THE UNIVERSITY OF ZULULAND

PERCEPTIONS OF THE UNIVERSITY OF ZULULAND ACADEMICS TOWARDS SCIENCE SHOPS

BY

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ABSTRACT

The study examined the perceptions of University of Zululand academic staff members towards adopting Science Shops. Science Shops represent a participatory action research programme which began in the Netherlands and introduced to the University of Zululand with a view to enhancing the university-community relationships. The study specifically focused on the academic staff members who participated in the NUFFIC training programme that gave birth to the idea of Science Shops. NUFFIC is a Dutch acronym of The Netherlands Organization for International Cooperation in Higher Education - translated into English.

The study used a qualitative research approach to explore the perceptions of academic staff about SSs. Qualitative research techniques were adopted for the study. A semi-structured questionnaire with open-ended questions was designed and used to obtain information from the ten (10) academic staff members who participated in the study. Focus group interviews were also conducted with the participants as a way of seeking additional information which was not covered in the questionnaire. The purposive sampling technique was used to select the participants from the four (4) Faculties at the participating institution, namely Faculties of Arts, Commerce, Administration and Law (CAL), Education, and Science and Agriculture.

Overall, results revealed that the participants perceived Science Shops as an important programme that merited adoption and integration into the University curriculum. The majority of the participants also believed that Science Shops had the potential to restructure the University for relevance (as its motto goes), in teaching, research and community service. Furthermore, Science Shops were seen as a possible means to generate alternative income for the University. However, some challenges were highlighted by the participants which they saw as needing attention before the Science Shop concept could fall on fertile ground. These challenges included the overpopulated classrooms, inadequate knowledge and orientation about community engagement research, and the nature of research in the Science Faculty which appeared not to be amenable to community participation.

DECLARATION

I declare that, except for references to other peoples' work, which have been duly acknowledged and referenced, this dissertation titled **Perceptions of the University of Zululand Academics Towards Science Shops** is the result of my personal research work carried out in the Department of Curriculum and Instructional Studies under the supervision of Professor Sitwala Imenda.

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Lungile Lindile Primrose Bele (Student) Date

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Prof. Sitwala Imenda (Supervisor) Date

DEDICATION

This Dissertation is dedicated to my mom, Mayrose Dlungwana, my lovely daughters, Qalo and Anelisa, my dear friend and mentor Prof. Nqabomzi Gawe, not forgetting Prof. Nomahlubi Makunga for her love, dedication and support during my study.

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I would like to acknowledge participants who availed themselves and took time from their busy work schedules to be part of the focus group interviews.

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ACRONYMS

NGO: Non-Governmental Organization

RQ: Research Question

SS: Science Shops

FGD: Focus Group Discussion

CHAPTER ONE

BACKGROUND TO THE STUDY

1.1 INTRODUCTION

Institutions of higher learning in South Africa, that is, universities and universities of technology, are tasked to ensure that new teaching and learning strategies are innovative and lead to the evolution of critical thinking skills and the development of new knowledge fields (Council on Higher Education [CHE], 2000). It is argued that this would better equip students to interact and prepare for the world of work and also be responsive to the needs of the surrounding communities. Thus, higher education institutions need to create and manage learning environments that facilitate advancement of students through action research, teaching and learning as well as community-service based programmes. The CHE envisaged further that the knowledge and empowerment of students from such programmes of study would enable them to be actively engaged in economic and social development, and be highly competitive globally (CHE, 2000).

The commitment by the government of South Africa to create a better life for all has sensitized decision-making bodies to incorporate in their policy frameworks elements that will reflect their commitment to the imperative of a better life for all. Higher education institutions have been directed to restructure and to indicate how their institutions will interpret this imperative and incorporate it into their visions, missions and academic programmes (CHE, 2000). It is in the same vein that institutions of higher learning were mandated to merge, whereby some traditional universities were merged with former technikons and others were to evolve into comprehensive universities with the mandate to develop technikon-type programmes. Thus, the National Plan for Higher Education (Ministry of Education, 2001) provided for institutions of higher learning to be responsive to the needs of the country.

However, the application of theory into practice within institutions of higher learning is an area that has not been getting enough attention (Fourie, 2003). Most programmes offered at universities are not in line with the needs of society (Farkas, 1999). Therefore, what would be desirable is to get students involved in solving real-life problems by applying theory to real-

life situations (Teodosiu and Caliman, 2002). One way of facilitating this has been through the notion of Science Shops (SSs) which were first established in the Netherlands in the 1970s to increase public awareness and provide access to science and technology to laymen and women, or non-profit organisations (Wachelder, 2003).Thus, the integration of the concept of Science Shops (SS) into the curricula of South African higher education institutions would be of strategic benefit to universities because of the cooperation that would be created between higher education institutions and business, communities and students. SS would also contribute to the ongoing modernization of university curricula by offering flexible modules of learning (Gnaiger and Martin 2001).

The core business of any university revolves around three pillars, namely (a) teaching and learning, (b) research and (c) community engagement (University of Zululand [Unizulu], 2010). These pillars are not new to the business of universities and universities of technology worldwide, are rated according to how successfully they deliver on these mandates. What is an ever-evolving phenomenon are ways in which universities give meaning to these pillars. In South Africa, the differentiation of higher education provision into universities of technology, comprehensive universities, and research universities is one of the ways in which the Department of Education has sought to serve the country's needs in an effective and efficient way. Universities must state upfront through their visions and missions the fitness of, and fitness for, purpose of their institutions. Therefore, as a comprehensive university, Unizulu needs to show how its programmes are restructured to reflect a shift from the traditional focus to one that has an applied bias. In this regard, research also needs to include applied/action research components rather than exclusively focused on fundamental research with the sole aim to generate knowledge for its sake. This is well captured by (Steinhaus, 2011 p.16) in his assertion that "access to knowledge is fundamental to the investigative process to the improvement of the societies across the globe". This assertion emphasizes the view that knowledge which is developed through action research leads to the improvement of societies. Community outreach is no longer about involvement in charity organizations and churches where university academics are members, but it is about participation in finding solutions to real life problems that are found in communities. Therefore, there is a need to seek and try out new ways of reaching out to communities and involving them as partners in the management and solving of real-life problems. It was for this reason that Unizulu opted to pilot new ways such as SSs, in pursuance of relevance to its proximate communities.

This study attempts to link theory and practice, as articulated in the Unizulu mission by producing "globally competitive graduates" (Unizulu, 2010). This will be appropriated by applying the knowledge and skills learnt to solve problems experienced by communities. This is what SSs seeks to achieve.

1.2 PRELIMINARY REVIEW OF LITERATURE

A look at the evolution of the universities shows how advanced civilisations have needed higher education to train the ruling class, priests, military personnel and other service elites (Perkin, 2007). However, it was only in medieval Europe that an institution recognizable as a university arose: a school of higher learning combining teaching and scholarship and characterized by its corporate autonomy and academic freedom (Perkin, 2007). Most universities and colleges started as community colleges some included technical and agricultural colleges. These had different functions, such as offering mostly undergraduate degrees in various subjects. Later, there was an emergence of both private and public universities. To-date, most public universities are state funded institutions while private universities charge much higher fees (Pillay, 2010). Nonetheless, whatever their type, shape or size, there is a dominant view that institutions of higher learning have a duty to ensure that the academic knowledge and skills that they espouse benefits the surrounding communities.

The concept of SS typically manifests as a facility, often attached to a specific department, of a university or a non-governmental organisation (NGO), that provides independent participatory research support in response to concerns experienced by civil society (Leydesdorff and Ward, 2005). It is a demand-driven and bottom-up approach to research. SS's work can be described as community-based research (CBR). Thus, SSs are organisations that provide independent participatory research in response to concerns experienced by civil society (Gnaiger and Martin, 2001). In this process, the public or civil society becomes part of the research process (Fisher and Wallentin, 2002). The main aim of SS is to provide access to (academic) knowledge to private persons, civil society organizations (CSO) and/or small or medium enterprises (SME) (Leydesdorff and Ward, 2005). In terms of the SS model, most organisations requesting research are non-commercial and lack the necessary resources to do the required research by themselves (Worthington, 2007).

According to Wachelder (2003) SSs originated in the late 1960's to early 1970s in the The Netherlands due to the tumultuous student protests of the late 1960s, in response to a lack of

commitment by the government and institutions of higher learning to the needs of the poor people. They were conceptualised for the purpose of moderating between academic scientists and organisations that could not afford to fund their own research (Fischer, Leydesdoff and Schophaus, 2004). This resulted in the formal establishment of SSs at some Dutch universities, such as the Universities of Utrecht and Amsterdam. At the time, the goals were to give free access of scientific knowledge to special interest groups such as unions and environmental activists. According to Leydesdorff and Ward (2005) the concept spread throughout Europe during the 1980s. The crucial idea behind SSs involved "a working relationship between knowledge-producing institutions and citizen groups that need relevant questions answered'' (Leydesdorff and Ward, 2005, p.4). Most SSs are units at a university run by scientific coordinators who initiate meetings and discussions between civil society organisations, who provide knowledge and expressed needs for the project on one hand, and university researchers, lecturers and students who conduct research in response to the expressed needs on another (Broderson and Jorgensen 2007). In solving civil society problems, a new knowledge is generated or an existing knowledge is combined and adapted.

Research models describe a variety of methods to carry out the scientific process. In contrast to the traditional model of scientific research, in SSs there is a continuum of community science research models that involve the public in significant ways. Typically, SSs are based on the Scientific Consulting Research (SCR) model, where a knowledge-producing institution (e.g., university) functions as a hub of consultants to community groups to answer questions raised by the community groups (Cooper, Dickson, Phillips and Booney, 2007). In this process, the community groups are empowered to use scientific information to solve specific problems.

There is also the Citizen Science (CS) model, which engages a dispersed network of volunteers to assist in professional research using methodologies that have been developed by, or in collaboration with, professional researchers. The public plays a role in data collection across broad geographic regions, and often, over long periods of time, usually to address questions raised by researchers (Wilderman, C.C., Barrow, A., and Imgrund.L. 2004). However, CS can have research and education goals similar to many participatory action research projects. It is, however, distinct from participatory action research in that it occurs on larger scales and typically does not incorporate iterative or collaborative action (Cooper et al, 2007).

The Participatory Action Research (PAR) model begins with the interests of participants, who work collaboratively with professional researchers through all steps of the scientific process to

find solutions to problems of community relevance. Cooper et al. (2007) outline three key elements of participatory research: (a) it responds to the experiences and needs of the community, (b) it fosters collaboration between researchers and community in research activities, and (c) it promotes common knowledge and increases community awareness. This is what SS, as a model of participatory research, seeks to achieve.

According to Gnaiger and Martin, (2001) SSs provide civil society with an easy access to the resources of universities and, at the same time, is able to foster links and relationships between the universities and society. This kind of an innovative learning strategy prepares students for the real life of work. Amongst the functions of SSs is that it mediates between theory and practice. Universities are knowledge producing institutions and the task of SSs is to create a link between the university and the community. SSs also act as an antenna for the university regarding new societal topics which are not yet addressed by NGO's. They pass on knowledge and also deal with the questions that are sensitive, while at the same time share the information with the community (Jorgense, Hall, Hall and Brodedersen, 2004).

Higher education should be orientated towards the future role of students in society outside university – thereby redefining the priorities of higher education to make students to continue to acquire new knowledge and use it in the service of societies, which is one of the key aspects of university education. This observation points to the benefits, and therefore importance, of integrating the concept of SS, as one model of acquiring knowledge through experience, into higher education curricula (Fokking and Mulder 2004).

In South Africa, the White Paper on the transformation of higher education (Department of Education, 1997 – in Lazarus, Erasmus, Hendricks, Nduna and Slamat, 2008) laid foundations for making community engagement (CE) an integral part of the core business of South African higher education (HE). The White Paper called upon HE institutions to demonstrate social responsibility and their commitment to surrounding communities by availing expertise and infrastructure for community-based Service Learning (SE) programmes (Lazarus, et al., 2008). Flowing from this, therefore, one goal of HE should be to promote and develop social responsibility and awareness among students about the role of HE in social and economic development and transformation through both CE and SL programmes. In the case of Unizulu, students have demonstrated receptivity and have shown growing interest in CE programmes, in particular and, in-principle, support the feasibility studies and pilot programme to CE in higher education (Bele, Boon, Sabela and Proost,2010).

Specifically, the White Paper spells out operational objectives which provide direction and support for embedding CE in South African HE, namely (a) to support the development of pilot programmes that give expression to the mandate of the education White Paper, (b) to monitor, evaluate and research these programmes, and (c) to use the data generated through this research to inform HE policy and practice at a national, institutional and programmatic level (Lazarus, et al., 2008). As a result, CE in South African HE has been construed to be an integral part of teaching and research, and also further as a mechanism to infuse and enrich teaching and research with a deeper sense of context, locality and application. In turn, this had given rise to a change in perception – whereby the terminology used for CE has shifted from 'community service' (Department of Education 1997, in Lazarus, et al., 2008) to 'knowledge based community service' (Higher Education Quality Committee, 2001), to 'community engagement' (Higher Education Quality Committee, 2004) and to a 'scholarship of engagement' (HEQC/CHESP, 2006). Lazarus (2008) further stipulates that service learning (SL) has its roots of experiential learning (EL), for the promotion of substantive learning. Built in its approach SL combines learning objectives, and community service. Students need to experience engaging with communities whilst at varsity. This engagement will provide a pragmatic and progressive learning experience.

The notion of community service (CS) in South African higher education is not new and has been gaining momentum since mid-1980s. The discourse and practice regarding Community engagement (CE) in higher education have shifted from the notion of "outreach" towards "community engagement". Community engagement implies a less paternalistic, more reciprocal and inclusive relationship between a community and a higher education institution, (CHE, 2004, in Bender, 2008 p.81). In other words, higher education institutions must ensure that the needs of the host communities are met through its teaching and research activities.

Due to the diverse nature of CE in HE, it became imperative to choose a strategic focus and an entry point for embedding CE in South African HE, given that teaching and learning (T and L) plays a central role in South African HE institutions. Thus, Service Learning (SL) emerged as an entry point for CE in South Africa's higher education (Lazarus, et al., 2008). Bringle, and Hatcher (2004, p.127 – in Lazarus, 2008) define SL as ''a course based, credit-bearing educational experience in which students: (a) participate in an organized service activity that meets identified community goals (b) reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the discipline, and an

enhanced sense of civic responsibility". Keeton (1983) explains that SL has its roots in experiential learning, for the promotion of substantive learning; SL connects students' experience to reflection and analysis in the curriculum.

From a theoretical point of view, SL invokes the theories of Bandura (1977), Coleman (1977), Dewey (1963), Freire (1970, 1973), Kolb (1984), Argyris and Schon (1978), Resnick (1987), Schon (1983, 1987) and others to explain its pedagogical foundations and practice. Therefore, if experiential learning is pursued it can transform students and help them to revise and expand knowledge and alter their practice (Keeton, 1983). The pedagogical challenge is to find ways and means to connect study and service.

The participation of academic staff in SL is essential for a successful programme. Therefore, it is imperative to integrate SL into the curriculum. This will in return control academic quality, as both academic staff and students gain familiarity with the approach. Academic staff also have a great deal to gain from participating in service-learning, including developing a new set of skills and presenting a programme that will excite their students, Bringle and Hatcher (2006)

There is partnership between the institutions of higher learning, SL, CE and policies which govern the organization and management of SL and CE. This partnership has been created in the form of SL internships. Boyer (1996 p.62 in Bringle and Hatcher, 2006) challenges higher education institutions to reconsider their mission to be directed towards educating students for a life as responsible citizens, rather than educating students solely for a career. By doing so, institutions of higher learning will take pride in connecting theory to practice in order to meet challenging social problems, particularly those faced by universities in urban settings.

Sometimes SL is viewed as credit-bearing, an educational experience in which students participate in an organized service activity that meets identified community needs and students gain further understanding of the course content (Lazarus,et al., 2008). We can draw parallel insights in this point because SS advocates the same method for questions brought in to be researched at a Master's level. In this instance, the student will have a broader appreciation of the discipline and an enhanced sense of civic responsibility. Both SL and SSs produce the best outcomes especially when meaningful service activities are related to course material, through reflective activities, such as group discussions, writing reflective papers and class presentations. Both these methods bring new life to the classroom. In the process, student

performance is enhanced in reading, writing, debates, problem solving skills and their interest in the subject is enhanced.

1.3 PROBLEM STATEMENT

The University of Zululand started the SS Pilot Project in March 2009 with the following objectives in mind:

- To broaden and improve students' knowledge, skills and attitudes,
- To empower local communities by actively engaging community members in projects that will provide solutions to their real-life problems,
- To introduce an action- research based approach to solve real life problems, and
- To encourage interaction between students and communities in order to show the relationship between theory and practice

Above all, the university expected students to be exposed to career-orientated experiences while learning. However, it was evident that the majority of students exited university without acquiring relevant skills related to serving the communities. A number of academic staff members from the four faculties at the University were trained on SS as part of a pilot study conducted with a view to integrating SS as part of the University's curriculum. However, despite this, the concept of SS has not yet been institutionalized as an integral part of the academic offerings of the University. Thus, the main purpose of this study was to explore the feasibility of institutionalizing SSs at the University of Zululand.

1.4 AIM OF THE STUDY

This study sought to explore the perceptions of Unizulu academic staff with respect to the institutionalization of Science Shops as an integral part of the University's curriculum offerings.

1.5 RESEARCH OBJECTIVES

More specifically, this study sought to:

1.5.1 Determine the perceptions of Unizulu academic staff about the concept of Science Shops.

1.5.2 Investigate Unizulu academic staff's views about the possible adoption of Science Shops as part of the University's curriculum offerings.

1.5.3 Explore challenges that may have prevented the academic staff from implementing SSs in their faculties.

1.5.4 Explore conditions or factors that would support or favour the implementation of SS at the University.

1.6 INTENDED CONTRIBUTION TO THE BODY OF KNOWLEDGE

The main aim of SSs is to avail (academic) knowledge, private persons, civil society organizations (CSO) and/or small or medium enterprises (SME) with academic knowledge and skills (Leydesdorff and Ward, 2005). Thus, SSs have the benefit of strengthening the relationships between universities and the surrounding communities. In this process, the public or civil society organisations become part of the research process (Fisher and Wallentin, 2002). Typically, also, SSs add value to multidisciplinary research and attract positive support from national, regional and local governments. The government would bring problems or topics for investigation from the communities. In turn, the resulting investigations would be of mutual benefit to students and the community, in that students would get an opportunity to learn and the communities would have their problems solved.

By exploring Unizulu academic staffs' perceptions towards integrating SSs into their respective curricula, the researcher wanted to get a deeper understanding of their perceptions on this matter – as well as possible adoption and implementation strategies which could make this initiative a success. Furthermore, it was envisaged that the investigation would also reveal the management skills attendant to SSs. In return, the study would make a worthwhile contribution to the image and quality of the programmes of the Unizulu by stipulating how the university can advance its curriculum so as to embrace and reach out to its surrounding communities.

As far as the researcher can tell, this study would be the first one on the topic of SSs in South Africa. Thus, it was envisaged that it would not only lead to the possible adoption, implementation and management of SSs at the Unizulu, but also make an innovative and worthwhile contribution to the fields of education and scientific research globally. As explained earlier, SS is an approach that links theory with practice – thereby strengthening relationships between the university and the surrounding community. As such, this research entailed an innovative approach to teaching, learning and community engagement – which are the three pillars upon which the mandate and aspiration of Unizulu rests.

1.7 RESEARCH DESIGN AND METHODOLOGY

The methods of study employed in this study are briefly described under the various sub-headings below.

1.7.1 Research Paradigm

The study used a qualitative research approach to explore the perceptions of academic staff about SSs (McMillan and Schumacher 2010). By so-doing, it was envisaged that this methodology would assist the study to unearth perceptions of academic staff towards the adoption of SS as part of the University's curriculum offerings. The qualitative research paradigm was chosen because it allowed both the researcher and participants to understand, explain, explore, discover and clarify situations, feelings, perceptions, attitudes, values, beliefs and experiences of a group of people (Kumar, 2011 p.104). The 'power-gap' between the researcher and the participants in qualitative research is far smaller than in quantitative research, because of the fact that there is informality in structures and situations in which data are collected (Kumar, 2011).

The qualitative approach has an element of purposeful identification of participants, whereby the researcher intentionally selects individual participants and sites from whom/which to learn and understand the phenomenon of interest (Creswell, 2014). Furthermore, when using qualitative research the researcher has the latitude of recording information on self-designed protocols that help organize information reported by participants to each question, relying mostly on general interviews or observations. Furthermore, qualitative research does not restrict the views of the participants. However, studying people in their own environment, qualitative research creates challenges for the qualitative researcher because information is gathered at face-to-face value. Therefore, the researcher needs to administer procedures of qualitative data collection with sensitivity to the challenges and ethical issues of gathering information (Creswell, 2014).

1.7.2 Research Design

This research used a Case Study research design. A Case could be an individual, a group, a community, an instance, an episode, an event, a subgroup of a population, a town or a city (Kumar, 2011 p.126). As such, individuals and/or focus groups form a strategy in which views, opinions and perceptions towards an issue, product, service or programme are explored through an open discussion between members of a group and the researcher. Furthermore, a case study

provides a researcher with an opportunity to study a "specific instance" that focuses on participants to provide a rich understanding of their perceptions in a "real life context" (Cohen et al., 2010 p.83). This approach allows researchers to "learn" about the phenomenon that provides voice to individuals particularly where the research uses typical sampling techniques (Creswell, 2014 p. 228).

