A class visit to a museum can be regarded to be extension of the formal classroom experience and is commonly planned for that reason, regardless of the informal setting environment of the museum (Anderson & Lucas, 2001). In the same manner, classroom-based post-visit activities can be considered to be an extension of the museum visit, and the potential benefits of carrying out such activities have been identified (Griffin, 1998; Griffin & Symington, 1997). I argue that, from a teacher's point of view, there are definite benefits for designing follow up activities that are closely linked to the formal school curriculum. Linking the experiences to the curriculum provides the advantage of an established relevant context to which the

learners' experiences in the museum and subsequently in the classroom can be related significantly (Griffin, 1998).

It is logical to assume that learners' understandings of at least some of the information and principles portrayed by the exhibits will be developed in varying degrees as a result of their museum experiences, but the extent of such transformations is difficult for teachers to predict. Nevertheless, the types and extent of knowledge development can be determined in part after museum experiences through a variety of means, such as in-gallery interviews, focus groups, surveys, and similar techniques (Falk & Dierking, 1992; Rennie & McClafferty, 1996). With experience, teachers may build a personal awareness of the range and probability of learning outcomes for learners whom they have taken to visit a local museum.

It has been suggested that follow up activities should be seen as supporting experiences which help develop learners' knowledge and understandings in the light of the wider school, curriculum, and life experiences (Griffin, 1998; Lucas, 2000). From a teacher's perspective, follow up activities should be developed from the basis of student knowledge which has resulted from the museum experiences, but contextualized within the wider curriculum.

The roles of post-visit activities as factors that have the potential to enhance museum experiences have been examined by several researchers (Falk & Dierking, 2000). According to Anderson et al. (2006) the post-visit activities strengthen new connections that were made during the visit and also give additional context for future experiences. If teachers do follow up activities the learners will therefore not only reinforce what they learned during the visit but will also be in a better position and prepared for the next museum they will visit.

Falk, Dierking, Rennie and Williams (2006) argue that the most vital question is whether the visit to a museum or a science centre has any valuable impact on the visitors. Their argument is based on the fact that the visits are always very short. Falk and colleagues argue that the impact depends solely on visitor’s motivation or interest for the visit. There is an argument that even though there might be a significant change in learners’ knowledge, this is short-lived and hence is misleading. These

changes that are observed after the visit disappear after some short time and the responses return to the original level (Falk et al., 2006). It is therefore important that teachers do some post visit activities so that whatever was learnt can be remembered even after some time.

The four sections, 2.1 to 2.4 provided some literature regarding importance of museum visits, teachers' preparations and follow up; and the role teachers play during the visits to museums. The following sections are discussions of the theoretical framework of my study.

2.5 Theoretical framework

2.5.1 Communities of practice

The basic argument made by Lave and Wenger (1991) is that communities of practice are everywhere and that we are generally involved in a number of them whether that is at work, school, home, or in our civic and leisure interests. In some groups we are core members, in others we are more at the margins. The term community of practice is defined as the participation in an activity system about which participants share a common identity and motivation. Teachers who make preparations, follow up activities and who are concerned about their learners learning science in the museums or trying to improve their learners' attitude towards science by taking them to museums form a community of practice. They may have similar challenges that they may try to overcome together and also share some experiences among themselves. These are some of the features of a community of practice.

The features of communities of practice differ. Some may have names while many do not. Some communities of practice are fairly formal in organization; others are very fluid and informal. However, members are brought together by joining in common activities and by what they have learned through their mutual engagement in these activities (Wenger, 1998). Communities of practice offer anyone with an interest in an area especially those with practical experience, to communicate in order to solve problems, share experiences and ideas share good practice and approaches which have worked, discuss research and new innovations. Teachers who take their learners to

museums may share these good practices and approaches hence they form a community of practice.

Lave and Wenger (1991) define learning as being situated in communities of practice, rather than within the minds of individuals as cognitive psychologists have traditionally assumed. By situated learning here we mean that the activity in which knowledge is developed and applied is not separable from or ancillary to learning and cognition nor is it neutral but it is an integral part of what is learned (Brown, Collins & Duguid, 1989). Brown et al. (1989) use the term legitimate peripheral participation to refer to active and gradually increasing participation in communities of practice, which results in learning.

People in the same community can be recognised by their characteristic practice. Wenger (1998) observes that despite being a novel concept, communities of practice are fundamental to our experience of our daily lives and therefore they are familiar. We are all members of many, often overlapping communities of practice. More defined groupings can be found in our professional contexts. Indeed, in schools, there are many overlapping communities of practice: playground gangs, after-school clubs, office secretaries, support staff and groups of teachers. One of these groups can be that of teachers who often take their classes to museums.

It is worth noting that not all communities are communities of practice. The three key dimensions of mutual engagement, joint enterprise and shared repertoire are all necessary conditions for recognition in this theoretical construct (Wenger, 1998). Mutual engagement refers to the amount and pattern of interaction among the members of the community (Lave & Wenger, 1991). These interactions shape the culture and practices of the community. On other hand joint enterprise is the term used to show that members of the community of practice have the same purpose, they do things collectively and they all have responsibility of what they do. Lastly, shared repertoire refers to the continual development and maintenance of a shared collection of procedures and ways of operating (Wenger, 1998). People who work alongside each other in a department without mutual engagement cannot be said to be part of a community of practice. Communities of practice are not therefore necessarily synonymous with institutional categories. Moreover, people can be mutually engaged

across school boundaries developing joint enterprise and shared inventory, forming trans-school communities of practice.

Membership of a community of practice is elective, requires acceptance and is characterised by participation (Wenger, 1998). Public institutions like schools or even other social configurations as a whole are often too large or complex to be treated as single communities of practice and must therefore be regarded as clusters of interconnected or overlapping communities of practice (Wenger, 1998). The schools therefore have many communities of practice and the teachers who often take learners or classes to museums form part of these clusters.

Teachers can form communities of practice within their own school and departmental structures. It does not have to be teachers from same department in the same or from the same school. It is more likely that communities of practice can form across departments or schools. Each local community interprets the broader discourse and develops its own practice and style. This is shared and appropriated through contact with other communities of practice. Some members of local communities of practice may reach out and become members of trans-school communities through engagement and participation, forming or joining of associations or societies, attending conferences where the discussion is about learning in museums.

2.5.2 Legitimate Peripheral Participation

Lave and Wenger (1991) use the term Legitimate Peripheral Participation to describe the process by which newcomers are included in a community of practice. It provides a way to speak about the relations between newcomers and old timers. The newcomers are those who are at periphery of the community while old timers are at centre or experts of the community of practice. It concerns the process by which newcomers become part of a community of practice. Learning is described as participation. Newcomers engage in real work that is connected to the work of old timers. In doing so, the newcomers become socialized into the field as their participation becomes more central. Teachers who take their classes to museums differ in experience. There are those who know little about museum visits and there are those who have great experience. Teachers with much experience occupy the

central position of the community of practice and those who are new occupy the outer part. The old-timers are also co-participants in the community of practice which means they also come with the same aims as other members. Initially teachers have to join a community of practice and learn at the periphery. As they become more competent they move more to the centre of this particular community of practice. Learning is, therefore, not seen as the acquisition of knowledge by individuals but as a process of social participation.

2.6 Concluding remarks

This chapter has given an overview of some of the research on informal learning. It also looks at those areas of informal learning that are given more attention by researchers and the ones that do not get enough attention. The literature discussed in this chapter shows that teachers' preparations, teachers' museum role, teachers' objectives about museum visits and teachers' follow up activities are some the areas that are not researched extensively. Hence my study is focusing on these areas.

As discussed in the previous (section 2.5), teachers who believe in using museums as educational resources for their learners form the community of practice in my study. A community of practice involves ways of doing and approaching things that are shared to some significant extent among members. Teachers who take their learners to museums have some common things to discuss regarding handling of such places hence they form a community. Within the schools there are such communities of practice. Communities do not necessarily have boundaries within the school but stretch even up to international level where members can share the information through technology communications. Through these communications members are able to solve the problems they encounter by referring to what other members do. In the next chapter I discuss the research design and methodology that facilitated the process of data collection and analysis.

Chapter 3: Methodology

This chapter is a discussion of the research methods and instruments that were used in collecting data for this study, as well as the sample that has been used and ethical issues. The limitations of both the research approach and instruments are also discussed.

3.1 Methodological orientation

Considering the research problem under study and the research questions, this study would be classified under the interpretive paradigm (Opie, 2004; Cohen, Manion & Morrison, 2000, Merriam, 1998*)*. According to Merriam (1998) researchers within this paradigm are interested in the experiences, interpretation or in discovering factors that distinguish people rather than testing hypotheses. Cohen et al. (2000) argue that the essential challenge in the interpretive paradigm is to understand the subjective world of human knowledge and understanding, to maintain the integrity of the phenomena being studied, attempts are made to get in the mind of participants in the study and understand their thinking.

The purpose of this study was to gain insight into how teachers prepare their learners for visits to museums, the role these teachers play during the visits, the perceptions these teachers have about aims of the visit and how teachers follow up with the class after the visit. The research method which seemed to be suitable for my approach was the case study. Merriam (1998) argues that a case study design is used to get the deep understanding of situations and views of those involved. Merriam (1998) and Opie (2004) both share the same sentiment about a case study in that it is intended to get a deeper understanding of a situation at a single instance. If one gets to have a deeper understanding of the study an extensive amount of data from a small number of participants would be collected (Leedy, 1997). In my case I used five teachers and used interview questions which lead to details of the practices of the selected teachers. My study also had boundaries within which it was done. The boundaries consisted of a single class visit for each teacher selected, and four museums.

This study is qualitative in nature. According to Cresswell (1994) a qualitative study is an investigation process of understanding a social or human problem, based on building a complex and holistic picture, formed with words, reporting detailed views of participants, and conducted in a natural setting. The study focuses on five Grade 6-9 teachers taking their learners to four museums which are Sci-Bono Discovery Centre, Hartbeesthoek Radio Astronomy Observatory (HartRAO), Adler Musuem and Johannesburg Planetarium. Merriam (1998) argues that this type of study tries to provide a substantial and rich description of the teachers' practices. Merriam (1998) further points out that the descriptive data collected would be "used to develop categories or to illustrate, support or challenge the theoretical assumptions held prior to data gathering" (p. 38). In this study, data is used to illustrate the preparations that teachers had with their learners before going to the museums, the follow up teachers do with their learners after the visits, the perceptions these have about the objectives of the visits and the role the teachers play during the visits with their learners.

3.2 Limitations of case study

While they have depth, case studies lack extensiveness (Ary, Jacobs & Razaveih, 1990). As a result the dynamics of few individuals, which is five teachers in this case, may produce a limited, if any at all, relationship to dynamics of others in different contexts. My study could also be said to be limited in terms of sample size because only five teachers were observed once at school before the visit, once at the visit centre and once after the visit hence its findings cannot be generalized to other teachers or even to these teachers' overall practice. Nevertheless, Opie (2004) advises that a case study is a valuable form of research particularly to teachers. Opie (2004) substantiates this point by citing Bassey who argues that the value of any educational research is "the extent to which the details are sufficient and appropriate for a teacher working in a similar situation to relate his/her decision to that described".

3.3 Sample

Five teachers who took their learners to a museum during the data collection period were the focus of the study. These were the teachers who were going to carry out preparation for the visit and follow up from the visit. They were already planning to take their learners to the museums before I could even ask them to take part in my

study. Teachers were contacted and asked if they would be making any preparation before going to the museum and if they would do any follow up after the visits. The museum administration was also asked to help to identify those teachers who visited the museum more than others on their list. This was done so that I could look at what could be best practice. This was the criterion used to select the participants and was also related to my research questions which tried to find out how the teachers made preparations and follow up activities from the visit. It therefore meant those who were not engaged in making the preparation for the visit and making follow up activities with their classes did not form part of the sample. For the purpose of triangulation (see 3.4 below) three learners in each teacher's class were interviewed. These were the learners that each teacher believed were intelligent and could be able to express themselves. However, I was aware that choosing only the intelligent learners has a degree of bias.

3.4 Data Collection

Qualitative approaches usually use triangulation (Opie, 2004) i.e. use of more than one instrument in collecting data. My study was no exception as it employed interviews and observation with the five teachers. The teachers were interviewed twice, that is before they went to museum and after they came back from the visit. The pre-visit interview for each teacher was done after classroom observation for preparation while the post-visit interview was done after classroom observation for follow up activity. The teachers were also first observed when they did their preparation for the visit with their classes, when they were at the museums and lastly when they did their follow up activities.

3.4.1 Interviews

Opie (2004) argues that the kinds of interviews available to researchers lie in a continuum ranging from structured to unstructured interviews. Cohen et al. (2000) elaborate this point further by saying that interviews differ mainly in "degree of structure, which, itself reflects the purpose of the interview" (p.270). In this study a semi-structured interview was used due to its flexibility as it would enable the researcher to probe for more insight in an idea. Opie (2004), in support, points out that a semi-structured interview allows for depth of feelings to be ascertained by providing opportunities to probe and expand the interviewee's response. He further points out

that the main advantage of semi-structured interview is that it allows the researcher to clarify questions or change the wording, to deviate from the pre-arranged questions depending on the interviewee's response. Moreover, a semi-structured interview provides the overall shape of the interview and prevents aimless rambling (Opie, 2004). Cohen et al. argue that interviews are conducted for numerous purposes, such as "to evaluate or assess a person in some respect … to gather data as in surveys or experimental situations" (p.268).

3.4.1.1 Teacher Interview

Each teacher was interviewed using a semi-structured interview format and probing questions were asked where the interviewer found it necessary to get more details. The interview focused on what the teacher thought about the visits to museums and reasons for taking the trips to museums. The teacher interview was also meant to find out how teachers had planned to follow up from the visit. The interview schedule was developed by referring to the research questions so that they acted as a guide of what questions could be necessary to get certain information (see appendix A). Some of the interview questions were adapted from Griffin and Symington (1997) and Cox-Petersen et al. (2003) and modified with the assistance of my supervisor. Each interview was recorded on audiotape. The data collected here was meant to help to answer the research questions;

- What are teachers' perceptions about the purpose and objectives of the visit?
- How do selected teachers follow up from the visit?

3.4.1.2 Learner interview

Three learners from each school were selected by each teacher and those were the learners that each teacher felt were intelligent and would be able to express themselves. These learners were interviewed to find out if they had the same perceptions about the objectives of the visit as their teachers. Learner interviews would also help to find out what learners think they would do in terms follow up activities when they got back to school after the visit. The interview questions were developed with the help of research questions and some were adapted from Griffin and Symington (1997).

3.4.2 Observations

This study looks at how teachers make their preparations with the class and the role they play during the visits. Since knowledge is situated in practice and is shaped by human interactions and context (Henderson, 1998), it was advisable that I observed the teacher while teaching or discussing with the learners while at school and also observe the sort of interactions she/he had with the learners while at the museum. I thought that this would afford me an opportunity to gain more insight into how teachers plan their visit and how they help their learners to learn and acquire more knowledge out of these visits. In regard to this Patton cited in Cohen et al. (2000) argues that observation affords the researcher the opportunity to look at what is taking place in a real situation rather than taking information from elsewhere. Cohen et al. further point out that observation allows researchers to understand the content of the situation and to see things that might otherwise be missed and to find out things that participants might not mention in interviews.

3.4.2.1 Teacher observation

Preparation:

Each teacher was observed during the preparation period at school. This was done through lesson observation during which the field notes were taken. Emerson, Fretz & Shaw (1995) define field notes as "accounts describing experiences and observations the researcher has made while participating in an intense and involved manner" (p5-6). The field notes were focusing on the activities that a teacher was doing. Teachers were asked to provide any materials that were used in preparation. These included worksheets and tables. Observation in this case was meant to provide data that would help to explore the research question:

- How do selected teachers prepare for the visit?

Role

During the tour in the museum the focus was on the teacher. The teacher was observed and during the observation the field notes were taken. The interactions of the teacher with learners if any, were noted down. Teachers were also interviewed to find out what role they would play during the visit. Data collected here was meant to help to explore the research question:

- What role do selected teachers play during the visit?

Follow up

Lesson observation was done in the teachers' classroom after the visit on the day when the teacher agreed with the researcher that she/he would be doing a follow up activity from the visit. As it was the case during the preparation, the observation focused on everything that the teacher did and said during the lesson. The data collected here was useful in exploring the research question:

- How do selected teachers follow up from the visit?

3.4.3 Piloting instruments

Having developed the instruments, the next step was to check whether they would work as anticipated. I used the teacher who intended to make preparation and follow up from the visit and this was a grade 7 teacher who went to the Johannesburg Planetarium. From the pilot study I realized that some of the words used in the original learner interview schedule were not clear to the learners so these were replaced in the final version of the interview schedule. I also learned to be more familiar with my interview schedule as this helps to make conversation more flowing. According to Cohen et al. (2000) the purpose of piloting observation schedules is to ensure that "The categories for the observation are discrete, i.e. there is no overlap between them" (p.306). Opie (2004) adds that one should carry out a pilot study to get rid of any ambiguities in the questions and to check the length of the interview. Cohen et al. (2000) take this point further by arguing that as there would be many categories to be scanned very quickly during observation, "the researcher needs to practice completing the schedule until he or she becomes proficient and consistent in entering the data" (p. 306-07). I carried out a study to pilot the instruments using a different school from the ones I used in the actual study. The school used in piloting the instruments had similar conditions to the ones used in actual study.

From the pilot study the recording of the interviews were not clear enough because of some distraction or noise from other members of staff and learners. This helped me to make special arrangement for quiet places where teachers and learners would be interviewed in the actual study. There were also some wording errors in the original

interview questions which I saw when trying to read the questions during the interviews. These were rectified in the final interview schedule (see appendix A).

3.4.4 Advantages and disadvantages of instruments

Since the study uses observations, the presence of the researcher might influence the results particularly if the researcher is new in the environment and stays for a short period as the subjects could have been on guard of what they say and do. In support to this, Opie (2004) argues that learners consciously or unconsciously, may change the way they would behave when being observed. According to Cohen and Manion (1980) the main advantage of observation is that the researcher can detect ongoing behaviour as it happens and is able to make proper notes on its relevant points. The researcher noted all the actions of teachers when making preparations and follow up activities at school and when teachers were at the museums with their learners.

Interviews on the one hand, present challenges to the researcher in terms of interviewing and listening skills as potential information may be missed due to poor questioning or listening skills (Opie, 2004). Furthermore, interviews require that the interviewer be able to retain control of interview, to probe kindly and softly, be able to manage personal space and be non-judgmental (Opie, 2004). Interviews are time-consuming to transcribe. The advantage of using interviews is that both verbal and non-verbal behaviour can be noted which cannot be achieved with a questionnaire. In addition the interviewer can rephrase questions or probe the interviewee to get a clear understanding which cannot happen when using a questionnaire. The interviews helped the researcher to get the perceptions of teachers and learners about visits to the museums.

