SECONDARY TEACHERS' VIEWS REGARDING LEARNERS' AWARENESS ON HOUSEHOLD WASTE MANAGEMENT IN NEWCASTLE SOUTH AFRICA

by

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SECONDARY TEACHERS' VIEWS REGARDING LEARNERS' AWARENESS ON HOUSEHOLD WASTE MANAGEMENT IN NEWCASTLE SOUTH AFRICA is my work and that all the sources that were used and/or quoted have been indicated and acknowledged using a complete list of references. All Ethical clearance as per the University of South Africa (UNISA) were adhered to.

Signature

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SUPERVISOR'S STATEMENT

This dissertation was submitted with my approval.

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DEDICATION

This study is dedicated to my God for guidance and strength He rendered me to work on this inquiry from the beginning to the end.

The study is also a special dedication to my son, Brendon Mcebisi Tankwa, who supported and motivated me throughout the study.

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ABSTRACT

Waste generation is a global problem encountered by many nations. In recent years, population growth, booming urbanisation, an increase in economic activities and rise of communities' living standards have significantly escalated household waste generation which has been a cause for concern. Waste production in households and schools imposes serious concern on the environment. To curb further depletion of environmental resources, sustainable consumption and household waste management practices and systems cannot be over emphasised. Therefore, the aim of the study was to explore the views of secondary school teachers' views with regard to learners' awareness of household waste management in Newcastle, South Africa.

This study, following a qualitative approach, adopted a case study design to explore secondary teachers' views on learners' awareness on household waste management in the Newcastle municipality, in the Amajuba District, South Africa. By using semi-structured interviews, non-participatory observation and documents analysis, data were collected from three secondary schools and nine teachers, teaching Natural Sciences, Social Sciences and Life Orientation in Grade 8.

The findings revealed that teachers understand the importance and benefits of household waste management although misconceptions of household waste management still prevailed. A challenge that emerged showed that teachers lack training to successfully integrate household waste management in their subjects. Their failure to identify household waste management themes in their CAPS subjects was sufficient evidence for the urgency of in-service training of teachers to assist them in integrating environmental education (EE) themes such as household waste management in their subjects. Although teachers experienced several challenges regarding implementing the theme of household waste management in their subjects, they considered the benefits outweighed the challenges.

Key Terms: household waste management, secondary school teachers, awareness, benefits, challenges. Natural Sciences, Social Sciences, Life Orientation, Grade 8.

KAKARETSO YA DIPATLISISO

Tlhahiso ya ditshila ke bothata bo aparetseng dinaha tse ngata. Dilemong tsa morao tjena, kgolo ya baahi, ho eketseha ha ditoropo, ho eketseha ha mesebetsi ya moruo, le ho phahama ha maemo a bophelo a baahi ho ekeditse tlhahiso ya ditshila tsa malapa ka mokgwa o bonahalang, e leng seo e leng sesosa sa ho tshwenyeha. Tlhahiso ya ditshila malapeng le dikolong e baka mathata a tebileng tikolohong. Ho thibela ho qepha ho eketsehileng ha mehlodi ya tikoloho, tshebediso e tsitsitseng le ditlwaelo tsa taolo ya ditshila tsa malapeng le ditsamaiso ho hloka ho elwa hloko ka tsela e kgethehileng. Kahoo, sepheo sa phuputso e ne e le ho hlahloba maikutlo a matitjhere a dikolo tse mahareng mabapi le tlhokomediso ya baithuti ka taolo ya ditshila tsa malapa Newcastle, Afrika Borwa.

Phuputso, ka ho sebedisa mokgwa wa boleng, e amohetse moralo wa phuputso e ikgethileng ho hlahloba maikutlo a matitjhere a dikolo tse bohareng hodima tlhokomediso ya baithuti mabapi le taolo ya ditshila tsa malapa mmasepaleng wa Newcastle, Seterekeng sa Amajuba, Afrika Borwa. Ka ho sebedisa dipuisano tse hlophisitsweng hantle, tlhahlobo e sa kenyelletseng bonkakarolo le manollo ya ditokomane, datha e ile ya bokellwa ho tswa dikolong tse tharo tse bohareng le ho matitjhere a robong, a rutang Saense ya Tlhaho, Saense ya Phedisano le Thuto ya Bophelo bakeng sa baithuti ba Sehlopha sa 8.

Diphetho di senotse hore matitjhere a utlwisisa bohlokwa le melemo ya taolo ya ditshila tsa malapa le hoja maikutlo a fosahetseng mabapi le taolo ya ditshila tsa malapa a ntse a atile. Phephetso e ileng ya hlaha e bontsha hore matitjhere a haellwa ke kwetliso ya ho kenyelletsa ka katleho taolo ya ditshila tsa malapa dithutong tsa bona. Ho hloleha ho kgetholla dihlooho tsa taolo ya ditshila tsa malapa dithutong tsa bona tsa CAPS e ne e le bopaki bo lekaneng ba ho potlaka ha kwetliso ya matitjhere a tshebetsong ho ba thusa ho kenyelletsa dihlooho tsa thuto ya tikoloho (EE) jwalo ka taolo ya ditshila tsa malapa dithutong tsa bona. Leha ele hore matitjhere a ile a ba le diphephetso mabapi le ho kenyelletsa dihlooho tsa taolo ya ditshila tsa malapa dithutong tsa bona, ba ile ba utlwa hore melemo e feta diphephetso.

Mantswe a bohlokwa: taolo ya ditshila tsa malapa, matitjhere a dikolo tse mahareng, tlhokomediso, melemo, diphephetso, Saense ya Tlhaho, Saense ya Phedisano, Thuto ya Bophelo, Sehlopha sa 8

NGAMAFUPHI

Ukukhiqizeka kukadoti kuyinkinga ehlangabezana nezizwe eziningi emhlabeni. Eminyakeni esanda kudlula, ukukhula kwenani labantu, ukukhula kwamadolobha, ukukhula kwemisebenzi yamabhizinisi kanye nokukhuphuka kwezinga lempilo yabantu yikho okuye kwadala ukuthi imizi ikhiqize izinga eliphezulu likadoti/lenkukuma, okuyinkinga ebekade ivele isikhona. Ukukhiqizeka kukadoti emakhaya kanye nasezikoleni kudala izinkinga ezibi kakhulu endaweni. Ukuqeda ukumoshakala/ukuguga kwemithombo yezendawo okuqhubekela phambili, kusobala ukuthi kudingeka izindlela ezisimelele zokugaywa kukadothi kanye nezindlela zokulawula kukadothi kanti konke lokhu kuyiqiniso elingenakuphikiswa. Ngakho-ke, inhloso yocwaningo kwakuwukuphenya imibono yabafundisi bezikole zamabanga aphakeme mayelana nokuxwayisa uhlelo lokulawulwa kukadoti endaweni yase *Newcastle,* eNingizimu Afrika.

Lolu cwaningo ngokulandela indlela yocwaningo eyencike kwingxoxo, luye lwalandela idizayini yocwaningo lotho ukuphenya imibono yabafundisi bamabanga aphakeme mayelana nokuxwayiswa kwabafundi ngokulawulwa kukadoti emakhaya ngaphansi kukamasipaladi waseNewcastle, ongaphansi kwesiFunda saseMajuba, eNingizimu Afrika. Idatha iye yaqoqwa ngokusebenzisa inhlolovo embaxambili, kwahlaziywa indlela yokuziphatha futhi kwahlaziywa imibhalo, kanti le datha iqoqwe ezikoleni zamabanga aphakeme ezintathu kanye nakubafundisi abayisishiyagalolunye, okungabafundisi abafundisa izifundo phecelezi *Natural Sciences*, *Social Sciences* kanye ne*Life Orientation* yabafundi bakaGreyidi 8.

Ulwazi olutholakele luveze ukuthi abafundisi bazwisisa ukubaluleka kanye nezinzuzo zohlelo lokulawulwa kukadoti, yize kusekhona ukudideka/ukungazwisisani mayelana nohlelo lokulawula ukuphatha kukadoti. Inselelo ebonakele, ikhombise ukuthi abafundisi baswela ukuqeqeshwa ukuze bakwazi ukuzwisisa kahle uhlelo lokulawulwa kukadoti kwizifundo zabo. Ukwehluleka kwabo ukwehlukanisa izindikimba zokulawulwa kukadoti emakhaya ezifundweni zabo ze*CAPS* kuye kwaba wubufakazi obanele besidingo esisheshayo sokuqeqeshwa kwabafundisi abasemsebenzini ukubanceda ukuba bakwazi ukuhlanganisa izindikimba zezifundo zezendawo *environmental education (EE)* ezinjengokulawulwa kukadoti ezifundweni

zabo.Yize abafundisi behlangabezana nezinselele ezimbalwa mayelana nokusebenzisa indikimba yokulawulwa kukadoti ezifundweni zabo, baye babona ukuthi izinzuzo zalokhu zedlula izinselele.

Amagama asemqoka: uhlelo lokulawulwa kukadoti, abafundisi bamabanga aphakeme, ukuxwayiswa, izinzuzo, i-*Natural Sciences*, *Social Sciences*, *Life Orientation*, IGreyidi 8

LIST OF ACRONYMS

BRICS	Brazil, Russia, China, South Africa
CAPS	Curriculum and Assessment Policy Statements
CEDU	College of Education
CSIR	Council for Scientific Industry Research
DBE	Department of Basic Education
DEA	Department of Environmental Affairs
EE	Environmental Education
ESD	Education for Sustainable Development
EU	European Union
GCSE	General Certificate of Secondary Education
IWMS	Integrated National Waste Management Strategy
L.O.	Life Orientation
NEMWA	National Environment Management Waste Act
N.S.	Natural Sciences
PET	Physical Education Task
S.S.	Social Sciences
SMT	School Management Team
UK	United Kingdom
UN	United Nations
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational Scientific and Cultural Organisation
WRAP	Waste Resource Action Programme
ZPD	Zone of Proximal Development

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CHAPTER 1

ORIENTATION OF THE STUDY

1.1 INTRODUCTION

Household waste management is a cause for concern globally due to population increases and urbanisation, resulting in waste management challenges. This view was supported by the United Nations Environmental Programme UNEP (UNEP, 2013:16), which stipulates that waste generation rates are fast increasing, especially in developing countries. This study explores the views of secondary school teachers concerning learners' awareness of household waste management in Newcastle, South Africa.