1.7.3 Target Population and Research Sample

The target population of this study were the participants who were involved in the training on the SS Inthuthuko programme and participated in the pilot study. The numbers of academic staff involved was thirty-six (36) and were drawn from the four faculties, namely: (a) Arts, (b) CAL, (c) Science and Agriculture, (d) Education. Training was conducted by the Wageningen University and Research Centre facilitators to equip participants with requisite knowledge for understanding SS. This also included skills for implementing and administering SS. The same academic staff members were involved in the pilot study that was conducted in 2009. With regard to the research sample, all members of the target population still at the University, and willing to participate in the study constituted the research sample.

1.7.4 Data Collection Procedures

The researcher first identified steps or processes to be followed in data collection, including identifying participants for the study. Subsequently, the researcher gained access to the participants by obtaining permission. Once this had been done, the researcher arranged dates and venues for the administration of the questionnaires and focus group interviews. Altogether, it was envisaged that there would be four sessions organised for data collection – one session per group.

As stated elsewhere, there were two researcher-designed instruments for data collection: a questionnaire and a focus-group interview protocol. Therefore, there were no restriction on the views of the participants. The researcher did not use someone else's instrument, such as is typically done in quantitative research where information is gathered by way of close-ended instruments. Instead, data were collected using a few open-ended questions that were specifically designed to find answers to the respective research questions (Creswell 2014 p.227).

The first part of data collection involved the participants filling out a questionnaire. It was envisaged that apart from eliciting the information that the researcher needed to answer her research questions, this jog the memories of the participants to remember some, if not all, of the events and issues pertaining to their involvement in the NUFFIC project – including the SS. Thus, it was expected that by the time the second phase of data collection took place, that is, the focus group interviews, they would have had a lot to contribute to the discussions. This way, the researcher expected to collect sufficient information on the subject matter.

Finally, it was important to collect data with sensitivity to the challenges and ethical issues of gathering information face-to-face in a workplace. Studying people in their own environment creates challenges for the qualitative researcher that may not be present in quantitative research where investigators mail out questionnaires to the participants.

1.7.5 Instrumentation

The researcher collected data using questionnaires, interviews. In order not to restrict the views of the participants, data was collected using open-ended questions. During data collection, the researcher used randomly mixed focus groups; each group comprised members drawn from different Faculties. This was done in order to provide variety and rigour amongst focus groups. Furthermore, documents produced during the workshops were consulted with a view to identifying issues of interest to the study that may have been forgotten by the participants.

1.7.6 Data Analysis Technique

Since the study was underpinned by interpretivism it was assumed that there would be multiple realities. Data from interviews were coded and analysed through a number of steps. Firstly, the data were transcribed verbatim from audiotapes. The notes constituted the first impression of the data collected (Creswell, 2014). Thereafter, the researcher read the manuscripts, wrote notes in the margins and coded the responses according to identified undergirding themes. Data from questionnaires was coded and analysed using the SPSS package, whereupon mean scores, trends and patterns were identified.

1.8 DEFINITION OF TERMS

In order to avoid ambiguity in this study the important and technical terms were defined operationally, as follows:

1.8.1 Science Shops (SS)

Science Shops, as used in this study, means participatory action research programme that connects the university teaching and research activities with the needs of the communities.

1.8.2 Science Shops as 'mediation' of knowledge

Science shops create a strong bond or linkage between the university and the community.

1.8.3 Unizulu Academic Staff

Unizulu Academic Staff were the lecturers involved in the delivery of teaching and learning, particularly those who had been exposed to the (SS) training.

1.8.4 Perception

Perception meant views, thoughts and reflections of academic staff that had been exposed to the Science Shop training.

1.8.4 Intuthuko

Intuthuko was the name given to the Unizulu SS. Literary meaning 'development'.

1.9 ETHICAL CONSIDERATIONS

The researcher sought written approval to do the research from the University's Ethics Committee. Individual participant's informed consent was sought and participants were assured of confidentiality and anonymity. Further verbal assurance in this regard was given at the beginning of the focus group interviews. To support confidentiality and anonymity in the study, no personal information was made available to any third parties. In addition, comments made during interviews were not attributable to any individual by name. Should circumstances arose that will have impact on the researcher's ethical obligations, the researcher would be

obliged to disclose them to the supervisor, and appropriate action would be taken in terms of the relevant University policies, rules and procedures.

A letter of consent was written to all participants detailing the particulars of the study. In this letter, the purpose and outcome of the study was outlined, and participants were informed about aspects pertaining to anonymity and confidentiality, as well as the termination of the participation in this study. This gave participants the opportunity to participate voluntarily in the study. The researcher confirmed the accuracy of the data transcripts from the focus groups with focus group members by doing member checks (Babbie and Mouton 2006 p.277).

1.10 CHAPTER BREAKDOWN

1.10.1 Chapter one

Chapter one will consist of an introduction or motivation for the study in this field, the statement of the problem, aims of the study, operational definition of terms and the plan for the organization of the whole report.

1.10.2 Chapter two

This chapter deals with literature review. The researcher reviewed literature related to perceptions towards the adoption of SS as part of the curriculum, identify challenges that may have prevented Unizulu from implementing SS in their faculties and explore conditions or factors that would support the implementation of SS at Unizulu.

1.10.3 Chapter three

This chapter discusses in detail the research design and methodology of the study. The procedures for data collection and selection of the participants and the plan for data collection and analysis will be discussed (McMillan and Schumacher, 2010, p.35).

1.10.4 Chapter four

This chapter will deal with presentation and analysis of data.

1.10.5 Chapter five

This chapter discusses the findings of the study, recommendations and suggestions for further study.

1.11 RESOURCES

This research has special resource implications, namely; digital voice recorder, student assistance, venue, stationery, photocopying and printing service, microphone and other incidental expenses.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews previous studies or literature on the subject of this research. The review seeks to expand the frontiers of knowledge so that the researcher is able to make inferences and assumptions appropriate to the study. Basically, this chapter serves as a bridge to link previous studies with the current one. Its aim is to present a critical evolution of existing literature with the objective of demonstrating the relevance of the current study in contributing to existing knowledge.

A look at the evolution of universities shows how advanced civilisations have needed higher education to train the ruling class, priests, military personnel and other service elites (Perkin, 2007). However, it was only in medieval Europe that an institution recognizable as a university arose: a school of higher learning combining teaching and scholarship and characterized by its corporate autonomy and academic freedom (Perkin, 2007). During the 1980's and early 1990's there has been a widespread emphasis on knowledge production and economic development (McGovern, 2013). The rise of a post-industrial, service-oriented society has raised several questions which universities and other institutions of higher learning need to give answers to.

Models and concepts of production and distribution of knowledge have been propounded to explain economic growth (Campbell and Carayannis, 2011). In the context of this study, some universities have promulgated and embraced notions of knowledge-based economy, learning economy and more especially knowledge-based society which sprung from the concept of Science Shops (SS) where knowledge is created and transmitted by modes of teaching, research and community service within a university (Etzkowitz and Ranga 2013). No doubt, the process of creating and transmitting knowledge is not complete until it involves students, academics and to a large extent the communities surrounding the university. This interaction can be called a 'marriage of convenience' involving three parties, that is, university/academics, students, and civil society as a whole. This is called the 'marriage of convenience' because these parties will forever need each other for growth and advancement, in terms of research and development, growth in the field of academia, and the welfare of the communities involved. The knowledge created within a specific university tends to infiltrate to a certain

extent into a process taking place elsewhere in another university and we encounter a myriad and exchange of knowledge production modalities.

Largely because of its success in both research and teaching, the university has grown immensely in terms of populations of students, number of researchers and public funding. As a result, the growth on universities has been connected with a rise in society's expectations in terms of advancements. These advancements and expectations have put the university under the spotlight to deliver to its surrounding communities and stop being an ivory tower by being more embracing of societal needs. In general, these interactions have given rise to a number of collaborations between universities, industries and civil society, thus increasing the transfer of knowledge from universities.

Major changes in higher education in South Africa occurred in 2004 after ten years of democracy (Badat, and Sayed, 2014). During this period South Africa started reforming its higher education system, merging and incorporating universities, and renaming all higher education institutions (HESA, 2005). The University of Zululand (Unizulu) was mandated to transform into a comprehensive university, the first requirement of which was to introduce technikon-type qualifications; and built into this requirement was the inclusion of community or service learning as a component of university teaching (HESA, 2005).

The majority of universities in South Africa are public universities, which means that they are State funded, with a number of private universities which are relatively fewer. In other words, most of the universities are funded by the government, while private universities charge much higher fees to sustain themselves. (Pillay, 2010). However, whatever their type, shape or size, there is a dominant view that institutions of higher learning have a duty to ensure that the academic knowledge and skills that they espouse benefit the surrounding communities by providing transactional spaces in their contexts where we see the division of labour and expertise in some kind of a triple helix partnership that exists between students, educators and communities (Campbell and Carayannis, 2011, p.12).

This study sought to offer a comprehensive account of the institutional identity of the participating university and how the teaching and research activities that are going on within the university can transform the host communities for the better.

2.2 THE SCIENCE SHOP CONCEPT

The concept of Science Shop (SS) typically manifests as a facility, often attached to a specific department of a University that provides independent participatory research support in response to concerns experienced by civil society (Leydesdorff and Ward, 2005). SSs are units at a university run by scientific coordinators who initiate meetings and discussions between civil society organisations, who provide knowledge and expressed needs for the project on one hand, and university researchers, lecturers and students who conduct research in response to the expressed needs on another (Broderson and Jorgensen 2007). In solving civil society problems, new knowledge is generated or existing knowledge is combined and adapted. Overall, the concept of Science Shops has the following two objectives:

(a) promoting, recognizing, and facilitating voluntary action as an expression of civic participation, solidarity, and social responsibility; and

(b) providing a framework for voluntary work between public or private organizations, on one hand, and universities, on another – resulting in the general empowerment of communities by sharing and imparting research knowledge, while students learn from the experiences they encounter in the course of undertaking their work.

As an instructional approach, SSs are demand-driven and bottom-up initiatives which can also be described as community-based research (CBR). It is an initiative that provides independent participatory research in response to concerns experienced by civil society (Gnaiger and Martin, 2001). In this process, the public or civil society becomes part of the research process (Fisher and Wallentin, 2002). The main aim of SSs is to provide access to (academic) knowledge by private persons, civil society organizations (CSO) and/or small or medium enterprises (SME) (Leydesdorff and Ward, 2005). Fourie (2003) postulates that the traditional division of institutional mission and academic activity into the triad of teaching, research and outreach is obsolete and of limited utility but must be merged into application and related forms of outreach.

The idea of the Unizulu SS, named ‘‘Intuthuko,’’ which means development, is a variant of SSs or an integration of science shop and academic consultancy training (ACT) (Stomph, 2015). The latter programme is a credit-bearing obligatory programme that is undertaken by Master’s degree students from the University of Wageningen (WUR). Even the naming

and selection of role players within groups as well as project commissioners and coaches for Unizulu was similar to the Wageningen ACT version. The main difference between Unizulu Intuthuko and the WUR ACT was in how students were selected. Intuthuko selected its participants from volunteers who were in their Bachelor's final year of study which was either a third year or fourth year, depending on the programme. Science shops focus on a problem in which the civil society organization is seeking research support. In this collective search for a solution new knowledge is generated or at least existing knowledge is combined and adapted.

This programme provides students with the possibility to work on a 'real world' project for external clients. There are ample opportunities to work on a multi-disciplinary project. Above all, the programme is based on the notion that students should constantly be challenged with tasks that refer to skills and knowledge beyond their current level of mastery. There is no single best way to start a science shop. Local circumstances play a large role and must inform the way in which a science shop is to be established, hence Unizulu adapted the SS concept and implemented it according to its environment.

Since students differ in interests and aims the SS programme offers a large variety of projects for which students apply as if it were their first job. The programme gives training to the applicant of high-level skills in an almost professional setting of a small consultancy team working for a true client on a real work assignment. To strengthen the students' professional skills needed for such team work, training in project planning and management and communication are integrated in the SS programme. Students are also provided with a study guide containing all the organizational information needed during the training.

Given that the SS programme affords a real work environment for the student, students are required to apply for a job in a project. Based on the application students compete with each other for a position in that project – since the project has different team functions, such as, project leader, process coach, content coach, treasurer and minute taker. The student should prefer one or other of these functions by writing a motivation. Based on all application letters the coordinator will assign project tasks to a team of five (5) students. It is not possible to grant every individual his or her first-choice project. Some projects will not be carried out because of a lack of interest while others may be popular.

Before the start of the SS programme students are expected to read all the information in the programme guide. Students are given a reader for communication skills, which provides them with excellent opportunities to practise some skills which will be needed when they are dealing with a client who has brought in an enquiry to be researched. During the execution of the project, teams need to plan and manage small projects so that they do a module in planning and management. The Project Planning and Management module (PPM) focuses specifically on: mission, vision and strategy of project teams, stakeholder analysis, planning and budgeting of projects, and developing a project proposal.

An essential professional skill is the ability to assess work and functioning of oneself and team members. Such an assessment is needed to improve student functioning and to facilitate resolving problems in an organisation. Every student keeps track of his or her personal functioning in a self-assessment dossier. This self-assessment dossier consists of an application letter, a paper outlining 'client' expectations, and reflection form papers.

The researcher sees SS as a guide to determining university interaction with communities in what has become known as the "scholarship of engagement" (Boyer, 1996; Lazarus et al, 2008). In the same vein, one might further include service learning, community engagement and scholarship of engagement as the evolution of terminology associated with the practices of engagement and a means of allowing institutions of higher learning to examine societal challenges by engaging surrounding communities.

Thus, the four main attributes of SSs are (a) the conceptual operation of SSs, (b) role functions, (c) student service learning, and (d) service learning communities.

2.2.1 The Conceptual Operation of SSs

In an SS, questions from civil society organizations are rephrased as scientific research projects and, under the supervision of a Professor or a Coach, students then carry out studies on the phenomena identified. Throughout the process of investigation, there are expected to be active interactions and communications between the students and community members with the help of the supervisor or coach. Students usually get credit points, counting towards their degrees, for their research. Equally importantly, the research leads to a report or another type of product that is useful to the client. In the process, the students gain valuable skills such as, problem definition, project-based working, communicating, planning, and the professor or researcher

will have case material for future scientific publication or further theoretical analysis (Fokking and Mulder, 2004). Moreover, supervision is part of the teaching obligation and publication of research articles, so all actors are doing what they're supposed to do: teaching, learning and researching. This is why a SS can be implemented in a university at relatively low additional cost, while the universities also serve the non-profit sector (Mulder, and De Bok, 2006).

2.2.2 Role Functions in SSs

Students involved in the project design and implementation have to assume the following roles: project manager, secretary, controller, project member, coach, expect, and commissioner.

The Project manager is responsible for the coordination and functioning of the project team, for defining the project goals and for the contact with the commissioner and third parties. The project manager will usually chair the group meetings. Required skills involve communication and interpersonal skills.

The secretary is responsible for the planning and preparation of team meetings (together with the project manager) and for the minutes and follow-up of meetings. The secretary is also responsible for administration and correspondence. Required skills include communication skills experience with MS-word, email and internet.

The controller is responsible for planning, budgeting and controlling of both the team work and the project. The controller is expected to have the following skills: experience with excel, knowledge with financial book keeping.

Project member together with the other group members are responsible for general and specific tasks, like exploring available sources of information and the correct selection and analysis of relevant data. Requisite skills for this role include: experience with ICT in searching for information in libraries and on the internet (Jordaan and Mabusela 2008).

The main task of the *coach* is to support and guide the team and each individual to function well. The coach organizes the first meeting of the team; is expected to be present during the first meeting with the commissioner; performs three interviews (at the beginning, mid-term and final performance) with each team member and is supposed to be available for all questions related to the team functioning.

The *commissioner* is formally the organisation or individuals who commissioned the project to the team. In many organisations the contact person is in fact the commissioner.

What has been described above is how SS evolved and Unizulu used similar concepts as Wageningen University except that, SS activities were undertaken by third, fourth year and honours students, as was explained earlier.

2.2.3 Student Service Learning

The introduction and development of student service learning through community engagement at Unizulu was motivated mainly by three demands. The first was the legislation by the Department of Higher Education demanding and emphasizing the need for students to undergo some community research project before they can graduate from the university with a degree (CHE, 2004). The second motivation was through the demand provided for in the regulations for Comprehensive Institutions under which the University was classified (CHE, 2004). In this regard, Unizulu was expected to reconfigure its programmes in order to fulfil its new mandate of being a comprehensive university. In one of its policy documents, The Department of Higher Education (2002), stipulated that comprehensive institutions in South Africa were expected to contribute to meeting a range of goals, which involved increased access, in particular, in career-focused programmes with prospective students able to choose from a wider variety of programmes. In the same vein, SSs could form part of the curriculum and allow students to take up research questions from the communities surrounding their universities. In that way students take part in career-focused and competency based programmes.

The third reason related to the improvement and strengthening of knowledge and research base for Unizulu students – not only students (Proost, 2010) but for academics as well, as they will find value in enhancing both their teaching and research capacity. Indeed, through interaction with community groups, universities can find themselves forging new relationships and forming partnerships. The expression of this demand would further lead to a higher increase in research output for both academics and students. Some concerns were expressed from a research design and methodology workshop held in 2010, by academics, that the research output was very low. In this regard, SSs could strengthen the development of applied research through linking both current research (practiced by universities) with participatory and action research. Alongside this, it was believed that opening up of career-focused programmes would allow prospective students to be able to choose from a range of programmes with different

entry requirements, thereby enhancing research capacity, while students respond to the social and economic needs of the communities surrounding their universities. In the process students and academic staff involvement in SSs would contribute to the strengthening of the universities in terms of research, the development of educational programmes as well as the relationships with communities.

2.2.4 Service Learning Communities

SS is perceived as a form of service learning as well as a credit-bearing educational experience in which students participate in an organized service activity that meets identified community needs and reflect on the service activity in such a way as to gain further understanding of course content, which means students involved in SSs take up extra classes, such as communication, project management and content coach classes. Students understand and appreciate the discipline better, students get an opportunity to reflect on every activity undertaken, and thus enhancing better understanding and better appreciation of the programme content involved (Lazarus, 2008).

Keeton (1983) argues that service learning is perceived as a sense of civic responsibility and an experience that produces the best outcomes when service activities are related to programme material. Hence SS advocates reflection activities such as directed writings, small group discussions, and class presentations. In these activities, communication, writing and presentation skills are enhanced.

SS offers learning which provides means for reaching educational objectives. The academic credit set is appropriate for service rendered by students to the outside community, when learning objectives associated with the service are identified and evaluated. Students do not only get to graduate at the end of the programme but discover that this type of learning and interaction with the communities brings new life to the classroom and enhances performance on their learning. Thus, student interest in the subject is increased. Students learn new problem-solving skills in their research, and this approach makes teaching more enjoyable. In addition, service learning expands programme objectives to include civic education (Steinhaus, 2011).

2.2.5 Models of Science Shops

The concept of engaged scholarship is not a new idea, but has been recently challenged by the need for greater knowledge production in a globalising society (Farkas, 2002). In the South African context, the notion of *service learning* increasingly became relevant as the country embarked on transforming its curriculum from an elitist one inherited from colonial and apartheid days to a broad-based one geared toward resolving the backlog of socio-economic challenges across various communities. Traditionally, universities which constantly engaged with the communities provided services. Within this context, SSs were based on the idea of volunteerism and learning, which went hand in hand with the idea of service learning, whereby students and researchers offered their services and time free-of-charge. In this respect, students did not earn anything in financial terms, rather they had an opportunity to develop their own skills.

The emphasis on service had the potential to enrich learning and renew communities, and also give added "new dignity to the scholarship of service". Universities have valuable resources (for example, students, academic staff, classrooms, libraries, technology, and research expertise) that could be made accessible to the community when partnerships address community needs. They also have a tradition of serving their communities by strengthening the economic development of their regions, addressing educational and health needs of the communities in which they are based, as well as contributing to their cultural life (Bringle, and Hatcher,2009).

In contrast to the traditional model of scientific research, SSs embrace a continuum of community science research models that involve the public in significant ways. Typically, SSs are based on the Scientific Consulting Research (SCR) model, where a knowledge-producing institution (e.g., university) functions as a hub of consultants to community groups to answer questions raised by the community groups (Cooper, et.al, 2007). In this process, the community groups are empowered to use scientific information to solve specific problems. At the same time, there is transformation in terms of attitudes from the students' point of view towards helping communities. Community members are not only informants who bring in questions, but can also be co-researchers in finding out solutions to questions. Therefore, in this way student research skills are enhanced.

There is also the Citizen Science (CS) model, which engages a dispersed network of volunteers to assist in professional research using methodologies that have been developed by, or in collaboration with, professional researchers. In this model, the public plays a role in data collection across broad geographic regions, and often, over long periods of time, usually to address questions raised by researchers (Wilderman et al., 2004). However, CS can have research and education goals similar to many participatory action research projects. It is, however, distinct from participatory action research in that it occurs on larger scales and typically does not incorporate iterative or collaborative action (Cooper et al., 2007).