3.5 Data analysis procedure

I analyzed the field notes and interview transcripts both deductively and inductively by carefully reading and re-reading through the data in order to formulate themes or categories (inductive) and at the same time using what I got from the literature (typology). In inductive analysis the researcher goes through the data to look for themes which are not predetermined. This type of analysis provides a systematic approach to analysing large amounts of data in ways that allow a researcher to feel confident that what is reported is certainly the representation of social satiation being

studied (Hitchcock & Hughes, 1995). On the other hand in deductive analysis data is analyse using predetermined categories which can be adopted from the literature. Data analysis is an on going cyclic process constituted in all phases of qualitative research (Hatch, 2002). This process involves selecting, categorising, synthesizing and interpreting the data. All the data collected from observation/field notes and audio-recording were transcribed by the researcher. Both inductive and typological analysis (Hatch, 2002) were used in my study. In order to do this I used the literature and experience gained on continuous interaction with the data (Hitchcock & Hughes, 1995).

3.5.1 Coding

Open coding of data applied to both the interview and observation field notes. The process was achieved by grouping data into categories. During this process of forming categories there were emerging trends that were taken care of and were also categorised (Cohen & Manion, 1994). In regard to categorising, Merriam (1998) advises that the categories or themes that emerge should reflect the purpose of the study and help in answering the research questions. I took Merriam's advice and therefore I was carefully scrutinising the trends that were emerging from data and I only adopted those that were useful for the research purpose. Below I give the example of the coding done on both the field notes and interviews. This was taken from the field notes written during one of the sessions at HartRAO.

> *One of the groups is taken out by Dan and the other group remains inside the hall with the two teachers while waiting for Momo who is still in her office. Meanwhile, Mrs Jury tries to explain to the learners remaining in the hall about the models of planets on display. She takes one of the models labelled Mercury and tells one learner to feel it. She also takes the other model labelled Jupiter and gives it to the same learner. She then asks the learner what the difference is. The learner says that the one labelled Jupiter is heavier than the one labelled Mercury……..*
>
> *The learners are handling the model of planets and the models are passed from each learner to the next.* **[Learning oriented interaction].**
>
> *Researcher: why do you think it is valuable to take this type of visits?*

Mr Dube: This type of visits?

Researcher: yah, this type of visits.

Mr Dube: Err… I think this type of visit sometimes for in a long time basis…..

Researcher: mmm

Mr Dube: it can sometimes pursue someone's career.

Researcher: ok.

Mr Dube: yah, may be can be an astronomist or planetarian.

Researcher: Ok.

Mr Dube: in other words it can pursue a learner's career **[Career].**

In the category of learning-oriented interactions I identified anything the teacher did to help the learners with content or exhibits during the visit. These included things like leading the learners through the exhibits, showing learners how a certain exhibit works, discussing with the learners how this relates to what they know. For the category of career, I identified anything where the teachers talk about learners getting into a certain science profession related to the visit. These included things like taking a career in astronomy, working as astronomist, or at planetarium or at museum.

The first coding was done on the field notes while the second one was done on the interview transcripts. What is written in bold is a category. As I described in the previous section some of the categories emerged from the repeated interaction with data while others came from the literature I read. So both inductive and deductive methods were used.

3.6 Reliability and Validity

3.6.1 Reliability

In order to ensure reliability the researcher first piloted the study. Since the research was using an interview as one of the instruments, it was important that interview questions were piloted. This helped the researcher to check whether interview questions were clear and related to the research questions and problem. Research writing is a way through which there is communication (Opie, 2004). It is therefore very important that people who read the research be confident about any assertions made. This was done by making sure that the data collection method was reliable and valid. Reliability refers to extent to which an instrument an instrument gives

consistence results under similar conditions. Opie views reliability as a property of a whole data collection process.

3.6.2 Validity

Since this study was not meant to generalise and because it was a case study, the internal validity was therefore more relevant. In this study validity was ensured by making sure that any claim made was well-matched with the data. The claims made were also supported by the literature. The support for the findings was drawn from the research data and this is what is called evidence based process (Opie, 2004). The arguments that were made in my study were based on the data collected and relevant literature through which the researcher had gone. Validity is another important process in research. Validity refers to the extent to which an instrument measures what is supposed to measure. Validity in research refers to relationship between a claim and the result of data collecting methods (Opie, 2004). According to Opie, there are two major types of validity and these are internal and external validity. Internal validity implies that the claims made are valid or self-contained within the gathered data. External validity implies that the findings of the study can be extrapolated and still be reasonable.

Maxwell (1992) divides validity into five categories which are descriptive validity, interpretative, theoretical generalizability and evaluative validity. Of the five categories, only three applied to my study and these were descriptive, interpretative and theoretical validity. Descriptive validity is concerned with the initial stage of research, usually involving data collection. The essential issue is factual accuracy in the informational statements that describe what was observed and experienced. Since this study used observation, it was important that this category of validity was considered. Interpretive validity is concerned with the meaning of events and actions. This was also the core of my study as there were some interpretations of some of the events or actions during data collection process. Lastly there is theoretical validity. This study was not using concepts and terms that were only experience or concrete dependent but it also used those that were abstract concepts that involved mental experiences. Theoretical validity goes further than the concrete descriptions and interpretations (Maxwell, 1992). This study was using theory of learning which is communities of practice to make descriptions and interpretations of events and

behaviour observed during data collection therefore it was taking care of theoretical validity. The other two categories, generalizability and evaluative validity did not apply to this study since it was not going generalize and it did use evaluative framework to subjects of study.

3.7 Ethical considerations

My study involved five schools from which the teachers came. It also involved the teachers themselves, the museum which was visited and the institution under which the study was taken which is University of the Witwatersrand in this case. The researcher applied for permission from the University of the Witwatersrand ethics committee by submitting the proposal with all its details. The research also involved the Gauteng Department of Education as its schools were involved in the study. The learners were also involved as the teachers were supposed to interact with them in the museum. Ethics has to do with the application of the moral principles to avoid harm or wrong doing to others, in order to encourage the good behaviour, be respectful and fair to those taking part in the study (Opie, 2004). Opie also argues that research ethics should apply through the study. This implies the research has obligation to the profession, to the readers of the research and to the participants. The researcher is therefore obliged to conduct the study in a manner that findings obtained would not be misleading as these findings could be published. Most importantly, the research is obliged to report precisely its findings (Ary et al., 1990).

Since the study was conducted with Gauteng Department of Education (GDE), the researcher asked for permission from this department to conduct the study. The application letter to GDE was accompanied by all necessary documents. The researcher also submitted the letter to the Principals of the school involved in the study. The letter indicated that the results would be confidential and the participants and schools would not be made known hence their privacy would not be made public. The letter had also shown that the participants were not bound to take part in the study and they could withdraw anytime if they were no longer interested in taking part in the study. The learners and their parents were given the consent forms and the letter showing details of the study (see Appendix C).

Everybody involved in the study was given assurance that findings of the study would not be given to any one else who was not part of the study without the permission of the participants. In other words the results would be used for the study only and anything given to any one during the course of the study would be collected at the end of the study. The parents had the right not to agree to let their children taking part in the study. So it was important for the researcher to show the parents how important the study would be and how it was going to benefit everybody involved in it. Since the study was using the tape recording and it was important for the researcher to assure the participants that fictitious names would be used when transcribing the two. The participants were given reasons for using tape recorder.

3.8 Reflections

The research methods were intended to capture the way teachers made their preparation for the field trips and the follow up activities after they had come back to school. They were also intended to capture teachers' objectives of the field trips and the role teachers play during these field trips. However, the fact that teachers were asked whether they would be doing something with their learners before and after the field trip must have influenced the way teachers behaved throughout the whole process of field trip. They might have done things they would not have done in my absence. This limitation must be kept in mind when looking at the data that is presented in the next two chapters. This limitation is further discussed in the next two chapters.

This chapter described the research design and methods of data collection used in my study. Furthermore, the sample, the instruments and the piloting has been discussed. The process of data analysis, and validity and reliability has also been discussed. In the chapter that follows I discussed the results of the study.

Chapter 4: Findings

4.0 Introduction

Chapter 3 provided justification for the research design of the study, the instruments used for data collection, a description of how the data was collected and the selection of participants of the study. This chapter describes the sample used in this study, as well as how data analysis was carried out from interviews and the observation notes written during data collection. It is mainly about results and some discussions of the results. The data analysis was carried out trying to answer the research questions which have been stated previously. These research questions are;

- *How do selected teachers prepare their learners for a museum visits?*
- *What role do these teachers play during the visit?*
- *How do these teachers follow up with the class after the visit?*
- *What are the teachers' perceptions about values and objectives of the visit?*

In this chapter I discuss the following

- 4.1 Research sample
- 4.2 Sites of study
- 4.3 First look at data
- 4.4 Closer look at emerging categories
- 4.5 Teachers' perspectives
- 4.6 Learners' perspectives
- 4.7 A closer look at teachers' and their learners' responses
- 4.8 Summary

4.1 Research Sample

Chapter 3 described how I obtained the study sample of five teachers and 15 learners from five schools. The summary of demographic and other relevant information about the sample is given in Tables 4.1 and 4.2

Table 4.1 Demographic information about the sample of teachers

Teacher (Fictitious Name)	School (Fictitious Name)	Gender	Grade (Taken to the visit)	Home Language	Population Group	Centre visited
Mr Dube	Thibe	M	7	isiZulu	Black	Planetarium
Mrs Jury	Martina	F	7	English	White	HartRAO
Mrs Rene	Mary	F	7	English	White	Adler Museum
Mrs Mango	Lodi	F	9	Sepedi	Black	Sci-Bono
Mrs Koke	KTS	F	6	English	White	HartRAO

Table 4.2 Demographic information about the sample of learners

Learner (Fictitious Name)	School (Fictitious Name)	Age	Gender	Grade	Home Language	Population Group	Centre visited
Lemao	Thibe	13	M	7	Sesotho	Black	Planetarium
Semaka	Thibe	13	M	7	Sesotho	Black	Planetarium
Boyele	Thibe	12	M	7	isiZulu	Black	Planetarium
Letty	Martina	11	F	6	English	White	HartRAO
Abby	Martina	11	F	6	English	White	HartRAO
Raji	Martina	11	F	6	English	Coloured	HartRAO
Boitumelo	Mary	12	F	6	Sepedi	Black	Adler Museum
Thapelo	Mary	12	M	6	Sesotho	Black	Adler Museum
Thabang	Mary	13	M	6	Sesotho	Black	Adler Museum
Lefa	Lodi	15	M	9	Sesotho	Black	Sci-Bono
Lebo	Lodi	14	F	9	Setswana	Black	Sci-Bono
Lizzy	Lodi	14	F	9	isiZulu	Black	Sci-Bono
Lerako	KTS	13	M	7	Sepedi	Black	HartRAO
Leseko	KTS	13	M	7	Sepedi	Black	HartRAO
Bongy	KTS	12	F	7	isiZulu	Black	HartRAO

The two tables above (Table 4.1 and 4.2) show the schools, teachers and learners which visited the museums. Thibe Primary School visited Johannesburg Planetarium while Lodi Secondary school visited Sci-Bono Discovery centre. Mary Primary School visited Adler Museum while Martina and KTS visited HartRAO. The tables show that there were two white and three black teachers. There were also four female and one male teachers and both of these were because I used convenience sampling. The tables also show that there were more grade 7 than grade 6 and 9 classes and this was also due to the type of sampling described in chapter three. The number of females and males differs because teachers selected those learners that they believed would be able to express themselves. Thibe Primary School and Lodi Secondary School were from townships while KTS, Martina Primary School and Mary Primary School were from Suburbs.

4.2 Sites of study

The study was carried using four centres. These museums are Johannesburg Planetarium, Hartebeesthoek Radio Astronomy Observatory (HartRAO), Sci-Bono Discovery Centre and Adler Museum. These museums are visited by school and family groups.

4.2.1 Johannesburg Planetarium

Johannesburg Planetarium is located in the premises of the University of the Witwatersrand. This museum is run by the university as part of its science awareness outreach programme. A large number of school groups visit the planetarium throughout the year. In 2007, Johannesburg Planetarium ran shows for 49,498 learners and 3810 teachers from both primary and secondary schools. Originally conceived in 1956 as part of celebrations for the 70th founding of Johannesburg, the planetarium was transferred by the City Council to the University of the Witwatersrand. The planetarium was opened in 1960 housing a reconditioned star projector from Hamburg, Germany (Johannesburg Planetarium, 1999).

Schools that visit Johannesburg Planetarium watch a one hour show and a presentation by the planetarium personnel. The learners sit quietly around the instrument which is used to project the pictures of the stars, planets and galaxies on the dome of the building. The presenter sometimes asks the learners some questions related to the presentation and sometimes learners are given chance to ask the presenter. At the beginning of every show learners and their teachers are given the star charts they will use to locate some planets and stars during the show. At the end of the show the lights are put on and learners leave the planetarium. The content of the show includes the solar system where the sun, planets, comets, asteroids and motions of the Earth and its effects are shown.

4.2.2 Hartebeesthoek Radio Astronomy Observatory

The Hartebeesthoek Radio Astronomy Observatory (HartRAO) is the only major radio astronomy observatory in Africa. It is located in a valley in the Magaliesberg hills, 50 km west of Johannesburg. The Observatory began as Deep Space Station 51, built in 1961 by the National Aeronautics and Space Administration (NASA) of the United States of America (Hartebeesthoek Radio Astronomy Observatory, 2008). The station tracked many unmanned US space probes. These included the Ranger, Surveyor and Lunar Orbiter spacecraft which landed on the Moon, the Mariner missions which explored the planets Venus and Mars and the Pioneers which measured the Sun's winds (Hartebeesthoek Radio Astronomy Observatory, 2008). The station was handed over to the Council for Scientific and Industrial Research (CSIR) in 1975 and was converted to a radio astronomy observatory. In 1988 the observatory became a National Facility operated by the Foundation for Research Development (FRD). In 1999 the FRD was restructured as the National Research Foundation (NRF).

HartRAO runs three programmes: the Radio Astronomy Programme, the Space Geodesy Programme and the **Science Awareness Programme.** The Science Awareness Programme encourages visits by the schools, clubs and the public to learn about astronomy, space and the research carried out using the radio telescope. The science Awareness Programme is run by two full time educators who also conduct teachers' workshops.

A visit to HartRAO lasts about four hours and entails activities such as;

- Watching a slide show on a range of astronomy- and space-related subjects
- Getting a close-up view of the 26-metre diameter radio telescope in action - the only one in Africa
- Observing the Satellite Laser Ranger in action
- Telling the time using the Sun Dial
- Using an Earth globe to learn about the Earth in Space
- Launching water/air rockets to learn about basic principles of physics
- Setting up a scale model of the Solar System to learn about the planets
- Using an orrery to see why we have day, night and the seasons
- Take a "trip to the Moon"
- Seeing how the Moon orbits the Earth and how they both orbit the Sun
- Use a telescope to project an image of the Sun to look for sunspots
- Make a starfinder for identifying stars and constellations (Hartebeesthoek Radio Astronomy Observatory, 2008).

The activities are lead by the Science Awareness Programme staff.

4.2.3 Sci-Bono Discovery Centre

The Sci-Bono Discovery Centre is a science centre project and it is one of the initiatives that the Gauteng Department of Education (GDE) has introduced as part of the Department's Mathematics, Science & Technology (MST) strategy.

The Sci-Bono Discovery Centre is located in the celebrated building known as the Electric Workshop in Newtown, Johannesburg. Supporters of the project include the Department of Science and Technology, a holding company called Blue IQ, the Johannesburg Development Agency, and various industry partners. The facilities include 6 000 square metres of interactive exhibition space comprising travelling exhibition space, a news room, a "firsts" gallery, icon exhibits and a pre-school discovery centre (Sci-Bono Discovery Centre, 2006). It also has a career centre that comprises an interactive career route map, aptitude testing, career guidance and

mentoring, a job facility, and life-skills training including a pre-school. The museum features new and exciting areas of contemporary science and technology, and the interactive exhibits like whisper dishes, momentum spinning wheel, magnetism displays and others.

The school groups visit Sci-Bono Discovery centre almost throughout the year. The centre has got several tour guides who take the learners around showing them exhibits and giving some explanations. Before the learners can enter the centre, they are given some rules and what is expected of them once they are inside by the tour guides. Learners are usually divided into groups and each group follows one of the tour guides. Teachers can also be in charge of the tour as the situation allows them to do so.

4.2.4 Adler Museum

The Adler Museum of Medicine was founded in 1962 and was originally situated on the grounds of the South African Institute for Medical Research, Johannesburg. It is now housed at the University of the Witwatersrand's Medical School Campus in Parktown, Johannesburg. The museum reports to a Board of Control appointed by the Faculty of Health Sciences of the University of the Witwatersrand, Johannesburg.

In June 1974, the museum's co-founders, Drs Cyril and Ester Adler, presented the Museum to the University of the Witwatersrand which named it the Adler Museum as a token of the esteem in which the founders were held by the University (Adler Museum, 2000).

The museum contains interesting and invaluable collections depicting the history of medicine, dentistry and pharmacy through the ages. Apart from the hundreds of items of medical historical interest on display, there are also documents, sculptures, pictures, videos and philatelic and medallion collections relating to medical history as well as the history of allied health sciences. The museum has a library of rare books and a significant history of medicine reference library. In addition, an archive arranged by subject matter is housed in the library, and biographical information relating to thousands of medical and allied health professionals, focused on South

Africa, is available to learners, researchers and interested members of the public. The archive also contains papers of eminent South African doctors and allied health professionals.

There are reconstructions of an African herb shop, a patient consulting a sangoma (traditional healer), a 20th century Johannesburg pharmacy, a dental surgery, a doctor's consulting room and an optometry display of the same period. Other attractions range from a reconstruction of patient being treated by the famous Persian physician Avicenna to an exhibition of early electro-medical equipment (Adler Museum, 2000). A showcase containing new acquisitions to the collection is constantly changed as donations are received. The objects displayed provide an insight into the range and diversity of the collection.

In the foyer outside the museum is a display of rare early iron lungs. Panels relating to the history of the Cradle of Humankind (Sterkfontein and environs) and a display of replicas from the site give visitors a fascinating glimpse into this world heritage site.

The museum arranges regular public lectures, tours for learners of all ages, film shows, temporary exhibitions, and provides excellent facilities for medical historical teaching and research. Temporary exhibitions which complement the teaching programme of the University include the history of malaria, tuberculosis and cardiology. Exhibitions on Health and Health Care under apartheid and HIV/AIDS were also developed and were available as touring exhibitions from 2007.

Tours take place from Monday to Friday between 09:00 and 16:00 and last for approximately 3 hours. An introductory talk on the history of scientific medicine is given by the museum’s staff. Learners are then divided into groups and complete worksheets prepared by the museum. The museum’s staff devise a tour to suit the particular needs of learners and educators.