Household waste is regarded as home products such as paper, containers, tins, cans, aluminum cans, glass, ceramics, polythene, textiles, and vegetable waste (Demirbas, 2011:1283). Daily, learners carry these items to school for various reasons and end up polluting the school environment. In addition to polluting the school environment, these products have become a major source of municipal solid waste, a view supported by Zhang, Huang, Yin, and Gong (2015:975). This implies that there is a need for schools to create awareness in learners of the negative impact of household waste on both the schools' environment and the surrounding areas. It is the researcher's view that developing learners' awareness of household waste management can play a vital role in reducing, reusing, and recycling the waste in schools. Furthermore, it can also reduce the chances of learners being exposed to hazards.

1.2 BACKGROUND

Newcastle Municipality is situated in the northern part of the province of KwaZulu within the Amajuba District. The town of Newcastle, with a population of approximately 56 144 (Newcastle Municipality Integrated Plan, 2015:3), covers an area of 1854 square kilometers comprising 31 wards. The main activities in the town are coal mining and trade business (Newcastle Municipality Integrated Plan, 2015:14). There are 175 schools in Newcastle (Newcastle Municipality Integrated Plan, 2015:15) and these are

clustered into five different circuits each with around 35 schools administered by a circuit manager.

Learners' awareness of household waste management

The importance and need for environmental education cannot be over emphasised. Environmental education helps communities to be more vigilant when it comes to problems affecting the environment, thus creating public awareness which enhances environmental preservation and protection. Education for the environment is crucial in developing learners' knowledge and understanding, which subsequently shapes their values and attitudes towards a sustainable environment (Phang *et al.,* 2016:387). Environmental education creates environmental awareness among communities since it is conducted in both formal and informal settings and contributes towards an increased appreciation of the value of all resources and the need to manage these resources sustainably and rationally (Phang *et al.*, 2016:387). Environmental education, therefore, should aim at raising learners' environmental awareness and instilling positive environmental values, especially when it comes to household waste.

As a starting point, schools should be encouraged to heed the call for best practices in waste handling and disposal. Household waste management initiatives, clean-up campaigns on environmental awareness need to be emphasised. Traditionally teachers have been regarded as agents of social change and modernisation as they inculcate knowledge and values in learners. Besides, learners see teachers as role models. Astelin (2011:90) indicates that learners tend to emulate their teachers and draw inspiration from them which implies that a teacher can play an influential role in sensitising the youth on environmental issues and promoting household waste awareness and understanding among learners to efficiently manage their environments and make them sustainable (Astalin, 2011:90). The Natural Sciences, Social Sciences, and Life Orientation curriculum includes topics on environmental awareness which would encourage the learners to become active role players in solving environmental problems and besides, would ensure that the community has a common goal in protecting the environment.

According to Licy, Vivek, Saritha, Anies, and Josephine (2013:48), education helps young people to become aware of challenges in their environments, to participate fully and effectively in the solving of environmental problems. Therefore, it

is the teachers' responsibility to impart knowledge on environmental issues such as household waste management for learners to understand and address environmental challenges in their communities. A study conducted with the Omani public revealed that directing environmental education to the youth would provide greater benefits than environmental education for seniors (Abdul-Wahab, 2008:48), which indicates the importance of developing awareness at an early age. In a bid to address environmental problems that have increased globally, curriculum developers worldwide have made environmental education imperative, embedding educational content to conserve and protect the environment states (Abdul-Wahab, 2008:48).

A study conducted by Cincera and Krajhazi (2013:117) on factors influencing learners' pro-environmental behaviour revealed that in developing countries sustainable consumption policies support various kinds of programmes to achieve environmental awareness and sustainability. These findings align with the United Nations' (UN) (UN, 2002:4) call for the development of awareness on environmental challenges and creating programmes to promote education and outreach. The school curriculum should include topics on environmental problems and awareness where the focus is on nurturing learners as agents of behavioural change, who in turn could affect their communities' waste management activities. The researcher argues that as the youth are the future occupants of their communities, the education curriculum and programmes need to be designed to develop environmental knowledge, skills, and attitude which would affect their waste management knowledge, behaviours, and values from an early age to achieve well-managed environments.

Integrating the theme of household waste management in Natural Sciences, Social Sciences, and Life Orientation to enhance learner awareness

In the South African context, the Curriculum and Assessment Policy Statement (CAPS) Grade 7-9 (DBE, 2011) emphasises that teachers should integrate Environmental Education (EE) themes into CAPS subjects. This view is supported by Licy *et al.* (2013:48) who contends that creating young people's awareness and developing their knowledge of household waste is essential. However, there are challenges as young people seem to lack interest in participating fully and effectively in the solving of environmental problems (Licy *et al.,* 2013:48). There is therefore a need for teachers and communities to work hand in glove imparting values, skills of household waste management so that learners can understand and be prepared to deal with

environmental challenges in their communities.

Licy *et al.* (2013:148) indicated that it is important to make learners aware that hygiene and responsibility for household waste management begin at home. This implies that when integrating the theme of household waste management in CAPS subjects, teachers focus on personal hygiene which begins at home or within their immediate environment, then the school, and finally, the local community. It is the role of the community and the school teachers to impart knowledge on household waste as a major contributor to solid waste, some of which are re-usable while others are not.

The challenge and successes of integrating the theme of household waste management in Natural Sciences, Natural Sciences and Life Orientation

Mutisya and Baker (2011:55) write that issues related to environmental problems have become a major concern for the international community, particularly for educational policy and curriculum developers. It is the researcher's view that several interventions and strategies are required to promote the integration of EE themes into CAPS subjects to enhance public awareness on household waste management and other issues.

Cincera and Krajhanzi (2013:120) state that in developing countries sustainable consumption and production policies were launched supporting various kinds of programmes to achieve their goals, various programmes were found to be instrumental in promoting the deliberation aspects of sustainable production and consumption. Their findings correspond with recommendations from the Plan of the World Summit on sustainable development United Nations (UN) (2002:7) which calls for a development of awareness-raising programmes on the importance of sustainable production and consumption patterns, particularly among the youth. The researcher's view on effective implementation is that school programmes should develop learners' knowledge, attitudes, values, and skills important to promote learners' awareness of household waste towards a sustainable environment.

The attitudes that are shaped and knowledge attained during childhood perpetrate to adulthood attitudes and knowledge Abdul-Wahab: (2008:39). Shaping learners' attitudes and imparting knowledge of household waste management in schools should prepare them to be responsible for the waste managing future citizens. In this regard teaching

learners about EE values and shaping their attitudes at early ages are equivalent to educating a generation of household waste management emphasis is maintained in schools.

Integration of household waste theme in the CAPS subjects in South African schools is a cause for concern. Probably teachers lack adequate training on how to integrate EE awareness in the CAPS subjects or it could be a lack of interest on the part of the learners. Although the South African Schools Act (Act no.108 of 1996) declares that waste management service delivery is the responsibility of the municipalities. Schools have a role to play in implementing household waste management and stimulating learners' interests in the lessons.

The Constitution of the Republic of South African (Act no 108 of 1996) emphasises that implementation of proper waste management service delivery, the municipalities need sound financial management systems, equipment management, adequate labour staff, and planning. In as much as the municipalities need financial sources and trained staff to manage waste, schools are not left out. Training of teachers on how to integrate EE themes in teaching CAPS subjects requires adequate finance to empower teachers to effectively impart knowledge to the learners with regards to EE themes. The researcher's view is that the training of teachers involves finance that may be a challenge.

1.3 THEORETICAL FRAMEWORK

This study explored various theories to build an understanding of theoretical perspectives regarding learners' awareness of household waste management. These theories were used to interpret the teachers' views and to situate the study within the theoretical context of the body of knowledge (Creswell, 2014). The researcher intended to review theories that assisted in finding the gaps in literature (Creswell, 2014). For this study, socio-cultural theory, place-based learning, and social learning theories were explored.

Socio-cultural theory clarifies knowledge that does not only deal with mental processes but addresses the holistic teaching of humankind to be responsible members of society (Stetsenko, 2004:501). Vygotsky (1978:57) indicated that the

interaction of learners with their environment develops knowledge. In this study learners' knowledge and awareness of household waste management can be acquired through the social environment. Learners emulate what happens in their social world. What the learners are taught at school or imitate from their social context and culture, promotes awareness on household waste management. The socio-cultural theory emphasises the Zone of Proximal Development (ZDP) which is the development of an individual's abilities to solve problems on their own (Vygotsky, 1978:58). In the school context, the teachers, peers, or any experienced personnel can provide and inform learners about household waste management and support learners in embarking on solving the problem of waste. Vygotsky's social-cultural theory emphasizes the context in which social activities happen and the school setting familiarises learners to classroom tasks and activities that shape and change their attitudes, thinking, and values. In the school context, teachers have the opportunity to implement household waste management practices and develop an awareness that should be passed on to succeeding generations (Shabani, 2016:80).

Social learning theory guided this study since the phenomenon under investigation is to explore the teachers' views regarding learners' awareness of household waste management. McLeod (2016:6) explains social learning theory as behaviour that is learned from the social environment through observation of role models. The models can be teachers, family members, peers, or television models, and the people whom learners admire. McLeod (2016:1) refers to Bandura's learning theory as being based firstly on mediation, which is knowledge passed from one person to another. In this study, for example, learners were expected to acquire knowledge values, and skills through the theme of household waste management being integrated into other CAPS subjects. The researcher expects that teachers should be able to impart knowledge regarding household waste management that is influential in changing learners' behaviour (McLeod, 2016:1), as teachers at school play a major role in influencing learners' behaviour. Learners pay attention to their models and later copy and imitate what they observed (McLeod, 2016:2). If the behaviour is reinforced or rewarded, learners repeat the behaviour whereas non-rewarding of the behaviour may result in a negative performance of the behaviour (McLeod, 2016:2).

In this study, learners are expected to imitate the behaviour of their role models in effecting household waste management. Reward or punishment of behaviour results

in either positive or negative performance, and this can relate to how learners conduct household waste management. Based on the social learning theory, which emphasis learning through observation and imitation rather than simply hearing things, can have a positive impact on how learners behave and, in this case, about household waste management. Learning is effective if a new behaviour is modeled by their school teachers, peers, or parents at home. In this study, learners will conduct household waste management when they observe and imitate their role models.