Figure 2.1 illustrates these three models

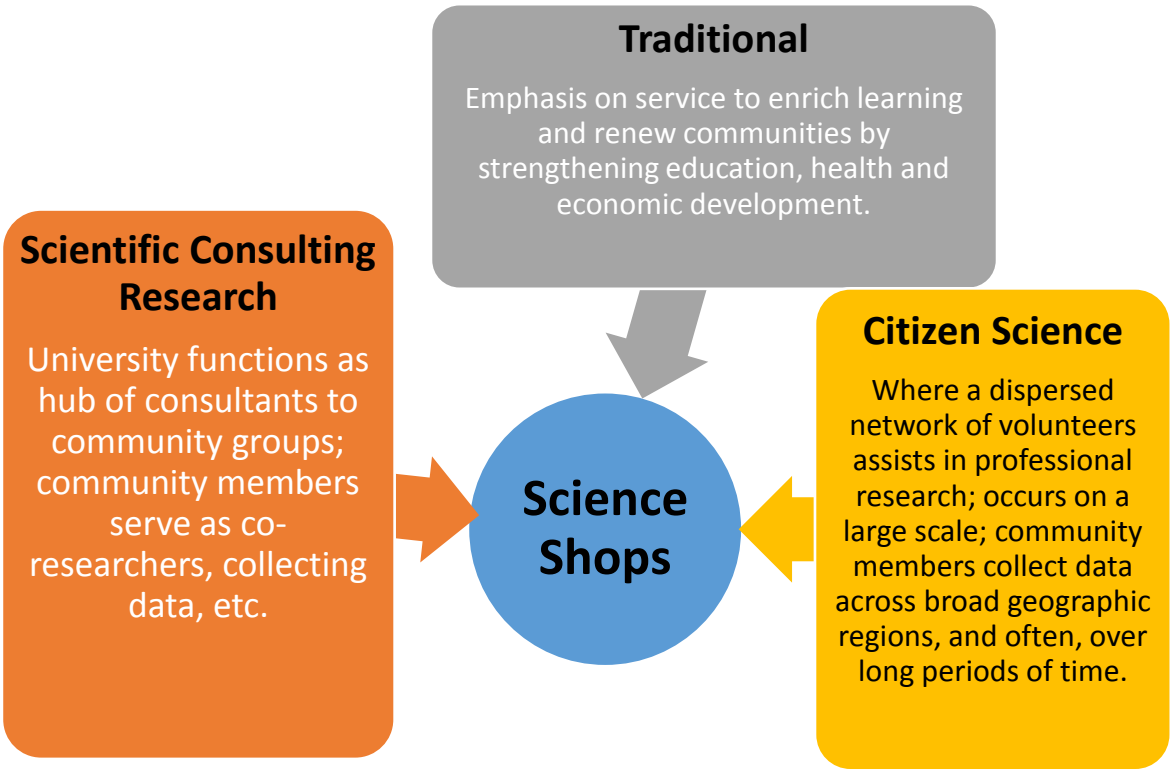


Figure 2.1: Three models of science shops

2.2.6 Mediation Process of University-Based Science Shops

De Bok and Mulder (2006:3) outline some steps of how a request is processed or handled, from the time it is received to the finalisation of the SS research. They refer to this as the 'mediation process'. The steps below serve as a guiding map followed by students and academics in doing research on a topic or research question brought in by a client, community member or an

organisation. Research topics may arise from factors such as Teaching and Learning, interaction with students and colleagues as well as members of the community. According to De Bok and Mulder (2006:3-4), to conduct an SS-based research study, the following steps must be followed:

1. *Receive/solicit clients and new questions*. Clients find SSs through websites, or guides by referral through other intermediaries, or even through the university switchboard. Targeted acquisition can be used to collect requests on certain topics at a suitable time (for example, based on supply of research capacity). The 'unaware' audience can also be approached actively.

2. *Map the real problem*. Together, the SS and the client make a clear articulation of the problem, including its background, cause–effect relationships and involved stakeholders. This is essential for analysing the potential role of research in the issue. General options for research or advice for a different strategy are discussed with the client.

3. *Preliminary research or quick scan*. A short literature search and expert contacts frame the research, and the best feasible approach is selected. The client is involved in framing the project. It might also become clear that research isn't the best solution to the client's needs. At this stage, the initial question can be refused, be referred, result in a short advice, or be formulated into a draft research proposal with a scientific research question. If required, a funding proposal can be drawn up.

4. *Find a supervisor or co-supervisor*. To guarantee maximum scientific quality, SS projects are always supervised or co-supervised by a member of academic staff in a relevant discipline. For academic staff, this counts as teaching load.

5. *Find a student/researcher*. The researcher (a student who is receiving course credits is normally preferred) makes a start with the formulation of a detailed research plan, in cooperation with the client and the supervisor and SS staff. Students can usually do projects in a practical period or for 'optional' course credits, or as their bachelors, masters or PhD thesis.

6. *Maintain communication*. The SS staff usually manage the research process and communicate with all involved, and safeguard the client's interest. This is essential for commitment to the project and acceptance of the results.

7. *Facilitate usable presentation and publication of results*. The scientific results are usually for use by laypeople, so the SS facilitates understandable and usable reporting. Apart from reports, media releases can be issued, or websites, brochures, CDs, advisory letters, etc., can be produced.

8. *Support implementation of results and follow-up actions*. If the client wishes it, a SS can support activities to increase the impact of the results. SS shop staff, students or supervisors can be actively involved in seminars, meetings with stakeholders, public hearings or press conferences. They can even be expert witnesses in legal cases.

9. *Make inventory of follow-up research*. Clients might not always be aware of the broader scope or scientific implications of their research question. Options for follow-up research are discussed with all stakeholders. Sometimes the SS or the research group involved continues the research because of societal or scientific interest in the subject, or a number of smaller questions are grouped together for more in-depth research (themes).

10. *Evaluation*. The project is evaluated (from the viewpoints of the student/researcher, the supervisor and the client). Client satisfaction, such as the feeling of empowerment, can be measured. Measuring the contribution of research to achieving their goals is less straightforward. An impact evaluation can be done later, but many societal factors play a role in 'real life.'

2.3 THEORETOICAL FRAMEWORK

Before focusing closely on Unizulu's SS pilot project, it is important to present the theoretical framework for this study. This will assist in analysing the Unizulu initiative and establish an understanding of where things may have gone wrong on the way from the inception of the innovation to full adoption.

This study was guided by the Diffusion of Innovation (DoI) theory (Rogers, 2003; Starkweather and Kardong-Edgren, 2008; Borrego, Froyd and Hall, 2010). According to

Borrego, et al. (2010: 186) "a diffusion of innovations perspective emphasizes characteristics of the innovators, the innovation(s), the potential adopters, and their context to understand and predict levels and rates of adoption." This perspective usually involves looking at the 'steps', 'phases' or 'trends' over time to see what happens to an innovation from its inception to full adoption; alternatively, to ensure that once an innovation has been mooted, it is driven through these steps and phases to ensure its complete diffusion into the system in which it is required to function.

Rogers (2003) identifies five stages through which an innovation passes, namely (a) Awareness, (b) Interest, (c) Evaluation, (d) Trial-making, and (e) Adoption. Starkweather and Kardong-Edgren (2008: 2) present these steps a little differently as follows:

1. Knowledge (exposure to its existence, and understanding of its functions);
2. Persuasion (the forming of a favourable attitude to it);
3. Decision (commitment to its adoption);
4. Implementation (putting it to use); and
5. Confirmation (reinforcement based on positive outcomes from it).

Referring back to Roger's terminology, the first stage of *awareness* simply means that the potential adopter of the innovation has heard about the particular innovation, but does not have much information about it. In the next stage, the person develops *interest* in what he or she had heard about the innovation, and makes an effort to get information about it so as to familiarise him/herself about it. The third stage of *evaluation* involves the person weighing the potential advantages, strengths, benefits and opportunities which could be associated with the innovation, in order to come to a decision as to whether or not to try it out. If the person decides against trying the innovation out, then the process ends at this point. However, if the user is persuaded to try it out, then this leads to the fourth stage – that is, *trial- making*. If for some reason the user does not continue to make use of the innovation, and stops using it any further, then this referred to as 'reneging on adoption.' The fifth and final stage of *adoption* refers to a user who continues with the full use of the innovation. This is the stage that everyone who comes up with an innovation wishes to attain, otherwise the innovation has failed to take root. Schematically, this may be represented as in Figure 2.2:

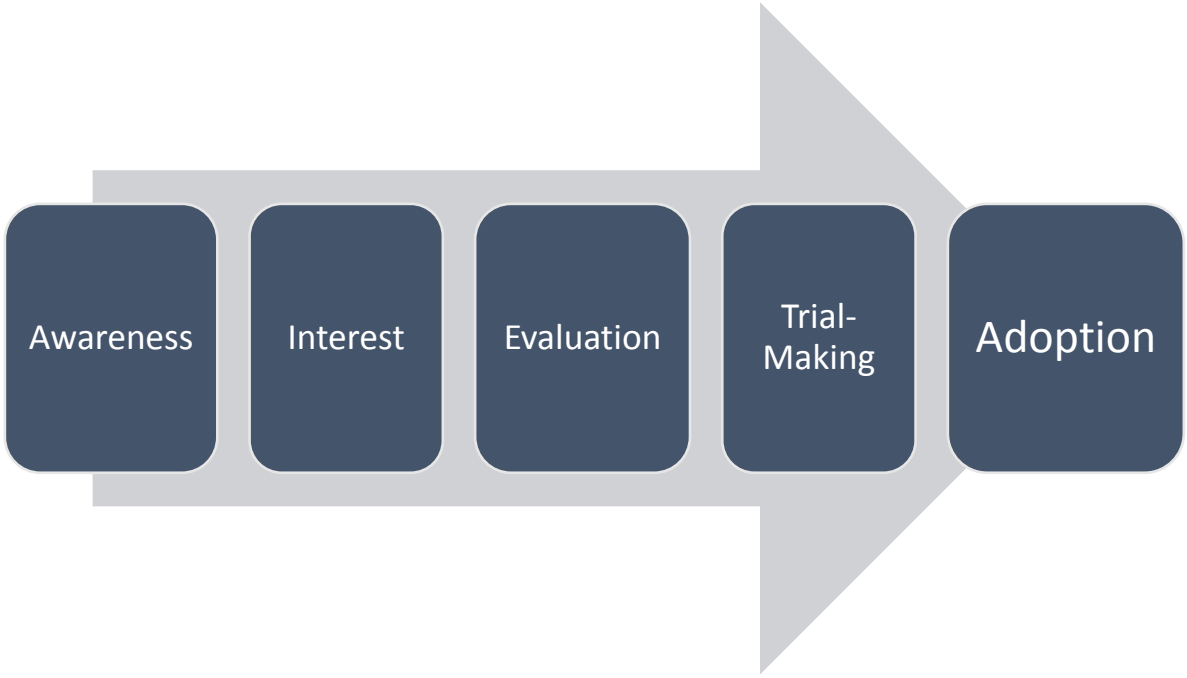


Figure 2.2: The researcher's illustration of Rogers' stages of an innovation

In further consideration of the above stages, Starkweather and Kardong-Edgren (2008: 2) posit that the following characteristics of the innovation will determine its full adoption, or failure to be adopted:

1. Relative advantage (the degree to which it is perceived to be better than what it supersedes);
2. Compatibility (consistency with existing values, past experiences and needs);
3. Complexity (difficulty of understanding and use);
4. Trialability (the degree to which it can be experimented with on a limited basis);
5. Observability (the visibility of its results).

The implication of this stage-based model is that, no matter how simple and straight-forward an innovation may appear to be, it requires a change agent/champion or driver to take it through these various stages. To move from one stage to another, different types of interactions and information are needed to finally achieve adoption (Borrego, et al., 2010).

Concomitantly with the above stages of an innovation, Rogers (2003) further identified five categories of independent variables which influence the rate or level of adoption of a given innovation, namely *perceived attributes of the innovation*, *type of innovation-decision*, *communication channels*, *nature of the social system*, and the *extent of change agents' promotional efforts*. These factors are schematically represented in Figure 2.3.

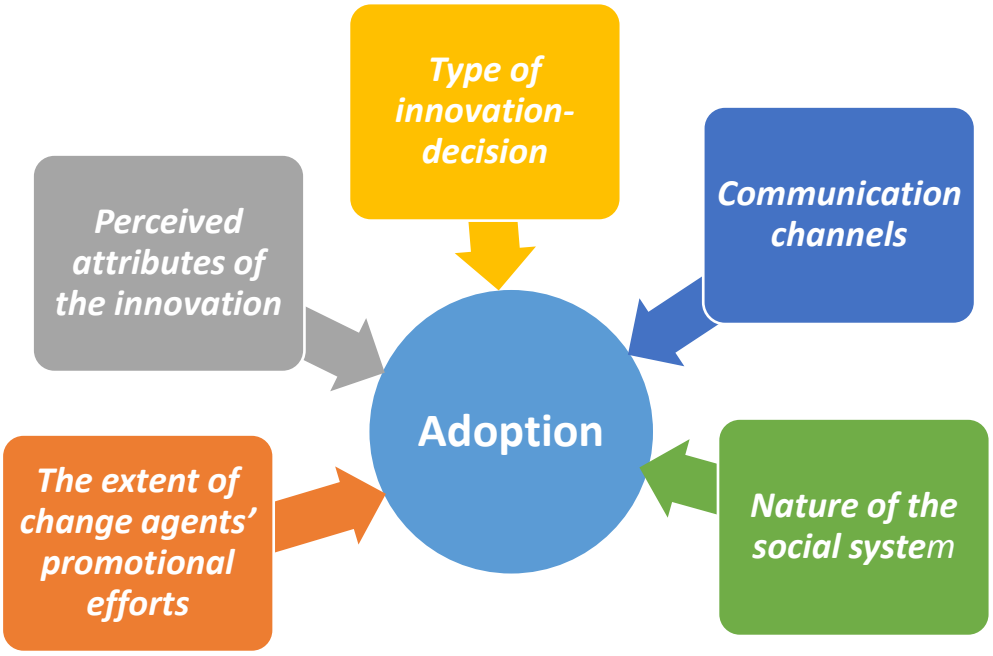


Figure 2.3 Categories of independent variables which influence the rate or level of adoption of an innovation.

These factors are now briefly described:

2.3.1 Perceived attributes of the innovation

This refers to (a) the compatibility of the innovation, that is, the consistency of the innovation with values, experiences, and needs of the potential adopter; and (b) the complexity of the innovation – that is the perceived (or actual) difficulty of adopting the innovation; thus, the higher the perceived complexity of an innovation, the lower its rate of adoption. For instance, innovations which can be adopted by a single enthusiastic lecturer will be much easier to move to adoption stage than one which requires coordination across departments and other Faculties

2.3.2 Type of innovation-decision

The type of adoption decision can be optional, collective, or authority. Many education innovation adoption decisions are optional among teachers or lecturers, particularly those that take place in one programme of study or one module. Adoption of more complex innovations, such as those requiring coordination across academic units and/or Faculties, may involve a combination of collective (collegial) and authority (top-down) decisions. Authority decisions can be made more rapidly than collective decisions, but may be undermined in actual implementation, while collective decisions may lead to embodiments of an innovation – in the original or adapted form. Adapted innovations may be sustainable because of a collective buy-in from the potential users

2.3.3 Communication channels

Communication channels can be mass media, such as in-house publications, seminars, workshops, journal articles, conference publications, and professional society publications; or interpersonal, such as having an informal conversation with someone describing his or her positive experience with a similar or the same education innovation. Rogers (2003) explains that mass media channels are more important at the awareness stage, while interpersonal channels are critical at the evaluation stage.

2.3.4 Nature of the social system

This refers to characteristics of the relationships between change agents, opinion leaders, and potential users of the innovation. In universities, Faculties and/or influential individuals may act as opinion leaders who influence the adoption decisions of others. As Rogers (2003: 330-331) explains:

> …the heart of the diffusion process is the modeling and imitation by potential adopters of their near peers' experiences with the new idea. In deciding whether or not to adopt an innovation, individuals depend mainly on the communicated experience of others much like themselves who have already adopted a new idea. These subjective evaluations of an innovation flow mainly through interpersonal networks.

With regard to these interpersonal networks, Borrego, et al. (2010: 187) distinguish between *heterophilous* and *homophilous* networks on the basis of similarities between members of a network – where the former refers to networks which have members with "an influx of novel

ideas," whereas the latter is one where there is high convergence of thought. The unfortunate this is that much as interpersonal networks play a key role in diffusion of innovations, homophilous networks have better communication (Borrego, et al., 2010: 187). As Rogers (2003: 306) surmises, "when two individuals share common meanings, beliefs, and mutual understandings, communication between them is more likely to be effective." However, common understandings between individuals is a necessary, but insufficient condition for change to occur (Foertsch, Millar, Squire, and Gunter, 1997).

2.3.5 The extent of change agents' promotional efforts

According to Borg (2017: 5) "the term 'agency' is commonly described as something that people achieve in different situations through their engagements, rather than something they possess." In this case, adapting an innovation to the local environment challenges lecturers and students (the frontline users of most, if not all, curricular innovations) to exercise agency, creativity, or skill to develop or adapt their own teaching innovations. Accordingly, together with other change-champions who are charged with the role of promoting and driving the curriculum innovation to full adoption, the actions taken and efforts made by teachers and students will be critical in determining the ultimate successful implementation of the innovation

2.3.6 Limitations of the Diffusion of Innovations Model

Ironically, the limitations of the DoI model arise from what must be its strength, namely the desirability of a buy-in from potential adopters, such that they embrace the innovation to the extent of adapting it to their local and unique circumstances. The challenge is that "the more an innovation is changed, adapted, and even developed independently in different locations, the more challenging it is to study using a diffusion of innovations framework" ((Borrego, et al., 2010: 187). As Borrego et al. further explain, "the framework acknowledges that this is a good sign of widespread adoption, but it also becomes more challenging to define, delineate, or trace" the innovation – based on its originally defined characteristics. In the end, even colleagues within the same department may disagree on whether or not what they do is still an expression of the same innovation. As Borrego, et al. point out, if the innovation was about student-active pedagogies, a head of department "might state that a faculty member is applying student-active pedagogies, while the faculty member, peer faculty members, and experts in student-active pedagogies may or may not agree."

Presently, only a handful of people will quarrel with the desirability of adapting curricula to local conditions. This is what makes teaching and learning authentic. Thus, ways have to be found to determine the adoption of an innovation even if it has been adapted differently by different users of the innovation. There is no substitute for authentic teaching and learning. Thus, notwithstanding this limitation, the researcher opined that the DoI theory could still be used in this study.

2.4 THE UNIZULU SCIENCE SHOP PILOT PROJECT

The University of Zululand went through a series of events towards the adoption and implementation of the SS concept, culminating in the piloting of the scheme between 2009 and 2010. The University went through an elaborate period of preparation before the actual SS activities commenced, starting with staff training. Staff training involved the selection of staff from Unizulu who were interested in the SS project and these staff members formed a working committee or task team. A group of academic staff representing the different Faculties were selected to visit Wageningen University in the Netherlands on a fact-finding mission. The tools they utilised in collecting information included observation of different groups of students registered for the Academic Master Cluster (ACT) degree which is the same as doing SS activities but at a Masters level. The team spent two months being part of the programme, including interviewing many academic staff and other experts involved the ACT project (content coaches, project leaders, students' commissioners and administrators, concerned communities). Above all, in-depth literature regarding SSs was reviewed.

The second phase of preparations took place after the team returned from Wageningen University. The team was required to prepare and make presentations of their involvement and experience at Wageningen to the management of the University and Executive Deans. Five staff members from the Faculties of Arts, Education, Science and Agriculture, and CAL who received training in Problem-Oriented Education (POE) in 2008 at Wageningen University held a workshop for the Executive Deans on SS. The presentation highlighted different ways in which curriculum development takes place at Wageningen University and the participants had to come up with ways in which these approaches could be implemented in the environment of Unizulu. The participants then came up with a proposal for a pilot study which was implemented at Unizulu in 2009. This marked the beginning of planning for the pilot project.

The third phase of the planning process involved inviting staff members at Unizulu to be part of the SS project. Letters of invitations were sent to the four Faculties inviting staff members who were interested in the SS concept to attend a workshop where the team was to present their experiences and intentions. Altogether, forty-eight (48) staff members and a twenty (22) students attended the workshop, where the NUFFIC Project Manager gave a brief presentation on the general background of NUFFIC and its responsibility to the University of Zululand and South Africa.

The fourth phase of the planning process was a workshop titled: 'train the trainer' held in 2008. This workshop was designed and implemented by a communication consultant, Jet Proost, from The Netherlands. Staff members were trained for a period of one week. The workshop provided an opportunity for participants to draft activity planning from July 2008 to July 2009. The planning included addressing the following questions: What had to be done? For whom and who would benefit? Who would perform what task, how – and when would the task be accomplished? What were the budget estimates?

The fifth phase involved module design. This stage was followed by the application of the facilitation skills acquired from the previous workshop. Trainers were expected to use the knowledge gained during the July 2008 workshop of "train-the-trainer" to train participants on group coaching.

The sixth phase comprised a workshop to train coaches. This workshop was facilitated by four of the staff members who had earlier gone to The Netherlands and participated in the July 2008 workshop on ''train the trainer.'' The SS task team (comprising academic staff who were representatives of the four Faculties) decided that, as a pilot project, four groups of students from the four Faculties would be adequate to participate in the project since SS task team members were all still on a learning curve with regard to SSs. The participating students were required to attend two classes in communication skills and project planning management. Seven questions were identified, and the SS task team members came up with a procedure of how the team would sell topics for different Faculties and to act as Commissioners. At the end of the pilot phase (Intuthuko), students had to present results to the Commissioners.

The students who were involved in the SS pilot project, interviewed in 2010, expressed that learning through SS brought new life to the classroom; that the learning that students received enhanced their performance on traditional measures of learning; that their levels of interest was

increased in the subject; that they acquired new problem-solving skills; that the approach made teaching more enjoyable by allowing them to go an extra mile during the cause of the study to do due diligence, researching information and asking questions (Proost, 2010). Overall, students expressed gratitude for the opportunity and the type of learning that was made available to them through the SS pilot project. They wished that this type of learning could be extended to other students as well throughout the University (Proost, 2010). One lecturer who was involved with the students in the SS pilot project also attested to these claims.

2.5 PERCEPTIONS OF ACADEMIC STAFF ABOUT SCIENCE SHOPS

The perceptions of academic staff about a programme or concept could be influenced by either social experiences, past experiences and/or culture (Alebaikan, 2010). These perceptions manifest in academic staff members' behaviour, attitude, characteristics, emotions, wants and expectations. Therefore, factors such as teaching and learning, research and interaction with students and colleagues, and past experiences may contribute towards a formation of a perception (Alebaikan, 2010). Various perceptions held by academics on SS are described under various headings below.