4.3 A first look at the data

The recorded interviews and observation field notes were transcribed. I was looking at how teachers made their preparations for the visit. Upon analysis of the interview and

observation transcription I made notes on sections containing information relevant to each of the four research questions, as well as unanticipated revelations. Firstly, I scrutinised and annotated the transcription of the interview and the observation notes made during the pre-visit class observation for the five teachers. I was looking at teacher behaviour and tasks given to learners or any discussion the teacher had with the learners. When I collated and analysed my annotations on the transcriptions, two categories emerged. In the first category, the observed actions and responses given by the teachers were dominantly **task-oriented preparation** (Griffin & Symington, 1997). These were characterised by emphasis on tasks such as completion of the worksheets. The preparation was also referred as task-oriented if the focus was put on the content only and no link between content and the visit was made. In the second category, the actions and responses of the teachers were learning-oriented. These were characterised by discussion of the museum visit and how it relates to the work done in class or discussion on how to use the museum for learning about the topic or career. This was regarded as **learning-oriented preparation** (Griffin & Symington, 1997). The teachers' preparation was therefore either task-oriented or learning-oriented. The examples of task-oriented and learning-oriented preparations are given in section 4.5.

I also scrutinised the observation notes made during the visit. I was looking at the behaviour of the teacher especially around her/his learners. Three categories emerged. In the first category, the behaviour of teachers showed **no interaction** with their learners. This was characterised by teachers dominantly interacting only with their fellow teachers not with their learners. In the second category, relationship between the teachers and their learners was dominated by discussion of the exhibits or doing an activity together. This type of interaction between teachers and their learners was described **learning-oriented interaction.** The third category was dominantly **control of learners' behaviour.** This was characterised by interaction observed between teachers and learners being only control of behaviour.

I also looked at the purpose of the visit as given by the teachers. Through scrutinising the interview transcriptions and making some notes the pattern of six categories emerged. In the first category the reasons for taking the visit as given by the teachers were mainly for **Enjoyment**. In the second category the reasons given were both enjoyment and educational (**Edutainment**) while in the third category teachers

mentioned relationship of the **Curriculum** and visiting place as the reason for visiting. In the fourth category the reasons given were related to **Interactive** nature of the visiting place. The fifth category was **Career** related. Teachers were more concerned about their learners being exposed to some science related careers. In some cases teachers did the visit because the class had to take a visit according to the school calendar so this is a school **Tradition**. The examples of each of these categories are described in section 4.5.

Analysis of the transcribed observation notes of the follow up activities done at each of the schools lead to the emergence of two categories. In the first category, the observed actions and responses given by the teachers were dominantly **task-oriented** (Griffin & Symington, 1997). These were characterised by emphasis on tasks such as completion of the worksheets or handing in the worksheet. In the second category, the actions and responses of the teachers were learning-oriented. These were characterised by incorporating learning experience from the visit into the classroom discussion of the topic or use of information about the visit to do assignments or projects. This was regarded as **learning-oriented follow up** (Griffin & Symington, 1997). The teachers' follow up activities were therefore either task-oriented or learning-oriented.

I came across some of these categories in literature and thought would be relevant for analysis. These categories included **Entertainment**, **Edutainment**, **Curriculum** and **Tradition** (Storksdieck, 2004). The categories **Career** and **Interactive** came solely out of the data. The categories that came out of Griffin and Symington's (1997) work include:

- **Task-oriented preparation**
- **Learning-oriented preparation**
- **Learning-oriented interactions**
- **Task-oriented follow up**
- **Learning-oriented follow up**

The other categories arose from the continuous interaction with the data. These categories were therefore grouped into four broad categories which were related to the research questions. These broad categories are; **Preparation, Interaction, Purpose** and **Follow up.** The broad categories and sub categories under each broad category are given below:

Category**: Preparation**

1. Preparation not directly about the visit
2. Task-oriented preparation
3. learning-oriented preparation conducted on the topic and/or the excursion venue

Category: **Interaction**

1. no interaction with the learners
2. learning-oriented interaction
3. Behaviour control

Category: **Purpose**

1. Entertainment
2. Edutainment
3. Related to curriculum
4. Interactive
5. Career
6. Tradition

Category: **Follow up**

1. task-oriented follow activities
2. learning-oriented follow up activities

4.4 A closer look at the emerging categories

In this section I give an overview for each category. The detailed analysis of each teacher will follow in section 4.5. However, I will start by giving a brief description of what each teacher was doing before the museum visit. Mr Dube and his class were

dealing with the topic planets and according to him this was the topic related to their visit to the planetarium. Mr Dube's class had been learning about the Solar System for the past few days before I visited their school. During the lesson that I observed Mr Dube focussed on the nine planets in relation to the sun, their movements around the sun and on their axes (revolution and rotation) and the number of moons around some of the planets. Mrs Jury and Mrs Koke (who visited HartRAO) were also dealing the same topic as Mr Dube (Johannesburg Planetarium) except that Mrs Jury's lessons included the stars, how stars expand, the red giants, white dwarfs and black holes. These were not covered in Mr Dube's and Mrs Koke's lessons. Mrs Rene (Adler Museum) on the other hand was dealing with the transplant surgery. Learners were labelling some human body parts especially those that can be transplanted e.g. skin, lungs, heart, liver, kidneys and eyes. The only exception among the teachers was Mrs Mango (Sci-Bono Discovery Centre) who made it clear that she was not taking the learners to Sci-Bono Discovery Centre for a certain topic. It was therefore difficult to get any content she did with class that could be related to their visit. The next section is an overview of the categories obtained during class observation before the museum visits.

Preparation

Table 4.3 Subcategories of **preparation** category for each teacher.

Teacher's name	**School**	**Grade**	**Preparation not directly about the visit**	**Task-oriented preparation**	**Learning-oriented preparation**
Mr Dube	Thibe	7	X	X	-
Mrs Jury	Martina	6	-	-	X
Mrs Rene	Mary	6	-	X	-
Mrs Mango	Lodi	9	-	-	X
Mrs Koke	KTS	7	-	X	-

Table 4.3 shows which of the three subcategories appeared on each teacher's transcription. The crosses show the subcategory under which each teacher's

preparation falls. Most of the teachers were doing task-oriented preparation. In this type of preparation teachers were putting more focus on worksheets that were going to be used during the visit. The preparation was not integrated into the topic related to the visit. The preparation that was done by the teachers was not about the visit. For example, Mr Dube put more focus on the worksheet about the solar system the learners were using to prepare for the visit but he did not say anything about how that is related to what his learners would see or would be doing at the planetarium.

Even though Mrs Mango appeared to have done learning-oriented preparation, her preparation was not about a certain topic in the curriculum but it was about taking learners to the centre mainly for career purposes. Her preparation was therefore categorised under learning-oriented preparation because it mainly focused on career. It is clear from what Mrs Mango was doing that the preparation was directly related to what she wanted her learners to do when they reached the museum.

Interaction

Table 4.4: Subcategories of **interaction** of each teacher with learners

Teacher's name	**School**	**Grade**	**No Interaction**	**Learning-oriented interaction**	**Behaviour Control**
Mr Dube	Thibe	7	X	-	-
Mrs Jury	Martina	6	X	X	X
Mrs Rene	Mary	6	-	X	-
Mrs Mango	Lodi	9	X	X	X
Mrs Koke	KTS	7	X	-	X

Even though literature shows there is usually more "reactive task-oriented interaction" between the teachers and their learners during the visits (Griffin and Symington, 1997), this was not the case with the five teachers that took part in this study (see Table 4.4). Griffin and Symington (1997) described reactive task-oriented interaction as the one where the teacher just stays with the learners and answers their questions but does not initiate any interaction with them. In this study the dominant category

was no interaction between the teacher and the learners. Most of the teachers (three of five) were observed having behaviour control interaction with their learners. This is common because teachers are always trying to make sure the learners are under control of either the teacher or the tour guide. However, behaviour control was not observed with Mr Dube and Mrs Rene. Mrs Rene probably did not have behaviour control with her group because it was really a small group of 10 learners she put more focus on leading her group rather than controlling their behaviour. Mrs Jury and Mrs Mango had all three categories even though they happened at different times. Only two teachers (Mr Dube and Mrs Rene) showed the one interaction category while the rest showed different ones.

Purpose

Table 4.5: Subcategories of **purpose for the visit**

Teacher's name	**School**	**Grade**	**Entertainment**	**Edutainment**	**Curriculum**	**Interactive**	**Career**	**Tradition**
Mr Dube	Thibe	7	X	X	X	-	X	-
Mrs Jury	Martina	6	-	X	X	X	-	X
Mrs Rene	Mary	6	-	-	X	-	-	-
Mrs Mango	Lodi	9	X	-	-	-	X	-
Mrs Koke	KTS	7	-	X	X	-	X	-

Table 4.5 shows that the reasons given by the teacher for taking learners to the museum differed in many ways. For example for Mrs Jury, interactive learning that is found at HartRAO seems to be one of the reasons why she took her learners there. There were more of these in her responses which showed that she was interested in exposing her learners to interactive environment where she believed they would learn better. Another interesting observation was that of Mrs Mango. Even though Mrs Mango made it clear during the preparation that the purpose of taking the learners to Sci-Bono Discovery Centre was career based, most of her responses showed that she

did not have clear reasons for taking learners to the museum. Three of five teachers had three or more purposes of the visits while the other two had one purpose (Mrs Rene) and two purposes (Mrs Mango). The most commonly given purpose for taking the learning to the museum was related to the curriculum which was given by four teachers. Interactive and tradition were each cited by one teacher who also happened to be the same teacher (Mrs Jury).

Follow up

Table 4.6 Subcategories of **follow up** for each teacher

Teacher's name	**School**	**Grade**	**Task-oriented follow up**	**Learning-oriented follow up**
Mr Dube	Thibe	7	-	X
Mrs Jury	Martina	6	-	X
Mrs Rene	Mary	6	X	-
Mrs Mango	Lodi	9	X	-
Mrs Koke	KTS	7	-	X

Table 4.6 shows that the teachers' follow up activity would be described as either task-oriented or learning-oriented. Task-oriented follow up activities were characterised by emphasis on tasks such as completion of the worksheets or handing in the worksheet while learning-oriented follow up activities were characterised by incorporation of experience gained from the museum visit into classroom learning of a topic or use of visit information to do assignment or project. It is interesting to observe that three of the teachers did learning-oriented follow up activities. Having provided an overview of the findings, the next section is an analysis of each teacher's perspective.

4.5 Teachers' perspectives

4.5.1 Preparation for the visit

4.5.1.1 Mr. Dube

Mr. Dube took his Grade 7 class to the Johannesburg Planetarium. Asked during the interview he said that the visit was related to one of the themes in the curriculum called solar system. The observation of his class preparation was done a day before the visit to the planetarium. From the analysis of the interview transcription and observation notes written during the class pre-visit observation two sub-categories emerged from Mr Dube's preparation; **Preparation not directly about the visit** and **task-oriented preparation.** 'Preparation not directly about the visit' was observed in discussion as indicated below

> *The other questions asked by the teacher;*
> *Mr Dube: How many planets does the solar system have?*
> *[One learner gives 9 as the answer to this question and it is confirmed to be correct.....*]
>
> *Mr Dube: Which is the name of the planet where we live?*
> *[Almost every one raise up their hands and the teacher choose one learner who answers the earth. The response is confirmed correct by the teacher.]*
> *Mr Dube: Which is the hottest planet?*
> *[Most learners raise up their hands again and the teacher chooses on learners. The learner gives response as mercury and it is confirmed correct.]*
> *Mr Dube: Why is mercury the hottest planet?*
> *[Most learners want to give the answer and the teacher points one who gives answer as because it is near the sun. The teacher confirms this as correct and rephrases the response as 'because it is nearest to the sun']*
> *Mr Dube: What else do you see on the solar system?*
> *L1: the comet*
> *Mr Dube: comet yes*
> *L2: asteroids.....*

Mr Dube: What do you notice about the Saturn? This is not Satan its Saturn.

[The learners laugh and the teacher points at one of them and she gives the response.]

L8: it has circles.

Mr Dube: that rights it has a ring. We call that a ring, understand?

[Preparation not directly about the visit]

(Mr DubeOP 33-47)

From the discussion above Mr Dube is not mentioning anything about the visit. This is not different from a normal classroom teaching where learners are not prepared for any type of visit. Learners were never told anything about the planetarium before this discussion so there was nothing to suggest that the whole discussion was meant for the visit to the planetarium. Part of the teacher's preparation was task-oriented and this is shown by the transcript that follows:

The teacher then tells learners that they are going to the planetarium. He then tells the learners to come up with the questions that they will ask when they get to the planetarium. The learners come up with some questions.

Mr Dube: which questions can we prepare ourselves for the visit?

[Preparation: task-oriented]

(Mr DubeOP 114-118)

This discussion took place at the end of the class lesson. The teacher was just trying to give learners something to do when they arrived at the planetarium. It might be possible that the teacher was not aware of how the sessions are conducted at the Planetarium especially because, according to what he told me, he had never been there. The teacher was not aware that learners are hardly given any chance to ask questions at the planetarium even though they spent time trying to discuss questions they would ask when they arrive at the Planetarium.

4.5.1.2 Mrs. Mrs Jury

The type of preparation done by Mrs Jury and her Grade 6 class can be described as **learning-oriented preparation.** This was shown by transcripts like the one below:

> *Mrs Jury then reminded the learners that most of the work they were doing would be done again at HartRAO and that most of the things that they were going to see at HartRAO would be the same or extension of what they did in class. Mrs Jury gave the example of telescope*
> *Mrs Jury: You remember we did something about the telescope?*
> *Class: Yes mam.*
> *Mrs Jury: Yah, at HartRAO they have this big telescope that they use to look at the sky. We would go at night you see some stars and planets that are not seen during the day. They do give explanations of how that telescope works. They also have some nice models to show the difference in mass of different planets so most of things you will see when you get.*
> *Learner 1: Mam are they going to show us stars using telescope?*
> *Mrs Jury: Like I said they would do that if we would go at night.*
> *Learner 2: What about the sun mam, would they show us the sun?*
> *Mrs Jury: I don't know if they have come up with something different but as far as I know they were not showing kids anything using those telescopes* **[learning-oriented preparation].**

(Mrs JuryOP 61-77)

Mrs Jury's learners had done some work about a worksheet on the stars and HartRAO for a week according to what she told me. In the middle of her lesson she reminded her class that the worksheet was related to the visit they would be taking. She was trying to incorporate what her learners were going to do at HartRAO into her lesson so that they could see the link between what they were doing at school and what they were going to observe during the visit.

4.5.1.3 Mrs Rene

Mrs Rene took her learners to the Adler Museum, and according to what she told me this was related to the topic of organ transplant. Analysis showed her preparation for the visit to be **task-oriented preparation.**

> *Learners are reading this handout and individually. Meanwhile Mrs Rene is going around making sure that everyone is reading. After 10 minutes of reading she asked the learners to divide into groups of five and discuss the information they got from handout. On one page of the handout are questions that learners are supposed to answer. Mrs Rene tells the learners that they should answer the questions in each group and everyone should write the answers individually which should be handed in before they leave the class* **[Preparation: Task-oriented]**

(Mrs ReneOP 23-27)

The learners were doing the worksheets which were about the organ transplant. However, the focus was put mainly on answering the worksheets. The worksheets that Mrs Rene and her class were using had some of the questions similar to those prepared by Adler Museum. The class had been doing them for a week and from Mrs Rene's responses there was no trace that preparation for the visit was integrated in teaching of the organ transplant. She told me that her learners have been working on the worksheet during the lessons and she was not teaching during this time.

4.5.1.4 Mrs Mango

Mrs Mango's class visit to Sci-Bono Discovery Centre was not related to any particular topic. She described the visit to be mainly about helping her learners to make career choices.

> *Mrs Mango: mmmh. We want learners to be prepared about career choices because some of them will be going to grade 10 next year.*
>
> *Researcher: Next year?*
>
> *Mrs Mango: Yah, so they must have err… little bit of the basic information about their career, the career that they are going to choose next year*

(Mrs MangoBVI 15-17)

Mrs Mango's preparation was therefore observed in terms of whether it was in line with the stated purpose of the visit. Part of what she did is given below.

> *Mrs Mango writes 'purpose of going to Sci-Bono' on the board and writes a list of reason for going to Sci-Bono:*
>
> 1. *Overall view of the career choice.*
> 2. *To give first hand overview about career choice in science and education in general.*
> 3. *Choice of subject grade 10 and beyond*
> 4. *To demystify concepts about science*
>
> *The teacher is telling the learners what each of is about. The learners are quiet and listening as she is explaining to them what each purpose is about* **[Preparation: learning-oriented]**

(Mrs MangoOP 77-85)

Even though the preparation Mrs Mango did was not related to any particular topic it was considered to be learning-oriented preparation because it was addressing the purpose of the visit.

4.5.1.5 Mrs Koke

Mrs Koke's preparation was for the visit to HartRAO. Her visit was related to the topic of Solar System. Her preparation was task-oriented because she mainly focused on the discussion of the worksheet she prepared for the visit.

> *The teacher then writes 'Hartebeesthoek Radio Astronomy Observatory (HartRAO) on the board and looks at her sheet of paper for a while. She then asks the learners what it is that they are going to see at HartRAO. Learners mention things they think they are going to see at HartRAO. These are: moon, sun, rockets, Pluto, Mars, Jupiter, Saturn, Mercury, Venus, Earth, Uranus, Neptune, stars. Meanwhile the teacher is writing the responses on the board.* **[Preparation: Task-oriented].**

(Mrs KokeOP 43-47)

Mrs Koke put more focus on learners giving correct answers to the questions on the worksheet. She was not probing on learners' responses so that they could have a better understanding of what they were discussing in relation to their museum visit and school curriculum.

4.5.2 Interactions of teachers and learners during the visit

I observed teachers and their learners during the visit. Mainly the focus was on how the teachers related with their learners at the museum. The teachers' interactions with their learners were described in terms of No interaction, Learning-oriented interaction and Behaviour Control. These subcategories emerged from the observation field notes taken at the visiting place.

4.5.2.1 Mr. Dube

There was no interaction observed between Mr Dube and his learners during the visit to Johannesburg Planetarium. This was mainly because the sessions at the planetarium are conducted in a manner that makes it difficult for teachers to help their learners in any way. The sessions are run solely by the planetarium personnel from the beginning to the end.

4.5.2.2 Mrs Jury

For Mrs Jury, all the subcategories emerged in the field notes. There was a time when Mrs Jury was not interacting with her learners but chatting with her other colleague.

> *The learners are then taken to the large model of the earth which is put outside the hall. The learners make the circle around this model and the tour guide is at the centre with the model. At this time the two teachers are chatting to each other and they sit somewhere a distance from the group* **[No interaction with learners].** (Mrs JuryOC 36-38)

At HartRAO, the teachers were not interacting with their learners because tour guides were showing the learners the displays that they have. The teachers did not have chance to help their learners in moments like those. The way the sessions are conducted at HartRAO tends to restrict teachers from having interaction with their learners. For example, the tour guide was late and the teacher guided the learners around while giving them some information about the exhibits but that immediately stopped when the tour guide arrived. I assume that possibly teachers would interact with their learners more often if they were given a chance.