Place-based theory also foregrounded this study. Place-based theory centres on the environment where the learner is socialised (Dewey in Kleederman, 2009:2). Dewey (in Kleederman, 2009:3) statesthat political, ecological, social, and ideological factors have an impact on learning. The impact can be either positive or negative. The importance and benefits of place-based learning depend on the learners, teachers, and community. Teachers need to use the environment's physical aspect, social aspect, and surroundings to gain knowledge that can be used as a source.

Sobel (2008 in Kleederman, 2009:3) claims that place-based learning theory is based on the natural environment and includes cultural, social, and economic conditions of the place. In this inquiry, the views of teachers in selected secondary schools of Newcastle were explored and reviewed regarding the phenomenon of learners' household waste management.

Place-based theory has the guiding principles on how learners acquire knowledge to solve problems (Dolmans, Grave, Hap Wolfhagen & Van der Vleeuten, 2005:733). These principles, discussed in more detail in Chapter 3, encompass that learning should be a constructive process, learning should be self-directed, learning should be a contextual process, and learning should be a collaborative process. The principles indicate that the place-based theory advocates that learners should be problem solvers and take initiative in their knowledge acquisition and discover new knowledge, thus expanding on their existing knowledge. The notion of teachers stimulating learners' interests towards self-directed learning in place-based learning concurs with Vygotsky's theory of socio-cultural theory, which promotes the scaffolding of the learners. In this regard, teachers present learners with a problem and monitor the process of learning where learners are stimulated and interact amongst themselves to solve problems.

In light of the place-based principles, learners' awareness of household waste management learning relates to learning as a contextual process. A school context should motivate learners to become aware of environmental issues such as household waste management and stimulating learning conditions, provided by teachers, could ensure that learners actively participate in knowledge acquisition and skill development for the management of household waste. This points to the principle that learning should be a constructive process, in that learners' active involvement and participation in household waste management should develop an awareness of the phenomenon.

1.4 PROBLEM STATEMENT

The importance of integrating environmental education themes, such as household waste management, in Curriculum and Assessment Policy Statement (CAPS) Grade 7-9 subjects cannot be over emphasised in South African schools. In supporting this view, Raveesh (2015:111) indicates that globally there is a high consumption pattern which is followed by a huge amount of household waste without the appropriate knowledge of how to manage it. Drawing from the experience as both primary and secondary school teachers, learners coming from both high-income and low-income backgrounds often bring a variety of food to school, which are packed in different packages that end up littering the school and the surrounding environment. Learners dispose of the containers and left-over food in the same dustbins both in the classroom and the school premises with little regard for recycling of similar materials. Community, schools, and teachers have a role to play in disseminating knowledge, skills, and shaping learners' attitudes towards waste-free managed environments. Taking this into account, there is a gap which the researcher needs to understand regarding learner's awareness of household waste management.

The main problem in this study is a huge waste generation in the school environment and the surrounding areas of schools in the town of Newcastle, South Africa which could be emanating from inadequate awareness of household waste management. It is for this reason that the study sought to reveal the views of secondary teachers' views regarding learners' awareness of household waste management in Newcastle.

1.5 PRELIMINARY REVIEW OF THE LITERATURE

Household waste challenges in other countries

Household waste management is a global problem. Both developed and developing nations encounter the same problem particularly as a result of population and economic growth (Han *et al.,* 2017:947). When discussing waste management practices, it is of paramount importance that the state of development of the country in the discussion be looked into, as that may have a bearing on the issues involved. Most municipal solid waste comprises household waste.

In India, huge amounts of solid waste have escalated as per census findings of 2001, as a result of population increase whereas waste management efforts, implementation of citizens' awareness with regards to household waste have not been enforced (Licy *et al.,* 2013:148). Raveesh (2015:111) concedes that in India, waste management currently entails the collection of waste from residential or industry and dispositing it in landfills. McAllister (2015:4) confirms that in India, household waste is deposited in low lying places outside the cities, violating the principles of sanitary waste disposal. In areas with minimal waste collection, household waste is burnt. It is the researcher's view that awareness campaigns regarding household waste management should be based on sensitising learners and citizens about unhealthy waste management systems and their effects on the environment should be highly promoted.

Agamuthu (2013:1) states that the amount of waste management needed depends on the patterns of consumption. Population increase, lifestyle, and consumerism result in increased household waste production and ends up in rubbish dumps of landfill sites. The quantities of waste deposited in landfills are influenced by management such as waste reduction patterns, which schools should introduce by sensitising learners to household waste management through a variety of programmes. Agamuthu (2013:1) concedes that in most developing countries, there is a lack of accurate data and transparency. The researcher's view is that household waste is not managed at the household level, nor at schools and in the community, which is the reason that collected waste ends up being picked by waste-pickers in large dumps.

Fei, Qu, Wen, Xue, and Zhang (2016:75) concur with Agamuthu (2013:2) on China's challenges in waste management owing to population growth and high standards of living, resulting in a waste increase. In China, participation in sorting household waste into categories of organic and inorganic needs to be done thoroughly thus ensuring separation at the source to reduce levels of waste deposited in landfills; however, if it is not practiced well, it does not work very well (Fei *et al.,* 2016:76).

Household waste challenges in South Africa

In South Africa, the Department of Environmental Affairs (DEA): Waste Management (2012:279) states that population growth and economic growth have resulted in an escalated increase in waste production. Waste generation exerts pressure on the waste management facilities which are already in short supply. The consequences of poor waste handling have had a major effect on schools and communities. The norm is that increased waste production stems from an increase in population, purchasing abilities, and consumerism. Within the school context, high learner enrolment has resulted in huge waste creation which could probably have a negative impact on the schools' waste management facilities.

It is the local governments' responsibility to provide waste management services in the communities (RSA Act no.108 of 1996). The fact that household waste arises from human activities means that it should be effectively managed so that it does not have diverse effects on the environment (DEA, 2008:11). Waste generation must be avoided where possible and only be disposed of when nothing else can be done with it. This will ensure that everyone lives in an environment that is safe and free from pollution and does not have a detrimental effect on health.

The Polokwane Declaration on Waste Management (2001:2) stipulates that the government, civil society, and the business community will ensure the reduction and disposal of household waste. The Republic of South Africa (2008) National Environmental Management Waste (2008) (Act 59 of 2008) outlines that waste must be well catered for and treated before it is disposed of. To this effect, it is the researcher's view that the schools have a responsibility to inform learners about household waste management to ensure that the learners and their community conform to the waste management requirements to live in a healthy and well-managed environment. This begins with schools taking responsibility for teaching the learners about hygiene and keeping their environment safe and free from household waste.

The Council for Scientific and Industrial Research (CSIR) report calls for the enforcement of reduced waste production to prevent depletion of natural resources, exhaustion of landfill capacity, and environmental waste impact (CSIR, 2011:20). The researcher found the statement to be relevant in this study because of the importance of schools in teaching young learners about waste, littering, recycling, and practicing sustainable methods of household waste management that could lead to an

improvement of household waste management. Household waste management can be implemented to avoid contamination which may impact negatively on the environment. The CSIR report (2011:20) contains information about hazardous waste, mixed wet food or organic waste, contaminated paper, and other recyclables, making them unfit for recovery. In schools when learners mix different kinds of waste in the dustbins, the waste gets soiled and contaminated. In this regard, contaminated waste may cause harm to the learners which contrasts with the expectations of The Republic of South African Environmental Waste Management (2008) (Act no. 59 of 2008).

The government has created the National Domestic Waste Collection Standards appropriate for different contexts. The standards apply to municipalities to implement measures for waste management to avoid and reduce waste through strategies such as reuse, recycling, and recovery since municipalities are obliged to organise the separation of waste at the household level (Waste Act, DEA, 2008). The call for waste management is not the responsibility of the municipalities only but should, as the researcher argues, be a responsibility of schools and the community.

The Department of Environmental Affairs (2011) stipulates more stringent requirements for landfills, including limiting the amount of waste that should be disposed of at the landfill; hence municipalities are obliged to engage in waste separation at the household level. It is crucial to implement successful waste minimisation strategies such as educating learners on household waste avoidance; reduction and recycling. The goal of the strategy is to promote waste minimisation through encouraging the concepts of reducing, reusing, recycling, and recovery of waste so that most of it is diverted from reaching the landfill (DEA, 2011). In light of this, schools have a responsibility of sensitising learners to household waste management and monitor its implementation.

Integration of the theme of household waste management in CAPS school subjects

Curriculum developers require the participation of stakeholders like management, teachers to develop a curriculum that applies not only at the institutional-level but for class implementation (Chitrangean, Sallekngam & Thongthew, 2010:161). This means that stakeholders should advocate for the implementation of household waste management in the classrooms or schools and that household waste management be integrated into other CAPS subjects like Environmental Education.

Cincera and Krajhazi (2013:118) contend the Eco-Schools programme, implemented in 47 countries, emphasises developing environmental awareness in schools and communities with a focus on including environmental issues in lesson plans and improving the school environment. Teachers work with the learners in this programme to minimise waste and become actively involved in recycling. Very little waste is disposed of by participating Eco-Schools. Furthermore, the Eco-Schools programme supports the community's waste minimisation and promotes the schools' policy of natural household waste management strategies. In South Africa, 853 schools in nine provinces are members of the Eco-Schools programme as per WESSA Eco-schools Newsletter (2018).

Within the context of Newcastle, the local municipality approved an Integrated Development Plan that cites waste as one of its key development challenges. It states that:

> The quality of the environment within the Newcastle local municipality requires urgent attention. This is symbolised mainly by the deteriorating quality of water, poor air quality due to emissions, urbanization, waste collection, and general lack of active open space in the Newcastle Local Municipality (2015:13).

In Newcastle, the physical, social, scientific, and technological, economic, political, and social dimensions are negatively affected because of burgeoning urbanisation and a lack of sustainable waste management implementation. Hence schools must educate and sensitive learners to environmental issues, creating awareness by integrating the theme of household waste management and implementation at grassroots level.

1.6 RESEARCH QUESTIONS

Against the above background, the main research question was formulated as follows**:**

What are the secondary teachers' views regarding learners' awareness of household waste management in New castle South Africa?

The following research sub-questions were posed to explore the main research question further:

1. How do teachers understand household waste management?
2. How do Natural Sciences, Social Sciences, and Life Orientation teachers integrate the theme of household waste management in their subjects to enhance learners' awareness?
3. What training have teachers received to integrate the theme of household waste management in Natural Sciences, Social Sciences, and Life Orientation?
4. What are the benefits of integrating the theme of household waste management in Natural Sciences, Social Sciences, and Life Orientation subjects?
5. What are the challenges of integrating the theme of household waste management in Natural Sciences, Social Sciences, and Life Orientation subjects?