European Universities consider SS to be an indispensable method for citizenship education through which students learn the art and practices of democracy (Papatsiba, 2006). Studies have emphasized the importance of service learning in higher education (Welch, and Koth, 2013; O'Grady, 2014; Levkoe, Brail, and Kezar, 2014; Chambers and Burkhardt, 2015).

In general, academic staff members at Unizulu, who had had the opportunity of attending the presentations hoped for this type of learning to be integrated into the curriculum, as it was evident that it provided students with skills which are needed for future careers (Proost, 2010). Unfortunately, when the project came to an end in 2013 there was a change of guard with respect to Unizulu Executive Management. Although the presentations made to the new Executive Management were hailed as representing good opportunities for student learning, none of the top Executives took responsibility to support staff members and come up with a policy for integration. Thus, referring back to the conceptual framework of this study as embodied in the categories of independent variables which influence the rate or level of adoption of an innovation (Figure 2.3), it may be said that the apparent failure of adoption of this innovation could be attributed to, inter alia, the lack of effective communication channels,

the nature of the University as a social system, and the extent (or lack thereof) of the agents' promotional efforts.

Farkas (1999) alludes to the notion that ordinary citizens are under-represented in today's Research and Development (R and D) environment, within the so-called triple helix of government, university and industry relations. The ordinary citizens have little or no mechanisms to live by, hence the Dutch student movement and also the transformation of the South African HE. SSs attempt to redirect university R and D towards economic and political non-elites. SSs mitigate the disproportionate power of business within the university environment by what Sclove and Scammel (1998:2, in Farkas, 1999) have called "community-based research" – that is, research that is initiated by communities and conducted for and often directly with or by communities.

Harkavey (2006, in Bringle and Hatcher, 2006: 48) opined that "universities cannot afford to remain shores of affluence, self-importance and horticultural beauty at the edge of island seas of squalor, violence and despair." Emphasizing service has the potential to enrich learning and renew communities, but it will also give "new dignity to the scholarship of service" Bringle and Hatcher (2006: 48) Universities have valuable resources, for example, students, academic staff, classrooms, libraries, technology, research expertise, laboratories etc., that become accessible to the community when partnerships address community needs. Universities also have a tradition of serving their communities by strengthening the economic development of their regions, addressing educational and health needs of the community, and contributing to the cultural life of the community.

Bringle and Hatcher (2006) further aver that HE community involvement and voluntary community service can also create a culture of service on a university campus. From a practical perspective, there are two salient means through which universities support and promote community partnerships – that is, through extracurricular and curricular activities. Extracurricular activities take place through student organizations, such as campus-based radio stations, and curricular activities take shape through community agencies and experiential learning opportunities, such as helping learners from neighbouring schools with homework. However, the learning objectives of these activities must not only focus on extending a student's professional skills but provide communities with access to academic knowledge (Leydesdorff and Ward, 2005)

2.6 ADOPTION OF SCIENCE SHOPS AS PART OF THE UNIVERSITY'S CURRICULUM OFFERINGS

The main aim of SS is to provide access to academic knowledge, for civil society. One of the objectives of NUFFIC was the possible adoption of SS as part of the curriculum offerings at UniZzlu. Integrating SS into the curriculum could have made an innovative and worthwhile contribution to the field of education and scientific research, and probably also have enriched Unizulu's programme offerings.

The successful adoption of SS would have meant integrating SS into the curriculum -such as having a component of research module forming part of SS. This would have enabled students the flexibility of choosing to do either traditional research or an SS project as part of, say, an Honours degree. Allowing this latitude to students would have meant more exposure to real life problems and acquisition of career-orientated skills, as well as a possible accumulation of other educational competences (Bringle, and Hatcher, 1996). Higher Education is changing to meet the needs of a rapidly changing society (Department of Education, 1997:3). As such, society's needs and demands are rapidly changing, which impacts on the availability of the resources at the disposal of institutions of higher learning. The University community is made up of students drawn from the surrounding communities, hence the need to adequately equip these students with the knowledge and practical skills needed by the outside communities. This will ensure that such communities are served better by these students. Education White Paper 3 talks about the transformation of HE in order to address the needs of the surrounding communities (Department of Education, 1997:1). In this context, transformation, amongst other things, would mean restructuring HE institutions by having them take up programmes that would allow the role players, that is, students and academics to advance the communities surrounding their university. Failure to do so, would amount to nothing but merely paying lip service to the notion of community engagement.

Universities should be seen as more enterprising by seizing opportunities and looking forward to helping students and communities by revamping their curricula to be, for instance, more "problem-based learning" (Department of Education, 1997; Hall, 2010: 3). Hall describes the need to bridge the gap between academic research and teaching within the university sphere and communities in need of academic assistance to resolve practical issues (Hall, 2010: 3). This could remove the stigma of having universities characterised as 'ivory towers.' In actual fact, communities that surround universities should be affluent in terms of services and support.

Presently, HE cannot keep up with the demands of civil society and has to be innovative in order to catch up (Department of Education, 1997). In particular, professional schools create a variety of experiential learning opportunities for their students (for example, clinical, internships, co-op programmes, field experiences, practical, and student teaching). However, the learning objectives of these activities typically focus only on extending a student's professional skills and do not emphasize to the student, either explicitly or tacitly, the importance of service within the community and lessons of civic responsibilities.

It is evident when looking at the HE landscape, that HE should orientate itself towards the future role of students outside university, in society. Therefore, the priority of HE needs to shift to teaching students how to continue to acquire new knowledge and to use knowledge in a societal context. SSs offer one method to include experiences of students with these aspects in the curricula (Fokking and Mulder 2004). Therefore, universities should implement SS units within their campuses that do research for civic society. SSs are present at many universities in The Netherlands, Demark and Romania, such as the University of Utretch in the Netherlands. In Romania a SS experience begins with a simple question and culminates in a chain of SS, and SS Viena of the Technical University in Denmark. Their main aim of all these SSs is to reach out to the civil society, improving their lives and advancing access to scientific knowledge for the citizens.

The university would be able to evaluate and monitor the processes and functioning of the programmes on offer. The university can ascertain whether they meet the needs of the community, students and industries (Gnaiger and Martin 2001). By meeting the needs of the surrounding communities and producing well-rounded students, the university will be able to live up to its mandate to offer programmes that are relevant to the needs of the surrounding communities (Unizulu, 2010).

All these concepts have in common the notion that the value of certain forms of knowledge decreases over time, suggesting that continuous actualisation and acquisition of new knowledge and the capability to apply knowledge in professional practice (including non-scientific) have become equally important. Furthermore, we now see that knowledge should not be focussed too narrowly; contexts should be taken into account.

In a knowledge society that aims to be more than a knowledge economy, SSs have a special place in the curriculum to support citizens in their quest for knowledge. People are also enabled

to take responsibility towards shaping their own lives and society. Moreover, citizens' demands for knowledge also provide an important input for research to complement other scientific or commercially-driven ways of finding research topics (European Commission, 2003).

2.6.1 Benefits of Science Shops as part of the University Curricula.

Science Shop projects are a little more work to organise than textbook cases, which can give problems within the decreasing university budgets and trends towards commercialisation of science (Leydesdorff and Ward, 2005). Students learn valuable skills from projects because there is direct interaction with stakeholders from a student's perspective due to the diverse nature of community engagement (CE) and communication with non-specialists. This diverse interaction prepares a student with skills to deal with diverse people in different circumstances other than classroom settings.

The process of applying scientific knowledge to real-world societal problem settings allows students to move away from the notion of seeing a lecturer as an expert, and begin to see him or her as a process leader in unpacking the questions at hand. In the process, students acquire the art of reflection outside the teaching and learning environment, such as group discussions, writing reflection papers when confronted with a real-life problem, and the application of scientific knowledge learnt in class by producing results that are implementable. Performance in reading, writing and speaking is enhanced. Students acquire a skill of doing research within a certain context, as dictated by a particular setting from definition of the problem up until the implementation of results at the end of the research, working in a multi- disciplinary setting.

It is evident therefore that SSs have a special place in linking all three pillars of the university core business, namely; (a) teaching and learning, (b) research and (c) community engagement (Gnaiger and Martin, 2001). Science shops combine research and teaching with service to society. Questions from communities are rephrased to scientific research projects. Students, under supervision of a lecturer then perform the research, or a researcher does it. Students obtain a mark for their participation in the research. The research will lead to a report or a publication, which is made available to the client. The student will have gained valuable competences related to project-based working – such as problem definition, communication with both scientific and non-expert audiences, planning, production of practical applicable results and reflection on the use of scientific knowledge in a societal problem setting. The

professor and/or the researcher will have case material for either direct publication or further theoretical analysis.

Moreover, the lecturer involved in this supervisory work is doing it as part his or her teaching obligation. So, in fact, all actors are doing what they are supposed to do that is, teaching, learning and researching. This is why SSs can be implemented at relatively low additional costs and why they can also serve the non-profit sector (Fokking and Mulder 2004).

The competences developed from SS projects and methodology have to a smaller or larger extent been included in the junior or Master degree structure at Wageningen, and they combine well with concepts of *enterprising university* and *lifelong learning.* For university renewal it is interesting that in principle SSs can exist in all university Faculties where societal needs can be met by university expertise. For instance, in The Netherlands they have SSs not only on the environment but also law, health, pharmacy, physics, social affairs – among others.

Gerold (2001), Director for Science and Society and the Directorate-General of *Curriculum Development through Science Shops* research explain that there are five reasons for support in SS, namely; (a) Trust of citizens in science is advanced by SSs; (b) SSs shorten communication lines (c) Beneficiaries are open to the scientific approach, thus increasing public awareness; (d) SSs have an influence on young researchers and research institutes, and (e) Social themes of SS research fit well with the university knowledge and skills spectrum of teaching and learning.

According to Hall, et al. (2000: 2), proponents of community-based learning claim the following advantages in terms of competences that the student develops through SS: (a) that students develop competencies of making connections from the abstract concepts learned in the classroom to applications to real-world problems; (b) that, as a form of experiential learning, SSs promote learning through a cycle of action and reflection – as students engage in research and write papers on the researched topics, thus reflecting over and over again on the research until a final product is produced; (c) that they also develop and acquire general skills that are useful in other contexts, particularly the world of work.

The above is a direct translation from practice to theory and from theory back to practice, as propagated by Ernest Boyer (in Lazarus et al; 2008) when he talks about the four steps (that is, discovery, integration, application and reflection) involved in the scholarship of engagement.

The four steps refer to the process of coming into contact with abstract concepts and new information in the classroom. The new knowledge is integrated with the existing knowledge that the student has which is then applied practically, and then reflection takes place until the results of the research can be presented to and be implemented by the client.

In many contexts, SSs have proven to be successful because the concept can be adapted to local circumstances and issues. Accordingly, SSs have proved to be a tool to reform education as a result of their pedagogical approach which is centred on problem-based learning.

According to Leydesdorff and Ward (2005), SSs are viewed as credit-bearing educational experiences in which students participate in an organized service activity that meets identified community needs and reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of civic responsibility. SSs bring experience that produces the best outcomes when meaningful service activities are related to course material through reflection activities such as directed writings, small group discussions, and class presentations (Bringle, and Hatcher, 2009). SSs provide an additional means for reaching educational objectives, and academic credit is appropriate for service activities when learning objectives associated with the service are identified and evaluated.

Most SS work is done in students' projects, often in the later years of their studies when they already have good knowledge of their discipline. For the scientific value of a SS project, the research question to be addressed may either come from inside or outside the university. The educational value of working on projects from outside, compared to projects from inside the university, is however much higher. The student develops extra competences, like project management, oral and written communication skills with non-expert audiences, translation of a societal problem into a scientific problem and translating the results back into the societal problem context. Students are thus better prepared for a job outside the scientific community.

Experiences from SS work can also be used in methodological programmes, teaching students in general on matters related to science and society. Furthermore, SS can take the form of service learning, and can be made regular university initiatives, both academically and in societal themes. It is evident that both the university and civil society have a partnership, in the long-term, through students who have learned to apply their knowledge in societal contexts

and for the civil society to have their problems solved and implement the results (Leydesdorff and Ward, 2005).

2.6.2 Benefits of SS to Students

From the students' point of view a science shop can represent an opportunity to work with a real-life problem, together with real-life people who have real-life needs of finding practically applicable solutions to their problems (Proost, 2010). Another benefit may be that the methods of studying and solving problems in the SS are different from what the university otherwise offers to teach the students (Hende and Jorgensen, 2001). Seen from societal and labour market points of view, SSs can provide students with valuable competences and qualifications that are not only vocationally but also socially relevant in later job situations.

It has been revealed that students in Service Learning contexts demonstrated more positive course evaluations, more positive beliefs and values toward service and community, and higher academic achievements as measured on mid-term and final examinations (Furco, 2011). This finding supports the notion that students who are involved in SS tend to develop a sense of social responsibility and citizenship skills through their interaction with the communities, and they display meaningful engagement skills and commitment to community service. The students become more competent in technical skills in a variety of fields, such as using different search engines when doing research. Other research supports the contention that student involvement in communities has a positive impact on personal, attitudinal, moral, social, and cognitive outcomes (Khanna, 2011).

Students involved in SSs do research from projects commissioned by outside commissioners under staff supervision and in the process learn valuable skills, such as communicating with clients and solving a problems in context. Students can earn credits for their work, which count towards their degree. Over and above, in this kind of training students are better equipped for the outside world where they find themselves having to make crucial decisions for companies.

There are various ways of including SSs projects in the curriculum. One way is to award credits to projects, or students can do projects as part of an existing module or practical period. A much-used option is the Master's thesis, which can be based on a SS request. To increase the benefits of SS projects for the curriculum, SS cases can be used as examples in many other programmes.

Students would later be able to apply their knowledge in practical situations, such as interpreting policies and manage complex situations without being guided, by applying the same experiences or competencies gained during undertaking SS projects. As such, SSs can provide a possibility of establishing more dynamic and direct beneficial relations between the academic institutions and the world outside the university, in that the two spheres can become more reflected in one another. Similarly, the SS can provide the opportunity of making teaching and research multidisciplinary (Hende and Jorgensen, 2001).

In general, SSs develop general skills that are useful in other contexts, particularly the world of work. Students develop new perspectives or new ways of looking at the community groups they engage with. In an interview with a student who was participated in the SS pilot project at Unizulu, the student interviewed emphasised the ability to connect abstract concepts learnt in the class, in form of theory, with a practical situation (Proost, 2010). The application of theory to practice, as well as general communication skills, were the competencies the student has gained by participating in a SS pilot project. As a student the experience was that the competences gained were valuable. The student expressed a need for the same experience to be extended to fellow students (Teodosiu and Caliman, 2002).

According to Jorgesen, Hall and Brodersen (2004) SSs allow students opportunities of translating learning from practice to theory and from theory back to practice. For example, students receive a question from a community member or a client, which needs to be translated into a scientific research question, by following the norms and standard of research. Afterwards, the results need to be translated back to practice and be explained to the client or a target group for implementation. This way, students learn the art of writing and articulation, an ability to explain concepts to communities, most-times these community members are not scientifically educated. The dialogue which takes place between students and community members enhances communication skills. The students deal with people outside the university, talk with them about what they want or need, and their main aim of bringing the question to them. This is done through dialogue methods, like different types of interviews. Students learn to translate questions from the community into research topics. As Huber (2016) puts it, this exercise gives students a skill of formulating a research question.

According to Jorgensen, et al. (2004) SSs afford students an opportunity of working in groups and learning the art of applying technical knowledge to practical situations. They learn skill

of being a team player, interacting with other students and learn to tolerate one another, something expected later in life and will be able to fit in any situation that is presented to them.

A case study conducted at a Colombian university revealed that improvements in student learning had a lot to do with the implementation of the SS model (Teodosiu, 2002). Students increased their involvement in the learning process when their academic activities gave good results. At the same time, students acknowledged the importance of community engagement and became active members of the community.

San, Ikeda, and Yeethat (2000) reported that students who had participated in learning activities which at the same time served communities demonstrated stronger outcomes in academic, writing ability, values, choice of a service career, and plans to participate in the real working world. This is an indication that students who engaged in this type of learning get more experience on real life issues. They are able to draw examples from the classroom setting and implement them in a practical situation. Hence, they grow in skills such as writing, since they produce reports from the projects. Their communication skills are enhanced from interviewing clients or commissioners. They have better planning or organisational skills from planning the project from its inception to the end.

2.6.3 Benefits of SS to Communities

The main focus of SS is solving local problems experienced by the communities using universities as a springboard, that is, to provide access to (academic) knowledge to private persons, civil society organisations (SCO) and small, medium enterprise (SMME). Typically, these individuals lack financial means to engage professional consulting bodies (Straver, 2010 as cited by Boere and Heijman). Thus, the communities benefit from the supply of existing information from university to community at no cost.

One of the preconditions for accepting projects from public organisations, is that such organisations should use the research conducted by SS (Straver, 2010 as cited by Boere and Heijman). When research has been completed, the SS team presents the results to the client for implementation. A lot of resources are used during this process and it stands to reason that the results are implemented by the communities which commissioned the research. Otherwise, the work would have been carried out in vain.

According to Perares (2010) there is a cost benefit involved in conducting research for communities where a professional consulting body is involved. In a SS where student input and academic supervision are involved there are no costs involved because research in this category is considered to be part of the education process. Furthermore, it is relatively more efficient, considering that SSs often rely on student and community volunteers who are part of the question being investigated (Sclove, et al., 1990).

Further, Perares (2015) states that in view of matching knowledge needs from the civil society with research capacity in academia the cost benefit will be much higher if communities were made to pay – considering that consulting costs are far more than one can think, when looking at the provisions that SSs provide, such as interactive platform for community members within the university, and the forms of partnerships that communities create with other organisations within the university. In addition, communities are able to establish connections and benefit from mentoring visits provided by the university. Overall, the most important thing is to build trust and keep a healthy relationship with community members.

According to Gnaiger and Martin, (2001) SSs provide civil society with easy access to the resources of universities and, at the same time foster links and relationships between universities and society. This kind of innovative learning prepares students for the real life of work. During their engagement with the community, students are faced with working in less structured environments, which not only allow partners from the university to apply, test and critically evaluate theoretical principles, but to find the gaps in them too. Students are more likely to find themselves in 'real world' situations where the environment is different from what the textbook is saying and will have to learn by experience, thus making a student a life-long learner (Fokking and Mulder, 2004).

The quality of SS projects are guaranteed because of the staff supervision and the fact that further analysis could be done on the same research project. The output of SS work leads to direct impact on the lives of the communities because once the results are presented and implemented there is imminent change from the community. Another long-term benefit to communities is that students who have done SS projects will be better prepared for jobs when they leave the university (Fokking and Mulder, 2004).

2.6.4 Benefits of SS to the University

Amongst the functions of SSs is that they mediate between theory and practice. Universities are knowledge producing institutions and the task of SSs is to create a link between the university and the community. SSs also act as an antenna for the university regarding new societal topics which are not yet addressed by NGO's. They pass on knowledge and also deal with the questions that are sensitive, while at the same time share the information with the community (Jorgense, et al., 2004).

Higher education should be orientated towards the future role of students in society outside university. Indeed, one key aspect of university education is to equip students with knowledge which could be used in communities. This observation points to the benefits, and therefore importance, of integrating the concept of SS into HE curricula, as one model of acquiring knowledge through experience (Fokking and Mulder, 2004). Furthermore, one of the most important aspects of learning that the SS provides is being able to transform HE practices, and enable students to gain new forms of knowledge and make use of it in a broader societal context. SS offers a means to combining community and university activity within university curricular (Fokking and Mulder, 2004: 549).

Boyer argues that university campuses are viewed as places where students get credentials and Faculties get recognition, while the overall work of the academics does not seem particularly relevant to the nation's most pressing problems (Boyer, 1996). This assertion means that the involvement of students in SS could ultimately add value to what students have learned, that is, application of theory into practice if they actually work on an actual project in real life. The benefit to students is that research is not exclusively for the purpose of achieving an academic qualification, but part of a bigger picture, not only in their lives but certainly in the lives of others. Since engaging in a SS programme is taken as a learning process for the future of the students, the coach will focus much more on the research process than the content of a research report. In the process, communities benefit as they access university quality research at no cost if the question is coming from the poor communities. Furthermore, the university will be able to evaluate and monitor the processes and functioning of the project – as well as determine whether the needs of the community, students and industries are being met. By meeting the needs of the surrounding community as well as creating well-rounded students, the university will be able to live up to its mandate. Additional research done paid for by the commissioners, might add third stream income to the institution.

Lastly, in implementing SSs, universities will have a direct interaction with surrounding communities – as they reflect on the use of scientific knowledge in the societal problem setting, do research in context, starting from defining the problem to the implementation of results. Working with students and communities in a multi-disciplinary setting, SSs help the stakeholders to link the university, students and communities. At the same time the university will have the benefit of exercising its mission, that is, teaching and learning, research and community outreach or knowledge transfer in relation to society. The supervisor involved in SS programme will have an opportunity to publish more articles from the research done with the community.

2.7 CONDITIONS THAT WOULD SUPPORT THE IMPLEMENTATION OF SS AT THE UNIVERSITY

The success of SSs as a bottom up approach for education renewal in European countries like The Netherlands brought so much change in education and research. Such that the concept of SS spread rapidly to other countries through Europe (Lleydesdoff and Ward, 2005). Bridging mechanisms like SSs at the institutional level can be very useful in developing social integration and community awareness. This section explores the conditions or factors that would support the implementation of SS at Unizulu.