> *One of the groups is taken out by Dan and the other group remains inside the hall with the two teachers while waiting for Momo who is still in her office. Meanwhile, Mrs Jury tries to explain to the learners remaining in the hall about the models of planets on display. She takes one of the models labelled Mercury and tells one learner to feel it. She also takes the other model labelled Jupiter and gives it to the same learner. She then asks the learner what the difference is. The learner says that the one labelled Jupiter is heavier than the one labelled Mercury……..*
> *The learners are handling the model of planets and the models are passed from each learner to the next.* **[Learning-oriented interaction].** (Mrs JuryOC 15-25)

The teacher was interacting with the learners trying to help them with some of the models on display. She stopped when the other tour guide arrived. It therefore suggests that one of the reasons why teachers have no interaction with their learners at the visiting places is the way the sessions in these places are run. During the time when the tour guides were in charge Mrs Jury was either not having any interaction with the learners or she was only controlling the behaviour of the learners.

> *Within ten minutes of the activity the other tour guide, Momo arrives and the learners are asked to stop with the activity by teacher (Mrs Jury) and listen to what Momo has to say* **[Behaviour control].** (Mrs JuryOC 26-27).

These are the type of interactions that Mrs Jury had with the learners while tour guides were in charge of the learners.

4.5.2.3 Mrs Rene

The situation at Adler Museum was different in that teachers have more time with their learners in the museum than is the case at HartRAO and Johannesburg Planetarium. Analysis of the field notes made during Mrs Rene's class observation revealed that she had learning-oriented interaction with her learners. In her case there were no other subcategories (No interaction and Behaviour Control).

> *The first presentation is about traditional healing. The curator is discussing with the learners about the traditional doctors. Meanwhile the teacher also adds to the curator discussion by including the different cultures and believes. The teacher seems to be helping with some knowledge where she has an idea. Learners ask the curator and their teacher about traditional healers.*
> *Learner: Is it true that only 10% of Sangomas are true healers while others are only after money?*
> *Curator: Yes, I can buy the argument because people are hungry out there*
> *Learner: Can I drink muti in order to kill someone.*
> *Curator: they work differently so it might be possible.*
> *[The teacher is describing to learners about some of the medicines on display.]*
> *Mrs Rene: this is called cupping. It is heated and put on your back.*
>
> *Stethoscope*
> *Learners are playing with the stethoscope and their teacher joins them. They are listening to one another's breathing.*
> *Mrs Rene: Have a look at this (pointing to one instrument). It's nose sharper, they put it on your nose. Look at these, they are heavy devices* **[Interaction: learning-oriented].** (Mrs ReneOC 15-30)

Even though Mrs Rene had learning-oriented interaction with her learners at Adler Museum she believes that teachers should only listen to the tour guides when they get to the visiting places. She believes that tour guides are more experienced so they should take over the work of teachers. She disclosed this during the interview.

Researcher: What role would you recommend them to play during the visit? Your colleague when they are taking their learners to museums or science centres?
Mrs Rene: I think to listen to what others have got to say because they have got more info more info than we have. That's not our areas of expertise so we are learning from other people I think. (Mrs ReneBVI 65-68)

Mrs Rene's response shows that she believes teachers are not supposed to have much interaction with their learners in terms of helping them at the visiting places. However, this is in contradiction with what she did at the Adler Museum where she was helping her learners play the role of a facilitator.

4.5.2.4 Mrs Mango

At Sci-Bono Discovery Centre there are some tour guides who take learners around. However, like at Adler Museum there is some teacher flexibility of going around with their learners, facilitating where necessary. For the three-hour visit at Sci-Bono teachers were sometimes found in groups isolating themselves from their learners. Sometimes these teachers would help to facilitate when their learners are moving from exhibit to exhibit. At the beginning of the session the tour guide took the learners in groups around the exhibit hall but at later stages learners were moving in groups or individually without the tour guides or teachers. It was therefore not clear when the teachers were supposed to facilitate and when the tour guides were in charge. Three subcategories emerged from Mrs Mango's observation; No interaction, learning-oriented interaction and Behaviour control.

Teachers are sometimes moving in groups without their learners. The main talk is about the way back to school since there is a transport problem. There are 7 teachers 4 of which are taking Grade 9 Natural science. Mrs Mango is among teachers sitting down at upper level of the exhibit hall. [No interaction] (Mrs MangoOC 32-34)

The teachers were more often found among themselves chatting to each other while learners were with the tour guides or by themselves. Mrs Mango was interacting with

her colleagues who were sitting in a group on upper level of the exhibit hall. There were cases where Mrs Mango would go to facilitate a certain group of learners even though this was only observed on few occasions like the one shown below:

> *At 14h30 the group that comes from presentation rooms is taken by teachers to look at the exhibits. Mrs Mango is one of the teachers helping the learners with some explanation of how the exhibits work. We are standing next to the whisper dish and Mrs Mango asks one learner to go to the other dish and whisper in it. The other learners are asked to listen. The learners are enjoying the activity and Mrs Mango leaves them to another. Now we are standing next to the spinning wheel. Mrs Mango asks one learner to sit on the wheel and asks another learner to turn him around. She instructs the learner to fold and stretch his arms and observe what happens* **[Interaction: Learning-oriented].** *The learner falls down when trying to fold his arms and the rest of the group is laughing. The learners are now doing the activity on their own and Mrs Mango goes back to the rest of the teachers who are sitting separately away from their learners* **[No interaction].**

(Mrs MangoOC 36-45)

The extract above shows that the teacher was not always with her learners even though she facilitated in some cases. The other teachers were hardly seen helping learners in any way during the visit. More discussion on this will follow in chapter 5.

4.5.2.5 Mrs Koke

Mrs Koke took her class to HartRAO where, as I described earlier, the teachers rarely get chance for facilitation. Two categories emerged from the analysis of observing her: No interaction and Behaviour control. There were no learning-oriented interactions observed during the visit.

> *There is one HartRAO facilitator. Learners are taken to the Sun Dial which is outside the visitor's hall. The facilitator greets the learners and reminds them that "this is an educational trip you all know". The teachers are standing*

behind the learners and they are telling their learners to listen to the facilitator **[Interaction: Behaviour Control].**

Facilitator: Who has been here before? (Facilitator asks the learners).

No one is responding then Mrs Koke raises her hand to show the facilitator that she has been here before. One of the teachers (language teacher) sits down a distance from the rest of the group. Mrs Koke is left with the learners listening to the facilitator.

Facilitator: What are the disadvantages of the Sun Dial?

Learner 1: It can't work when it is at night.

Learner 2: It can't work when there is cloud cover.

The presentation continues until it is disrupted by one visitor who is asking for information from the facilitator. She leaves the learners and assists the other visitor. Meanwhile both teachers leave the learners and sit down some metres away chatting to each other **[No interaction].** (Mrs KokeOC 7-14)

Mrs Koke was supposed to carry on with whatever the tour guide was doing with the learners instead of leaving the learners on their own. Since Mrs Koke had visited the place before, she was familiar with the demonstrations, so she could have assisted the learners in the absence of the facilitator.

4.5.3 Purpose of the visit

There were various reasons given by the teachers for the visits they took to the museums. Teachers gave as many as up to four reasons for taking their learners to the museums. For instance, Mr Dube and Mrs Jury gave four reasons each, Mrs Koke gave three while Mrs Mango and Mrs Rene gave one each.

4.5.3.1 Mr Dube

Analysis of interview transcriptions and field notes revealed that to Mr Dube the purpose of the visit was for the categories of Entertainment, Edutainment, Curriculum and Career. Most of the time Mr Dube related the visit to the work the class was doing at school or curriculum.

Researcher: Ok, I think there are several other museums around here. Why the planetarium? Why not the other science centres but the planetarium?
Mr Dube: err… hence the word planetarium involving planets.
Researcher: yah.
Mr Dube: the word planet is derived from err.. Planetarium.
Researcher: yah.
Mr Dube: …plenty of things there that they can see and observe concerning the planets.
Researcher: Ok ok. Is your visit related to anything in the curriculum?
Mr Dube: Yes, it is related to the curriculum. As I said to you we are dealing with SS [social sciences] and SS has got Geography part of it which involves the planets
[Curriculum] (Mr DubeBVI 34-44)

Even though Mr Dube related the visit to the curriculum, it was clear that the same visit would have been part of entertainment the learners were going to have after the session. The learners had prepared meals with them which I was told they had prepared for the picnic at Zoo Lake after the session.

Towards the end of the session the presenter asks the learners to ask some questions but no one asks any question. The session ends and the learners and their teachers are released. I am told by Mr Dube that the learners are also going for the picnic at Zoo Lake as most of them will probably be leaving the school after writing their examinations **[Entertainment].** (Mr DubeOC 22-26)

Mr Dube also described the visit as both interesting and educational.

Researcher: and the one you have just visited. The last one.
Mr Dube: eerr… between planetarium and museum?
Researcher: yah.
Mr Dube: mmmh… both of them are interesting. They are educational although they are dealing with different chapters and different things but they are both educational and interesting, especially planetarium **[Edutainment]** (Mr DubeAVI 38-43)

But he also described the visit to be career related to the learners

Researcher: why do you think it is valuable to take this type of visits?

Mr Dube: This type of visits?

Researcher: yah, this type of visits.

Mr Dube: Err… I think this type of visit sometimes for in a long time basis…..

Researcher: mmm

Mr Dube: it can sometimes pursue someone's career.

Researcher: ok.

Mr Dube: yah, may be can be an astronomist or planetarian.

Researcher: Ok.

Mr Dube: in other words it can pursue a learner's career

[Career]. (Mr DubeBVI 72-91)

This shows that sometimes teachers have multiple purposes for a single trip they take with their learners. Sometimes teachers' actions show another side different from what they say they are doing. For example Mr Dube in the interview emphasised curriculum as the main purpose for the visit to planetarium but it was also clear from the prepared picnic that the visit was also for entertainment.

4.5.3.2 Mrs Jury

Mrs Jury described the purpose of the visit as the categories I identified as Edutainment, Curriculum and Interactive. The analysis of her interview also revealed that taking the visits like the one she took with her class could be a tradition of the school.

Researcher: err…have you been to any other science centre or museum apart from HartRAO?

Mrs Jury: Err..mmm…we do a lot of outing not only with science centre but we do a number of outing in the school. They go to the one for the cave, they go to Pretoria museum. They…we try we try err…you know do at least two outings per grade per term. I can tell where the…where the grade 4s have been. Is that what you want me…what other outings we do? **[Tradition]**

(Mrs JuryAVI 35-40)

It was apparent from her response that every class had to do the visit and this could lead teachers taking the visit because it was the tradition of the school. However, Mrs Jury also gave interactive nature of the HartRAO as the reason why she was taking her learners there

> *Mrs Jury: ahh…I just found that HartRAO is more interactive than the Planetarium. If it's for the younger children they learn…they learn so much because the learning experience of interactive. They are not just sitting, looking and listening you know. They are participating in the learning process by having opportunity to look at all those models and touch them and feel them. And centrifugal force to actually you know go there, spin so that they can remember so well. In fact the one male student who is here, he has been to the school and he said when he was here the school went to HartRAO* **[Interactive].** (Mrs JuryAVI 12-17)

The interactive nature of the HartRAO was probably the main reason why Mrs Jury took her learners there. This is because she used the word 'interactive' fifteen times in her post visit interview. She was really emphasising it more than anything else. However, Edutainment and Curriculum were categories that emerged during the analysis.

> *Mrs Jury: Because they have gone beyond what you would cover in the classroom. And that's really what we look at in an outing. It must be beneficial, educational need to the children. As well as the children enjoy it because when they enjoy it then they learn so much more. Ahhh…you know I find that if they go and the facilitators are not good or don't control the children or the children don't listen to them then it becomes pointless exercise. I can go back to HartRAO they really are good. Their facilitators are excellent. The children really enjoy them and they are very knowledgeable about what they are talking about, you know* **[Edutainment]** (Mrs JuryAVI 120-126)

> *Researcher: Did you know what type of exhibits they…they are having there?*

Mrs Jury: Ahhh..mmm I did before I brought school children because I had seen it before and I knew that it was interactive and I know that it fitted in with…with the work I have covered at school.

[Interactive] [Curriculum] (Mrs JuryBVI 27-29)

Like Mr Dube, Mrs Jury also had many reasons why she was taking learners to the museum. She emphasised the interactive nature of the museum but she also made it clear that the visit was related to what they were doing at school. Mrs Jury was also aware that the museum would give her learners important knowledge while at the same time enjoying themselves (Edutainment).

4.5.3.3 Mrs Rene

Like other teachers in the study Mrs Rene also considered the visit to be related to what they were doing at school.

Researcher: Why do you take this particular class on this field trip to this Museum?
Mrs Rene: Because of what we are doing with grade 6 that is organ transplant and I do err…early nursing **[Purpose: Curriculum].** (Mrs ReneBVI 5-6)

Apparently for her the visit was used to consolidate what they have been doing with her Grade 6 class. She had one clear purpose for the visit unlike the teachers who had several reasons for their visit to the museum.

Researcher: What do you expect them to achieve after this visit?
Mrs Rene: Just to consolidate everything that they learned, put all together.
(Mrs ReneBVI 40-41)

This suggests that teachers sometimes use museum visits as a sort of reinforcement of what they did with their classes or a sort of a summary.

4.5.3.4 Mrs Mango

Mrs Mango's main purpose for taking her learners to Sci-Bono was Career-related. She was referring to learners making their choice of subjects in the next class depending on what career they would like to follow in future.

> *Mrs Mango: mmmh. We want learners to be prepared about career choices because some of them will be going to grade 10 next year.*
> *Researcher: Next year?*
> *Mrs Mango: Yah, so they they must have err… little bit of the basic information about their career, the career that they are going to choose next year* **[Purpose: Career].** (Mrs MangoAVI 16-20)

Even though Mrs Mango described that the purpose of the visit was to help learners make career choices, the visit itself was science related. So it means the choices the teacher was referring to were science related careers. It was not clear why Mrs Mango decided to take the visit at the time she did. The response she gave when she was asked why she decided to do it at that time was not convincing. She was not able to relate the objectives of the visit as she stated them before with the reason why the visit is done at the time it was done. The reason she gave was that they were completing the curriculum so the learners were not busy therefore they could be taken somewhere. From this response one could sense that probably the visit was an 'end of the year day out'.

> *Researcher: why are you doing this visit at this time, why not at any other time, why [this] time in particular?*
> *Mrs Mango: mmmmhh… errr… learners are not that much busy so that….we are busy completing the tasks. We are through with the tasks of the whole year so that's why we have to take them somewhere* **[Purpose: Entertainment].** (Mrs MangoBVI 25-30)

Reasons like entertainment are usually not put explicitly by the teachers but their plans suggest that they view the visit as a sort of a 'day out' like in the case of Mr

Dube. For Mrs Mango it was clear from her responses that the visit was also a day out from school.

4.5.3.5 Mrs Koke

The purpose of the visit (as the analysis from Mrs Koke's interview show) was related to the curriculum, for career and for learners' edutainment.

> *Researcher: Ok. Why do you take this particular class on this field trip?*
> *Mrs Koke: err. Part of the science curriculum of the grade 7 is space and they do planets and I know they show the children the distances between planets here. And that's what they said when we went there for the first when they gave the course to teachers* **[Purpose: Curriculum].** (Mrs KokeBVI 9-12)

Mrs Koke also took the visit because she wanted the learners to consider careers in astronomy as she believed HartRAO is also about that. She also considered the visit as a chance the learners could use to be inspired for choosing careers as scientists or astronauts as she put it.

> *Researcher: Why do you think these types of visits are important in general?*
> *Mrs Koke: Ahhh…mmm it takes them out of their environment. Some of our children err…I must say some of them get more and more in contact with the other…outer worlds. But then some of them they go to school go home, church may be and then they don't go to other places at all. And it's also…a career may be job opportunity somewhere and just the normal going up into space as astronaut* **[Purpose: Career]** (Mrs KokeBVI 65-69)

Even though Mrs Koke took the visit for curriculum and career purposes she was aware of the combination of both enjoyment and educational aspects brought by the HartRAO. As she described it, learners got a lot of information while at the same time having fun.

> *Researcher: How would you classify the whole trip? Was it fun or not?*

> *Mrs Koke: It was fun but also err…they learnt a lot. They got a lot of information and they put through in practice* **[Purpose: Edutainment].** (Mrs KokeAVI 60-61)

In summary, the teachers were generally able to give the purpose for their visit. However, they gave many reasons for the same visit. Some of the teachers had reasons which differed from what they indicated as the purpose of the visit during preparation. For an example Mrs Mango's main reason for taking her learners to Sci-Bono Discovery Centre was described as career. However, it was clear that she was also doing the visit for enjoyment and educational aspect.

4.5.4 Follow up from the visit

Two subcategories emerged from analysis of teachers' follow up activities. Their activities were either task-oriented or learning-oriented. Task-oriented in that they are characterised by emphasis on tasks such as completion of the worksheets or handing in the worksheet. Learning-oriented follow up activities are characterised by emphasis on learning process, in other words a discussion of the topic in relation to the place visited. Three of the teachers did learning-oriented follow up activities, while Mrs Mango's and Mrs Rene's follow up activities were task-oriented. Teachers generally did some follow up activities which were related to the visit and the discussions were more about what the learners got from the museums. The fact that teachers gave their learners a chance to reflect on their museum visit experiences and also teachers giving additional information show that they had learning-oriented follow up activities with their classes. This is shown in the transcripts of three teachers that follow.

> *Mr Dube then divides the class in to groups of 5. He tells them to discuss among themselves all things they have learned from the field trip. He also tells learners that he is expecting to come up with as much information as they possibly can on day and night, the moon, solar system, satellites and stars. As he is moving around he helps the learners to explain some of the things they saw at the planetarium* **[Follow up: Learning-oriented]** (Mr DubeOF 34-36)

Learners are then given the worksheet to fill. Mrs Jury reminds them that they will be writing test and exam on the visit they took yesterday. Learners are divided into their already existing groups. There are 5 groups with members ranging from 3-5. The learners are discussing the worksheet and the teacher is moving from one group to the next. The worksheet is on how the sundial works, its advantages and disadvantages, uses of satellites, movements of the sun and others. This is scheduled to take one hour. Towards the end of the lesson Mrs Jury discuses the worksheet with her class and she also bring some concepts they did in previous lessons **[Follow up: Learning-oriented]** (Mrs JuryOF 12-15)

The learners are discussing in their groups using some notes they were given by Mrs Koke. Mrs Koke is moving around from one group to the other. She is assisting learners where they seem not to know the answers. Learners seem to be familiar with the information needed to fill the table as they hardly ask for help. Mrs Koke reminds the learners that on additional information about the planets they remember what they were told at HartRAO and she is also giving some information about the stars, black hole, sunspots and other concepts learners seem to have problem to understand **[Follow up: Learning-oriented].** (Mrs KokeOF 22-26)

However, there were two teachers whose follow up activities with their classes were task-oriented. Even though the work they gave to their learners was related to the visit to the museum they were not able to make any discussions with learners about the work. The only thing the teachers did was to mark either the assignment or the worksheet.