1.7 AIM AND OBJECTIVES

This study aimed to explore teachers' views regarding learners' awareness of household waste management in selected secondary schools of Newcastle, South Africa.

The objectives of this study are to:

- examine how do teachers understand household waste management,
- understand how Natural Sciences, Social Sciences, and Life Orientation teachers integrate household waste management in their subjects,
- ascertain training that teachers received training to integrate the theme of household waste management in Natural Sciences, Social Sciences and Life Orientation,

- reveal the benefits of integrating the theme of household waste in Natural Sciences, Social Sciences, and Life Orientation subjects,
- expose the challenges of integrating the theme of household waste in Natural Sciences, Social Sciences, and Life Orientation subjects.

1.8 SIGNIFICANCE OF THE STUDY

The rationale for conducting this study was to contribute new knowledge regarding learners' awareness of household waste management in schools and the surrounding areas. The findings of this study might be useful to schools, public and private, regarding learners' awareness of household waste management. Furthermore, learners' awareness of household waste management could contribute to ensuring waste-free schools and be extended to their communities in Newcastle. The study could further contribute to identifying gaps in knowledge that should help with how the curriculum integrates the theme of household waste management in other CAPS subjects.

1.9 RESEARCH METHODOLOGY

Any given research has to focus on the most suitable design and method to gather the most appropriate data to give the most informed results (Creswell, 2014). In the following sections, the paradigm underpinning the research is briefly described. Thereafter, the research method or approach is verified with the design deemed most appropriate for this study being introduced. Data collection is introduced and briefly discussed as is the data analysis used in the study. Issues of trustworthiness and ethical considerations are also briefly discussed in the subsequent sections.

1.9.1 Research Paradigm

Philosophical research is mainly guided by different paradigms which include the positivist, interpretive, or critical research paradigm (Ryan, 2018:130). This study is embedded in the interpretivism paradigm as it aims to investigate learners' awareness of household waste management in selected secondary schools in Newcastle, South

Africa. Henning *et al.* (2004:20) refer to knowledge being constructed through observing phenomena and also giving descriptions of people, beliefs, values, and reasons to create meaning and understanding of the topic under investigation. In this study, the researcher used the interpretive lens to explore the teachers' views on learners' knowledge regarding household waste management in selected secondary schools in Newcastle, South Africa.

Maree (2014:52) states that the ontology is what is true, reality, or that which is or how we come to know. The ontological assumption concerning household waste management was unveiled by probing the teachers' views on learners' awareness of household waste management. The researcher considered the participants' experiences on learners' awareness of household waste management.

Epistemology refers to knowledge about a phenomenon (Maree, 2014:52). Epistemology answers how we come to know, how we can discover and know the truth. It is assumed that every subject in the school curriculum has a particular environmental focus embedded within it, as per the Department of Basic Education which concurs with Loubser (2014:59). Learners are expected to be knowledgeable about environmental issues, in this case, household waste management but household waste is still a cause for concern in most schools and surrounding areas of the schools in Newcastle town, especially in high-density suburbs.

1.9.2 Research Method

The research method is a research plan which specifies and clarifies the steps from broad assumption stipulating detailed data collection methods, analysis, and interpretation (Creswell, 2014).

Researchers use different research approaches that suit the inquiry of their investigation. Qualitative, quantitative, and mixed-method approaches may be used by researchers depending on the study. Henning *et al*. (2004:3) state that the quantitative approach controls the elements and the actions of the participants with predetermined data collection instruments designed by the researcher being used (Creswell, 2014). Numeric data are collected and analysed statistically.

Neuman (2011:174) explains that qualitative approach captures language and words that come from the participants about their lived experiences in a natural setting. A qualitative approach investigates the meaning and understanding of the social problems of individuals or humans (Creswell, 2014). A qualitative approach clarifies what happens, why it happens, and the way it does. Language and words that come from the participants bring about social reality from the perspective of the participants (Leedy & Ormrod, 2010:135).

A combination of qualitative and quantitative research approaches is regarded as mixed methods research (Creswell, 2014). Mixed methods research is a way of triangulating and bridging gaps that may be omitted in qualitative and quantitative data collection sources (Creswell, 2014), assuming that focusing on qualitative or quantitative alone may not yield valid, trustworthy, and in-depth data.

This study followed a qualitative approach as it was deemed applicable to the study as it sought to explore and understand the phenomenon of teachers' views regarding learners' awareness of household waste management in the context of selected secondary schools in Newcastle. The researcher wanted to fully understand the phenomenon from the participants' perspective about their lived experiences in a natural setting.

1.9.3 Research Design

Loubser (2014) explains that research design is a distinctive framework clarifying how data regarding the study will be gathered while Creswell (2014) regards research design as procedures of how the inquiry gets conducted. The research design refers to the way an inquiry is perceived and conducted and how the findings get compiled (Mouton, 2000 in Henning, Van Rensburg & Smit, 2004:30).

The philosophical assumption that researchers bring into the study are the strategies used in the research such as qualitative case studies and quantitative experiments (Creswell, 2014); however, this inquiry was a single-case study. Stake in Henning *et al*., (2004:32) state that in a case study, the topic of inquiry is explored as a unit of a system. The system may be a group of people, documents, or any social entity bounded by parameters stipulating place, time, and any information that can be gathered within the boundaries. Stake (2008) stipulates that a group of individuals or a system bounded in a specific place in a particular time with unique characteristics

studied in-depth is considered a single-case study. Creswell (2014) agrees with Stake who considers a single-case study to be an in-depth exploration of a system or individuals bounded by activities or events. Yin (1994:2) states that rare or unique events found in cases that are critically investigated are referred to as a single case study.

This study employed a single-case study on learners' awareness of household waste management in the three selected secondary schools of Newcastle town in South Africa.

1.9.4 Selection of Participants

According to Bryman and Bell (2007), the population represents the universe of unity from which the participants are selected. The selected secondary schools and teachers from secondary schools in Newcastle municipality, located in Amajuba district, met the specific criterion of the investigation (Alvi, 2016:32). McMillan and Schumacher (2010:138) indicate that selection of the participants is when a researcher selects participants from the population who will represent or give the most appropriate information about a topic of inquiry. The target population of the study was three (n=3) secondary schools and (n=9) teachers who are currently teaching Natural Sciences, Social Sciences, and Life Orientation in Grade 8. One teacher per subject and three teachers in each of the three schools were selected as participants. The three secondary schools were selected from a high-income area, a low-income area, and one on the periphery of urban Newcastle to have a range of in-depth understanding of the learners' awareness regarding household waste management.

1.9.5 Data Collection

Stake (1998) and Merriam (1998) concur that a case study researcher must capture data from multiple sources. Different tools should be used to gather data. In a qualitative inquiry, the researcher spends time exploring the setting of the inquiry, participants and documents are studied using specific tools and techniques to gather in-depth data based on the inquiry (McMillan & Schumacher, 2010:322). In this study, data were collected using semi-structured interviews, observation, and document analysis (Henning *et al*., 2004:99).

1.9.5.1 Interviews

The researcher conducted face-to-face semi-structured interviews with Natural Sciences, Social Sciences, and Life Orientation teachers. Three teachers who teach Natural Sciences, Social Sciences and Life Orientation in each of the three selected secondary schools of Newcastle were interviewed McMillan and Schumacher (2010:355) explain that interviews are used to obtain fruitful data from the participants on how they perceive their world and events in their lives. The interviews were conducted because the researcher wanted to obtain first-hand information about learners' awareness on household waste management, theories foregrounding the teaching of learners' awareness of household waste management, integration of the theme of household waste management in other CAPS subjects, the challenges and successes of integrating the theme of household waste management in Natural Sciences, Social Sciences and Life Orientation subjects and finally, strategies to integrate the theme of household waste management in Natural Sciences, Social Sciences and Life Orientation subjects to enhance learners' awareness.

1.9.5.2 Non-participatory observation

McMillan and Schumacher (2010:350) explain that during observation, behaviour that happens naturally in a natural setting is captured to understand the phenomenon being studied. In this single-case study, the behaviour of teachers in integrating the theme of household waste management in other CAPS subjects to enhance learners' awareness. An observation checklist was used by the researcher to capture data related to the surrounding school premises.

1.9.5.3 Document analysis

Curriculum and Assessment Policy Statement (CAPS) for Natural Sciences, Social Sciences, and Life Orientation subjects were analysed for content on household waste management as the Environmental Education theme. Henning *et al*. (2004:99) state that both old and new documents are reliable sources of information as long as they relate to the study topic and the main research question. In this single-case study, the Natural Sciences, Social Sciences, and Life Orientation CAPS documents, teachers' lesson plans, and assessment plans were relevant documents which the researcher analysed to collect data related to the integration of household waste management theme. Document analysis was used to bridge the gap that could have been probably

left by semi-structured interviews and observation and provided in-depth and informative data on the integration of household waste management theme.

1.9.6 Data Analysis

Data were analysed thematically (Neuman, 2011:510). Data were organised into manageable themes, trends, and relationships. This was done to understand various elements of data through inspection of relationships between concepts, constructs and to see whether there were any patterns or trends that could be identified or isolated to establish themes in the data. McMillan and Schumacher (2014:355) stipulate that qualitative data collection and data analysis are interwoven. Data analysis starts during the data collection process and involves starting with specific data and ending with categories and patterns. Themes and conclusions thereafter arise. Data collected through interviews were transcribed and concluding notes were written during the data analysis process. Field notes and transcripts were critically examined and synthesised. During the analysis of interviews, the researcher gave meaning to what participants said and constantly checked the research questions and the research aims for correlation.

1.10 MEASURES FOR TRUSTWORTHINESS

In qualitative studies, the trustworthiness of data can be determined by using the criteria of dependability, transferability, credibility, and confirmability to ensure the trustworthiness of the inquiry findings, whereas quantitative researchers base their findings on reliability, objectivity, and validity (Guba, 1981 cited in Anney, 2014:272).

- Dependability

The true value of the findings can be realised by attaining first-hand information from the participants' perceptions of their lived experiences (Anney, 2014:272). The true value criterion was applicable in this study since data was collected qualitatively based on the participants' perspectives about the phenomena of inquiry. Research findings that are consistent after data collection from a similar context with similar participants are dependable (Merriam, 1998:205). In this study, dependability was established by the researcher taking full control of the data capturing, methods, and auditing the data collection methods.