Functionally, SS can be seen as intermediaries that may provide a counterbalance and legitimacy in a context where more commercially orientated technology transfer and science parks are supported for economic reasons, which for many reasons could not have been affordable to the greater community. A reflection of the current state of education may provide us with a variety of elements that may be important for "a new social contract between science and society" from the perspective not exclusively economic (Leydesdorff and Ward, 2005:10). SS practices offer a point of crystallisation where the latent demand for public access to science and technology can become visible, not only as a point of intellectual interest (as in a science museum), but as a matter of interest rooted in social structures – such as NGOs. The clients of SSs formulate a need to obtain access to research capacity, but they provide a kaleidoscope of issues which prepares a student for a civic duty. In this regard, Ernest Boyer challenges HE to reconsider its mission to be that of educating students for a life as responsible citizens, rather than educating students solely for a career (Boyer, in Bringle et al., 2006).

It is envisaged that there is much that universities can do autonomously and at relatively low overhead costs to achieve a degree of modernisation of their curricula. National support is valuable for the networking of SSs and generally facilitating their development and integration in universities. The Unizulu motto says, 'Restructured for Relevance'. Certainly, it stands to both reason and logic that SSs should receive much support at the University in actualising this motto, and as part of offering qualifications that fit within the mandated practical orientation of HE curricula (CHE, 2004). Changes in the University's curriculum to encompass more practical work should have fallen easily and neatly with the notion of SSs. Fields of Study, such as Social Work, Tourism, Law, Hydrology, Science and Agriculture, as well as Education, to name but a few, could similarly have fitted into the SS model of education and training. In other words, the new curricula should become more practice-oriented – focusing on societal issues.

The adoption of SSs, would have necessitated allocation of office facilities to house the SS activities and dedicated staff – such as SS coordinator. In the process, SS project supervision would have been part of the regular staff activity at the University. In principle, the potential for SSs is large. The concept is applicable in all scientific domains where prospects exist to tap into knowledge and skills that can be sued to respond to societal demands (social issues, law, health, etc.). This will increase the problem-solving capacity in these areas and also give an impetus to educational renewal/actualisation in these domains. This way civil society is served, and a practical start is made with education renewal through problem-based learning.

Universities, through SSs, can also play a role in the government activities which target communities which struggle with social issues. Students will have the possibility to volunteer to take part in activities aimed at forestalling the well-being of communities. Moreover, they will be able to exercise their right to be citizens by making the decisions to support the communities. They will have the opportunity, as citizens, to work towards the betterment of the community and to improve the life of all citizens. Besides, the definition of citizenship has broadened. "Rather than service to the political community, citizenship as a concept is also related to specific groups by profession and class and by religious or other groups" (Hodgkinson, 2004: 192). This allows individuals to identify themselves as citizens of the world.

2.8 SUMMARY

Problem-based or problem-orientated learning is not new in education. Its previous approach was how a teacher used techniques during lessons. This has evolved to problem-orientated learning as well as career-orientated learning. In this chapter, the researcher has put together information on how the notion of SSs forms part of the framework and paradigm of cooperative, problem-orientation and service learning. The researcher has shown that SS is a type of learning that can be implemented as an interactive learning strategy at institutions of higher learning. As students and academic staff deals with real life experiences (projects) SS provides students with additional skills that are found outside the classroom.

As Unizulu, situated in a rural environment, transforms itself into a Comprehensive institution it has a very specific responsibility regarding the surrounding communities. The university needs to ensure that these communities are developed and supported. SSs could be the window through which much of the teaching, learning and research could be conducted in concert with the real-life concerns of the surrounding communities. Not doing so, may turn out to be a missed, golden opportunity which would have assisted the University to live up to its espoused motto of "Restructured for Relevance."

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter describes the methodology followed in this research. In doing so, the chapter is arranged into the following sections: introduction, research design, study population, sample and sampling techniques, instruments for data collection, procedure for data collection and data analysis. The chapter also discussed the ethical issues associated with this study, as well as trustworthiness of the research data, transferability, credibility and dependability of the study.

3.2 RESEARCH PARADIGM

The study was grounded within the interpretivist epistemology which recognises multiple realities, and the importance of understanding a situation through the eyes of the participants (Cohen, et al., 2011). The researcher attempted to understand the perceptions of academic staff towards the adoption of SSs as part of the University curriculum, through the meaning and importance that these academic staff members attached to the concept.

The qualitative research paradigm was chosen because it allowed both the researcher and participants to understand, explain, explore, discover and clarify situations, feelings, perceptions, attitudes, values, beliefs, and experiences of a group of people (Kumar, 2011). This research paradigm has an element of purposeful identification of participants whereby the researcher intentionally selects individual participants and sites from whom/which to learn and understand the phenomenon of interest (Creswell, 2014). Moreover, qualitative research uses tools such as individual and focus-group interviews, direct observations, discussions and journals, among others, to gain information on participants. The aim being to engage participants in conversations and discourses that allow their lived experiences, views and opinions to be revealed. Typically, these are recorded and analysed with respect to the research objectives.

Moreover, qualitative research believes that investigating social phenomena should include the participants' points of view or opinion as a way of empowering them (Gikenye, 2012). The qualitative research approach, therefore, recognizes the fact that knowledge creation is not a

monopoly of the investigator and that the participants can also contribute by supplying authentic raw information about their situations or circumstances.

3.3 RESEARCH DESIGN

Research design as described by Kumar (2011) is a procedural plan and arrangement employed in a study to provide answers to research questions and research objectives. Brink et al. (2014) also see research design as the detailed outline and planned procedure pointing to the direction or how an investigation will take place. This direction includes the types of research instruments to be employed, how the data for the study are to be collected and methods/techniques suitable for analysing the research data.

Qualitative research design, using case study, was employed in this study. The researcher used a case study design to look at the perceptions of Unizulu academic staff towards the adoption of SS as part of the curriculum. A case study could be an individual, a group, a community, an instance, an episode, an event, a subgroup of a population, a town or a city (Kumar, 2011). According to Imenda (2006: 29), ‘‘case studies are in-depth investigations into a specific, and relatively small, area of interest, which may be carried out on one individual, several individuals or one group of individuals”. As such, individuals and/or focus group interviews form part of strategies in which views, opinions and perceptions towards an issue, product, service or programme are explored through an open discussion between members of a group and the researcher. The case study approach therefore, allows the researcher to “learn” about the phenomenon that provides voice to individuals, particularly where the research uses typical sampling techniques (Creswell 2014 p.22). Furthermore, Imenda and Muyangwa (2006) aver that a case study allows the researcher to gain information by interviewing individuals as well as studying historical documents to gain more insight into the area of interest.

Qualitative research uses tools such as audio recordings, note taking, interviews and focus groups for the purpose of gaining information from the participants. The researcher chose the qualitative research approach so that she could extensively engage the participants in discussions with an intention of eliciting enough information about ‘perceptions of Unizulu academics towards SS’’. The outcome of the case study would be putting together data collected which might throw some light on certain conditions that might have prompted the researcher to carry out the study (Imenda 2006).

According to Babbie and Mouton (2007), a qualitative research approach has the following benefits:

- The research occurs in a natural setting of the participants; the researcher conducted the study at the University of Zululand in a relaxed environment for the participants, which made it easy for the researcher to illicit information from the participants.
- The qualitative research looks at the process instead of an outcome; the researcher aimed at finding the perceptions of the academics towards SS.
- The research process uses an inductive approach; the researcher allowed the study to unfold and came up with conclusions at the end of the study for further investigation.
- The researcher is seen as the main instrument in the research process; the researcher planned the whole scenario from inception up to the end of reporting the outcomes of the study.

3.4 TARGET POPULATION

Population in a study refers to the entire elements that meet the criteria for inclusion in a study (Burns and Grove, 2003; Olaniran, 2017). McMillan and Schumacher (2014) also view population in a study as elements that match the exact criteria in a study, and to which the researcher aims to generalize the result of a research. The researcher conducted her study at the University of Zululand, located in KwaDlangezwa, KwaZulu Natal Province of South Africa. Since the study aimed at investigating the perceptions of the University's academic staff on the adoption of the SS concept into the curriculum, the study population was drawn from the academic staff members from the four Faculties, namely Arts, CAL and Law, Education, and Science and Agriculture. Moreover, academic staff members who participated in the NUFFIC Project that gave birth to SSs served as the target population for the study.

3.5 SAMPLE AND SAMPLING TECHNIQUE

Sampling in a research could be categorised into two, i.e. probability and non-probability. Probability sampling looks into the probability that any element or member of the population could be included in the sample, while in non-probability sampling the researcher cannot specify this probability (Welman, Kruger and Mitchele, 2005).

The purposive sampling technique was employed by the researcher in selecting the sample for this study. Purposive sampling allows a researcher to select his/her participants based on his/her personal judgements (Patton, 2002). This sampling technique helped the researcher to select participants who were informative about the matter being studied (McMillan andSchumacher, 2010: 138). In other words, the researcher selected the research sample from the lecturers who had been exposed to SS training and had participated in the SS pilot study in 2010. This selection cut across the four Faculties, namely Arts; CAL, Science and Agriculture and Education. Training was conducted by the Wageningen University and Research Centre facilitators to equip participants with requisite knowledge to understand SSs, and skills for the implementation and administration of SS. The total number of academic staff involved in the study was nine (9), and they served as the participants for both the questionnaire and focus group discussion

3.6 DESCRIPTION AND SELECTION OF PARTICIPANTS

After permission to conduct the study was granted by the research office, letters of invitation to participate in research study were sent out to the targeted participants. A sample of nine (9) academic staff members from the four faculties were invited to participate in the focus group interviews. That is, four (4) from the Faculty of Education, three (3) from the Faculty of Arts, two (2) from the Faculty of Science and Agriculture and one (1) from the Faculty of CAL. Another member from the Faculty of CAL was unable to participate in the focus group interview because she was writing examinations at the time the interview was to take place. The target population was seen as a rich source of information to undertake the interview because they had been trained in SSs programme and were leading different students' groups during the pilot study of the programme.

3.7 DATA COLLECTION INSTRUMENT

A semi-structured questionnaire and focus group interview guide were used as instruments to collect data for the study. The purpose of the focus group interview was two-fold: (a) to tease out additional information from the participants as well as (b) triangulate information collected through the questionnaire. Furthermore, historical documents (NUFFIC project reports) were consulted to verify dates, information given out by the participants.

The researcher requested the participants to complete a biographical data questionnaire in order to collect background information from the participants in terms of age, gender, level of education and experience in teaching, as well as work experience elsewhere, experience with the NUFFIC project and SSs.

The semi-structured interview schedule (See Annexure B) developed was based on the training of the SS programme that academics received through workshops. Furthermore, the researcher gained additional insights on the topic from the literature review, which resulted in the formulation of questions which, in turn, led to robust discussions among participants. The intention of the researcher was to gain insight on how Unizulu academics perceive SS, and what factors could influence integration of SS into the university curriculum.

For each focus group interview, the researcher explained the purpose of the study and assured the participants that their responses in the session would be treated as confidential as possible. Each participant was requested to complete a consent form. The completed forms were collected by the research assistant and returned to the researcher. After that focus group interviews were conducted (See Annexure B) throughout this process the researcher took into account the ethical issues underpinning the study.

3.8 DATA COLLECTION PROCEDURES

The researcher used a digital voice recorder to capture the voices of the participants during the focus group interviews. A set of questions which captured the objectives of the study were also prepared in a questionnaire format to elicit further information from the participants.

Focus group interviews are economical on time, producing a large amount of data in a short period of time. However, they tend to produce less data than interviews with the same number of individual on a one-to-one basis (Cohen, et. al., 2011). The researcher formed focus groups of three (3) to two (2) members per group based on the level of exposure in the training of SS. Ranging from the academic staff members who were trained from the inception phase of the project to those who joined later and had the opportunity of being trained on the SS programme. Both these academics formed the group of participants that were interviewed. Overall, the groups were a mixture of representation according to Faculty and Departments.

3.9 VALIDITY AND RELIABILITY

Validity is viewed by Brink et al. (2013) as the extent to which an instrument measures what it intends to measure, while reliability is a way of ensuring that an instrument designed for a study is of good quality (Kimberlin and Winterstein, 2008). According to Kumar (2011) the concept of reliability in relation to research has the same meaning when we say that a person is reliable. A person is reliable when he is consistent, predictable, dependable, stable and honest. Hence a research a tool is said to be reliable if it is consistent, stable, predictable and accurate. Therefore, should there be a need to run similar investigation under same conditions it would yield similar results.

3.10 DATA ANALYSIS

Data collected from the field work were analysed qualitatively and thematically using content analysis method. Content analysis, according to Terry College of Business (2012) is a research method used to make replicable and valid inferences by coding and interpreting textual material. The demographic data of the participants were presented in tables with graph illustrations of each data set on the table. However, the qualitative data which came from the verbal responses of the participants were coded thematically and presented with comprehensive discussions of each of the interview responses, with justifications from the previous studies

3.11 ETHICAL CONSIDERATIONS

Research study approval

According McMillan and Schumacher (2006) considerations should be sought and permission given before commencing a study. The researcher wrote a letter to the Deputy Vice-Chancellor Research (DVCR) with an aim of obtaining permission to conduct to research. A letter of permission to conduct the study was obtained from the University of Zululand Research Ethics Committee in response to the letter seeking permission. After the approval to conduct the study, the researcher sought permission and consent from the participants that she identified for the study; only lecturers who had been exposed to SS training across the four faculties were selected.

Informed consent and confidentiality

The researcher adhered to the ethical standards of research before the study commences. Participants were informed about all aspects of the research before the start of every interview session. Individual participant's informed consent was sought and participants were assured of confidentiality and anonymity. An informed consent letter was sent out to all participants. The letter outlined the purpose of the study and why the participants were chosen to participate in the study.

To abide by confidentiality and anonymity in the study, the participants were assured that no personal information would be made available to any third parties. In addition, comments made during interviews would not be attributable to a particular individual by name. This gave participants confidence in volunteering to participate in the study. The researcher further made an undertaking that should there be circumstances that would arise and impact on the researcher's ethical obligations, the researcher would be obliged to disclose them to her supervisor, and appropriate action would be taken in terms of the relevant university policies, rules and procedures.

The researcher confirmed the accuracy of the data transcripts from the focus group with focus group members by doing member checks (Babbie and Mouton 2006: 277).

3.12 SUMMARY

This chapter outlined the research paradigms and design used for the study, population and sampling technique as well as the ethical issues considered while carrying out the research, which include the principle of anonymity and confidentiality as well as securing permission from the university and participants before the data collection exercise. Research objectives justified the use of the qualitative interpretative methods in the study. The data-collection instrument used was a questionnaire with both structured and open-ended questions. Focus group interviews were also used. Data for the study was collected from a selected sample of academic staff members of the University of Zululand. The data were analysed and interpreted thematically using content analysis technique.

The next chapter presented data analysis and interpretation as well as discussions of the major findings.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 INTRODUCTION

This chapter presents the analysis of data collected during field work. The specific objectives of this study were:

- To determine the perceptions of Unizulu academic staff on the concept of Science Shops (SS);
- To investigate the academic staff's perceptions on the possible adoption of Science Shops as part of the University's curriculum offerings;
- To explore challenges that may have prevented the academic staff from implementing Science Shops in their Faculties; and
- To explore conditions or factors that would support the implementation of Science Shops at the University.

Data for the study was collected through questionnaire and focused group interviews conducted for the participants who are academic staff members at the university. The questionnaires were administered to a sample of ten (10) participants consisting of lecturers from the four faculties of the institution, namely; Faculties of Arts, Education, CAL, and Science and Agriculture. The academic staff members that served as respondents for the study were purposively selected because they participated in the training on Science Shops.

4.2 ANALYSIS AND PRESENTATION OF DATA COLLECTED THROUGH QUESTIONNAIRE

4.2.1 Demographic Data of the Respondents

The demographic characteristics of the participants featured in the questionnaire included gender, academic and professional qualifications, content specialisations, years of teaching experience at Unizulu, and previous years of work experience before joining Unizulu. The participants were asked to state their biographical data with the aim of determining whether demographic characteristics of participants had anything to do with their perception and interest in community intervention strategies and programmes like SSs. Since community service is one of the three core services of the University, besides teaching and research, it was

envisaged that the academic staff members' content areas of specialization and years of teaching experience may have affected their views about the role of SL at the University. On the question of teaching experience, the researcher wondered as to whether or not the younger and less experienced academics thought differently about the concept of SS, compared to the more experienced academic staff.

Studies have highlighted various reasons why universities must promote community engagement programmes among both staff and students (e.g. Vogelgesang and Astin, 2000). These reasons include:

- enhancing personal and communication skills of the student
- creating strong bond between the university and the host communities
- helping the students acquire work-related skills prior to graduation
- creating platforms for institution's academic members to put theory into practice

Taken individually and collectively these are, indeed, good reasons for pursuing instructional strategies that promote community engagement programmes.

4.2.2 Gender of the participants

The gender composition of the academic staff members who participated in the study is presented in Table 4.1 and Figure 4.1.

Table 4.1 Gender distribution of the respondents (n= 10)

Gender	Frequency	Percentage
Male	03	30
Female	07	70
Total	10	100

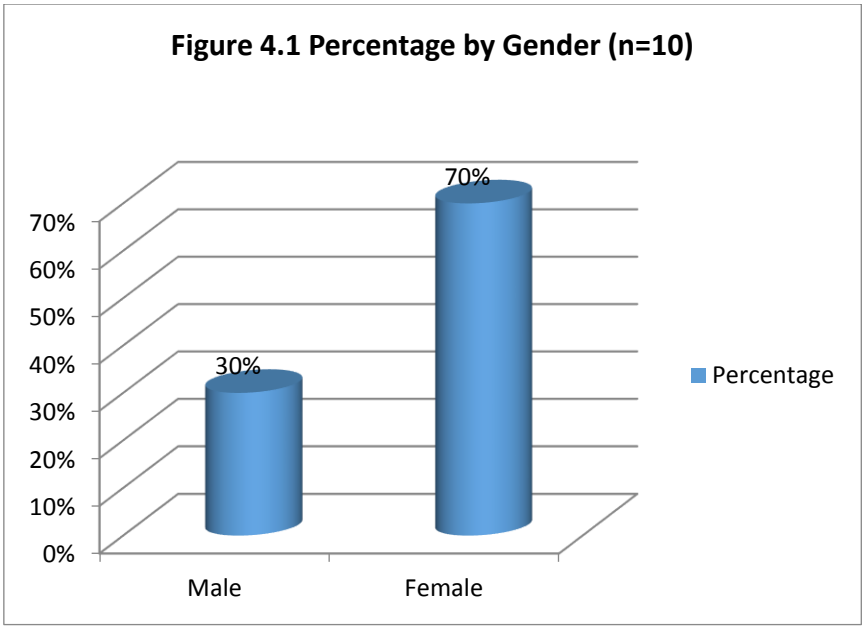


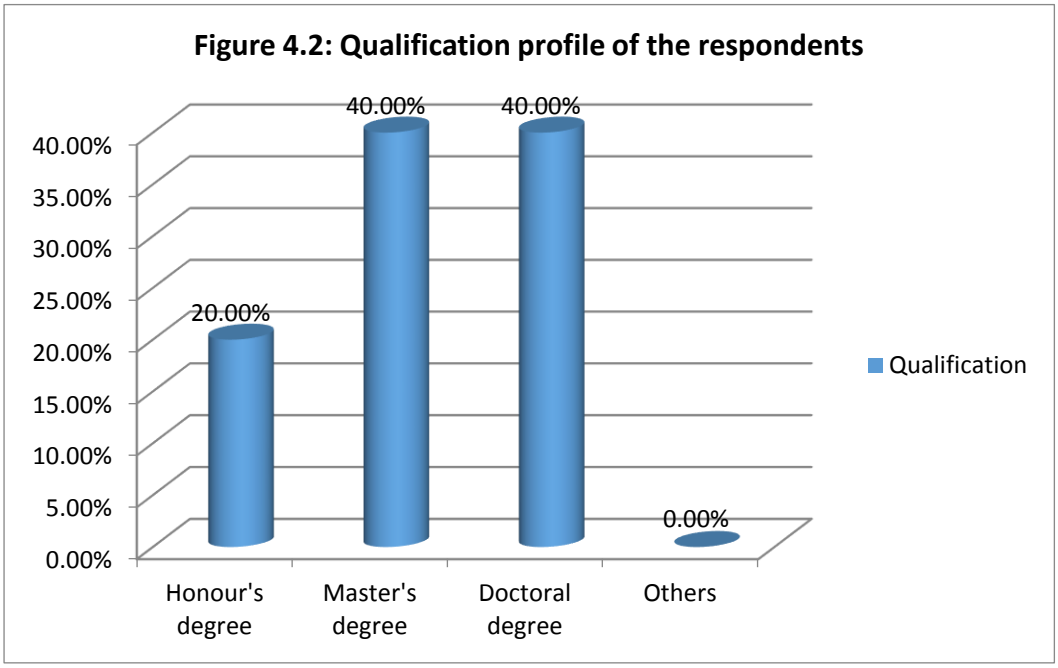
Table 4.1 and Figure 4.1 revealed that seventy percent (70%) of the sampled academic staff were female, while the remaining thirty percent (30%) were male. Female respondents formed the majority of the study participants because female lecturers participated in the Science Shops training more than their male counterparts, and this is very interesting part of the study as the result is a major shift to the findings of previous studies which revealed that male lecturers tended to show more interest in community engagement than their female counterparts (Schmidt, Shumow and Kackar, 2007; Archibong et al,2010; Perkmann et al, 2013;Chung et al, 2015)

4.2.3 Qualifications of the participants

Table 4.2 shows the participants' qualifications. From the table, twenty percent (20%) of the academic staff who participated in the study held honour's degree, forty percent (40%) of staff held Masters' degree, followed by another forty percent (40%) who held Doctoral degree qualifications. The implication of this result is that the majority of the academic staff members that participated in the study had the required qualifications to teach at the university level, thus their participation in the study.