Mrs Rene tells me that she is using the visit as a wrap for what she was doing with the class. She therefore told me that what she is going to do is to give the learners an assignment to make a summary of what they have learned at the museum. She tells me that she will instruct her learners to include things like the stars, solar system, satellites and other things they learned at HartRAO. She tells me that the learners will submit their assignments so that she can mark them. The learners were supposed to work individually at home **[Follow up: task-oriented].** (Mrs ReneOF 1-4)

Mrs Mango arrives and now there is a change of plan. She is no longer going to make follow up in the class but she is going to given learners an assignment that will be handed in 4 days later.

Assignment:

1. *List some of the exhibits in Sci-Bono Discovery Centre that are related to what you did or you are doing here in school.*
2. *For seven of those you listed about describe how each works and what is the science [in] it. You should make a detail[ed] explanation which is also scientific for every exhibit chosen.*
3. *Write an essay on the importance of career guidance. This should be half to three quarters of a page long. In your essay include the information you got from Sci-Bono Discovery Centre.*

The learners were supposed to do this assignment at home and submit it in 4 days. For that period which was supposed to be used for follow up activity and observation the teacher did a normal teaching of content not directly related to the visit **[Follow up: Task-oriented].** (Mrs MangoOF 10-21)

Mrs Mango did not plan to give the learners an assignment from the beginning. She only told me that she was going to do it when I arrived at school for class observation. It might be that Mrs Mango was never going to make the follow up activity in the first place. She was probably influenced by the fact that I told her that I was interested in teachers who were planning to make the follow up activities. The fact that her objective for the visit was only career related might explain the reason why Mrs Mango changed plans for follow up activity on the day she was supposed to be observed.

4.6 Learners' perspectives

In each class, three of the learners that went with their teachers to the centre were interviewed either at school a day before the visit or on the day of the visit before the start of the session. The interview questions were mainly on learners' thinking about

why they were taken to the visit, what they thought they were going to learn at the visiting site and whether they expected to do any follow up after the visit. The learners gave different responses and these were classified under two categories; **purpose of the visit** and **follow up.** The subcategories were similar to the ones used in teachers' data. The table that follows shows some number of occurrences for each subcategory under **purpose.**

4.6.1 Purpose

Table 4.7: **Purpose of visit as viewed by learners**

Learner's name	**School**	**Grade**	**Entertainment**	**Edutainment**	**Curriculum**	**Interactive**	**Career**	**No clear Purpose**	**Tradition**	Centre visited
Lemao	Thibe	7	-	-	X	-	-	-	-	Planetarium
Semaka		7	-	-	X	-	-	X	-	
Boyele		7	X	-	X	-	X	-	-	
Letty	Martina	6	X	-	X	-	-	-	-	HartRAO
Abby		6	X	-	X	-	-	-	-	
Raji		6	X	-	X	-	-	-	-	
Boitumelo	Mary	6	-	-	X	-	-	-	-	Adler Museum
Thapelo		6	-	-	X	-	-	-	-	
Thabang		6	-	-	X	-	-	-	-	
Lefa	Lodi	9	-	-	-	-	-	X	-	Sci-Bono
Lebo		9	-	-	-	-	-	X	-	
Lizzy		9	-	-	-	-	-	X	-	
Lerako	KTS	7	-	-	X	-	-	X	-	HartRAO
Leseko		7	-	-	X	-	-	X	-	
Bongy		7	-	-	X	-	-	X	-	

Table 4.7 has different colour shading to show which learners come from the same school. The same categories used in teachers' data were used for learners as way of triangulation. Analysis of learners' interviews shows that some of the categories that appeared in teachers' are not there in learners' interviews. There was also emergence of a new subcategory that was not observed with teachers which was 'No clear purpose'.

Three learners from Thibe Primary school, Lemao, Semaka and Boyele perceive the visit to Johannesburg Planetarium as related to the curriculum. It is clear that these three learners had the same perception about the visit as their teacher. However, Boyele had other different perceptions from the others about the visit. He perceived the visit as a way of enjoyment. Boyele also took the visit to Planetarium as a chance to be a scientist, and was able to relate the visit and doing science as a career. Boyele also knew that whatever they were going to do at the planetarium was related to the Solar System which was something he already knew. However, he was interested in getting more information than he already had.

> *Boyele: Yah, just want to enjoy the visit* **[Entertainment].** (BoyeleInt. 48)

> *Boyele: Yah, I'm willing to be scientist* **[Career]** (BoyeleInt. 12)

> *Boyele: Ahh… I'm expecting to do…to know more than I expected to know. I will be knowing how to do this work and then how the sun operates to the earth* **[Curriculum].** (BoyeleInt. 18-19)

Semaka was a learner who at the time of the interview seemed confused as why they were going to the planetarium.

> *Semaka: Because they want us to study the things. I am sure they gonna study SS and then we don't know what they are planning because as they talked about the moon, the sun but we don't know why the things that they gonna ask you there. And yah. And you know that…. yah* **[No clear purpose].** (SemakaInt. 10-12)

The learner did not seem to have any clue why they were taken to the museum. He only knew that it was something related to social science and planets which showed that learners were probably not given enough details about the visit.

The three learners from Martina Primary school that visited HartRAO were also aware that one of the reasons why they were taking the visit was that it was related to what they were doing at school.

> *Researcher: is that related to whatever you re doing at school? How is it related to whatever you are doing at school?*
> *Letty: We are learning about stars and the planets and we are learning about solar system.*
> *Researcher: is that what you are doing at school now?*
> *Letty: Yah* **[Curriculum]** (LettyInt. 11-14)

> *Researcher: Why do you think you[r] teacher took you to this place?*
> *Abby: Because they want us to learn about the solar system and be hands-on the solar system and repeat it in our work at school and we have been doing lots of it at school so we need to learn about it* **[Curriculum].** (AbbyInt. 1-3)

> *Researcher: Why do think your teacher decided to take you to this centre?*
> *Raji: Because we want to learn about solar system and this will be in the exam at end of the year. We want to learn about all the planets and what forms them and everything about the solar system* **[Curriculum].** (RajiInt. 1-3).

Apart from the common views that these learners had about the visit relating to the curriculum they also had similar views about the visit being for entertainment. For instance, they were all expecting the visit to have an element of fun according to what their teacher had told them and their own anticipation.

> *Letty: She told us that we gonna come and make rockets and its interesting, and we gonna have a lot of fun* **[Entertainment].** (LettyInt. 3-6)

Raji: We are… I am expected to like read information and launch rockets and do all funny stuff like that **[Purpose: Entertainment]** (RajiInt. 6-9)

Researcher: Ok. What are you expected to do when you reach this place?
Abby: to launch a rocket, have fun and do all sorts of activities
[Entertainment]. (AbbyInt. 7-8)

Learners from Mary Primary school that visited Adler Museum had same perception about the visit. Three of them considered the visit to be related to the curriculum. They had anticipated observing what they dealt with at school which was organ transplant in Natural Science.

Boitumelo: Yes, like we did transplant in class and may be we will see how transplant is done there **[Curriculum]** (BoitumeloInt. 8-9)

Thabang: She wants us to learn about body organs and transplanting kidneys and heart **[Curriclum].** (ThabangInt. 4)

Researcher: Is there anything related to what you did or you are doing in class about the visit?
Thapelo: Yes, in NS we do transplant of body parts **[Curriculum].**
(ThapeloInt. 11-12)

Learners from Lodi secondary that visited Sci-Bono Discovery Centre seemed to have no idea why they were taken on the visit. The purpose of the visit was not clear from the responses they were giving during the interview. Learners were aware that the visit was science related but they did not seem to have any clue as to what it was that they were going to do or see at Sci-Bono Discovery Centre. They were sure that they would learn something at the centre but they could not tell what it was.

Researcher: What is it that you are going to study here?
Lebo: I don't know but I'm really interesting to find out **[No clear purpose]**
(LeboInt. 7-8)

Lizzy: I am thinking our teacher brought us here because we have to learn more things about science **[No clear purpose]** (LizzyInt. 7-8)

Researcher: Why do you think your teacher is taking you to Sci-Bono?
Lefa: Our teacher is taking us to Sci-Bono so that so that we can learn science **[No clear purpose].** (LefaInt. 1-2)

The same pattern observed with learners from Mary Primary school was also observed in KTS Primary school learners. They were doing astronomy at school and they knew the visit was somehow related to the topic. This could be seen from their responses.

Lerako: We are actually doing space and astronomy now in school **[Curriculum].** (LerakoInt. 14)

Leseko: I think she wants us to learn more about our universe and our solar system and then more about different kinds of planets **[Curriculum].** (LesekoInt. 5-6)

Bongy: Errr…I think to learn about all the other…all the planets and the Earth and the sun and all that **[Curriculum].** (BongyInt. 3-4)

Even though learners had an idea that the visit might had been related to the what they were doing or did at school there were cases in the interview they seemed not to know exactly what it was that they were going to do. They were not consistent in their responses in that at one point they mentioned that the visit was related to their school but in some instances they looked not sure why they were taken to HartRAO.

4.6.2 Follow up

The learners' interview questions were also on whether they thought they would be doing any follow up activity. Learners from Thibe Primary school gave different responses on this. It was clear that learners were not told anything about the follow up

activities because the responses they gave were more of what they themselves would do after the visit rather what their teacher said they would do. It was not clear from the responses learners gave how to categorise the type of follow up activities they were anticipating.

> *Researcher: Do you expect to do any work at school related to the visit? Here at school do you expect to do any work any type of work which is related to the visit you are attending tomorrow?*
> *Lemao: Yes.*
> *Resaercher: What type of work?*
> *Lemao: Like drawing the planets, like drawing the planets* (LemaoInt. 57-62)

> *Researcher: Now when you come back do you expect to do any work in the school in other words in your class which is related to what you are going to do in the planetarium?*
> *Boyele: Yah, I'm going to write some notes.* (BoyeleInt. 38-40)

> *Semaka: any work in… at school there are SS and Natural Science* (SemakaInt. 49)

Learners from Martina Primary school also gave responses that indicated they were not sure about what they were going to do at school in terms of follow up activities. However, the learners were aware that their teacher might give them some work related to the visit. They talked about things like questions about the visit in the exam, doing experiments about solar system and filling the worksheets that would be kept in their school files.

> *Researcher: Ok. Are you expected to do any work related to this visit when you get back to school?*
> *Raji: Yes I am expected to do that because it's in our exam and because it's fine activity* (RajiInt. 6-9)

> *Researcher: Ok. Do you expect to do any type of work when you get back to school?*

Abby: yes, lots of work. We did experiments in school in natural science lots of things learning about solar system (AbbyInt. 16-19)

Letty: (inaudible) and we have got a file in a file we have got worksheet in there. (LettyInt. 21)

Learners from Lodi Secondary school were not different from learners from other schools discussed above. They were not told what they would do after the visit. One of the learners was even upfront about the fact that they were not told anything about the follow up activity at school. However, learners mentioned things like help other learners about what they learned at the centre and also telling those who were not able to the take the visit to Sci-Bono Discovery Centre.

Researcher: are you expected to do something related to this visit when you go back to school after visit?
Lefa: after visit we will go home because it is already after school.
Researcher: It can be a day after or two. Did your teacher say anything about doing something like assignment, worksheet, debate or something?
Lefa: No, she didn't tell us anything (LefaInt. 21-26)

Lebo: Who [we] have no clue about….like others who are also in grade 9 but were left behind because of money yah we are going share the knowledge with them (LeboInt. 31-32)

Lizzy: There are people who didn't come with us here then I will give them the message that I found it here. Yah, if some of people they didn't understand what they were teaching us here then I will explain to them. (LizzyInt. 40-43)

The three learners from Mary Primary school were a bit different from other in terms knowing what they were going to do as a follow up from the visit. Learners were aware that their teacher would give a worksheet. Boitumelo said that they were told by their teacher. On top of that learners anticipated their teacher to give them a test or essay on the visit.

Researcher: Do you expect to do any work at school related to the visit you are taking?
Boitumelo: Yes, Mam will give us some worksheets to fill I think.
Researcher: Did she tell you anything about what you will do when you come back from the visit?
Boitumelo: Yes, she told us that we will do some worksheets
(BoitumeloInt. 12-15)

Researcher: Do you expect to do any work at school related to the visit?
Thapelo: Yes, we expect to write essay may be and some worksheet Mam will give. (ThapeloInt. 17-19)

Researcher: Do you expect to do any work about the visit the visit when you get back to school after the visit?
Thabang: Yes, I expect to do any work. I expect to write a worksheet. I will write a test or something Mam will give us. (ThabangInt.11-14)

Learners from KTS Primary school answered the question on follow up in various ways. They were not consistent in their responses. One learner was expecting to write an essay and continue with the topic, the other was anticipating to get questions from the teacher while the other one was just expecting the work with the fellow learners.

Lerako: I think Mrs Koke said we gonna write an essay on it because every trip we go to, we write an essay on it. I think we gonna write an essay and we gonna do more on space (LerakoInt. 24-26)

Bongy: May be write an essay and then Mam may be our teacher is ask us about err…questions about what we learned from the centre
(BongyInt. 20-21)

Researcher: Are going to do any work with the rest of the class related to the visit when you get back to school?
Leseko: Yah. I'm expecting to do some work with others.
Researcher: Did your teacher tell you anything about that?

Leseko: No, she didn't tell me. (LesekoInt. 17-21)

Generally learners had diverse perceptions about the visit to one of the three centres. They were not consistent in terms of why they were taken to the centre and the type of follow up they were anticipating. These could be taken to mean that learners were not given clear reasons why they were taking the visits and what they would do when they got back to school. The next section is about the closer look at teachers and their respective learners.

4.7 A closer look at teachers' and their learners' responses

4.7.1 Purpose for the visit

Table 4.8 shows that teachers and their learners in some cases had different views regarding the purpose of the museum visit. Learners' responses indicated that they did not have a clear purpose about museum visit and this was observed in teachers responses. The categories Edutainment, Interactive and Traditional were not identified in learners purposes of the visit while they were identified in teachers' response.

Mr Dube's perception about the purpose of their visit to the planetarium was that it was for entertainment, edutainment, relating to curriculum and career. However, learners' interviews revealed that they took the visit for entertainment, curriculum and career. One of Mr Dube's learners also had no clear purpose of the visit. There was a slight difference in perception about the visit. This difference could therefore be taken to show a teacher and learners were not on same footing regarding the purpose of the visit. This information is shown on table 4.8 overleaf.

Table 4.8: Teachers and their learners' purpose of visit

School	Participants	Entertainment	Edutainment	Curriculum	Interactive	Career	No clear Purpose	Traditional
Thibe	Mr Dube	X	X	X		X		
	Learners	X		X		X	X	
Martina	Mrs Jury		X	X	X			X
	Learners	X		X				
Mary	Mrs Rene			X				
	Learners			X				
Lodi	Mrs Mango	X				X		
	Learners						X	
TKS	Mrs Koke		X	X		X		
	Learners			X			X	

Mrs Jury had the following perception about her class visit to HartRAO: it was for edutainment, curriculum, interactive and traditional. Her learners on the other had a perception that the visit was for entertainment and related to the curriculum. Mrs Rene regarded the visit to be related to the curriculum. Her learners also perceived the visit as related to the curriculum. Mrs Mango perceived the visit as way of learners' entertainment and for career guidance. Her learners on the other hand did not have a clear purpose about the visit. Mrs Koke's reasons for taking the learners to the visit were for edutainment, curriculum and for career. Her learners' interview analysis revealed two subcategories; curriculum and No clear purpose.

Teachers' objectives about the visit were not always exactly the same as those of their learners. This could mean that teachers did not do enough work with their learners so that they could share the same view about the visit. The preparation done at each school was possibly not adequate to make both teachers and their learners have same viewpoint about the visit.

4.7.2 Follow up from the visit

Learners' responses to any question about the follow up activities showed that learners were not sure if they would do any activity or not. Even if from past experience they knew an activity was likely, they were not sure what it was that they were going to do. Because of this uncertainty it was not possible to identify follow up subcategories from learners' responses.

The fact that learners were not able to state their anticipated follow could mean that teachers did not tell them anything about what they would do at school after the visit. This can also be an effect of limited preparation of the visit. The teachers might not have given their learners a broad picture of the visit where learners were supposed to link between what they were doing at school and the visit and what they did at museum with what they would do when they got back to school.

4.8 Summary

The results indicate that the teachers did not convey to their learners clear, explicit purposes or objectives for the visits they took. By contrast, in schools groups where the visit was related to the topic being done at school, both the teachers and learners were able to articulate the purpose of the visit. Teachers were giving so many objectives of the visit that could be taken to show they were not sure about the purpose of the visits.

Teachers were also not able to give their learners a broad picture of the visit to help the learners see the link between what they were doing at school, the visit itself and what they would do after the visit. One of the reasons why teachers could not do that could be that even teachers themselves did not have the whole, clear, coherent picture about the visit.

Teachers to some extent had prepared their learners for the visit and therefore the learners knew a small amount of what they were going to do or see at the museum. However, one teacher focused on the content of what the learners would come across at the museum rather trying to make the link between the content at school and what

learners would observe at the museum. Teachers carried out preparations that focused mainly on the worksheets prepared for visit. However, some did include visit content into their lessons.

Some learners had the view that the visit was related to something they did or would do at school. As described in section 4.6.1 learners (4 of 15) also viewed the visit to be for entertainment and career. However, seven learners did not have clear purpose about the visit.

Most of the learners were anticipating to do follow up at school even though they did not have any idea what it was that they were going to do. Some of the learners were not anticipating any follow up activity. This could mean that teachers were not upfront with their learners regarding whether they would do any follow up and what it was that they would do. The next chapter is about the findings in relation to literature.

Chapter 5: Discussion

5.0 Introduction

This study set out to investigate the practices shown by a few teachers when taking learners on visits to museums. It focused mainly on (i) the preparation that those teachers carried out with classes before they took the visits (ii) the sort of interactions that the teachers had with their learners when they were at the museums (iii) the objectives of the visits as given by the teachers taking their learners to the museums and (iv) the type of follow up activities carried out by the classes after their visits.

This chapter discusses the findings presented in chapter 4 in relation to findings of other similar studies done before. Chapter 4 provided the findings on how the five teachers involved in the study prepared with their classes before the field trips. It also provided the findings of the type of interaction teachers had with their learners at the museum and the objectives teachers had about the field trips. These teachers' objectives were derived from both deductive and inductive coding of the interview transcripts. The findings were also about how teachers made their follow up activities from the field trips.

This chapter is divided into the following sections:

- Preparing for the museum visits: it looks at how the five teachers carried out preparations for the field trips.
- The role teachers play during the museum visits: it considers the role the five teachers played looking at their interactions with their learners during the field trips
- Teachers' perceptions about purpose and objectives of the visits: it gives a clear indication of purpose and objectives of the visits given by the selected teachers.
- Making follow up activities: it shows how selected teachers carried out their follow up activities after their field trips.

- Teachers as members of community of practice: it is about the selected teachers as members of the community of practice and their location on the community of practice.
- Learners' perceptions: it considers how the learners thought about the purpose of the visit and their anticipation for any follow up activities after the visit.
- Conclusion: this is the conclusion of the chapter.