- Transferability

Lincoln and Guba (1985 cited in Krefting, 1990:217) explain that applicability of

findings in other contexts yields similar results. Research findings from one context can provide similar findings in a context outside the inquiry parameters yet there are similarities in context. Applicability of the research findings to another context with similar participants yields transferability.

- Credibility

Consistency is achieved if the repetition of data collection is done with the same participants under the same conditions and the same outcomes are achieved (Anney, 2014:275). Consistency in the results is whereby the same data collection instruments are administered with the same participants under the same situation providing credible outcomes.

- Confirmability/ Neutrality

Research findings need to be based on the participants and the situation of the researcher should be free from bias which could influence the data findings (Krefting, 1990:216). The researcher dealt with data that came from the participants free from bias and not based on the researcher's perspective or experience.

In this inquiry, research findings verification was done by member checks. Guba (1981:85) affirms that to improve the quality and true value of the inquiry, research findings should be sent back to the participants to verify if the findings are a reflection of the information that was provided by the participants.

- Validity

In this investigation, the researcher used ecological validity which on one hand, Neuman (2011:456) proclaims to be the degree to which the participants' social world described by the researcher matches with the participants' setting or the information extracted from the participants. The researcher's presence did not affect the participants' daily procedures. The study has ecological validity since the events occurred naturally. In this case, data that was collected from the participants on household waste management was tallied with what happens in the participants' natural context, the presence of the researcher during data collection was not supposed to alter or change what always happens in the schools. Furthermore, to ensure the validity of the data collection tools, which were semi-structured interviews, non-participatory observation and document analysis, it was important that they evaluated what they were supposed to evaluate (household waste management). On

the other hand, Henning *et al*. (2004:148) stipulate that validity suggests the truthfulness of the data that is gathered. In this inquiry, the data which the researcher collected was supposed to fit well with the actual reality about household waste management in the social world which is the schools. The researcher ensured validity by checking the research questions, theoretical interpretation, and findings. Validity was also enhanced by the use of audio recorders for detailed descriptions of data from the participants on household waste management (McMillan & Schumacher, 2014:354).

1.11 ETHICAL CONSIDERATIONS

This study involved humans hence it was ethical for the researcher to protect the rights and wellbeing of the participants in the investigation (McMillan & Schumacher, 2010:117). Research ethics deals with what is morally right or wrong for the participants (McMillan & Schumacher, 2010:117). Application of what is ethical and legal for the protection of the participants was imperative. The researcher applied for and was granted ethical clearance from UNISA CEDU for purposes of data collection.

- Informed consent

The researcher was open and honest with the participants by providing an explanation about the purpose of the study and in what way the information was to be used. The aims and benefits of the study need to be revealed to the participants (Henning *et al*., 2004:73). The outcome of the study about the participants' lived experiences were made available to the participants for their review if they wished to have it. The researcher informed the participants about the instruments and the role of the participants in the inquiry. The participants were fully aware that they were participants in the study and they were free to withdraw at any time if they wished to and there was no penalty for participants who wished to withdraw. Informed consent helped to establish whether or not the participants knew that they were participating in the inquiry and the participants were not supposed to act contrary to their principles.

- Voluntary participation

The researcher informed the participants that taking part in the study was voluntary and not compulsory. McMillan and Schumacher (2010:118) state that the participants

should not be forced or coerced to participate. They may choose to participate or not and are free to withdraw from the study should they desire to do so at any stage of the research. There was no penalty if the participants wished to withdraw from this study if they felt uncomfortable due to the data collection process. Participants voluntarily partook and provided information on the study without the researcher compelling them. The participants participated in this study with full knowledge that there were no costs which they were going to incur as a result of this study and that the study could not benefit them individually but could benefit the schools, communities, and the society at large.

- Harm or risks

This study did not cause harm or expose the participants to risks. Participation in this study had no detrimental consequences for participants. The study involved non-vulnerable adult participants older than 18 years and no foreseeable risks were anticipated. Personal information that was gathered from the participants during a face-to face semi-structured interviews did not include sensitive information. The study neither revealed embarrassing information nor exposed the participants to any form of danger. McMillan and Schumacher (2010:119) state that the research participants need to be protected and be safe when they partake in an inquiry. To ensure safety in this study, data was collected at the workplaces (schools) of the participants during the day.

- Confidentiality

Neuman (2011:119) alludes to the fact that the participants' identity should not be revealed but remain anonymous. Confidentiality was exercised in this inquiry with the use of pseudonyms to conceal who the participants were and to protect their dignity. The data that the researcher collected in the field was being kept confidential.

1.12 DELIMITATIONS OF THE STUDY

The study was delimited to fit the defined scope (Leedy & Ormrod (2010:332). In this study, the researcher only focused on the selected three secondary schools and six teachers currently teaching Grade 8 Natural Sciences, Social Sciences, and Life Orientation classes in schools situated in the town of Newcastle within the Amajuba

district, South Africa. The study could not be generalised to other districts or the entire population.

1.13 CLARIFICATION OF TERMS

Household Waste

Household waste is home products, a major source of municipal waste that includes paper, containers, tins, aluminum cans, glass, ceramics, polythene, textiles, vegetables, and other food remains (Demirbas, 2011:1284).

Waste Awareness

Waste awareness is becoming knowledgeable or sensitive about household waste management.

Waste Management

Waste management is the avoidance of waste where it can be avoided, reduced, or re-used, according to the Department of Environmental Affairs (Act no.59 0f 2008). At the local government level, waste management involves storage, collection, transportation, separation, treatment, and disposing thereof.

1.14 CHAPTER OUTLINE

This study on secondary teachers' views regarding learners' awareness of household waste management in Newcastle, South Africa is comprised of six chapters. Chapter One, the introduction, presented the general overview, the background to the study, with the problem statement, rationale, aims, objectives, and research questions being specified. Chapter two discusses the lens which guides the inquiry in terms of the theoretical framework. In Chapter three, an in-depth review of scholarly literature underpinning the inquiry is portrayed. Chapter four presents and describes the methodology, research design, research methods, research ethics, limitations, and delimitations. The data analysis and discussion of findings are presented in Chapter 5 and the final chapter, Chapter Six, the study summary and conclusions as well as recommendations are provided.

1.15 CHAPTER SUMMARY

Chapter one presented the orientation of the study comprising of the background of the study introduction, aim, research objectives, questions, and presentation of the study.

CHAPTER 2

REVIEW OF RELATED LITERATURE

2.1 INTRODUCTION

In Chapter One, the background to the study, the aim, and objectives, the limitations and organisation of the study were presented. This chapter will focus on reviewing the literature of scholars in line with the topic of study.

2.2 HOUSEHOLD WASTE

Household waste management is a global problem. Both developed and developing nations encounter the same problem particularly as a result of population and economic growth (Han *et al.,* 2017:947). Zhang, Huang, Yin, and Gong (2015:12) support this view and confirm that solid waste management is a major global challenge especially in urban areas of developing countries. When discussing waste management practices, it is of paramount importance that the state of development of the country in the discussion be looked into, as it may have a bearing on the issues involved. Considering that waste management is a global challenge hence the researcher found the essence in reviewing scholarly literature based on household waste management in some parts of the (developed and developing countries) to have a consolidated understanding of the theme of waste management. Most municipal solid waste comprises household waste which needs to be properly managed to prevent adverse consequences. Waste management strategies impact negatively on the environment; for example, on human health and climate change, if not properly managed (Bourguignon, 2015:3). Schools are not spared in this regard. Besides, contamination of the soil occurs when chemicals and greenhouse gases like methane contaminate the soil and atmosphere due to pollutants from waste disposed of in landfills and of concern, is that littering may cause harm to animals ingesting plastic (Bourguignon, 2013:3).

2.2.1 Household Waste Challenges in Developed Countries

In developed first world countries, waste management is a cause for concern owing to huge consumption patterns, economic status resulting in escalated waste production rates which bring about waste management challenges (Karpagan, 1999 cited in Mwiinga, 2014:1). The economic status of a country determines the amount of waste production. The wealthier the country, the more paper and plastic waste (Hoornweg & Bhada-Tata, 2012). In 2003, the percentage of household waste deposited in landfills by Austria was 30%, Belgium 11%, Denmark 7%, Germany 20%, Netherlands 3%, and Sweden 13% while the United Kingdom (UK) rated the highest 74% due to cheap landfill sites, less collection of recyclable waste, cost of recycling and lack of public interest to manage waste (Eurostat, 2015:2). The consequences of lack of awareness and action were that many recyclables ended up in landfills. Furthermore, in the European Union, ensuring consumer protection concerning toxins found in recyclables handling before recycling is a challenge (Bourguignon, 2015:7).

In the United Kingdom (UK) a government department division and the local authorities take responsibility for the collection of waste, which is a key factor in waste management (Cole, Osmani, Guddus, Wheatley & Kay, 2015:5). However, UK residents do not fully participate in household waste management. The householders' behaviours, attitudes especially on sorting their household waste before disposing of it, is a major challenge. Twenty percent of the householders do not use recycling facilities at all (Cole *et al*., 2015:5) and may be aware of the connection between consumer patterns and waste management.

In many parts of the world, waste that is disposed of mainly comprises leftover food (Oelofse & Nahman 2012:8). Sixty-one percent of the food thrown away as waste is still fit for human consumption. In the Netherlands, this comprises 8% while in the United States of America (USA) 25% of food waste that is disposed of can be avoided (Oelofse & Nahman, 2012:8). Taking this into account, the researcher argues that this could be the result of a lack of consumers' knowledge on the environmental impact and effects on humans of leftover food that is thrown away.

2.2.2 Household Waste Management Challenges in developing countries

Several factors have been identified to be contributory to poor waste management in Asian countries. The factors include less household participation, bad waste initiatives, lack of community awareness, and low waste collection measures (Asian

Development Bank, 2011 cited in Storey, Santucci, Fraser, Aleluia & Chomchen, 2015:1067). These challenges probably need different stakeholders to intervene regarding waste management challenges in Asian countries (Gerellschaft Fur international Zusammenar Beil (GIZ), 2013 cited in Storey *et al*. (2015:1067-106). Countries such as Malaysia, Philippines, Sri Lanka, China, Thailand, India, and Nepal waste management issues will be discussed in this inquiry.