Table 4.2: Qualification levels of the respondents (n-10)

Qualification	Frequency	Percentage
Honour's degree	02	20.0%
Master's Degree	04	40.0%
Doctoral degree	04	40.0%
Others	00	0.0%
Total	10	100%



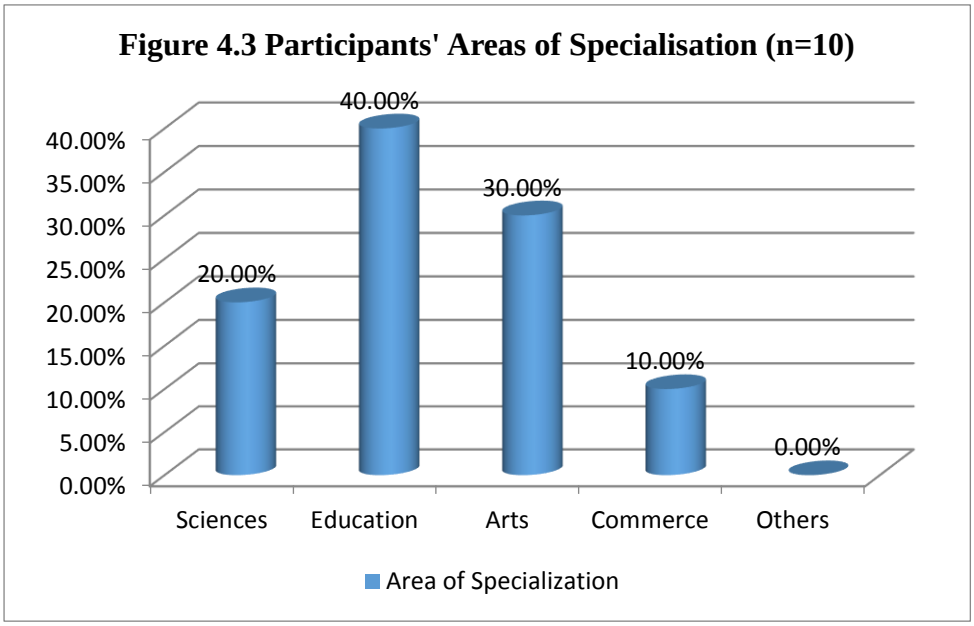
4.2.4 Specializations of the participants

The participants' academic fields or areas of specialisations are presented in Table 4.3 and Figure 4.3.

Table 4.3 Areas of specialisation of respondents (n=10)

Field/Specialization	Frequency	Percentage
Science	02	20
Education	04	40
Arts	03	30
CAL	01	10

Total	10	100



As highlighted earlier, the University of Zululand, where the study was conducted, consists of Four Faculties, namely; Arts, Education, Science, and CAL. Table 4.3 and Figure 4.3 show that forty percent (40%) of the participants came from the field of Education, thirty percent (30%) from Arts, twenty percent (20%) from Natural Science and Agriculture, while the remaining ten percent (10%) came from CAL.

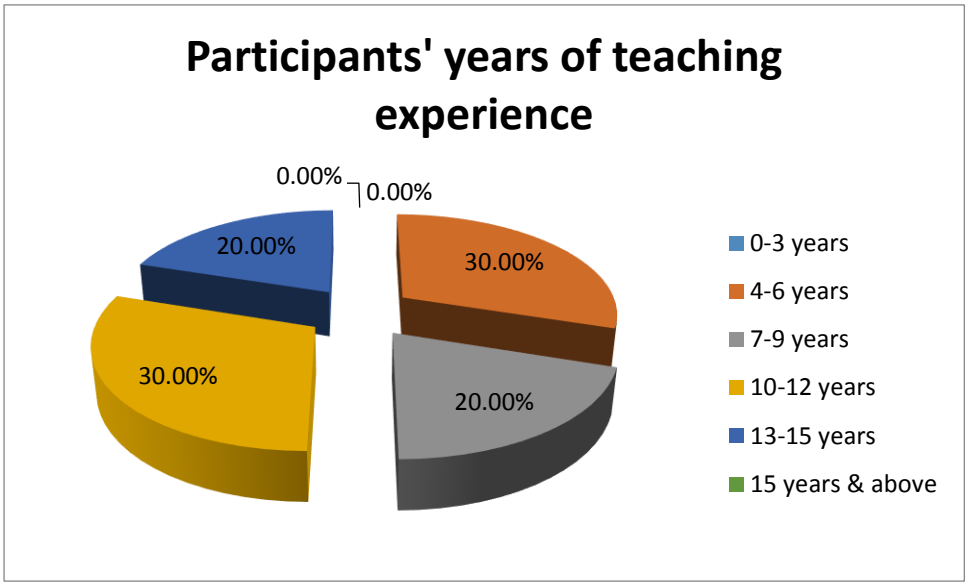
4.2.5 Years of teaching experience

The number of years of teaching experience of the participants in the university was also considered as one of the major demographic variables in this study, on the basis that this could have influenced their perceptions of community engagement activities in one way or another. The profiles of the respondents with respect to their years of teaching experience at the University are presented in Table and Figure 4.4.

Table 4.4: Participants' years of teaching experience (n=10)

Years of Teaching Experience	Frequency	Percentage
0-3	00	0.0
4-6	03	30
7-9	02	20
10-12	03	30
13-15	02	20

Total	10	100



The data displayed in Table 4.4 and illustrated in Figure 4.4 show that thirty percent of the research sample had 4-6 years of teaching experience with the university; another thirty percent (30%) had between 10 and 12 years of teaching experience; twenty percent (20%) had 7-9 years of teaching experience, while twenty percent (20%) had 13-15 years of teaching experience. Therefore, looking at the number of years the respondents had been working at the University, one can say that the majority of the respondents had a good knowledge of the university system and the surrounding communities.

4.2.6 Years of working experience before joining the University

The participants' years of work experience outside the University of Zululand was also considered as a possible factor which could have influenced the respondents' disposition towards the concept of SS. This information is presented in Table 4.5 and Figure 4.5.

Table 4.5: Participants' years of working experience before joining Unizulu (n=10)

Years of Teaching Experience	Frequency	Percentage
0-3	01	10
4-6	02	20
7-9	01	10
10-12	01	10
13-15	05	50
Total	10	100

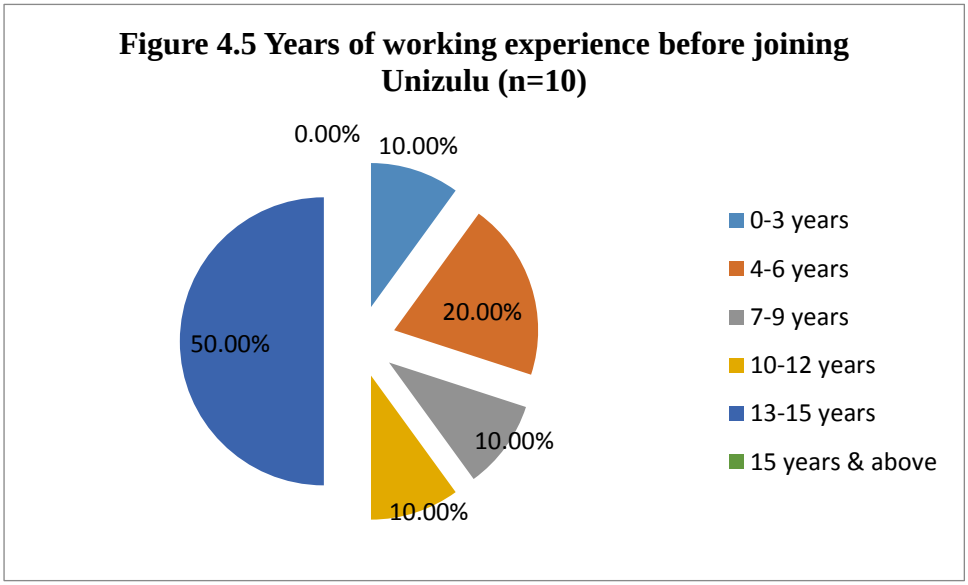


Table and Figure 4.5 show that half of the academic staff who participated in the study (i.e. 50%) has up to 13-15 years of work experience before joining the University of Zululand. Furthermore, twenty percent (20%) of the respondents had 4-6 years of work experience; ten percent (10%) had 7-9 years of working experience; another ten percent (10%) had 10-12 years of experience, while the remaining ten percent (10%) had 0-3 years of work experience prior to joining the University.

4.3 ANALYSIS OF DATA ACCORDING TO RESEARCH QUESTIONS

Questions were mainly set in the questionnaire in order to get the raw and more comprehensive responses from the participants concerning the various research questions which guided this study. In order to give voice to the respondents, most of the questions were open-ended. Reja et al. (2003) notes that open-ended questions are more advantageous in comparison to closed-ended questions in a questionnaire because they allow the study participants to add more

information, personal feelings, attitudes and understanding of the subject matter which enables the researcher to get the true feelings of the respondents on the subject or issue being addressed. Open-ended questions in a questionnaire also permit an unrestricted number of possible responses or answers, and participants can respond in detail with more clarifications (University of Waterloo, 2017).

4.3.1 Participants' Perceptions about the Concept of Science Shops

There were two open-ended questions in the questionnaire which attempted to solicit answers to the first research question. The first one asked the respondents to explain their personal involvement with the NUFFIC Project, in the process stating what they considered to have been the 'highs' and 'lows' of that experience. In response to this first question, most participants explained that they interfaced with the Science Shops Project by taking part in the training that was offered in which the concept of SSs was introduced. From the preliminary workshop participation, some of them went further and did more training in Research Methodology, which was really the main vehicle through which SSs were to operate. Table 4.6 gives a summary of the participants' verbatim responses to the first open-ended question in the questionnaire.

Table 4.6: Participants' personal involvement with the NUFFIC Project (n=10)

S/No.	**Gender**	**Faculty**	**Participants' Responses**
1.	Female	Education	I served as a member of the NUFFIC project, and I gained a lot of information through the workshops, and through the engagements I had with other colleagues that participated in the programme
2.	Female	Education	The high side was the workshop on project management which opened my eyes and minds to the pros and cons of project management
3.	Female	Arts	I attended a number of amazing workshops where I ended up translating documents from English to Afrikaans, though it was difficult to keep up with the speakers.
4.	Male	Science	I attended a number of training/workshops, though as a student then, and the readiness of the students from Netherlands and commitment of staff was so amazing.

5.	Female	Education	I was trained for the programmes on Academic cluster and Science Shops. I enjoyed every bit of the training.
6.	Female	Arts	I participated in the programme from the inception. I enjoyed the training programmes on PEN and SL. I also learnt a lot from the training sessions on development of study programmes
7.	Female	CAL	I like the fact that the project created a robust platform for student involvement. I see the introduction to action research as the high side of the project, and lack of capacity to implement most of the ideas received from the training as the low side.
8.	Male	Arts	I participated in the workshops and training as a student, though I joined it late.
9.	Female	Education	I was part of the committee members for the project. Attending the workshops and actively participating in the training was very interesting for me.
10.	Male	Science and Agriculture	I was involved in the preparation of the VPA toolkit and I also received training in a course in Research Methodology in the Netherlands.

Table 4.6 shows that the majority of the respondents actively participated in the project, both as members of the planning committee and as co-facilitators in the training and workshops. The opportunity for robust discussions and collaborations among the academics and students, as highlighted by Participants 1, 4 and 7, as one of the unique elements of the SS project. As the main highlight, the participants were happy that the project gave them a platform to interact and share meaningful ideas with other participants. They found this to be beneficial to their personal, professional, and societal developmental situations. Leydesdorff and Ward (2005) also view such forums where academics are given an opportunity to come together and discuss social/community issues as very useful. They saw such opportunities as affording them time, place and space for rigorous debates that are needed for collaborations between science and society. It is also clear from the table that majority of the respondents identified with the ‘‘high sides’’ – that is, the benefits of the Project, more than with any ‘‘low sides’’ – that is, with any shortcomings.

However, from the point of view of ‘diffusion of an innovation’ (Borrego, et al., 2010; Rogers, 2003; Starkweather and Kardong-Edgre, 2008), one may say that more needed to have been done. Looking at the experiences reported in Table 4.6, against Rogers’ five stages through which an innovation passes, the first four stages may have been achieved, namely awareness,

interest, evaluation and trial-making. However, the final step of adoption eluded the project. There could have been many reasons for this, including stages 3, 4 and 5 of Starkweather and Kardong-Edgren, namely decision-making about possible adoption, implementation and confirmation (Starkweather and Kardong-Edgren, 2008: 2). It is possible that the academic staff who participated in this project did not have the authority to make any decisions concerning changes to the curriculum.

The second open-ended question for this section sought to solicit the participants' overall impressions of SSs as a teaching and learning strategy. From the responses, all the participants expressed positive feelings and impressions about Science Shops; that the approach was an effective teaching and learning strategy (see Table 4.7).

Table 4.7: Participants' overall impression of SSs (n=10)

S/No.	Gender	Faculty	Participants' Responses
1.	Female	Education	Science Shops provide opportunities for both students and academic staff to improve on their research activities.
2.	Female	Arts	Learner centeredness and integrative teaching approach of the programme. Also, the transformative method which encourages participation by learners
3.	Male	Science	I would say Science Shops is the ''Best teaching tool/strategy ever''
4.	Female	Education	It was an 'eye-opener' into the concept and idea behind action research and problem-solving oriented programme
5.	Female	Education	A good strategy that relate/connect theory with practice
6.	Female	Arts	A good teaching and learning strategy that puts students at the centre of teaching and learning.
7.	Male	Arts	It is a strategy that helps the academic to facilitate and simplify teachings for students
8.	Female	Education	It encourages active participation of students
9.	Male	Science	It is a powerful tool that connect higher education institutions with their host communities to foster problem-solving oriented research
10.	Female	CAL	It exposes students to critical thinking and reasoning.

From the data presented in Table 4.7, the respondents particularly identified learner-centeredness, integrative and collaborative aspects of the SS teaching strategy as making the

approach to be quite desirable. The respondents also pointed out that this approach was good for building bridges between the institution and the communities, and between theory and practice; that the teaching strategy promoted the development of critical thinking and problem-solving skills. According to the participants, these attributes made the SS programme to be an interesting and engaging academic adventure for both university students and academic staff.

Within the context of triangulation adopted in this study, focus group interviews were carried out in order to get further elaborations on the responses obtained from the questionnaire. From the responses obtained from the focus group interviews, it is clear that the participants held very favourable perceptions about SSs. In the focus group interviews the participants were asked the following direct question: response to the question during the focus group interviews were captured verbatim below: *What is your perception about the Science Shops Programme?* The following verbatim responses were obtained:

> *For me it is a good and beneficial programme because I didn't understand anything about action research before and we got to know about it* (F1, Education).
>
> *I think the concept is good, and it was going to be our niche area in the University. If you look at the multidisciplinary nature of the programme, especially the involvement of students in their own learning. To me, that makes it an excellent programme to be adopted* (F1, Arts).
>
> *Having attended the workshop, and observed, I think SS is a good concept that the university could have embraced because it has a component of engaging with industries and companies that could foster collaboration and assist in generating extra income for the university* (M1, Science and Agriculture).
>
> *Science Shops programme perfectly fits into the rural based university like Unizulu, and help people to highlight the problem in the community. It is viable, the rurality of the university makes it more relevant for SS programme* (F2, Education).
>
> *SS is a practical approach to getting students engaged in addressing problems. It encourages active involvement and communication among the groups. It also assist students to integrate the theory into practice. It is very fascinating to students.* (F3, Education).

Science Shops is a unique project that should be embraced by the management to restructure the university for relevance (F2, Arts*).*

This SS concept is relevant to all the three pillars that a university is expected to serve which are teaching, research and community engagement. (M, Arts).

As my colleagues have said, Science Shops came up with strategies of responding to the challenges within our communities by coming out with solutions from the university (F4, Education).

Science Shops embraces participatory teaching, learning and action research, and for this reason it takes care of everything that a student will need to be a lifelong learner (M2, Science and Agriculture).

My personal experience as someone very new in the system, it was an orientation for me, something which would have been more meaningful if SS is introduced early to all students. It made me to understand what relationship should exist between lecturers and students, between lecturers and students to community, and the role the university in general should play in uplifting the host community (F1, CAL).

As revealed in the verbatim remarks highlighted above, all the participants had a good perception about the SS programme. They reflected the same strengths and benefits of SSs which were revealed from the analysis of the questionnaires, namely the participatory approach to teaching and learning, students' involvement as well as its problem solving oriented strategies as the major benefits of the programme. One of the participants particularly emphasized the fact that the University of Zululand was located in a rural setting, and therefore, that the SS approach could improve the socio-economic status of the rural communities around it. This view accords well with UNESCO's notion of 'the social function of the university' (UNESCO, 2005). Similarly, Czuba (2005) also points out that universities must prioritise community engagement programmes, just as they usually do for teaching and research, because it contributes significantly to social progress, political emancipation, economic growth, spiritual or cultural advancement of individuals, groups, institutions or the community.

Nonetheless, other circumstances could have weighed heavily against the full adoption of this innovation – such as (a) SS's relative advantage over the status quo, (b) compatibility with the

ongoing curriculum, and (c) complexity of the SS concept (Starkweather and Kardong-Edgren, 2008: 2). Changing from an established way of things to a new dispensation often requires a lot of energy and commitment, which appear not to have been associated with this project.

Therefore, the answer to the first research question is that the participants perceived SSs as a good programme that would help the university achieve its aims and objectives as revealed in the university motto 'Restructured for Relevance'.

4.3.2 Participants' Perceptions about Adopting Science Shops as Part of the University's Curriculum Offerings

The second research question of this study sought to find out the participants' perceptions and views about the possible integration of Science Shops into the curriculum of the university. In their responses, all the participants held favourable perceptions and views about the adoption of SSs to be part of the University's programme offerings (see Table 4.8).

Table 4.8: Participants' perceptions about making SSs part of the University curriculum (n=10)

S/No.	Gender	Faculty	Participants' Responses
1.	Female	Education	Science Shops will assist the students to link theory with practice. It will also create opportunities for the university to give back to the host communities
2.	Female	Arts	This is a good idea which I think the management and staff of the university should keen into.
3.	Male	Science	This will contribute immensely to the capacity growth and development of the university students, in terms of application of theories into practice
4.	Female	Education	It will contribute meaningfully towards the development of the host communities
5.	Female	Education	It helps learners in applying theoretical knowledge to solve real-life problems
6.	Female	Arts	It will create independent and socially responsible learners

7.	Male	Arts	It will assist both students and lecturers in the university to develop independent thinking. It will also encourage innovation.
8.	Female	Education	The move to integrate the programme into the curriculum must be supported by the major stakeholders in the university
9.	Male	Science	Science Shops can assist the university in generating third stream income.
10.	Female	CAL	It is an ideal state of becoming if the leadership of the university is committed to it.

According to Table 4.8, the participants favoured the adoption or integration of Science Shops into the University's curriculum offerings on the strength of the benefits identified above, namely assisting both the University students and lecturers to translate theory into practice, develop critical and problem-solving skills, encourage independent thinking, strengthen the links between the University and surrounding communities, cultivate the spirit of social responsibility, and promote innovation and creativity within and outside the university community.

From the focus group interviews, where the respondents were asked to state which aspects of SSs should be adopted as part of Unizulu's curriculum, the following verbatim responses were obtained:

> *Research, project based teaching and learning, project management, event coordination. Student teachers were taught how to assist high school students to solve problems within their communities*. (F1, Education)

> *The concept is more relevant to community engagement because the objective of Science Shops accommodates community engagement, especially in our university which is rural based. For instance, in my Department we have a module on rural development, and this SS concept can be integrated into it.* (F1, Arts)

> *I still try to use the recorded videos to teach students but that was when we have the projectors in the classrooms. I also think participatory action research part of the SS can be adopted into our curriculum.* (M1, Science and Agriculture)

Community engagement part of the programme is unique. Universities need to get involved in what is going on in the community. (F2, Education)

As Faculty of Education, we are expected to be communicating with our community, to go out there and find out what their problem are rather than just go there to get information because we want to write a paper (F3, Education)

The element of community engagement of the programme makes it unique; especially it will make people to look at the university not only as an ivory tower but a place where solutions to community problems will be sought. (F2, Arts)

Science Shops also accommodates student who are slow learners because of its simple approach to learning because it is more practical in nature as you can adopt practical approach like demonstration in class for student to understand. (M1, Arts)

When our students go for teaching practice, we need to make them identify problems within the community and write a kind of problem statement. I think our students do Teaching Practice (TP) in isolation of the community and we need to change that (F4, Education).

I think the student engagement attribute of the programme, as it was done in Netherland, is unique. Though our students are not that matured as those in Netherland. (M2, Science and Agriculture)

I said I will never give my student multiple choice questions because it doesn't bring out their thinking skills, in terms of how people could be developed, creative thinking, preparing them for the outside world, practical skills, giving students case study. I have been applying these in my classes. (F1, CAL)

The attributes of SSs which appeared so common in the responses of all the participants were project-based teaching, project management, communication skills, critical thinking and reasoning skills, and student engagement strategies. All the participants were of the view that students would be better prepared as agents of change in their respective communities and the nation at large if SSs were integrated into the curriculum of the University.