5.1 Preparing for the museum visits

Much research has been done on school preparation for museum visits as discussed in chapter 2 of this study. Most of these studies highlight the importance of learners being prepared for the visits because the more familiar they are with what they are suppose to do during the visit, (e.g. with the place to be visited and the kind of event in which they will be involved) the more fruitful the visit will be for them (Orion, 1993; Anderson & Lucas, 1997). Some research shows the significance of ensuring learners have proper levels of knowledge about the content of the visit (Balling, Falk and Aronson, 1995 and Bunet, 1995 cited in Lucas, 1999). Furthermore, some teachers express their awareness about the importance of content preparation before taking the visit to the museum but they hardly implement this when planning their visits (Storksdieck, 2001). Part of the study described here is therefore to look at those teachers who do carry out preparations before the visit and how they do it.

The next few paragraphs summarise teachers' preparation as discussed in the previous chapter. Mr Dube, a teacher from Thibe Primary School did his class preparation in a way that it was not clear how the visit to the planetarium would take place. The discussion was on the topic "Solar System". According to Mr Dube, the class had dealt with the topic before. The way Mr Dube conducted the discussion was as if the lesson was meant as revision of what the class had done before. His class preparation was therefore described as not related to the visit. Mr Dube had taken a diagram of solar system from a school text book and this was given to the learners at the beginning of the lesson that was observed. The discussion was about the planets and other aspects of the solar system which all was on the hand outs given to learners. The

introduction of Mr Dube's lesson did not give any clue that discussion was related to the visit they would be taking to the planetarium.

Mrs Mango who took her class to Sci-Bono Discovery Centre, described the main reason for the visit to be career-related. Her preparation was regarded as learning-oriented even though it was not about a specific topic in the school curriculum. The discussion she had with her class was about how learners could choose subjects they would take in Grade 10 or their career. This discussion was therefore taken to be a reflection of what Mrs Mango wanted her learners to see and acquire from the visit. However, in addition, her discussion included scientific information that the learners would get at a science centre even though the main purpose of the visit was given as career related.

Mrs Jury's class preparation was also described as learning-oriented. She was using the worksheet that had some information from HartRAO. The cover page of the worksheet had the HartRAO emblem and there were questions in the worksheet that were directly about HartRAO. During the lesson, Mrs Jury indicated to her learners some of the activities they would do at HartRAO. The class was dealing with the topic 'Solar System' at the time of the visit. Mrs Jury's preparation for the visit was likely to give her learners some ideas about what to expect at HartRAO.

The teachers whose preparation was regarded as task-oriented were the ones who put more focus on the worksheets they had prepared. For example, Mrs Rene's was working on the worksheet about the Transplant Surgery. Learners were answering the questions in groups while their teacher was moving around trying to help them where the questions were not clear or the learners could not get the answers. It was only at the end that Mrs Rene told her class that they were going to see something like the one they were dealing with at Adler Museum. So, most of the lesson was mainly about the worksheet even though it was somehow related to the visit.

DeWitt and Osborne's (2007) summary of how teachers can enhance effectiveness of taking their learners to museums includes encouraging teachers to be familiar with the setting of a place they would like their learners to visit. However, the transcript

below, taken from Mrs Mango's pre-visit interview, tells otherwise about her knowledge about the museum that was visited.

Researcher: Sci-Bono Discovery Centre. Now, how did you know about this centre?
Mrs Mango: Hai..! Actually I didn't now about the centre. My colleague here Mr. Dango is the one who has the whole information about this place so it is the first time I'm going there.
Researcher: It is the fir… first time you are going there?
Mrs Mango: Yah.
Researcher: Ok.
Mrs Mango: I know nothing about the place……
……
Researcher: How? How is it related to the curriculum?
Mrs Mango: Science based because I'm teaching them natural science so some of the things they know them in the textbook so they must…look at it and observe some of the equipment they are talking them …. About them in science and how they are used.
Researcher: Do you have any idea what the centre provides?
Mrs Mango: mmmh I don't have the idea.
Researcher: You don't have any idea?
Mrs Mango: mmmm.
Researcher: Ok.
Mrs Mango: I would be lying to you coz I don't know the place. It's for the first time.
Researcher: mmm.
Mrs Mango: mmmh. I know I I heard that it is science centre but I have never been there.
Researcher: do you have any idea the type of exhibits that are found there?
Mrs Mango: ha ha ha ha ha ha ha (laughing) no.
Researcher: no idea?
Mrs Mango: mmmm.
Researcher: not even from a friend, not even from the colleague or some one?
Mrs Mango: ha ha ha ha (laughing)… no.

It was clear that Mrs Mango did not have any idea about the place she was taking her learners to and she had never been there before. She made it clear that one of her colleagues was the one who came up with the plan to take the visit and had the information about the visit. According to the recommendations from literature as summarised by DeWitt and Osborne (2007), preparation without knowing anything about the place to be visited is not encouraged. Even though Mrs Mango mentioned that Mr Dango (her colleague) had the information about the museum they were visiting they did not share the information. It was a bit surprising that preparation was done by Mrs Mango alone without any assistance from her colleague even though she did not have any idea about the museum and the exhibits found there.

Unlike the other four teachers Mrs Mango's preparation did not have any content on a particular topic. As mentioned earlier her focus was learners' choice of career. Mrs Mango's experience of taking learners to museum visits is also worth noting. During the interview she mentioned that she had never been to any museum before as indicated in the transcript below.

> *Researcher: Have you ever been to any other science centre or museum?*
> *Mrs Mango: No for me it was the first time. I told you before.*

The experience of preparing for the museum visit was new to Mrs Mango. However, her preparation was regarded as learning-oriented because the class observation was a reflection of what she wanted her learners to gain from the visit.

Even though she did some preparation with her class, Mrs Mango seemed not to be valuing the importance of the pre-visit preparation. In her response to how she would advise her colleague to make preparation she just mentioned technical preparation. It was also observed in the Tal, Bamberger and Morag (2005) study that most teachers reported the technical arrangements of the visit. Mrs Mango's response therefore could mean that she only did the preparation because she was influenced by the researcher, as indicated by her response below:

Researcher: Err…if your colleague is planning to take a visit to science what would you recommend her to do for preparation?
Mrs Mango: Err…must make sure that the transport is ok and then arrangement for catering is also ok. Yah. The departure time and the time for coming back so he she he or she must see on that areas that they are properly arranged.

The importance of preparation is discussed in several studies like Anderson and Lucas (1997), Griffin and Symington (1997), Griffin (1998), Michie (1998), Anderson and Zhang (2003) and others as described in chapter two. Griffin and Symington (1997) in their study (consisting of 29 teachers and 735 learners) found that most of the teachers did very little preparation while they spent more time on the organisational aspects of the visit. Even though Griffin and Symington's (1997) study was a larger study there were aspects of it that are reflected in this study. For instance, they found that teachers were focusing on worksheets during their last preparation for the visit which was the similar situation in this study.

Some studies e.g. Griffin and Symington (1997), Griffin (1998) and Anderson and Zhang (2003) discuss the lack of preparation by the teacher before they take their learners to museums. However, in this study the situation was different in that all the teachers selected were involved in pre-visit preparations. The reason being that when I chose the subjects the criteria I used included only those who would make some preparations (discussed in chapter 3). This might have influenced even those teachers who were not intending to make any preparation for the visit to do it. In this study the teachers still had some logistics to do but in addition they did make more substantial preparation for the visit.

Only two teachers' preparations were described as learning-oriented. These are the teachers who were able to relate the discussion they had with their learners with the visit. These results confirmed those of Griffin and Symington (1997) and Griffin (1998) where they found that for those schools which were involved in pre-visit preparations some of them were able to discuss the topic of the visit in class, how the visit was related to what they were doing in class and how they would use the museum for learning about the topic.

According to their responses, almost all the teachers except Mrs Koke were able to do the visit at the time they wanted it to be done. Their failure to link the preparation for the visit with the topic they did at school could therefore not be because of the schedule for the visit. They were not restricted by the schedule not being in line with the topic they were dealing with. This was different from what Kisiel (2003) describes as the reason why teachers could not link the visit to the curriculum where he stated that teachers were unable to schedule the visit within the suitable time frame.

Even though teachers were satisfied with the time at which they did their visits, a study done by Orion (1993) shows that the visit to the museum should be placed at the beginning of the learning process. Interviews with the teachers showed that they did their visit at a time different from what Orion suggests as the transcripts below confirm:

> *Researcher: Why at this particular time? Why are you doing it at this time?*
> *Mrs Koke: Normally we do it a little bit earlier but in the learning program or the program that we use OBE Plus they put space the last term.*
> *Researcher: Ok.*
> *Mrs Koke: And because of our concert and all that things this is the last day. I know it's very late but before the exams at least they have information of space fresh in their memories*

> *Researcher: Why are you doing this visit at this time, why not at any other time, why time in particular?*
> *Mrs Mango: mmmmhh… errr… learners are not that much busy so that….we we we are busy completing the tasks. We are through with errr… the tasks of the whole year so that's why we have to take them somewhere.*
> *Researcher: is that related to the curriculum any how?*

> *Researcher: Ok. Why are you doing this visit at this time?*
> *Mrs Rene: Because I have finished of…it's the time I have finished work with the fiction and I was doing something like this at the end of the section*

It was not clear why teachers took the visit at the time they did. They gave different reasons but which where not enough to give the clue of the time they thought would be appropriate for the visits. The issue of appropriate time to take the museum visits is not discussed much in literature. It is therefore worth finding out whether it would be appropriate for the museum visits to be at the start, middle or end of the related topic in future research.

5.2 The role that teachers play during the visit

This section is a summary of the role that was played by the teachers when they were at the museums with their learners. I first summarise the interactions that teachers had with their learners as this was discussed in chapter 4, and go on to incorporate the findings of some other studies. This study was looking at the role that teachers played during the visit in terms of the interactions these teachers had with their learners at the museums. Most of the time teachers were not interacting with their learners. When they did, the interaction was either in the learning-oriented or behaviour control categories. As I discussed in chapter 4 learning-oriented interaction was described as the relationship in which teachers and their learners had some discussions about the displays or were doing the activities together. Behaviour control was described as a situation where teachers were only dealing with the behaviour of their learners. Mrs Rene was the only teacher who was not having any interaction with her learners. She was also not observed controlling the behaviour of the learners. There were possible reasons for the different observations. Firstly, she had the choice of taking her learners around Adler Museum with curators helping her with other groups of learners. Secondly, there were enough curators to take care of her small number of learners (20 learners) and move them around the place. Mrs Rene therefore did not have to control the behaviour of the learners or leave the learners on their own.

Mr Dube did not have learning-oriented interaction or behaviour control. This was because of the setting at Johannesburg Planetarium. The visitors sat around the instrument that projected pictures and listened to the presentation by the planetarium staff until the show was over. So, there was no way that Mr Dube would have interacted with his learners.

Mrs Jury was observed showing learning-oriented interaction with her learners when the tour guide was yet to arrive but this immediately stopped when the guide arrived. It was possible that Mrs Jury would have more learning-oriented interaction with her learners if the situation allowed. Mrs Mango on the other hand had more chance to facilitate her learners but this was limited. Her learners were sometimes found in small groups with no tour guide or a teacher around them. So, the limited interaction she had with her learners would not have been caused by lack of opportunity to interact with them.

There was no learning-oriented interaction observed between Mrs Koke and her learners. Most of the time the learners were either engaged in discussion or listening to the presentations by the tour guides. It was not clear whether Mrs Koke would have shown learning-oriented interaction with her learners if she had had the chance. The reason being that most of the time she was always chatting to the other teacher and seemed not interested in what the learners were doing or discussing.

The discussion above showed that sometimes teachers are not to blame for their lack of learning-oriented interactions with their learners. They are in most cases restricted by the way the museums conduct their sessions. The situations of Mrs Rene and Mrs Jury could be taken to show that if teachers were given chance they would facilitate the learning of their learners. On the other hand, the fact that Mrs Mango had a chance to facilitate learning of her learners but did not do that could mean that sometimes teachers neglect their responsibility of facilitating their learners' learning.

The teachers who accompanied teachers who participated in this study were never seen helping the learners in any way. In most cases these accompanying teachers were not teaching the same subject as the teachers I interviewed. For example, Mrs Koke told me that the teacher accompanying her was a language teacher who did not know anything about the Natural Science. All the participants were accompanied by at least one teacher who was not a Natural Science or Social Science teacher. These accompanying teachers could not help the learners during the visit.
Tal and Morag (2007) found that tour guides did not involve the teachers in activities and discussions. The main assistance that the guides asked for which would initiate teacher-learner interactions was technical, involving arranging the learners in groups,

calling them to move to the next activity and so forth (Tal & Morag, 2007). The same thing was observed in my study. There was never a case where teachers were called into helping in facilitation but most of the time they were helping to control learners' behaviour.

Griffin and Symington (1997) found that teachers were transforming their classroom-styled instructions into informal settings and they were not linking the topics being studied at school with the museum learning environment. They also found that the strategies used by the teachers were more task-oriented. This study was different in that the teachers (Mrs Jury, Mrs Rene and Mrs Mango) had learning-oriented interactions with their learners and they were certainly not observed using classroom-styled instructions.

Sometimes teachers neglect the chance to facilitate their learners' learning because they regard the museums as having sole responsibility for learners when they are at the museum (Anderson, Kisiel and Storksdieck, 2006). Anderson et al. found that a third of teachers in their study believed that it was museum's responsibility for planning the at-venue experience to the exclusion of any teacher input. It is probably the responses like the one given by Mrs Rene which show that teachers might have the perception that museums are responsible.

> *Researcher: What role would recommend them to play during the visit? Your colleague when they are taking their learners to museums or science centres?*
> *Mrs Rene: I think to listen to what others have got to say because they have got more info more info than we have. That's not our areas of expertise so we are learning from other people I think.*

Even though Mrs Rene had what could be called learning-oriented interaction with her learners she still felt it was the museum's responsibility to take over with facilitation of learners learning when they were at the museum.

Griffin (1994) reported that teachers' involvement in learners' learning in museums ranged from actively working with the learners in small groups, to monitoring learners' behaviour, to leaving learners to fend for themselves as teachers took the

break from teaching. The same pattern was observed in this study where teachers sometimes left learners alone in the museum. The example given in this study is that of Mrs Mango and her colleagues at Sci-Bono Discovery Centre. Teachers (Mrs Jury, Mrs Mango and Mrs Koke) also were involved in behaviour control and sometimes facilitating their learners learning as described in earlier on this section.

In Kisiel's (2003) study where he examined the worksheets generated by the teachers he found that teachers believed that learning would probably not occur during the visit without a worksheet designed to guide learners or keep them on-task. In my case the worksheets were not used during the visit, but the teachers believed that museum tour guides were experts and could therefore help learners to learn.

5.3 Teachers' perceptions about the purpose and objectives of the visit

Teachers gave different reasons why they took their learners to museums and why they thought it is important to take such visits with their classes. As described in chapter four teachers' responses were categorised into objectives like Entertainment, Edutainment, Curriculum, Interactive, Career and Traditional. Teachers gave more than one purpose of the visit during the interview. This might mean that teachers had multiple purposes for the visit or they were not sure of the purpose of the visit or that they somehow did not think about the exact purpose of the visit.

Some of the teachers were hesitant to give responses to why they were taking the visits which also might mean that they were probably not certain about the purpose of the visit. For example, Mrs Mango made it very clear that she was taking the learners to Sci-Bono Discovery Centre for career purposes. Even her preparation was mainly on careers. But her interview revealed that another purpose for her class visit was also Entertainment. This might be taken to mean confusion rather than her having multiple purposes for the trip.

Mr Dube's responses were classified into Edutainment, Curriculum and Career. However, his learners were seen with some bags full of drinks and some food stuff. Asked why they were carrying so much food stuff while they were visiting a planetarium which was just an hour away from school, they mentioned that they were

on their way to the zoo for picnic. Apparently Mr Dube and his colleagues had organised an end of the year picnic for the learners. The picnic was a sort of farewell for those who would be leaving the school. It was difficult to understand how Mr Dube expected the learners to learn anything during the visit while the destination was a picnic at the zoo. It will possibly be interesting for future research to try and find out what effect visiting several places in a single trip has on the learners learning in those places.

Mrs Jury told me that her school planned the visits each class would take and there were a certain number of visits each would be allocated per term.

> *Researcher: Have you been to any other science centre or museum apart from HartRAO?*
> *Mrs Jury: Err..mmm…we do a lot of outing not only with science centre but we do a number of outing in the school. They go to the one for the cave, they go to Pretoria museum. They…we try we try err…you know do at least two outings per grade per term…..…*
>
> *Mrs Jury: I'm actually giving you the copy. This is our term calendar. They go to Constitutional Hill the grade 6s as well. This is err…history related.*
>
> *Mrs Jury: we also bring people in. the grade 6s and 7s had the reptile demonstration.*
> *Researcher: Ok.*
> *Mrs Jury: where I had somebody and who has his own…he runs the reptile park out of Fourways who comes in with the exhibits. The grade 7s have arachnidan demonstration of a guy who studies spiders in South Africa and he comes in and brings the spiders. Err…they go to the Theatre, they went to…the grade 5s have been to Parktown Heritage Theatre that is history related. They have been on a tour to Coca-Cola factory and that's more related to EMS, Economic Management Science and they have seen whole production process in a factory…..*

Mrs Jury: …..… The Weather station, that is with Ann… Weather station that is excellent outing.

It was possible that some of visits were done because it was the tradition of the school to take visits every term. School tradition was therefore considered to be one of the reasons why Mrs Jury took her learners to the museum.

Almost all the teachers (except Mrs Mango) mentioned the content or the subject they were doing at school as one of the reasons for taking their class to museum. It is likely that teachers were aware of the learning opportunities that museums provide to their learners. Teachers were able to describe how the visit was related to the topic they were doing at school.

Michie (1998) in his study to find factors that influence science teachers to organise and conduct the visits found that some of the reasons teachers gave for taking the visit included their belief that visits give learners hands-on, real life experiences which they could not get from the laboratory or normal classroom teaching. Teachers in Michie's study also believed that the activities at the museums improve learners understanding and their attitudes towards science. On other hand, Falk, Moussouri and Coulson (1998) reported that some objectives for visits included education, social event, entertainment and practical issues and they believe that these objectives affect how visitors learn. These different objectives for visiting a museum show that people go to museums with different objectives. In this study a similar pattern was observed as teachers gave various reasons for visiting as shown by the transcription of Mrs Koke's below;

Mrs Koke: But I know there are other places but prefer this because children enjoy ***[Purpose: Entertainment]***

Mrs Koke: It was fun but also err…they learnt a lot. They got a lot of information and they put through in practice ***[Purpose: Edutainment].***
Researcher: Why do you think these types of visits are important in general?
Mrs Koke: Ahhh…mmm it takes them out of their environment. Some of our children err…I must say some of them get more and more in contact with the

*other…outer worlds. But then some of them they go to school, go home, church may be and then they don't go to other places at all. And it's also…a career may be job opportunity somewhere and just the normal going up into space as astronaut.**[Purpose: Career]***

Falk et al. (1998) also reported that usually a visitor would express several of these objectives. This was similar to this study where all the teachers in the study gave more than one reason for visiting. Anderson, Kisiel and Storksdieck (2006) describe the situation of having multiple objectives for visiting the museums as a sign that teachers were aware of the rich opportunity provided by the visits. On other hand, Storksdieck, Kaul and Werner (2005) referred to this multitude of objectives as conflicting. It was not clear from my study whether multiple objectives given by the teachers was an indication that teachers were aware of the opportunities provided by the museums or they did not know the specific objectives of the visits. Further research in this area would be valuable in South Africa.