The geographical location of countries does imply that they are developed. In Venezuela, South America it seems that although the Ministry of Environment and Waste is aware of the negative impacts of landfilling as a waste management strategy, efforts or implementation to curb waste disposed of in landfills have not been practiced to protect the environment and curb health risks (Karagiamidis, Wittmaier, Kontogianni, Wolff, Red-sawyerr & Sankah, 2012:53). This could be negligence or lack of knowledge on the part of the government of Venezuela with regards to waste management and its effect on the environment.

Malaysia has encountered a rapid waste increase of about 10.91% over the past ten years due to urbanisation, economic escalation, lack of policy implementation, inadequate technology, poor waste management facilities, lack of public awareness, and attitudes towards waste management (Akil & Ho (2014:1). Malaysia is one the fastest developing countries with high population growth, economic rise but it lacks policy implementation on waste management (Akil & Ho, 2014:2). Several factors influence the lack of policy implementation and include urbanisation, economic escalation, inadequate technology, inadequate waste management facilities, high consumption patterns, and besides, public participation in waste management involving reduction, recycling, and reuse (3Rs), in line with the Solid Waste Management and Public Act 672 of 2007, is lacking (Akil & Ho, 2014:2). This is in line with Desa, Kadir, and Yusooff (2012:103) who state that Malaysia faces waste management issues due to population increase, economic development, and modernisation. However, the lack of waste management emanates from substandard documentation of waste production rates and poor storage and collection techniques.

In the Philippines, as in other Asian counties, waste management problems are a result of population growth which gives rise to increased consumption rates. Furthermore, a huge amount of waste generated comprises biodegradable that is improperly discarded yet could be recycled. However, this has not been practiced. (Alave, 2011:1-

2). A study conducted on knowledge, attitudes, and practices regarding waste management conducted in the Leyte Education Division of the Philippines, revealed that secondary school learners generally had positive attitudes to waste management and were willing to follow the schools' policy and rules (Ramos & Pecajas, 2016:1462).

In Sri Lanka, the country faces waste problems due to a lack of awareness on waste management, inadequate waste management resources, poor policy implementation, low commitment and motivation of staff (Lalitha & Fernando, 2019:197). Learners' lack of knowledge on waste management stems from the non-integration of Environmental Education themes in the curriculum (Lalitha & Fernando, 2019:201). The researcher argues that schools need to include EE themes in their teaching, sensitise, and equip learners with the necessary knowledge, since learners will become future citizens responsible for environmental issues affecting them.

China and India face waste management problems emanating from over-population and increased urbanisation. This has resulted in increased waste production in China from 3% to 10% over the last 10 years and the country has become the largest waste producer in comparison to countries like Sweden, the UK, Japan, and the USA, according to the World Bank statement (cited in Ghosh, 2016:177). As a result, China has invested in solid waste management equipment and infrastructure that has improved the country's waste management. The researcher argues that countries need to find strategies and techniques to solve their waste management problems.

The amount of waste management depends on the patterns of consumption (Agamuthu, 2013:1). Of concern is that huge consumption and lifestyle result in increased household waste production. Waste produced in schools or communities, if not properly managed, ends up disposed of in landfills and the quantities of waste are influenced either by lack of awareness or waste reduction patterns. To influence waste reduction, schools should instill greater awareness in learners of the environment and sensitise them to proper household waste management programmes. Agamuthu (2013:1) explains that in many countries, developing and developed, landfills are not able to cope with the increased waste and effective recycling projects have not been implemented. Informal recycling takes the form of waste pickers with 2% of the urban population in Asia and South American taking on this role. The researcher considers waste picking beneficiary to residents in the form of job creation and a source of income as in China, there are about 6 million informal waste pickers working in large

dumps and In India, a reported one million are involved in waste picking (Agamuthu, (2013:2). Waste picking creates jobs and income for the unemployed; provides financial benefits to families and reduction of waste pilling in landfills. Recycling of waste material would influence landfills and the researcher argues that household waste could be managed at the household level such as in schools and communities and recycled and this would contribute to extending the lifespan of landfills (Agamuthu, 2013:1).

Fei *et al.,* (2016:75) concur with Agamuthu (2013:2) on China's challenges in waste management owing to population growth and high standards of living resulting in a waste increase. In June 2016, the Chinese National Development and Reform Commission and the Ministry of Housing and Urban-Rural Development jointly issued a mandatory waste separation draft, stating the importance of residents' active involvement in waste management programmes (Xu, Li, Ling, Lu & Shen, 2017:2). Residents' active pro-environmental initiative is essentially focused on sorting household waste into categories of organic and inorganic needs for successful waste management (Xu *et al*., 2017:2). However, waste management in cities was unsuccessful and indicated non-compliance to policy (Fei *et al.,* 2016:76). It seems that in many cases, the residents of China do not show concern for strategies set to improve waste problems in their environment and it seems that lack of awareness and concern of the impact of waste to the environment is the cause.

In India, the population is estimated at more than 1,21 billion with 31,2% making up the urban population (Gosh, 2016:176). Huge urbanisation, poor planning, and improper financial management negatively impact India's waste management (Census, 2011) which aligns with Ghosh (2016:176) and Kaushal, Varghese, and Chabhukdhara (2012:1473) who report on waste management issues emanating from huge urbanisation, improper financial management in India.

Various studies conducted in India depict the relationship between economic status and consumption patterns that has raised waste management challenges due to improved economic status which increases consumption rates (Kaushal *et al*., 2016:1476). As in China, many cities in India do not comply with the year 2000 rule of proper waste management due to some factors, such as poor land use, lack of financial capacity, poor regulation enforcement, lack of political preferences, and irregular communication between stakeholders. Furthermore, Indian cities are classified and

ranked according to population size and each has a different waste management approach. In the city of Aligah, 80% of the collected waste is disposed of in open dumping. There are no proper landfill sites and the consequences are

unhealthy waste practices which are hazardous to the environment (Singh, Yodar, Ayib & Siddiguib, 2014:20).

India is divided according to climatic conditions and as a result, different living standards, consumption patterns, and waste production rates differ based on the place and climate, yet the challenges of waste management are vividly noticed in all urban areas of India due to overpopulation (Joshi & Ahmed, 2016:18) in addition to increased industrialisation which is a driving force in waste production increase. Funds earmarked for waste treatment diminish and the country has had to resort to the storage, collection, transportation, processing, and disposal as the only means of waste management (Kaushal *et al.,* 2012:1474). Raveesh (2015:111) concedes that in India waste management currently entails the collection of waste from residential or industry and dispositing it in landfills, many of which are open and not properly managed. Thus, India's greatest challenge about waste management is the non-separation of waste and the dependency on landfills which struggle to cope with increased waste (Joshi & Ahmed, 2016:2).

Kadam and Sarawade (2017:15) also report on waste management in India where escalating urbanisation and lifestyle has caused rapid waste production and uncontrollable levels of waste dumped on roadsides, in water sources, and other undesignated places resulting in environmental pollution and unsafe environmental conditions. As a result of the above, it seems that the implementation of a policy on household waste control has not been enforced (Licy *et al.,* 2013:148).

In many areas of India, household waste is deposited in low-lying places outside the cities, violating the principles of sanitary waste disposal. In some areas of India, minimal waste collection and household waste are burnt. In both these instances, there are significant threats to surface and groundwater as well as health risks, and it is the researcher's view that awareness campaigns regarding household waste management in India, based on sensitising learners and the citizens about unhealthy waste management systems and their effects on the environment, are not promoted.

In Thailand, the government endorsed a no-dumping clause and formally decentralised many of its responsibilities which led to the closure of the Maha Sarakham landfill site

to the local government by August 2015. Subsequently, the no- dumping closure, which was approved by the Thailand government and enforced bythe local government of Tha kon Yang, deterred the communities from disposing of their waste in its local landfill. The communities consequently resorted to burning and dumping waste on roadsides which had diverse effects on the environment and communities (Yakalang, Clark & Ross, 2017:3).

Nepal faces waste management challenges such as dumping, uncollected waste, lack of implementation of waste management strategies, and poor service delivery from municipalities (Rai, Bhattarai & Neupane, 2018:2). Huge amounts of waste emanate from rural-urban migration, from increased purchasing habits, high waste production, and consumer attitudes and behaviour towards waste management (Rai *et al.,* 2018:2). In small cities of Nepal, household waste is probably due to high numbers that exert pressure on the waste management services; as a result, residents are willing to pay for waste services to curb environmental impact due to non-waste collection (Rai *et al*., 2018:2).

2.2.3 Household Waste Management Challenges in Africa

African countries also face similar waste challenges to developed first-world countries and Asian countries. In developing countries, solid waste management is regarded as the responsibility of municipalities (Mwiinga, 2014:17). The problems emanate from the huge population in urban areas which causes an increase in consumption patterns and waste production. Han *et al*. (2017:52) suggest that in developing countries, social factors such as population, family size, education, and geographical location also have a bearing on waste production and waste management. The researcher disagrees with the fact that family size has an impact on waste generation and management but thinks the attitudes of the households towards waste and awareness probably result in waste practices. However, the lack of knowledge, skills, and attitudes of consumers seems to play a role in household waste management.

Ifegbesan (2010:201) states that one of the challenges Nigeria faces include unhealthy solid waste disposal. The cities of Nigeria such as Abuja and Aughelli experience waste management problems like any other city in developing countries due to influx of people to urban areas and improved lifestyle that escalates waste production patterns, resulting in pressure exertion on the financial sector and resources of waste management (Efe, 2013:5). Of concern is that policy and literature

on waste management is inadequate to conscientise communities about household waste management. Nigeria lacks policy implementation, sufficient facilities, and funding whereas consumption patterns rapidly increase, and attitudes of residents towards waste management show indifference due to lack of knowledge on waste management (Ifegbesan, 2010:201). In Aughal, large volumes of waste are disposed of in illegal dumpsites and on both sides of Uduaran Street in Iwhreko. However, residents do not seem to pay attention to waste deposited in undesignated places (Efe, 2013:2). Waste dumping on the roadsides, unlawful dumping areas, in water drainage systems, and open areas are evident in the city of Port-Harcourt, yet residents seem unconcerned about the dumping of waste in undesignated places (Agwu, 2012:84). Poor management of waste services and the communities' attitude towards waste management is a cause for concern in Nigeria's cities.