As a follow up question, the participants were asked to comment on the workshops that had been conducted, introducing the SSs. In response, the respondents had the following to say:

> *It was very informative and practical. We understood the practical part of action research. It was also conducted by people who had experience, so it was beneficial. I got to know about the skills that are relevant to action research such as investigative skills, communication, working with grassroots community people*. (F1, Education)

> *The workshop was good. It promoted the spirit of team work and collegiality among all the academic staff that participated*. (F1, Arts)

> *I think the workshop were sufficient enough to promote and ensure that we see the need to solve community problems from the university and all the people that attended the workshop could testify to that.* (M1, Science and Agriculture)

> *It was of high quality, they exposed us to different strategies of Action Research. I believe the skills learnt made us to be able to acquire problem solving skills, visual problem appraisal*. (F2, Education)

> *Very practical in nature. It assisted us and guided us to be able to device practical ways to solve issues. It enables us to assist and interact with each other. It is necessary as teachers to conceptualize where exactly the learner will benefit*. (F3, Education)

> *The workshop was very informative to both staff and students. To staff because they were exposed to vital information. Students gained communication and presentation skills and we would like to have more of such workshops.* (F2, Arts)

> *I like the fact that, with SS, you do not work in Silo but in multidisciplinary group with multi-members. The workshops also exposed us to different methods of approaching teaching and learning process. It fosters partnership*. (M1, Arts)

> *The workshop on project management was so interesting to me. It exposed me to different strategies of responding to problems, like putting the problem that belongs to education together, the one for health and take them to the right Department*. (F4, Education)

The workshop facilitators were skilled enough to do that. The facilitation was okay, though it was a new concept to me and the turnout was impressive. (M2, Science and Agriculture)

The location of the workshop was well planned, no distractions. It was well organized. The topics were stimulating, and delivered by various academics who are experienced. I felt not excluded. It makes people to learn from each other. (F1, CAL)

All the participants expressed their satisfaction with the workshops that were conducted which introduced them to the merits and demerits of SSs. A female participant from the Faculty of Education identified project management as the most beneficial aspect of the workshops to her; that project management further enlightened and empowered participants with the necessary skills and knowledge to execute a project. Action research was another important aspect of the workshop that the participants identified as an area of interest and benefit to them. In addition, some of the participants reported that the workshops gave them an opportunity to network and collaborate with colleagues from the same university and those from outside the University.

The above follow-up question led to another one where the participants were asked to identify the aspect of the workshop which they liked the most. To this question the participants answered as follows:

Rubbing shoulders with people that are knowledgeable in the field, we were free to express ourselves freely. The networking aspect was superb as we were able to meet colleagues from other universities; this was an aspect that was really beneficial to me. We understood the way people did things in their institutions. (F1, Education)

It was the research part. Science Shops helped by introducing a new approach to research by having a content supervisor, and a project supervisor. This is something that is not common in our research today. Which means SS is a very innovative concept. (F1, Arts)

I think it was beneficial to the university in two different ways. First of all, it helped the University to expose students to various problems in their communities and applying a research element to a real-life situation. Secondly, we have been called a Comprehensive University but we have not even become a comprehensive university

yet. One of the main pillars of a comprehensive university is community engagement. Science Shops could help us to play that role very well as community people always look up to the University but the University has so far let them down. (M1, Science and Agriculture)

Student presentations, meeting the community, knowing people. Through SSs I got to know a lot of people, and who does what in the university. It was very interactive, especially interacting with the international community. (F2, Education)

The problem-based focus of the workshop. Our students are used to memorising without fully understanding how to apply the content in context. Science Shops incorporate theory with practice and also make one realise that there is no one answer to a question. Students don't think outside the box unless they are taught how to do so. (F3, Education)

SS is a way of dealing with large numbers of students in class. University can as well restructure the classrooms to make the lecture interactive. (F2, Arts)

I like the fact that it was very interactive and student centred. It fosters participatory approach to learning. (M1, Arts)

Active participation and engagement of the programme as one had to write and do things. When students are active, they learn more about the participatory approach to learning. (F4, Education)

For me I think Science Shops is part of the development-oriented programme that will make us go forward as a university. I am sure the students would get along with the programme quickly because they will also be involved in the teaching/learning process. (M2, Science and Agriculture)

It unpacked the community engagement concept. When I joined the University, the following week was the week the workshop was introduced, and it was an eye opener for me. I had a clear understanding of community engagement after the workshop. (F1, CAL)

The problem-solving techniques, learner-centredness and active participation/engagement were mostly identified by all participants as what they loved most about the programme. The one participant from the Faculty of CAL referred to the first SS workshop she attended as having unpacked the community engagement concept for her. Overall, the responses of all the participants towards SSs showed that they were fully ready for the programme, which they believed will further bring them closer to the communities that surrounded the University. Thus, to answer the second research question, it may be said that the participants held the view that the adoption of SSs would strengthen the University's curriculum offerings; that such a step would firmly and favourably anchor the University in respect of action research, and in responding positively to the pressing problems facing surrounding communities.

4.3.3 Challenges that Could Impede the Adoption of Science Shops at Unizulu

The third research question of this study was reflective in nature. It sought to establish why it may not be possible to adopt SSs to be part of the University's curriculum offerings, despite the preparations, training and espoused benefits of this innovation. In responding to this question, large class sizes, logistics and changing the mind-sets of both lecturers and students to accept the concept. Several of the respondents did not think there would be any problems adopting this innovation. One even went as far as to suggest that a "unit" would have to be established to oversee the integration and implementation of SSs at the University. Table 4.9 gives a summary of the responses of the participants.

Table 4.9: Factors impeding the adoption of SSs (n=10)

S/No.	Gender	Faculty	Participants' Responses
1.	Female	Education	Reduction in class size as working with a large class on this project will not be effective enough. There is also a need to train the new university lecturers and those who were not involved initially.
2.	Female	Arts	No major challenge, if all the stakeholders can be positive, although numbers can be a problem
3.	Male	Science	The biggest problem is in the logistics management
4.	Female	Education	I don't foresee any problem because science shops encourage community service which is one of the 3 pillars of any university

5.	Female	Education	The challenge I see is how to streamline the university curriculum to accommodate Science Shops
6.	Female	Arts	Integration into the curriculum, change of mind set of some lecturers are what I see as challenges that needs to be addressed
7.	Male	Arts	Some lecturers do not understand this new approach to teaching and learning, so there is need for them to be trained.
8.	Female	Education	I do not see any major problem
9.	Male	Science and Agriculture	The challenge would be to develop a unit to oversee the running of the programme and staffing
10.	Female	CAL	Getting students along in this project may be a bit challenging

In response to a general invitation to the respondents to share with the researcher anything that they considered important in relation to the subject under investigation, a number of suggestions emerged – ranging from the need to develop an enabling policy framework to the training of staff. These are summarised in Table 4.10.

Table 4.10: Suggestion on how SSs could be integrated into the University's curriculum (n=10)

S/No.	Gender	Faculty	Participants' Responses
1.	Female	Education	We also need to think on the benefits the project will bring to us as an institution
2.	Female	Arts	I think more staff must be trained and empowered to adopt this strategy
3.	Male	Science	Processes and policies that will drive the implementation of the programme must be looked into
4.	Female	Education	Our communities are faced with many problems, and the university is in the best position to respond to these problems through Science Shops
5.	Female	Education	It is a wonderful project; it needs the support of the management.
6.	Female	Arts	This is a niche area that the university must adopt because it comes with lots of benefits
7.	Male	Arts	The project is very relevant to this university, being a rural based one.
8.	Female	Education	It is a powerful tool for enhancing community-development oriented research.
9.	Male	Science	I look forward to seeing the full implementation of the programme in this university

10.	Female	CAL	As part of community engagement, the university must liaise with other stakeholders, especially the Department of Higher education and Training (DHET) in implementing this programme

Overall, the researcher was struck by the general level of optimism among the participants concerning the adoption of SSs. In particular, there was general consensus that SSs would play a very important part in transforming the lives of the people and communities for a better living. From Table 4.10, five views of the respondents need to be re-iterated here to illustrate how positive the respondents were about SSs:

> *Our communities are faced with many problems, and the university is in the best position to respond to these problems through Science Shops* (F, Education).

Indeed, this is really central to the concept of SSs. As a nucleus of theoretical knowledge, skills and expertise, surrounded largely by communities that have not had the privilege of receiving even primary school education, the University of Zululand should be encouraged to interface with the surrounding communities and share its knowledge and expertise.

> *It is a wonderful project; it needs the support of the management* (F, Education).

Indeed, given the power structure in most universities in South Africa, there is no curriculum innovation that will succeed without a change champion at the level of Executive Management. In big measure this may actually explain why, despite the preparations and training of academic staff that took place in the first few years of the NUFFIC Project, no absorption of the innovation ever took place. One may say that things would have been different had the concept been fully endorsed by Management. Certainly, the issue of an enabling policy framework would have been developed had there been a change champion at the level of Executive Management.

> *This is a niche area that the university must adopt because it comes with lots of benefits* (F, Arts).

> *The project is very relevant to this university, being a rural based one* (M, Arts).

The University of Zululand has a fortunate location in the middle of a rural area where there is no other resident university. Thus, the location presents itself as a niche area not only for SSs

but also for other community-related programmes, such as service learning and community engagement generally.

> *It is a powerful tool for enhancing community-development oriented research* (F, Education).

Research that is linked to community development, within the context of rural Africa, is a high priority area. However, most rurally located universities have often not done enough to promote research that leads to the development of rural communities. So, certainly, if the adoption of SSs would have catalysed 'community-development orientated research,' this would have enhanced both the status of Unizulu and the livelihoods of the communities surrounding the University.

From focus group interviews the respondents expressed themselves as follows, in response to the question as to what they saw as possible hurdles in the way of implementing SSs in their respective Faculties:

> *People had resistance to what was new. People did not want to try what is new to know whether it is going to work or not. One of the hurdles is also the frequent changes of management and leadership at the university. I think the Faculty failed to drive the programme.* (F1, Education)

> *I think the problem with the university is that we change management and the new management tends not to follow up on the projects inherited from the previous management.* (F1, Arts)

> *Integration into the curriculum in Sciences would have been a bit difficult. In terms of developing a module, is it going to be the responsibility of the Faculty? This programme needs everybody to be involved to achieve good result, but the time available to each academic staff member is limited.* (M1, Science and Agriculture)

> *People thought SS was a separate exercise whereas it was meant to be part of the curriculum. In fact, the students liked it so much but because it didn't kick off immediately, so it faded off.* (F2, Education)

Time factor, and also because it is a foreign concept, change is not easy. It is not about the academics only but also about the community. We must also know that academics are already filled with teaching and research activities. (F3, Education)

I think time factor can be a barrier, especially getting time out of other assignments to implement this. (F2, Arts)

I think Sustainability is another thing we need to look into. Starting a project is much easier than sustaining it. (M1, Arts)

Time constraint. With the workload that we already have and to try to put this in motion. Working with other students from other faculties is a problem. Financial constraint is another issue because getting students transported to communities was an issue. (F4, Education)

With science, we normally do a lot of research in the laboratory, with lab coat but most of us are not used to attending to community-based problems. We can collect data from the community but we find it difficult working with the community people. People in natural sciences generally have a problem with diverting from the traditional way of doing research. We only use community as a means not working with community. (M2, Science and Agriculture)

Not using the people that were involved in the training will make the implementation difficult. It was people who were involved that have the comprehensive understanding of the programme. (F1, CAL).

Among the likely obstacles that the implementation of this community engagement programme called SSs might face were identified by the study participants. Prominent among these include changing the mind-set of people, challenges of large class of students, and constraints associated with limited time which the academics have to perform teaching, research and community engagement roles. Moreover, one of the participants from the Faculty of Science also pointed to the style of laboratory research in Sciences which is regimented and may not accommodate the community-embracing method of SS programme. However, these are the hurdles that the University of Zululand and other universities interested in implementing this

programme must respond to for the academic staff members and students to be able to participate fully in the programme.

Universities worldwide are established to play the three major roles of teaching, research and community engagement (Huber, 2016). Of all these three roles, community engagement seems to be the area where most universities record low performance. Based on the data obtained from the participants as revealed on the Table 4.10, a programme like SSs presented a rare opportunity for the University of Zululand to engage with the host communities to yield lots of benefits to both parties. However, there were challenges identified by the participants, as revealed in Table 4.9. These challenges hindered the successful implementation of SSs at the university. Some of the main challenges highlighted by the respondents included logistics, in terms of time constraint; large class sizes; and mind-sets of some members of staff which may not work well with the programme.

Referring to the five categories of independent variables which influence the rate or level of adoption of an innovation (Rogers, 2003), it is evident that some of the variables could have played a role in the non-adoption of this innovation. In this study, the respondents decried their workloads, large class sizes, logistics and time constraints as some of the challenges they had faced while trying to accommodate SSs. This speaks to the compatibility and complexity of the innovation (Rogers, 2003) as major variables in the adoption of the SS as an innovation. With reference to the conceptual framework of this study, the other variables which could have detracted from the infusion of the SS innovation included (a) the nature of the University of Zululand, as a social system, (b) the communication channels within the institution, (c) the type of innovation decisions that needed to have been taken, (d) perceived attributes of the SS as the innovation that needed to be infused into on-going academic programmes, and (e) the extent of change agents' promotional efforts. (Rogers, 2003).

As things happened, this initiative took place at a time when there were many curricular-related changes in the history of higher education in South Africa, generally. Universities in the country were merging, forming different clusters and redefining themselves in their new roles according to the types of higher education institution the government had determined for them to become: whether remaining as traditional universities, evolving into comprehensive universities or becoming universities of technology. For the University of Zululand, its mandate was to evolve into a comprehensive university. Furthermore, the University was required to rework its curriculum offerings to comply with a new Higher Education

Qualifications Framework, which was promulgated in October 2007 (Government Gazette, 2007). Thus, in terms of what the University of Zululand was at the time, as a social system, there was just too much pressure to have to integrate SSs as part of its curriculum amidst other (ostensibly) more legitimate demands from government. It is possible that the authorities, although giving tacit recogtion to the project, saw the SS not to be part of the institutional identity the University was attempting to carve for itself.

Communication channels, in terms of who was responsible for informing the institution about this innovation was also a major challenge. SSs were introduced through a project funded by the Netherlands. SSs were a success story in the Netherlands, but was there a real felt need for them in South Africa? Perhaps so, but at the time, the curriculum direction given to universities by government was one promoting the notion of service learning (Fourie, 2003; Higher Education Quality Committee, 2004). So, was service learning to be abandoned in favour of SSs, or was it possible to embrace both concepts in a complementary way? These questions needed deep pondering, at a time when the push for compliance was far greater than the quest for excellence and good sense. Administratively, the project was placed in the office of the Deputy Vice Chancellor, so all communications about the programme originated from there. Typically, programmes are easier to adopt and implement when they originate from the departments.

Coming to the third aspect of Rogers' model, at most universities, decisions pertaining to academic matters are taken through very definite statutory bodies which start at the departmental level, then go to Faculty and then Senate. In this case, however, the SS project was located at a very high point in the system. For the project to have been successfully integrated into the institutional programmes, it would have required some change agents at the departmental level. The office of the Deputy Vice Chancellor should, therefore, have created an environment for change agents to operate at the departmental level which, in this case, did not happen.

With regard to the "perceived attributes of the innovation", the fact that the participants decried the various constraints reflected in Table 4.6 suggests that a significant effort was needed, from the point of view of the lecturers, in order to accommodate the SS project. This could also have been compounded by the fact that the change agents were from the Netherlands, and not even part of the institution. Thus, although these change agents tried hard to promote the project, it

would appear that the internal dynamics within the institution militated against the eventual adoption of SSs.

4.3.4 The Conditions or Factors that could Support the Implementation of SSs at Unizulu

The fourth research question of this study sought to establish the conditions or factors which could support the implementation of SSs at the University of Zululand. Table 4.11 gives a summary of the ways suggested by the respondents.

Table 4.11: Factors that would aid the implementation of SSs at Unizulu (n=10)

S/No.	Gender	Faculty	Participants' Responses
1.	Female	Education	Necessary resources for teaching and learning need to be put in place.
2.	Female	Arts	Yes, in terms of staff that went through the training and the office that was opened for the project, though the office is closed now.
3.	Male	Science	Yes, there always enablers. The value of Science Shops in addressing community problems is one main driving factor.
4.	Female	Education	Yes, the enablers are the staff that was part of the training. They are the enablers that the university needs because they possess the skills and knowledge to run the programme.
5.	Female	Education	A good number of lecturers were trained on the implementation of Science Shops, so they are the enablers
6.	Female	Arts	Availability of the trained staff, office, and valuable information about the implementation of the programme are what I see as enablers
7.	Male	Arts	Yes, fortunately we have a vibrant teaching and learning centre to support the implementation.
8.	Female	Education	There is an orientation guideline that can expose new academic staff and students to the context of Science Shops.
9.	Male	Science	Yes, there are lots of tools that have been developed to catalyse the project at the university.
10.	Female	CAL	Retention of academics that got through the training is a good enabler for this programme. They are the ones needed for the university to be restructured for relevance.

The first respondent in Table 4.11 held the view that for SSs to be integrated into the University's programmes, the 'necessary resources for teaching and learning must be put in place.' Indeed, for every innovation, there ought to be some capitalisation pertinent to the requirements of such an innovation. It is not clear what the respondents refers to in relation to SSs. However, the implementation of SSs requires students and their lecturers to travel to communities, have consultative meetings and engage in hands-on activities which will lead to practical application of theory in order to bring about practical solutions to problems posed by the communities. So, certainly, this way of teaching poses different resource challenges compared to lecture-room based teaching. Therefore, the resources which may at present be in place will only partially meet the requirements for the SS integration.

Several of the other respondents alluded to training of staff for the SS integration. Indeed, every educational innovation requires adequate training for those who will need to implement it. In the case of SSs, some preparatory training was carried out at the beginning of the project at Unizulu. Some years have passed by since that time, so if this innovation were to be implemented, there would have be need for a critical mass of trained staff to drive it. Having well trained and knowledgeable staff is a strength and an asset that will assist the University to move forward with the SSs. As Hassan and Olaniran (2011) point out, proper training is an asset for any organization, both manufacturing and service based. This is also true of the SS programme.

The above sentiments mirrored those which came from the focus group interview, where the participants were asked to state what they would say to Executive Management about SSs. In response, the respondents commented as follows:

> *I would say the management must involve people who are trained and use them to turn the University around with Science Shops. (F1, Education)*
>
> *By not implementing Science Shops, you have missed the opportunity to know your community beyond the walls of the University. (F1, Arts)*
>
> *I will just ask the Management to please embrace the concept for the benefit of both the university and the surrounding communities, and to also see it as a way of generating additional income for the university. (M1, Science and Agriculture)*

I will emphasize the issue of community engagement. It can improve the community. It can improve the relationship of the University with the community. (F2, Education)

It is a good programme. We need to study other countries and see how it works and adopt the best part of it. (F3, Education)

I would say this is the niche area for the University which the management must embrace. (F2, Arts)

I would advise the management to re-open and revive the rural development office, and Science Shops is more relevant to promoting the image of Unizulu as a rural based institution. (M1, Arts)

This is a good concept that can be used to revive one of the pillars that holds the University, i.e. community engagement. It will also help our students to develop their skills and capacities. (F4, Education)

I would say I cannot over-emphasize the importance of Science Shops in the curriculum of Unizulu (M2, Science and Agriculture)

Restructured for relevance must embrace both academics and support staff, importance of having a strategy to retain staff is important, and staff members are being overworked. If we keep losing academics, we cannot be a strong institution. I will say SS is a relevant approach if we really want to restructure for relevance. (F1, CAL)

Overall, in this study, the majority of the participants identified training as a major enabler that could drive the programme at the University. In addition, the respondents also added the provisioning of adequate resources as well as creation of better conditions of service – all as enablers for full implementation of the SS programme at the University. The overwhelming view from the interview was that Executive Management could play a big role in driving the SS project at the University.

4.4 SUMMARY

The Motto of the University of Zululand, where the study was conducted is known as ‘‘Restructured for Relevance.’’ Some of the participants in the study believed that the

University cannot be said to have been restructured for relevance if it cannot attend to the needs of the surrounding communities through intervention programmes, such as SSs. Therefore, as a way of summarising the responses of the participants towards the research questions, the academic staff interviewed perceived SS programme to be an opportunity to reposition the University for better.

Overall, the participants were favourably disposed towards the SS concept, and reported that they gained a lot of information, knowledge and insights about many things as a result of participating in the SS workshops. It was, further, quite clear from the results that all the participants were ready to see to the actualization SSs at Unizulu. However, they held the view that the readiness on the part of the university Management to implement the project was lacking. Some of the participants identified frequent changes in personnel at the level of Executive Management as a possible reason for the failure of the SSs to take off the ground, owing to the absence of a change champion at that level. The participants made some suggestions which may aid the adoption and implementation of this programme at the University of Zululand.

4.5 CONCLUSION

Although, the SS concept was pioneered in the Netherlands, it has drawn the attention of many other countries, such as Germany, France, Austria, Denmark, the United Kingdom, Romania, Israel, Canada, Malaysia, South Korea, and the United States of America with success stories. In this study, participants were optimistic that the SS programme is unique and its adoption into the University curriculum is capable of addressing pressing problems facing communities today. The role of institutions of higher learning such as universities in providing services that can develop social and economic capacities of people living in under-resourced communities cannot be over-emphasized. Universities are a part of the expanding market which is orientated to people and communities, and since universities are established with the tax payers' money, they should not operate as islands of knowledge but as partners in the progress of the communities and people who give up their taxes. In other words, both local and academic communities see themselves as equal partners in progress, and this can be demonstrated by introducing partnerships or networks between universities and communities, or by developing joint programmes and projects that can benefit the two. This is generally the idea behind SSs.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The purpose of this chapter is to give a summary of the whole study, draw conclusions and offer some recommendations that can be useful in the future, as well as making suggestions for further studies on the adoption of Science Shops as a research and practice-orientated programme to bridge the gap between universities and communities.

5.2. SUMMARY

This section is presented according to the major aspects of this study as reported in the various chapters so far.

5.2.1 Problem Setting, Conceptual Framework and Research Methodology

This study set out to investigate the perceptions of Unizulu academic staff members on the adoption of the Science Shop programme at the University of Zululand. The specific objectives that guided the study were:

- To determine the perceptions of the University of Zululand (Unizulu) academic staff on the concept of Science Shops (SS);
- To investigate the academic staff's perceptions on the possible adoption of Science Shops as part of the University's curriculum offerings;
- To explore challenges that may have prevented the academic staff from implementing Science Shops in their Faculties; and
- To explore conditions or factors that would support the implementation of Science Shops at the University.