The study done by Kisiel (2005) reports that most of the teachers (90%) stated that a connection to the curriculum was an important reason for the visit. These results were similar to those in my study where four of the five of teachers reported content or subject they did at school as one of the reasons they visited the museums with their classes.

5.4 Making follow up activities

The importance of follow up activities is discussed in many studies among others Anderson and Zhang (2003), Griffin and Symington (1997) Griffin 1998, Lucas (1999), Lucas (2000), Tal et al (2005) and these were discussed in detail in chapter 2. Some of the studies reported the lack of follow up activities after the visits (Kisiel, 2003; Storksdieck, 2001, Anderson & Zhang, 2003) while others show how teachers do their follow up activities (Anderson, Lucas, Ginns & Dierking, 2000; Lucas, 1999; Lucas, 2000). In my study teachers were involved with the follow up activities after their visits to the museums with their learners as making follow up activities was one of the criteria used for choosing the teachers as mentioned in chapter 3.

As was discussed in chapter 4, the teachers' follow up activities in my study were either task-oriented or learning-oriented. Task-oriented follow up activities were characterised by emphasis on tasks such as completion of the worksheets or handing in the worksheet, while learning-oriented follow up activities were characterised by emphasis on learning processes such as discussion of the topic in relation to the place visited. Three of the five teachers carried out learning-oriented follow up activities with their classes while the remaining two did task-oriented follow up. Those in the learning-oriented category (Mr Dube, Mrs Jury and Mrs Koke) had discussions with their classes after the visit which included the subject content learners acquired from their respective visits. Lucas (1999) observed the same pattern during the class observation of one teacher who was doing a follow up activity with her class. Like Mr Dube, Mrs Koke and Mrs Jury, the teacher in Lucas' study was leading the discussion about what his learners had learned during the visit.

The other two teachers (Mrs Mango and Mrs Rene) did things differently. Mrs Mango gave her learners an assignment which they were supposed to hand in after four days. Mrs Mango had promised to have a discussion with her class as a follow up. However, on the day she was supposed to be observed she told me that she had a change of plan and would be giving her learners an assignment. Mrs Rene on the other hand was using the visit to consolidate what she had done with the class. Her follow up activity was an assignment that was given to the learners in which they had to make a summary of the visit, to be marked for assessment. Mrs Rene and Mrs Mango's way of handling their follow up activities after the visit might have not given them an opportunity to find out what their learners learned from the visit. They might have got something from the assignments but the issue was even if they came across some misconceptions or wrong ideas from their learners they would not get a chance to address them immediately. I would consider that a class discussion with their learners (in addition to the assignment) would have been ideal. Even though sometimes teachers make follow up activities they are not always meant to consolidate what was done during the visit. For instance, Lucas (2000) found that the teacher's follow up activity was not meant to provide the connection between the visit and any science subject done at school at that time but rather an enjoyable end of school programme. However, the teachers involved in my study were different from

what Lucas (2000) reported in that they were linking the visit with what they were doing at school which I consider a good practice.

Griffin (1994) and Griffin and Symington (1997) found that after the visit to the different museums some teachers did not do any follow up activities. This is different from results in my study in that everyone did the follow up activity. The reason for the observed difference was possibly the fact that I was only looking for teachers who would make follow up activities. So even for those who might have not done any follow up activity were probably influenced to do it.

5.5 Discussion in relation to the theoretical framework

5.5.1 Communities of practice theory

As described in chapter 2, this study is informed by the Communities of Practice theory. The basic argument made by Lave and Wenger (1991) is that communities of practice are everywhere and that we are generally involved in a number of them, whether that is at work, school, home, or in our civic and leisure interests. They further argue that in some of these communities we are core members while in others we are more at the margins. Those members who are the core of the community of practice are called old timers or experts and those who are at the peripheries or margins are called newcomers.

The characteristics of such communities of practice differ. Some have names while others do not. Some communities of practice are quite formal in organization while others are very fluid and informal. However, members are brought together by joining in common activities and by what they have learned through their mutual engagement in these activities (Wenger, 1998). A community of practice involves ways of doing and approaching things that are shared to some significant extent among members. Members are bound together by their jointly developed understanding of what their community is about and they hold each other accountable to this sense of joint enterprise (Wenger, 1998). Communities of practice may include a group of nurses in a ward, community of engineers interested in a new design or even a street gang (Wenger, 2000).

5.5.2 Describing the community

This study focused on a community of practice of teachers who take their learners to museums. The teachers in this community probably have the same objectives of getting the most out of the museum visits. A model used by Atherton (2005) to describe a community of practice consists of a circle (see Figure 5.1). Members of the community of practice can be located within the circle, which has indefinite boundary and ever changing centre. The outer part of the circle represents the periphery where the newcomers in the community are located. The inner part or the core of the circle represents the old timers or experts in the community are found. I used and adapted Atherton's model to locate the teachers in my study on their community of practice.

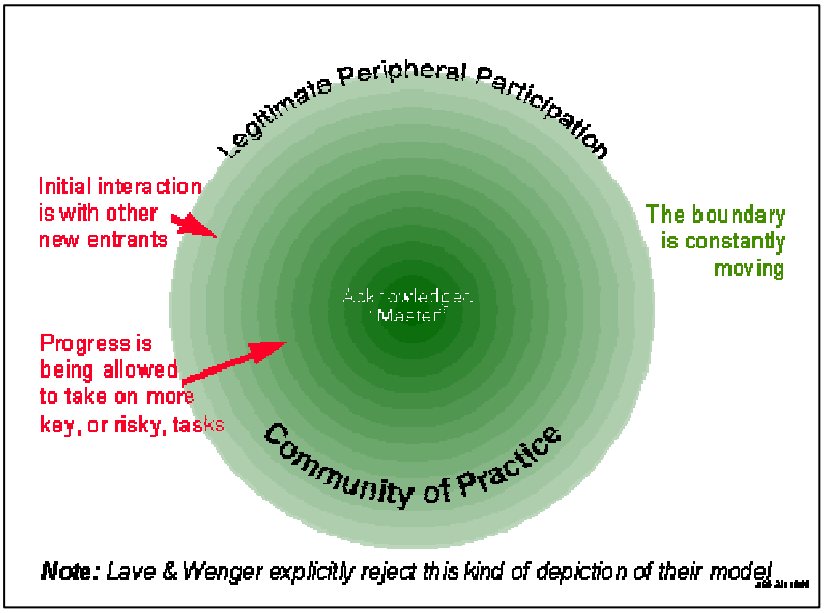

Fig. 5.1: Communities of practice model (Atherton, 2005)

The centre of this community of practice would comprise of teachers who do learning-oriented preparations, learning-oriented follow up activities and have learning-oriented interactions with their learners at the museum. The periphery on the other hand will comprise of teachers who either do task-oriented preparation, task-oriented follow up activities or task-oriented interactions with their learners or no preparation, no follow up activity or no interaction with learners.

5.5.3 Locating the teachers within their community of practice

Preparation

When it comes to preparation for the visit, Mr Dube would be located on the periphery of the community of practice. This is because his preparation at one point seemed to be not related to the visit. Mrs Rene and Mrs Koke are neither on the periphery nor the centre of community because of task-oriented preparations they did. However, towards the core there are Mrs Jury and Mrs Mango who both did learning-oriented preparations. These are represented on the diagram below (figure. 5.2). The circle represents the community of practice while coloured dots represent each of the teachers. The allocation of the teacher on the diagram is not to scale but it is an estimation of where each would be based on my analysis of my interviews with them.

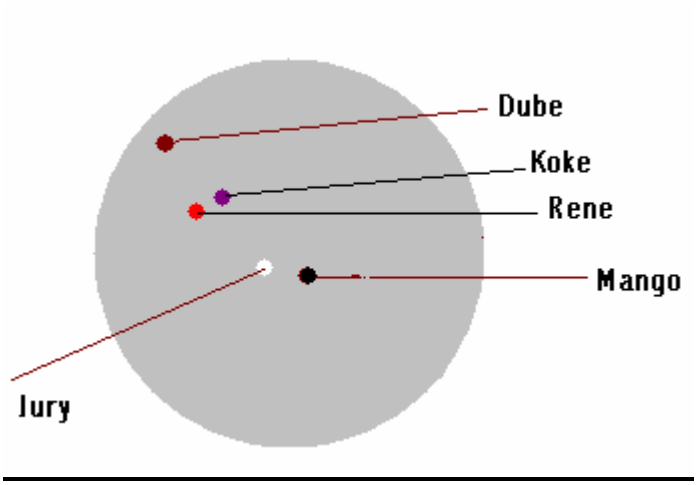

Fig. 5.2: Location of teachers in the study on Atherton CoP Model regarding their preparation for the visit.

Interaction

When considering the interactions teachers had with their learners Mr Dube and Mrs Koke are found on the periphery because they did not have interactions with their learners. On the other hand Mrs Jury, Mrs Rene and Mrs Mango were found nearer the core because they had learning-oriented interactions with their learners. This allocation does not reflect reasons described earlier on why teachers had this type of interactions (see Figure 5.3).

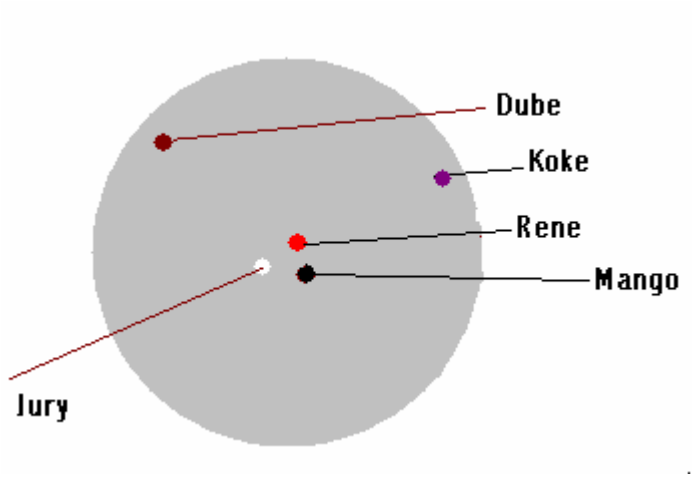

Figure 5.3: Location of teachers in the study on Atherton CoP Model regarding their interaction with their learners during the visit.

Follow up

When considering the follow up activities Mrs Rene and Mrs Mango would be on the periphery while Mr Dube, Mrs Jury and Mrs Koke would be at centre of the community of practice, as shown in Figure 5.3. Mrs Rene and Mrs Mango would on the periphery because they had task-oriented follow up activities with their learners. Conversely, Mrs Koke, Mrs Jury and Mr Dube were located towards the centre because they did learning-oriented follow up activities with their learners.

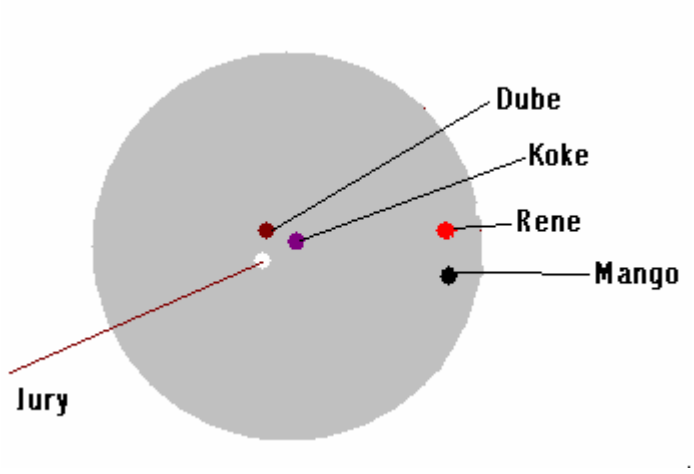

Figure 5.4: Location of teachers in the study on Atherton CoP Model regarding their follow up activities for the visit.

5.5.4 Discussion

It is clear from the analysis that a teacher can be an old timer at doing one activity but be a newcomer when it comes to another activity. For example, Mr Dube is a newcomer when it comes to preparing for visits and interacting with learners (because they were task-oriented) but he is an old timer when it comes to doing a follow up activities (because they were learning-oriented). In contrast, none of the teachers was found on the periphery for all activities.

I can paint a portrait of Mrs Jury as a good example of what is expected from teachers who visit museums with their learners, as she was at core of the community of practice for all the activities. She did a learning-oriented preparation, learning-oriented follow up activities and she also had learning-oriented interactions with her learners. For these reasons, one could term hers as 'best practice' of taking learners to the museums. One possible reason why Mrs Jury was at the core was the vast experience she had when it came to taking learners to museum visits. Table 5.1 below shows how teachers responded when asked which other museums they had been to.

Table 5.1 Teachers' responses

Researcher: Have you ever been to any other science centre or museum?

Mr Dube	*Mr Dube: Yeh, went to museum, there is a museum Krugersdorp called Maropeng. They went there last year in the Heritage day. That's the only place that we have been.* *Researcher: ah…. Was it the school or private visit?* *Mr Dube: No… it was something organised by the Municipality. All the schools in the township and around Krugersdorp were there.*
Mrs Koke	*Mrs Koke: We went to went to the zoo in October.* *Researcher: mmmm.* *Mrs Koke: I know there is Sci-Bono but you can only get them to so many trips.* *Researcher: Yah.* *Mrs Koke: But I know there are other places but prefer this because*

	children enjoy
Mrs Jury	*Mrs Jury: They go to the one for the cave, they go to Pretoria museum. They…we try we try err…you know do at least two outings per grade per term……* *Mrs Jury: ……they go to Constitutional Hill the grade 6s as well. This is err.…history related.* *…..…they go to the Theatre, they went to…the grade 5s have been to Park Town Heritage Theatre that is history related. They have been on a tour to Coca-Cola factory they have seen whole production process in a factory.… there is Weather station one and then there is Adler Museum. …..the National Cultural History Museum….Weather station one and then there is Adler Museum….. We look at the Adler, you could probably count it as science centre. The Pretoria museum can also be counted as a science centre but it's no longer called Pretoria museum any more its called something else.*
Mrs Rene	*Mrs Rene: Yes, I have been to Robin Island. We have been to Africana museum, the SA National cultural museum, the Transvaal museum,.. ….. we went to the Constitutional Hill.*
Mrs Mango	*Mrs Mango: No for me it was the first time. I told you before.*

The interviews with the teachers in this study show that Mrs Jury was the most experienced in terms of the number of museums she has been to. This possibly explains why she was at centre of the community of practice when looking at teachers' preparations for the visit, follow up activities and interactions with the learners during the visit. It therefore means for the teachers to be old timers of this community of practice (of teachers who take their learners to museums) they need to be regular participants in this community of practice.

Even though I chose to use communities of practice as my theoretical framework there were some difficulties that came with it. Firstly, the theory is more applicable to individuals who do things together. But in my study the teachers that form the

community of practice did not know each other and did not share any direct information. Secondly, following Atherton (2005), I used the circles to describe where teachers could be located when looking at preparation, interactions and follow up activities. However, the original theory does not support the depiction of the model used in this way. However, despite these limitations, the community of practice model does allow me to categorise the five teachers in a manner which may be useful for further research in this field.

5.6 Learners' Perceptions

Learners were interviewed in order to get the idea of whether they know why they were taken to museum visits by their teachers. As I discussed it in chapter 4, learners gave various purposes for their museum visits. Their responses were grouped into Entertainment, Curriculum, Career and No Clear Purpose. It is worth noting that not all categories that emerged from teachers' interviews were found in learners' interviews. For instance, the following categories were not found in learners' interviews while they were found in teachers' interviews; Edutainment, Interactive and Tradition.

The important thing to note regarding the learners response to the interview is that there are learners who did not know why they were taking the visit. These were described to have No Clear Purpose. This shows that sometimes teachers take their learners to museum with a certain purpose but the learners themselves do not have any idea why they are taken to the museums. If the learners are not sure why they take a field trip there is a high possibility that they would not achieve what their teachers want them to achieve. It is the responsibility of teachers to make sure that their learners know the purpose of the field trip before they go to such trips. These findings substantiate what Griffin (1998) found in her study. Griffin found that 42% of the learners interviewed did not know the purpose for the excursion they had. Griffin also found that even some teachers did not have a clear purpose for the excursion which is different from the findings of my study where all the teachers have some purpose for their field trips. The results of my study show that teachers are not consistent in terms of having clear purposes for taking their learners for the field trips. This is likely to

affect their learners who also will not know the reasons for taking the trips. The next chapter is about the implications and reflections, and conclusions of the study.

Chapter 6: Conclusions, Reflections and Implications

6.1 Introduction

In this chapter, I first present the summary of the study including the purpose of the study, the research questions, methodology and findings. I will also draw conclusions based on the findings presented in chapter four and five. I will also reflect on these findings as well as some of the issues raised during the research. Finally, this chapter will discuss implications and limitations of the study and then make recommendations based on these findings as well as recommendations for further research on related issues.

6. 2 Summary of the study

This study was stimulated by the fact that evidence in museums from South Africa suggests that the school visits make up the majority of visitors numbers even though the international literature shows that most teachers are not engaged in the visits that their learners take (Lelliott, 2007; Tal, Bamberger & Morag, 2005). The other reason for the study was that there is limited evidence for suggesting that South African teachers are following the trend by their counterparts in other countries (Lelliott, 2009).

The purpose of the study therefore was to investigate how teachers who take their learners to museums handle the visits. The study attempted to find out how teachers make their preparations with their learners, what role they play during the visits; how they follow up with the class after the visit and the perceptions they have about the purpose and objectives of the visit.

Five teachers were selected from those who were planning to take their learners to the four museums that were used for the study. These were teachers who intended to do the preparations and follow up activities. The study was limited to teachers teaching Grades 6 to 9 who were taking their learners to four museums which were Sci-Bono Discovery Centre, Hartbeesthoek Radio Astronomy Observatory (HartRAO), Adler

Museum and Johannesburg Planetarium. A case study design was chosen and interviews and observation were used for data collection.

6.3 Research questions and findings

The research questions were answered as indicated in the following four sections:

6.3.1 The First Research Question

My first research question asked *'How do the selected teachers prepare their learners for a museum visit?'* The results showed that individual teachers made preparations differently. One of the teachers' preparation was not directly about the visit. Three of the five teachers put focus on the worksheets they prepared during the preparation. Two other teachers incorporated the visit in the topics they were teaching and were upfront with their learners about what they were going to do and see at the museums. One of the two teachers whose preparation was learning-oriented focused on the science career the learners would get from the visit as described in section 5.1. Her preparation was different from others who focused on the science topics.