Most schools face waste management challenges and it includes littering of materials used in the classrooms, leftover food, food packaging, and other materials discarded in the schools' environment. This pollution often takes place as a result of increased enrolment in most public schools and may lead to health risks (Oloruntoba, Olugbenga & Shendell, 2011:26). Additionally, inadequate waste management facilities, lack of knowledge on waste management, hygiene, and sanitation are not included in the Nigerian mainstream school curriculum (Oloruntoba *et al.,* 2011:26). Probably lack of knowledge and adequate waste management facilities causes poor waste management in most schools in Nigeria.

In Nigeria, a constantly changing school curriculum has impacted negatively on learners' knowledge of waste management. However, school subjects like hygiene which integrates environmental education, have been substituted by health education that does not provide diverse knowledge on waste management which has resulted in adverse effects on awareness of waste management (Ifegbesan, 2010:201). Consequently, the rapid change of the curriculum tends to harm both teachers and learners trying to adapt to changes.

According to Karagiamidis *et al.* (2012:15), waste management is a challenge in many Nigerian cities as waste is dumped along the roads and under bridges owing to lack of proper landfill sites as well as political, technical, economic, policy, and operational inefficiency. It has been reported that in the city of Lagos, Nigeria with a large population of over 10 million people, residents deplete natural resources due to

poverty leading to huge waste management issues (Karagiamidis *et al*., 2012:510).

In Paynesville, Liberia, residents experience similar waste management problems due to urbanisation, overpopulation, and increased consumption patterns owing to improved lifestyle (Almazan-casoli, Alfaro & Sikra, 2019:60). The residents of Paynesville prefer to clear waste from their immediate surroundings by disposing of waste in trails and undesignated places or burn and bury their waste near their homes where children easily have access (Almazan-casoli *et al.,* 2019:60). The residents do not consider the effects of their actions on the environment and human health. Although the local government collects waste, it is not regularly done in low-income areas, hence residents resort to risk waste management strategies to deal with piles of waste (Alazan-casolo *et al.,* 2019:60)

In Kampala, Uganda, solid waste which is estimated to be more than 84% is generated from households due to urbanisation. However, the Kampala local government lacks adequate infrastructure and waste management resources. Hence only 4% of the waste is collected while the rest is either burnt or deposited in the drainage systems (Ssemwenga, 2006 cited in Banga, 2011:25). Uganda, a country known for agricultural activities should be directing or collecting biodegradable waste towards composting in contrast to the landfilling of waste. This could be implemented by schools teaching learners to engage in composting and recycling of food waste. However, technical aspects of waste management such as privatisation of waste collection services and landfilling have drained 35% of Kampala city council funds channeled towards waste management. Although recycling is a key method of most cities in other countries this has not been the case with urban Kampala (Omran, Mahmood, Abdul & Robinson, 2009 cited in Banga, 2011:29). Recycling promotes economic and ecological solutions to waste management; however, lack of understanding of environmental degradation as a result of human consumption patterns, agriculture, and technology non-application is a problem which affects all living beings (Polat, Kaynya & Karamuftuoglu, 2014 cited in Kaya, 2019:5; Schneider, 1977). As a result, waste management awareness concerning problems in the environment could sensitise schools and communities on the importance of sustainable waste management strategies.

Botswana, like other developing countries, faces increased waste management challenges emanating from rural-urban migration impacting waste management

facilities owing to consumption and waste production especially in the Gaborone area. Although the 3Rs have been introduced, no implementation has happened (Mupara, Nkuba & Gwebu, 2017:267). Of concern is the poor quality of air emanating from improper waste collection and waste disposal strategies (Kgati & Balaane, 2001 cited in Kgosiesele & Zhaohui, 2010:145) with open dumping and incineration of waste being prevalent in low-income urban areas of Botswana (Gwebu, 2003 cited in Kgosiesele & Zhachui, 2010:146). Residents and schools in Botswana are prone to ill-health and diseases caused by poor waste management in the country's low-income areas. Hence improvements in waste management were drafted, finalised, documented, and approved to be gazetted as a bill to curb waste (Maburutse, 2009 cited in Kgosiesele & Zhachui, 2010:147).

To sum up, Brazil, Russia, India, China, and South Africa (BRICS) face waste management challenges as a result of poor planning, lack of infrastructure, low financial capacity for waste management, unclear job descriptions of stakeholders involved in waste management, and lack of proper data quantities of waste (Goncalves, Morges, Marques, Lima & da Silver, 2018:14). This has repercussions on waste disposal in undesignated places such as open dumping on roadsides which is hazardous to the environment and human health. Additionally, in these countries, consumers dispose of toxic waste that needs special treatment in landfills due to a lack of adequate waste management systems. However, government, municipalities, the population, and other stakeholders in BRICS countries need to work hand-in-hand to deal with waste management challenges that affect them.

2.2.4 Household Waste Management Challenges in South Africa

In South Africa, population and economic growth have resulted in escalating increases in waste production (DEA, 2012:279). The norm is that increased waste production occurs due to purchasing abilities and similarly, population increases mean more waste production. Waste generation exerts pressure on the waste management facilities, the responsibility of local government, which are already in short supply emanating from huge waste production (Newcastle integrated plan 2015).

South Africa's Integrated Pollution and Waste Management White Paper, published in the government gazette No 227 in March 2007, was an attempt to put in place waste management strategies for the disposal of unavoidable waste. It also highlighted waste

prevention, minimisation, and resource conservation (Ezeah, 2010:8). The policy focused on the implementation of waste legislation by various government stakeholders to deal with waste in provinces and commit to waste management implementation, as stated in the Polokwane Declaration in September 2001.

The Polokwane Declaration on waste management (2001:2) outlined strategies for that the government, civil society, and the business community to ensure the reduction of household waste disposal while The Republic of South Africa National Environment Management Waste (2008) (Act 59 of 2008) outlined that waste must be treated before it is disposed of. The fact that household waste emanates from human activities means that it should be effectively managed to curb diverse effects on the environment (DEA, 2008:11). Waste must be avoided where possible, be disposed of when nothing else can be done with it, to ensure that everyone lives in an environment that is safe, free, and not detrimental to the health and well-being of communities.

The Council for Scientific and Industrial Research report CSIR (2011:20) called for reduced waste production enforcement to prevent depletion of natural resources, exhaustion of landfill capacity, and environmental waste impacts. The CSIR report (2011:20) explains that hazardous waste, mixed wet food or organic waste, contaminated paper, and other recyclables, are unfit for recovery. In schools, different kinds of waste are mixed in the dustbins; the waste gets soiled and contaminated. In this regard, contaminated waste may cause harm to the learners which contrast with the expectations of The Republic of South Africa National Environment waste management (2008) (Act no. 59 of 2008).

The new Domestic Waste Collection Standards created by National Environmental Management: Waste Act, 2008 (Act No. 59 2009) outlined the provision of waste collection services improves the quality of life of the entire community to ensures a clean and more acceptable place to live and work in (DEA, 2011:1). This meant that municipalities were given standards against which to measure their waste reduction strategies. However, the call for waste management is not only the responsibility of the municipalities, but the researcher considers household waste management should be the responsibility of schools and the community. The Department of Environmental Affairs (2011) stipulated more stringent requirements for landfills, including limiting the amount of waste that should be disposed of at the landfill hence municipalities are obliged to engage in waste separation at the household level. For successful waste

minimisation, strategies such as educating learners on household waste management –reduce, reuse and recycle (3Rs) - should be implemented so that the majority of household waste is diverted and does not reach the landfill. In light of the above, schools have the responsibility of teaching learners about household waste management to ensure that the learners and their community conform to the waste management requirements to live in a healthy and well-managed environment.

In South Africa, inequality of distribution of waste management services exists particularly in the communities based on economic status and geographical location emanating from imbalances and influences of apartheid policies which demarcated population groups and provision of resources and opportunities (Dlamini, Rampedi & Ifegbesan, 2017:14). Consequently, this has impacted negatively on poor low-income areas and rural places whose waste management is poor compared to high-income areas. It is argued that the provision of waste management services should be evenly distributed to all communities so that waste is not detrimental to the health of people, as mandated by The Republic of South Africa National Environment waste Act (2008) (Act no. 59 of 2008). This is further supported by the Waste Management Act which states that municipalities should provide equal waste management opportunities using procedures and processes that adequately and equally promote waste management services to all communities (Dlamini *et al.,* 2017:22).

South Africa's municipalities face huge challenges concerning delivering equality and sustainable waste services to all households due to lack of skilled manpower, insufficient funds, and inappropriate equipment (DEA. 2012:117). To cope with these challenges, municipalities have privatised and outsourced waste services which have impacted heavily on previously disadvantaged low-income areas due to prolonged lack of waste collection (DEA) (2012:117). The researcher argues that hygienic environments are pivotal in the prevention of outbreaks of diseases and maintenance of healthy environments to preserve natural resources. As a first step, the researcher recommends that schools take the responsibility for teaching learners about hygiene and keeping their environment safe and free from household waste through the integration of specific topics of environmental education into school subjects. This is discussed in the following sections, beginning with what is done in other countries, and then what is happening in South Africa.

2.3 THE WAY FORWARD FOR WASTE MANAGEMENT

In 1992, governments agreed on The National Waste Strategy for Ecological Sustainable Development, for the improvement of resource depletion and reduce the environmental impact of waste disposal (Xevgenos, Papadaskalopoulou, Panaretou, Moustakas & Malamis, 2015:658). In Australia, the government committed itself to reduce the impact of waste on natural resources and minimise resource consumption. The Australian waste policy emphasised, “more resources and less waste” which is a resource conservation and waste management strategy to be achieved by the year 2020 (Xevgenos *et al*., 2015:658). In Europe, the waste management legislation specified that by the year 2020 waste management needed to curb waste sent to landfills and minimise incineration. The waste management directorate emphasised that non-disposal of biodegradables waste in landfills needed to be enforced. In Japan, the waste policy, which was adopted in 2000 promotes reuse, reduction, and recycling (3Rs). The target is to recycle 24% of waste.

The Jawahalal Nehru National Urban Renewal Mission (JnNuRM) in India spent huge sums of money developing a landfill site, compost plant, biogas plant, and recycling plant to improve waste management in India. Furthermore, Swachh Bharat Mission (SBM) initiated the 2014-2019 massive cleanliness where substantial finance was set aside to improve waste management, control the outbreak of diseases by preventing dumping of waste in open areas, taking cognizance of health risks and environmental impact in the outskirts and cities of India (Ghosh, 2016:177-178).