Science Shop as a problem-orientated educational strategy is generally embraced as an innovative way of teaching and learning. Therefore, it rests upon the Unizulu management and in particular, the office of the Deputy Vice-Chancellor: Teaching and Learning to drive and

implement innovative ways of teaching and learning. Embracing SSs will give an impetus to ongoing curriculum development renewal, as education is not static but is continually changing according to the demands of the time. SS is about changing the mind-set of the people in the management to develop new strategies for knowledge absorption and creation.

Referring to the theoretical framework of this study, which is based on the five stages advanced by Rogers (2003) through which an innovation passes, namely *awareness, interest, evaluation, trial-making,* and *adoption,* it is evident from the results of this study that the participants had gone through experiences / stages similar to these stages. However, where there appear to have been hurdle was with regard to the 'characteristics of the innovation', upon which adoption depends, namely (a) relative advantage, (b) compatibility, (c) complexity, (d) trialability, and (e) observability (Kardong-Edgren, 2008; Borrego, et al., 2010). Even from the participants' responses, it is not stated that the SS sensitisation or orientation workshops really addressed the issues of the compatibility between the new innovation (that is, SSs) and the existing curricula in the different Faculties. It appears that all the effort was centred around 'selling' the SS concept. Expecting individual lecturers to make individual decisions on how SSs could be integrated into their curricula, against the backdrop of the CHE registration requirements was an unrealistic move. There was no university-level integration point where SS was sized up against the prevailing curriculum in terms of the compatibility of their 'values, past experiences and needs'. Similarly, the complexity of embedding SS-based projects into the prevailing curricula appears to just have been glossed over. Beyond these two factors, although there was a limited trial period on a voluntary basis, accompanied by observable benefits, these two stages lacked adequate impetus to result in a sufficient enough critical mass needed to drive a curriculum change. At Executive Management level, there was a lack of a change agent.

This study was grounded within the interpretivist epistemology, as the researcher attempted to understand the perceptions of academic staff towards the adoption of Science Shops as part of Unizulu's curriculum. The qualitative research paradigm was chosen because it allowed both the researcher and participants to explore the research objectives of the study. A total of ten (10) participants, comprising of academic staff members who had previously participated in the SS programme at the University (Unizulu) from the four Faculties constituted the research sample for the study. Thus, the respondents were mainly full time academic staff members of the university that participated in the NUFFIC training programme, sponsored by the Government of Netherlands, which gave birth to the idea of Science Shops. Majority of the

participants had between four and twelve years of university teaching experience; four of the ten participants held doctoral degrees, four Master's degrees, and the remaining two held Honour's degrees. On the question of gender, seven were female and three male. With regard to fields of specialisation, four came from the Faculty of Education, three from the Faculty of Arts, two from the Faculty of Science and Agriculture, and one from CAL.

A questionnaire consisting of open-ended questions was administered to the research sample before the participants were organised into four focus group interviews. Qualitative data collected through the questionnaire and focus group interviews were analysed using content analysis and presented in tables and reported verbatim, while demographic characteristics of the participants were coded and analysed using simple percentages and frequency counts.

5.2.2 Main Results and Findings

The main results and findings of the study are presented in line with each research objective.

5.2.2.1 Perceptions of participants about Science Shops

The first objective of this study was to determine the perceptions of the University of Zululand (Unizulu) academic staff on the concept of Science Shops. All the participants explained that their entry point into the Science Shops Project came by way of their participation in the training that was offered by NUFFIC representatives, first to introduce the concept, and later to offer training in various aspects of the concept – such as research methods. It was out of these experiences that all of them expressed positive impressions about SSs, citing a number of benefits that they associated with this innovation. One highlight which the participants were happy about was that it gave them a platform to interact and share meaningful ideas with other participants. They found this to be beneficial to their personal, professional, and societal developmental situations. Furthermore, they saw opportunities that came with the NUFFIC workshops as affording them time, place and space for rigorous debates that are needed for collaborations between science and society.

The second open-ended question for addressing the first research question sought to solicit the participant's overall impressions of SSs as a teaching and learning strategy. From the responses, all the participants expressed positive feelings and impressions about Science Shops; that the approach was an effective teaching and learning strategy. The respondents

particularly identified learner-centeredness, integrative and collaborative aspects of the SS teaching strategy as making the approach to be quite desirable. The respondents also pointed out that the SS approach was good for building bridges between the institution and the communities, and between theory and practice; that the teaching strategy promoted the development of critical thinking and problem-solving skills. According to the participants, these attributes made the SS programme to be an interesting and engaging academic adventure for both university students and academic staff.

The same sentiments also emerged from focus group interviews. Therefore, the answer to the first research question is that the participants perceived SSs as a good programme that would help the university achieve its aims and objectives as revealed in the university motto 'Restructured for Relevance'.

5.2.2.2 Perceptions of participants on the possible adoption of Science Shops

With regard to the second research objective, the participants favoured the adoption or integration of Science Shops into the University's curriculum offerings on the strength of the benefits identified under the first research question, namely assisting both the University students and lecturers to translate theory into practice, develop critical and problem-solving skills, encourage independent thinking, strengthen the links between the University and surrounding communities, cultivate the spirit of social responsibility, and promote innovation and creativity within and outside the university community.

From the focus group interviews, all the participants expressed their satisfaction with the workshops, and therefore felt ready for the adoption of SSs as part of the University's curriculum. To the benefits outlined under the first research question, (a) project management, (b) action research, and (c) opportunities for networking and collaboration with colleagues from within the university and from other universities. Overall, the responses of all the participants indicated that they were fully ready for the programme, which they believed would further bring them closer to the communities that surrounded the University. Thus, the answer to the second research question, was that the participants held the view that the adoption of SSs would strengthen the University's curriculum offerings; that such a step would firmly and favourably anchor the University in respect of action research, and in responding positively to the pressing problems facing the surrounding communities.

5.2.2.3 Challenges that may have prevented adoption of Science Shops

Overall, the researcher was struck by the general level of optimism among the participants concerning the adoption of SSs. There was general consensus that SSs would have played a very important role in transforming the lives of the people and communities for a better living; that the adoption of SSs would have catalysed 'community-development orientated research' which, in turn would have enhanced both the status of Unizulu and the livelihoods of the communities surrounding the University. However, there was a realisation that no curriculum innovation can ever succeed at a university without a change champion at the level of Executive Management. In big measure this was seen as one of the major reasons for the *adoption failure* of SSs at Unizulu - notwithstanding the preparations and training of academic staff that took place in the first few years of the NUFFIC Project. The presence of a competent change champion at the Executive Management level would also have resulted in the development of an enabling policy framework, which would in turn have driven the whole operation.

According to the participants, in addition to the lack of Executive Management endorsement, prominent among the other challenges that stood in the way of SS adoption were (a) the mind-sets of key role players, particularly the academic staff, (b) large student class sizes, and (c) constraints associated with limited time which the academic staff had to perform teaching, research and community engagement roles. Moreover, one of the participants from the Faculty of Science also pointed to the style of laboratory research in Sciences which is regimented and may not accommodate the community-embracing method of SS programme. This speaks to the issue of logistics with respect to the changes which would have needed to be made in order to accommodate SSs. Thus, according to the respondents, these were the hurdles that militated against the adoption of SSs as part of Unizulu's curriculum offerings.

5.2.2.4 Conditions that would support the implementation of Science Shops

For every curriculum innovation to succeed, there ought to be some capitalisation pertinent to the requirements of such an innovation. In this case, the implementation of SSs would have required students and their lecturers to travel to communities, have consultative meetings and engage in hands-on activities which will lead to practical application of theory in order to bring about practical solutions to problems posed by the communities. So, certainly, this way of

teaching poses different resource challenges compared to lecture-room based teaching. Therefore, the resources which may at present be in place will only partially meet the requirements for the SS integration.

Apart from resources, some respondents alluded to training of staff for SS integration as an important enabler for the implementation of SSs. Every educational innovation requires adequate training for those who will serve as key implementers of the innovation. In the case of SSs, some preparatory training was carried out at the beginning of the project at Unizulu. Some years have passed by since that time, so if this innovation were to be implemented, there would be need for a critical mass of trained staff to drive it. Having well trained and knowledgeable staff is a strength and an asset that will assist the University to move forward with the SSs. In addition, the respondents reiterated the point that Executive Management could play a big role in driving the SS project at the University.

5.3 CONCLUSION

The findings of this study have prompted the researcher to ask questions such as 'what' can be done to address the situation. Overall, the researcher came to the conclusion that, the University should be aggressively involved with the surrounding communities by responding to their demands and needs. In doing so, the University can use classrooms/lecture halls as a platform to induce commitment from the students and allow them unleash their potential and learn to care about the communities where they come from – thus, fulfilling the mandate of teaching, research and community engagement.

The university needs to recurriculate and restructure its programmes and find a space to include SSs, which is an innovative way of teaching that allows students to design the projects they are involved in, implement them and come to some enhanced understanding of the issues they are addressing, together with community members. This would allow students to discover knowledge on their own instead of being spoon-fed. In The Netherlands SSs came up as a result of the bottom-up approach that was taken by academic staff and students to share their knowledge and skills with surrounding communities. This worked well in Europe, but circumstance differ from those obtaining in Africa. Unizulu might need a strong drive and impetus from the heads of departments who are directly involved in teaching and learning. This drive might change the mind-sets of the powers that be. Consequently, this could filter to organising large classes to suit the needs brought about by integrating SSs into the curriculum.

The spin-offs of this organisation will mean sufficient time to involve students in research and third stream income generation on behalf of the University.

5.4 RECOMMENDATIONS

Based on the findings of this study, the following recommendations may be made:

- The major finding to the first research question was that all the participants expressed very positive perceptions about SSs. Given this, it is quite clear that the staff who had participated in the workshops developed a good impression about SSs. Therefore, it may be recommended that, adequate and on-going training of academic staff on effective community engagement practices and strategies must be prioritised as a policy by the University of Zululand. This will ensure that all academic staff members have equal and unhindered access to training, irrespective of the time they join the services of the university. In addition, those who have been trained must be used to champion the cause of community engagement and action-based research activities for the University, especially SSs.

- On the second research question the major finding was that all participants favoured the adoption and integration of SSs as part of the university curriculum offerings on the basis of different skills that will be inculcated to students. Therefore, it may be recommended that, the University management look into the issue of over-packed timetables and teaching schedules of the lecturers at the University. One of the challenges identified by the participants in the study as a factor that can limit the implementation of SSs was the issue of tight teaching schedules. University can respond to this by employing more staff members who will be able to share the teaching loads of the current academic staff members in each Faculty.
- On the third research question, there was a general consensus from the participants that SS could play a major role in transforming the lives of the communities and could be a catalyst in community-development orientated research. Yet, there was realization that for curriculum innovation to succeed a change champion at the Executive Management level was needed. While all participants sampled in this study agreed that one of the main responsibilities of the University was to respond to the needs of the host

communities, one of the participants lamented the closure of the Centre established to address rural integration and development. Therefore, it may be recommended that the University be urged to consider reopening the Centre and equipping it with the necessary staff, facilities and funding that will see to the establishment of SSs and other community development orientated programmes.

- On the fourth and last research question, the major finding was that engaging in SSs as an innovative method of learning would mean visiting communities and have consultative meetings with them. In doing so, students would be enabled to apply the lessons learnt to practical situations. Training of new staff members and support from Executive Management could play a big role in driving and implementing SSs at the university. Therefore, it may be recommended that there is need for the University to review its academic staff employment and retention strategies in order to prevent staff attrition. It was pointed out by the study participants that many academic staff members who were trained on the concept of SSs were no longer with the University. The reality is that no employee would like to stay in a work environment that is not fulfilling his or her career goals, objectives and aspirations. Therefore, adequate staff motivation must be provided by the University to attract and retain highly qualified and skilled academic staff members with a passion for community development activities.

5.5 LIMITATIONS OF THE STUDY

This study sampled the opinion of the academic staff members at Unizulu, a comprehensive university located in KwaZulu Natal (KZN) Province of South Africa, which is only one of several universities in the province with their own strategies and programmes to reach their communities. Without doubt, each of the higher institutions has its own peculiarities and unique contexts which may shape the views and perceptions of academic staff about the concept of community engagement, especially SSs programme. As a case study which, by design and philosophy does not aim to generalise its findings, the reader is advised to make any generalisations from these findings with utmost discretion.

At the University of Zululand, where the study was located, more than fifty (50) academic staff members were trained on the concept of SSs. However, it became impossible for the researcher to include all the academic staff that participated in the training due to some limitations of time, space, and the fact that some of them had left the University for other institutions of higher

learning. The researcher was able to investigate the views and perceptions of the participants on SSs concept, as well as the conditions necessary for the implementation of the programme into the university curriculum. Since the entire academic staff members that received training on SSs could not be interviewed because they had left the institution, was a major limitation of the study, therefore, is that only academic staff members who were available in the university during the period of this study were involved.

Trowler (2011) refers to research conducted in one's own institution as 'insider research' or 'endogenous research'. In similar vein, Greene (2014: 1) explains that "Insider research is that which is conducted within a social group, organization or culture of which the researcher is also a member." In this regard, Floyd and Arthur (2012: 3) point out that "many of the ethical issues and dilemmas that arise when undertaking insider research are not covered or thought out fully during the ethical review application." Being an insider researcher means being embedded in a shared setting, emotionally connected to the research participants, with a *feel for the game and the hidden rules*. Furthermore, Floyd and Arthur (2012: 3) "put forward the notion of external and internal ethical engagement for insider researchers." So, on the question of confidentiality, for instance, Floyd and Arthur (2012: 3) explain that 'traditional' or 'external' confidentiality ensures that the participant remains anonymous, but that for insider research, there is also internal confidentiality, which refers to the risk that people involved in the research may be able to recognise each other, or be recognized by someone familiar with the participants even if anonymity has been observed. Thus, when certain verbatim statements are presented in a qualitative research report (e.g. dissertation or thesis), a participant can be recognised by his or her choice of words by those who interact with him or her on a daily basis.

In addition, from the notions of external and internal confidentiality, the concepts of 'external' and 'internal' ethical engagement also arise – where the former is seen as "the superficial, easily identifiable ethical issues, such as informed consent and anonymity, which insider researchers attend to by submitting their application for ethical approval to their institution's internal review board" (Floyd and Arthur, 2012: 3). The latter "relates to the deeper level ethical and moral dilemmas that insider researchers have to deal with once 'in the field'; the below surface, murky issues that arise during and after the research process linked to on-going personal and professional relationships with participants, insider knowledge, conflicting professional and researcher roles and anonymity" (Floyd and Arthur, 2012: 3).

This discussion is being advanced here as a way of highlighting some of the dilemmas and challenges associated with insider researching, as was the case in this study. For example, "insider researchers need to consider whether it is appropriate to act on the information they have obtained through their research" (Floyd and Arthur, 2012: 8). Furthermore, "insider status may confer privileged access and information, but the researcher's position in an organisation may also act as a constraint, limiting who is willing to participate and what is revealed" (Floyd and Arthur, 2012: 8). Accordingly, this stands out as one of the limitations of this study. It is possible that someone well-known to the participants may identify, or associate, a given verbatim response with a particular participant – rightly or wrongly.

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APPENDIX 1

RESEARCH ETHICS CLEARANCE

UNIVERSITY OF ZULULAND
RESEARCH ETHICS COMMITTEE
(Reg No: UZREC 171110-030)

RESEARCH & INNOVATION
Website: http://www.unizulu.ac.za
Private Bag X1001
KwaDlangezwa 3886
Tel: 035 902 6887
Fax: 035 902 6222
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ETHICAL CLEARANCE CERTIFICATE

Certificate Number	**UZREC 171110-030 PGM 2015/238**							
Project Title	**Perceptions of the University of Zululand academics towards science shops**							
Principal Researcher/ Investigator	LLP Bele							
Supervisor and Co-supervisor	Prof SN Imenda							
Department	Curriculum & Instructional Studies							
Nature of Project	Honours/4th Year		Master's	x	Doctoral		Departmental	

The University of Zululand's Research Ethics Committee (UZREC) hereby gives ethical approval in respect of the undertakings contained in the above-mentioned project proposal and the documents listed on page 2 of this Certificate.

Special conditions: (1) The Principal Researcher must report to the UZREC in the prescribed format, where applicable, annually and at the end of the project, in respect of ethical compliance.
(2) Documents marked "To be submitted" (see page 2) must be presented for ethical clearance before any data collection can commence.

The Researcher may therefore commence with the research as from the date of this Certificate, using the reference number indicated above, but may not conduct any data collection using research instruments that are yet to be approved.

Please note that the UZREC must be informed immediately of

- Any material change in the conditions or undertakings mentioned in the documents that were presented to the UZREC
- Any material breaches of ethical undertakings or events that impact upon the ethical conduct of the research

Classification:

Data collection	Animals	Human Health	Children	Vulnerable pp.	Other
X					

Low Risk	Medium Risk	High Risk
	X	

The table below indicates which documents the UZREC considered in granting this Certificate and which documents, if any, still require ethical clearance. (Please note that this is not a closed list and should new instruments be developed, these would require approval.)

Documents	Considered	To be submitted	Not required
Faculty Research Ethics Committee recommendation	X		
Animal Research Ethics Committee recommendation	X		
Health Research Ethics Committee recommendation			X
Ethical clearance application form	X		
Project registration proposal	X		
Informed consent from participants			X
Informed consent from parent/guardian			X
Permission for access to sites/information/participants	X		
Permission to use documents/copyright clearance			X
Data collection/survey instrument/questionnaire	X		
Data collection instrument in appropriate language		Only if necessary	
Other data collection instruments		Only if used	

The UZREC retains the right to

- Withdraw or amend this Certificate if
  - Any unethical principles or practices are revealed or suspected
  - Relevant information has been withheld or misrepresented
  - Regulatory changes of whatsoever nature so require
  - The conditions contained in this Certificate have not been adhered to

- Request access to any information or data at any time during the course or after completion of the project

The UZREC wishes the researcher well in conducting the research

Professor Nokuthula Kunene
Chairperson: University Research Ethics Committee
11 February 2016
LLP Bele - PGM 2015/238

CHAIRPERSON
UNIVERSITY OF ZULULAND RESEARCH
ETHICS COMMITTEE (UZREC)
REG NO: UZREC 171110-30
11-02-2016
RESEARCH & INNOVATION OFFICE

APPENDIX II

RESEARCH INSTRUMENT

DATA COLLECTING INSTRUMENT FOR UNIZULU ACADEMIC STAFF

This data collecting instrument consists of two sections. Section A focuses on participants' biographical information as well as their views, and perceptions about Science Shops – and any challenges and prospects associated with the possible integration of the concept of Science Shops into the University curriculum. This section will be completed by the participants immediately before the focus group interview. The purpose of the focus group interview is two –fold: (a) to tease out additional information from the participants and well as (b) triangulate information collected from Section A.

Opening

You were invited because of your participation in the NUFFIC Project, and therefore your familiarity with the concept of Science Shops. As you are aware, your participation in these focus group interviews is voluntary, and you may decide to terminate your participation at any time, should you feel that you're being inconvenienced in any way, or you may feel that you do not wish to answer certain questions, in which case you are free not to answer them. However I hope that this interaction will be as enriching and valuable to you as I expect it to be to me. I will, therefore, value and depend on your participation for the success of this research. Nonetheless, I am obliged by research protocols to remind you of your rights. If you are ready and willing to participate, we may now start with the discussions.

SECTION A (To be completed by individual participants)

PERSONAL INFORMATION

This section seeks information based on your biographical data. Please put an "X in the appropriate box.

1. Gender

Male	Female

2. QUALIFICATIONS AND FIELD OF SPECIALIZATION

2.1 Qualifications: Indicate your highest academic qualification.

Bachelor's Degree	Honours Degree	Masters Degree	Doctoral Degree	Other(Specify)

2.2 Write the highest qualification you hold

3. University teaching experience (in years)

0-3	4-6	7-9	10-12	12-15

4. Work experience elsewhere (in years)

0-3	4-6	7-9	10-12	12-15

5. Experience with NUFFIC project

Please, explain your personal involvement with the NUFFIC Project, generally, highlighting what you may consider to have been the 'highs' and the 'lows"

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6. Experience with science shops

Please, explain your personal involvement with Science Shops and highlight what you may consider to have been the ’highs” and the “lows”.

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7. What were your overall impressions about the overall idea of Science Shops as a teaching and learning strategy?

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8. What are your views concerning the integration (or adoption) of Science Shops into the curriculum offerings of the University?

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9. Are there any challenges that you foresee which would need to be overcome if the University were to take Science Shops on board as one of its teaching/learning strategies?

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10. As the University stands today, are there factors, or enables, that would support the implementation of Science Shops at the University?

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11. Is there anything else that you would like to share with the researcher concerning Science Shops?

SESCTION B (FOCUS GROUP INTERVIEW)

There are no wrong answers but there well may be rather differing points of view. You must remember your voice or point of view is as important and valuable as anyone else's. So, as you advance your point of view or opinion, please allow other group members to also have an opportunity to state their case. So, please, feel free to share yourpoints of view even if they may differ from what others are saying. As a researcher, I value all the contributions: positive and negative. To me they are of equal value and importance.

QUESTIONS

1. What did you think of the Science Shop (SS) programme/concept?
2. How did you feel about the workshops that were conducted?
3. What did you like best about the SS program?
4. What could have been the main hurdles implementing SS in your faculties?
5. Which attributes of SS could be adopted as part of the curriculum for Unizulu?
6. Suppose that you had one minute to talk to the VC about the topic of SS. What would you say?

THANK YOU FOR PARTICIPATING IN THIS STUDY.YOUR TIME AND EFFORT IS GREATLLY APPRECIATED.