6.3.2 The Second Research Question

The second research question was *'What role do these teachers play during the visit?'* The results showed that most of the time at the museum teachers did not interact with their learners but were observed chatting among themselves while the museum tour guides were leading their learners through discussions and exhibits. There were times when three of the teachers helped their learners with some information and sometimes leading the discussions in the absence of the tour guides. Three of the teachers were also seen putting their learners under control. Teachers who were seen helping their learners were only doing that when there were no tour guides. However, Mr Dube was never seen managing his learners behaviour or helping them with any kind of information because of the set up of the museum he visited where visitors just sit, watch and listen as I discussed in section 5.2. The five teachers involved in this study therefore played different roles during their class visits to museums.

6.3.3 The Third Research Question

The third research question was *'How do these teachers follow up with the class after the visit?'* The results showed that the five teachers used different approaches to do follow up activities. Two of the five teachers made their learners complete the worksheets that were prepared for the visit or they were only submitting the worksheet they had already completed. The other three teachers had discussions about the visit in relation to the topic they were doing with their learners.

6.3.4 The Fourth Research question

The fourth research question was *'What are the teachers' perceptions about objectives and purpose of the visits?'* Teachers had different objectives and purposes about the visits they took with their classes to the museums. All the five teachers did not have one specific purpose for the visit but instead had several of them. Two of the five teachers regarded their visits to be for enjoyment. Three considered their visit as for enjoyment but at the same time for learning. Four teachers considered the visit to be related to what they were doing at school or what they did at school that related to science content. One teacher stated that the reason for taking her class to the museum was the interactive nature of the museum where learners are interacting with each other, with the exhibits or with the teachers and the tour guides. Three teachers' purpose and objectives for museum visits included exposing learners to science as a career so that learners could have career choices. There was also one teacher who stated that taking learners on museum visits was what each class had to do every term. So it was what could be called a norm or tradition of a school to take such visits to museums.

6.4 Conclusions

Some teachers did not incorporate the museum visit and the topic they taught at school. Their preparation was mainly about the visit without integrating the visit and the curriculum explicitly. This might lead the learners to think the visit is isolated from the curriculum. Some of the teachers focused on the worksheets they prepared

and these were used as preparation guidelines. Other teachers integrated the visits into what they were teaching at school.

The teachers' role was not clear during the visits to the museums. Some were observed helping their learners with the exhibits on display but this only took place in cases where the tour guides were not available. In some cases teachers were observed not attending to their learners even when these learners were not attended by the tour guides. Sometimes teachers played the role of disciplinarians where they were observed putting the learners under control even in the presence of tour guides. Teachers were basically not included in the programmes for the day during the visit. This was clear since they were not allocated anything to do. Probably these could be the reasons why teachers were sometimes found doing nothing.

Teachers had many objectives for the visits they took. However, it was found that a number of their learners were not aware of some of these objectives. Some learners did not even have any idea why they were going for the visits. Furthermore, several teachers did not have any experience about the museums they were visiting which could bring some doubt about the way they made their preparations and their objectives for that particular visit. These teachers could therefore be referred to as new comers. Though, it must be stated that, not all the teachers lacked the experience about their target museums.

The follow up activities done by three teachers included the discussions about what the learners learned from the visit. However, for some teachers the follow up activity was just about completing the worksheet and handing it for marking. This might have denied some learners an opportunity to ask their teachers some questions related to the visit. Furthermore, it was possible that teachers did not have chance to identify any misconceptions which learners might have got from the visit and I therefore regard these teachers as new comers in the community of practice.

6.5 Implications of the study

6.5.1 Implications for teachers

The fact that learners sometimes go to museums not knowing what they are going to do should be a concern for teachers. Teachers therefore have to make sure that their learners are aware of the purpose for the visit. I believe this can help learners to be focused when they get to the museums and therefore be in a better position to achieve what the trip is meant for. This study shows that some teachers are not consistent when it comes to having clear objectives for taking their learners to the visits. It is therefore very important for teachers to have a proper planning that includes whatever learners will be learning. Teachers should visit the museum before planning so that they could know what the museum provides beforehand and this can help to improve the community of practice.

Accompanying teachers most of whom were not science teachers did not help learners except with behaviour management. Therefore accompanying teachers need to be informed and well-prepared, in order to have a better understanding of the educational purpose of the visit, and to know what the learners are going to do and see, so they can effectively engage with the learners on a learning level when given a chance at the museum, rather than help with a behavioural management role.

6.5.2 Implications for the teacher education

Some teachers were found to have no interactions with their learners at the museums. This was despite the fact that some of them had a chance to help their learners. This must be a concern to those who are involved in teacher education because teachers seem not to see the potential museums have for helping learners learn. Teachers need to be made aware of the significance of taking their classes to museums. They need to be trained in order to see the importance of facilitating their learners' learning process in the museum settings.

The type of preparation that some teachers did also needs to be given special attention. The fact that one of the teachers' preparation was observed to be not

directly about the visit should be a concern to those people in charge of teacher training. It would be very important for the teachers to be given education in regard to how they prepare their learners for the museum field trips. Teachers should also be trained on how best they can follow up from these field trips. The follow up is another concern since some teachers were observed doing what I called task-oriented follow up. This type of follow denies the learners and the teachers to have some discussions that would probably be productive to learners.

Teacher training can bring teachers with interests in museum field trips together. These teachers from different schools and probably countries are likely to form a small community of practice. This community of practice is likely to have discussions over how best to handle the museum field trips. So teacher training centres are also likely to be helpful in this regard.

6.5.3 Implications for the Museums

Some teachers were not given chance by the tour guides to help their learners. The way some museum programmes are run denies teachers a chance to facilitate their learners' learning. Where teachers got an opportunity to help their learners through-out the session some did quite a good job of having learning interactions with their learners. It is therefore very important that museums try to adjust their programmes so that teachers, who are the ones who have objectives for bringing their learners to museums be given chance to help their learners. There was no cooperation and team work observed between tour guides and teachers. Therefore training programmes for the tour guides and teachers could contribute to the formation of coherent objectives suitable for both museums and visiting schools. Museums should also provide some written guidelines for teachers before their visit like the ones suggested by Braund (2004) provided in Appendix E. Museums should therefore be places where members share experiences and challenges and the people who work at the museums should be part of these communities of practice.

6.6 Research Limitations

As with all studies in science education my study has its limitations, thus include the following:

- The sample in this study is small and it is from one area of the country. It therefore means the results cannot be generalised.
- Different grades were used. For instance there were four primary teachers and one secondary teacher. Because of this uneven choice of teachers I was not able to see the patterns for both primary and secondary schools.
- Selection of intelligent learners by the teachers might have had a degree of bias.
- The criteria used might have influenced the participants somehow. Teachers were asked if they would make preparations and follow up activities with their classes and this might have made the teachers to change what they would do if not observed.
- The study did not consider the qualifications and the experiences that teachers had which might have had influence on the way they participated.

6.7 Reflections

When I began this study I was interested in finding teachers' practices in regard to using museums visits. I was especially interested in those making some preparation and follow activities for their visits. This study tried to find how teachers make preparations with their classes before they could go to a museum and the type of follow up activities they were doing after the visit. Finding what teachers thought about the purpose and objectives of such visits was also a priority of my study.

Teachers occupy different levels in the community of practice in which they belong. Some of the teachers are at the periphery level or they can be called newcomers while others are old timers in their community of practice when it comes to preparing for the museum visits. The same thing can be said about how teachers make their follow up activities and the role they play during the visits.

The findings in this study are similar to those of other studies done earlier. For an example, Griffin and Symington (1997) found that teachers used task-oriented methods for their preparation and in their follow up activities and during the visit. The objectives of the visit as described by the teachers are also similar to what other researchers found before. For instance, Michie (1998) and Falk et al. (1998) had similar finding about teachers' objectives for taking museum visits.

One of the important findings of the study is that teachers can take their learners to museum not only to learn about the scientific content that might be helpful in their classroom content learning but also for other things like improving learners attitude towards science (Falk et al., 1998) and helping them to make career choices.

Falk and Dierking (1992), claim that it is the responsibility of the teacher to inform the learners about the purpose of the visit. Hence one would expect teachers and their learners to have more or less the same objectives about the visit. However, this similarity was not observed in my study. In fact, teachers had far more objectives for the visit than their learners.

In conclusion I believe that this research shows that even teachers who claim to prepare and do follow up activities are not handling the museum visits appropriately. Therefore in the community of practice of teachers who take their learners museums there are those who are found at the core and those at the peripheries. The museums, the education authorities through in-service and pre-service, and teacher organisations can make sure that the few teachers have good practice (old timers) share the practices with those who are regarded as newcomers or are found on the peripheries in this community of practice.

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Appendices

Appendix A

Interview schedule

Pre visit teacher interview

1. How did you know about this museum?
2. Why do you take this particular class on field trip to a museum?
3. Why did you choose to visit this museum in particular?
4. Why are you doing this visit at this time?
5. Is your visit related to your curriculum in any way? How?
6. Did you know what kind of exhibits that are found in this museum?

6(a) If yes: how?

7. Did you receive any information about what you wanted your learners to see in the museum?

7.(a) If yes: is the information sufficient for you or would you have wanted more information in order to prepare?

8. Have you told your learners before hand about the visit?

8(a) if yes: what have you told them?

10. What do you expect your learners to do when they reach the visiting place?
11. What do expect your learners to achieve after this visit?
12. Why do you think it is valuable to take these types of visits?

13. Are going to assign any task for learners for during the visit to the museum?

14 Are students involved in the planning of the visit?

14(a) If yes, how?

Post visit teacher interview

1. Was there any other thing you could have done other than taking your learners to the museum? If yes, what is? And why didn't you choose it over the visit?
2. Have you been to any other museums before?

2(a) If yes, was it a school/private visit?

2(b) if yes, can you list some of them?

2(c) If yes, why have you visited them?

3. When you think back on the visit(s) you took before, what differences between those and the one you are visiting now?
4. Have you been to this museum when you were still a learner?
5. Would you visit this museum again privately?
6. Would you visit this museum again with your learners?
7. Are you planning to visit other museum or science centre with your learners in future, or rather not?
7a If yes, can you name some?
8. Would you recommend other colleagues to visit the museum with their learners?
8a If yes: why?
8b If no: why not?
9. If your colleague is planning to take a visit to a museum, what would you recommend them to do for preparation, for during the visit, or as follow up?
10. How would you classify the entire trip: was it fun for you and the learners, or rather not?
10a Why? Here you can refer to anything associated with the trip.
11. Final question: any remarks, things you wanted to say but I didn't ask for that still seem important to you; something that would be important for me to better understand your visit, its reasons, the context, your preparations and post visit activities, your role during the visit? Any recommendations or other types of remarks?

Learner interview

1. Why do you think your teacher is taking you to the museum?
2. What are you going to study there?
3. What are you expected to do when you get the museum?
4. Is what you are expected to do at the museum related to what you are doing/did in class before?
5. What do you think you are going to learn while you are in the museum?
6. Do expect to do any work at school related to this visit?

Appendix B

Mr. S.M. Mosabala
phone : 717 5400
e-mail : mosabalas@yahoo.com

Informed Consent Form for teachers: Interviews and Observation

Looking closely at teachers who prepare for museum visits

I, _____ consent to participate in this study conducted by Mr S.M. Mosabala of the University of Witwatersrand for his research on looking closely at teachers who prepare for museum visits. I realise that no negative consequences will result from my participation in this study. I give permission for the material to be used for research only.

I participate voluntarily and understand that I may withdraw from the study at any time.

Interviews:
I further consent to being interviewed as part of the study. I also understand I have the right to review the transcripts made of our conversations before these are used for analysis if I so choose. I can delete or amend any material or retract or revise any of my remarks. Everything I say will be kept confidential by the interviewer. I will only be identified by a pseudonym in the transcript. In addition, any persons I refer to in the interview will be kept confidential.

Verbatim quotes from me may be used in the research report, but they will be reported so that my identity is anonymous. Any specific individuals I refer to will be given pseudonyms. I understand that the results of the study may be published, but my identity will be anonymous.

Name: _____
Signature: _____
Date: _____

Audio recording:
I further consent to audio-recordings to be made of the interview. I understand I have the right to review the transcripts made from these audio recordings before these are used for analysis if I so choose. I can delete or amend any material or retract or revise any of my remarks. Everything I say will be kept confidential by the interviewer. I will only be identified by a pseudonym in the transcript. In addition, any persons I refer to in the interview will be kept confidential.

Name: _____

Signature: _____

Date: _____

Observation:

I further consent to being observed as part of the study. I also understand I have the right to review the transcripts made of observation before these are used for analysis if I so choose. I can delete or amend any material or retract any of my actions. Everything I say and do will be kept confidential by the researcher. I will only be identified by pseudonym in the transcripts.

Name: _____

Signature: _____

Date: _____

Notes taking

I further consent to note-taking to be made of the observation. I understand I have the right to review the notes made from observation before these are used for analysis if I so choose. I can delete or amend any material or retract or revise any of my remarks. Everything I say will be kept confidential by the researcher. I will only be identified by a pseudonym in the transcript. In addition, any persons I refer to in the interview will be kept confidential.

Name: _____

Signature: _____

Date: _____

Appendix C

Mr. S.M. Mosabala
phone: 717 5400
e-mail: mosabalas@yahoo.com

Informed Consent Form for learners and parents: Interviews and Observation

Looking closely at teachers who prepare for museum visits

I, _____ consent to participate in this study conducted by Mr S.M. Mosabala of the University of Witwatersrand for his research on looking closely at teachers who prepare for museum visits. I realise that no negative consequences will result from my participation in this study. I give permission for the material to be used for research only.

I participate voluntarily and understand that I may withdraw from the study at any time.

Interviews:
I further consent to being interviewed as part of the study. I also understand I have the right to review the transcripts made of our conversations before these are used for analysis if I so choose. I can delete or amend any material or retract or revise any of my remarks. Everything I say will be kept confidential by the interviewer. I will only be identified by a pseudonym in the transcript. In addition, any persons I refer to in the interview will be kept confidential.

Verbatim quotes from me may be used in the research report, but they will be reported so that my identity is anonymous. Any specific individuals I refer to will be given pseudonyms. I understand that the results of the study may be published, but my identity will be anonymous.

Name: _____
Signature: _____
Date: _____

Parent/Guardian
Name: _____
Signature: _____
Date: _____

Audio recording:
I further consent to audio-recordings to be made of the interview. I understand I have the right to review the transcripts made from these audio recordings before these are used for analysis if I so choose. I can delete or amend any material or retract or revise any of my remarks.

Everything I say will be kept confidential by the interviewer. I will only be identified by a pseudonym in the transcript. In addition, any persons I refer to in the interview will be kept confidential.

Name: _____
Signature: _____
Date: _____

Parent/Guardian
Name: _____
Signature: _____
Date: _____

Observation:
I further consent to being observed as part of the study. I also understand I have the right to review the transcripts made of observation before these are used for analysis if I so choose. I can delete or amend any material or retract any of my actions. Everything I say and do will be kept confidential by the researcher. I will only be identified by pseudonym in the transcripts.

Learner
Name: _____
Signature: _____
Date: _____

Parent/Guardian
Name: _____
Signature: _____
Date: _____

Notes taking
I further consent to note-taking to be made of the observation. I understand I have the right to review the transcripts and the notes made from observation before these are used for analysis if I so choose. I can delete or amend any material or retract or revise any of my remarks. Everything I say will be kept confidential by the researcher. I will only be identified by a pseudonym in the transcript. In addition, any persons I refer to in the interview will be kept confidential.

Learner
Name: _____
Signature: _____
Date: _____

Parent/Guardian
Name: _____
Signature: _____
Date: _____

Appendix D
Information sheet

Research Study on Learning in Museums

My name is Mpho Mosabala. I am a Masters of Science student at School of Education at the University of the Witwatersrand.

I am carrying out a study of informal learning at the Adler Museum, SciBono Discovery centre and the visitor's centre of the Hartebeesthoek Radio Astronomy Observatory, mainly looking at how teachers use these places for learning purposes. This research will not only benefit the institutions involved in the study but will also improve the learning and teaching of science using museums as resources.

Your school is a representative of many other schools under Gauteng Department of Education. I would like to interview you as learner/teacher who is going to visit one of the above places. I would also like to observe your class when doing the preparation before taking the visit, when doing the follow up activity after the visit and also during the visit. If any, I would also like to get any material that you will use for the visit. I selected you because your class is intending to visit one of the places mentioned above in time to come.

Each of interviews will take about 30 minutes that is interviews before going to the museum and the one after the visit. I would also like to conduct follow interview with you several weeks or months after the visit.

If you agree to take part in my study, I would like to make it clear that your participation will be appreciated and totally voluntary. No harm or any bad effect will be caused to you because of my study. To ensure this, all the information will be treated with confidentiality and anonymity. All the tapes used for interview and any other information will be destroyed at the end of the study. If you choose to participate, you have the right to withdraw any time or decline to answer any questions. I promise to provide you the summary of study results at the time of completion if you would wish to have them.

Thank you.

Appendix E

Getting the most from your visit to a museum or hands-on centre

Before you go:

- Think about the purpose of your visit and its position in your scheme of work. Is the visit to give general experience and stimulation as an introduction to the topic? Is it to support specific learning of certain concepts? Is it to consolidate teaching that has already taken place?
- Visit the museum, or if you can't, visit its website or talk with someone who has been before.
- Plan for what scientific concepts and skills should be met before the visit and what should be followed-up back at school.
- Decide what part of the exhibition or what exhibits will form the focus for learning and/or whether your pupils need to follow a set route or sequence.
- Find out what facilities and services the museum offers, e.g. whether the museum has 'explainers' to assist pupils. a classroom where work can be followed-up or workshop activities led by the museum's education service. Decide how you will use these services.
- Find out what additional adult support is available and can be provided for the visit, e.g. parents, student teachers, etc.
- Decide how adults might be informed and supported so that they can offer help to pupils at the museum, e.g. devise prompt sheets or use ones provided by the museum.

At the museum:

- Provide some time and space for pupils to orientate themselves and 'play'. This allows the class to have some free exploration time and to dissipate some of their initial 'energy'.
- Tell the class what you expect them to do. It is usually better for pupils to work in pairs or small groups so that social interaction at exhibits can occur.

- You may want to offer some limited guidance or prompts, e.g. by way of a 'trail card'. Record experiences, e.g. by taking digital photographs or making a video.

Following your visit:

- Ask pupils to tell you what they remembered most from their visit. What were they impressed by? What new things did they learn?
- Allow pupils to develop their learning by broadcasting their experiences to others. You could ask them to do this by preparing and sharing posters and displays or by giving a presentation.
- Use activities and practical tasks that enhance and develop the learning experiences at the museum. Avoid trying to replicate what they did at the museum.
- Refer back to experiences at the museum, not only in the topic but in future lessons as well. This helps pupils to value the experience and to consolidate learning by integrating gains from the informal situation in the museum with the more formal learning in school.

From: Braund, M. (2004). Learning science at museums and hands-on centres. In Braund, M. & Reiss, M. (Eds.), Learning Science Outside the Classroom (pp. 113-128). London: RoutledgeFalmer.