In the USA, the Environmental Protection Agency documented the move from waste management to materials management, which aims to reduce waste and increase sustainable use of resources (Xevgenos *et al*., 2015: 659). The New York State Department of Environmental Conservation (2012:2) stated that waste production in New York totals more than four pounds a day per person. Hence the New York Department of Environment and Conservation came up with waste management strategies which schools were required to implement such as reducing and recycling

all recyclables, recovering waste using technological and environmentally acceptable methods and only disposing of waste which can neither be reused nor recycled (The New York Department of Environmental Conservation, 2012:2).

In Ontario, Canada, door-to-door promotion of waste awareness campaigns and education on the effects of waste on the environment, decreased waste diversion to landfills and consumption patterns and waste awareness improved (Lakhan, 2014:223). This awareness may further extend to developing waste knowledgeable schools since learners are part of the community what is learned in schools may be practiced in the communities.

Waste produced in the European Union countries (EU) recorded improvement as a result of less waste generated in businesses, public sectors such as hospitals, and schools, which produce 10% of the total waste in the European Union (Union Agency cited in Bourguignon, 2015:2). Furthermore, the EU decreased waste reduction due to economic decline, and a marked shift from landfilling to recycling was noted (Bourguignon, 2015:2). Consequently, awareness of waste can help to control waste production rates provided waste generators, inclusive of learners at schools, are willing to improve their waste management.

In many developed countries such as the UK, Japan and Taiwan plastic waste which forms household waste is a challenge and causes harmful effects like land pollution, food contamination, energy loss, and economic declination (Chow, So, Cheng & Veng, 2017:126). However, strategies to deal with the impact of waste have been put in place; for example, educating communities about waste, informing business stakeholders, alerting the government and imparting knowledge in schools, and practicing recycling, reduction, reuse, and regeneration with learners in the schools of Japan, Taiwan, UK, and Hong Kong respectively (Chow *et al*., 2017:127). Educating and imparting knowledge about household waste management may probably yield environmentally favourable results if waste management partakers take the initiative and apply appropriate waste management strategies.

In the UK, purchasing habits, consumption patterns, and willingness of residents did not corroborate. Hence, the programme *Love Food and Hate Waste* were designed to reduce food waste and increase public awareness of waste management (Cole *et al.,* 2011:7). Another programme *Waste Resource Action*

Programme (WRAP) was initiated and focused on minimising packaging and reducing food sales which resulted in 520 000 tons of packaging waste reduction between 2005 and 2011 (Cole *et al.,* 2011:7).

It can thus be noted that the initiation of waste management programmes may assist with waste management not only in the communities but also at schools. The integration or introduction of waste management themes in the school curriculum at all grades and levels to equip learners with knowledge of household waste management to promote environmentally sensitive behaviour towards sustainable waste managed environments and environmental problems is vital (Ifegbesan, 2010:211). The curriculum should incorporate EE themes to develop learners' attitudes, values and shape them to be better citizens for them to be able to deal with EE issues in their communities and manage household waste more effectively

2.4 INTEGRATING THE THEME OF HOUSEHOLD WASTE MANAGEMENT IN THE CURRICULUM

The incorporation of EE themes in the school curriculum has been deemed vital in allowing learners to explore environmental issues, engage in problem-solving, and take action.

Siraj-Blatchford and Pramling-Samelson (2016) cited in Pamuk *et al*. (2019:1) argue that teachers play a crucial role in influencing learners' behaviours and attitudes. In this regard incorporating and integrating the theme of waste management in school, subjects may play a significant role in shaping learners' behaviours and attitudes towards household waste management. Jouhara *et al.,* (2017:486) further support this view by stating that reduction of household waste produced in schools and using most of it at the household source level, could solve problems of littering, and the cost of waste management facilities might decrease rapidly. However, this calls for teacher-learner active involvement in the curriculum by the integration of EE themes such as household waste awareness.

2.4.1 Integrating the Theme of Household Waste Management in the Curriculum in Developed Countries

Embracing environmental education themes in school subjects can have positive effects about waste management in schools. The United Nations Educational

Scientific and Cultural Organisation (UNESCO) proposed that the curriculum aims at educating individuals and developing environmental literacy. Awareness of sustainable development has been the global focus of educational institutions for the past 10 years. Hence Environmental Education for Sustainable Development (ESD) emerged from Environmental Education (EE) (Kaya & Elster, 2018:76).

Teachers play a significant role in changing and shaping learners' performance in schools with learners' knowledge, skills, attitudes, and values being determined by the quality of teaching provided by the teacher. Embracing environmental education themes in school subjects enhances learners' knowledge about household waste management problems (Hattie, 2003 cited in Kaya & Elster, 2018:83) and can have positive effects concerning waste management in schools. In German schools and teaching is governed by rules of the Federal States with the school curriculum including teaching knowledge about the use of materials using various teaching strategies (Huber & Gordel, 2006 cited in Kaya & Elster, 2018:76).

In Cyprus, the curriculum of the General Certificate of Secondary Education (GCSE) integrates environmental education themes in various school subjects. For example, the 6th and 7th foundation Science, Science for Grades seven and eight also Biology and Chemistry for Grades nine, ten, eleven and twelve (Firat, Karaz & Gündüz, 2011 cited in Kiraz & Firat, 2016:16). Besides, Kiraz and Firat (2016:23-24) further stipulate that to enhance environmental awareness and knowledge sensitivity about EE themes, primary school, middle school, and secondary teachers need to include EE topics in the curriculum. Furthermore, the Ministry of Education needs to revise and promote the inclusion of EE themes across the curriculum. In view of this learners could probably be empowered with the appropriate knowledge and skills to deal with household waste management challenges in their environment.

Integration of EE themes like sustainable waste management in the school curriculum is crucial as reported in studies conducted in Spain and Turkey. Martinez-Borreguera, Maestre-Jimenez, Meteos-Nurez, and Naranjo-Correa (2019:18) argue that compulsory integration of EE themes throughout formal education needs to be promoted. They suggest that learners need to engage in education that promotes knowledge acquisition and be pro-environmental sensitive to household waste management to have waste-free and non-resource depleted environments.

Martinez-Borreguera *et al*. (2019:19) advocate for the proper and adequate training of teachers with knowledge of how to integrate environmental sustainability and EE issues in their teaching of school subjects to promote education and solve household waste management challenges identified. Pamuk and Kahriman-Pamuk (2019:33) align with Martinez-Borreguera *et al*. in arguing that as teachers have an influential role on learners' behaviour and attitude, the integration of EE themes in teaching' may have a bearing on learners' household waste management awareness.

In the USA, the Connell Waste Management Institute provides a wide range of lesson plans and learner activities to empower high school teachers to impart knowledge on EE themes particularly waste management (Beckrich, 2018:64) This could probably assist teachers to integrate waste management theme in their subject to enhance teaching and learning on household waste management. Tutoring, imparting knowledge, and empowering primary and secondary school learners about the environment and issues about the environment, has been worthwhile particularly in Environmental Education (Ballantyne, Fien & Packer, 2001). Additionally, educating learners about the environment is vital in attaining long-term sustainable lifestyle choices and since learners will be the future environment partakers, knowledge attitudes and skills acquired at tender ages is vital in shaping their behaviour (Kolbe, 2015).

Integration of the theme of household waste management in school subject yields positive results, as confirmed by Nargund-Joshi and Lee (2013:57) who reported that integrating the theme of waste management in project-based learning with Mathematics and Science, assisted learners in developing positive attitudes towards waste and better methods of dealing with waste problems emerged from their research. Additionally, awareness of waste stimulated learners' minds on how they could contribute to their communities to reduce waste. Hence the researcher argues that the integration of EE themes in other subjects has positive results and will have an impact on household waste management.

As previously stated, teachers have a crucial role in developing learners to be quality citizens (Chitrangean *et al*., 2010:151), therefore, the achievement of learners is significantly dependent on the teachers' effectiveness of curriculum instruction and

this is particularly relevant in developing countries where the role of environmental education could play a major part in addressing challenges found in these countries.

2.4.2 Integrating the Theme of Household Waste Management in the Curriculum in Developing Countries

In some countries, the teaching of EE was considered inadequate and not achieving the goals it was set out to achieve. In India, the Indian Supreme court endorsed and introduced compulsory integration of EE themes in the institution's curriculum (Sonowal, 2009 cited in Suhail, Ahmed & Shakir, 2017:15). Schools in Uttarakhand have embraced the enforcement of compulsory integration of EE themes in the school curriculum up to the 8th class (Suhail *et al.,* (2017:15). Similarly, the Indian Ministry of Education introduced the Swachh Bharat Mission 2014-2019 which informs and educates citizens on the cleanliness of the environment. Education for sustainable development is another initiative that 800 learners and other stakeholders embarked on to assess the prioritisation of integrating EE themes teaching school subjects (Ahmed *et al*., 2017:16). The researcher argues that the involvement of EE themes in school subjects would improve learner engagement in waste management initiatives that would further improve waste management in schools and their communities.

In Bangladesh, Ullah, Hassan, and Uddin (2013:35) argue that positive attitudes, knowledge towards environmental issues could result in improved literacy and change in values concerning EE problems. They argue that environmental consciousness and sensitivity need to be promoted at grass root level in young children and should be an integral part of the school curriculum to encourage learners to be active role players in EE issues to conserve waste resources and protect their environments.

In the Philippines, the division of Leyte, secondary school learners' knowledge, attitudes, and practices on waste management was rated average with learners demonstrating low environmental knowledge (Ramos & Pecajas, 2016:1462). It is suggested that learners' lack of knowledge acquisition on waste management in the Leyte division Secondary school probably was a result of little integration of EE themes in the school subjects or lack of motivation of learners to partake in waste management. As schools and educational institutions are major waste generators awareness needs to be developed ensuring learners' positive attitudes and willingness

to partake in waste management issues. Thus, the integration of EE into school subjects is vital.

A study conducted in Ogun State, Nigeria indicated that secondary school students and staff members consider waste management as a cause for concern in their schools due to poor waste management practices The findings of the study reveal a lack of sensitisation of learners on the importance of integration of EE themes in teaching and learning to equip learners with the necessary knowledge on waste management and development of positive attitudes towards waste management issues (Ifegbesan, 2010:211). Although the Nigerian government-mandated integration and implementation of EE themes in the school curricula educating learners about the environment and imparts of waste on the environment solid waste is still dumped in urban and rural regions of Nigeria (Akinbote, 2007:47). The researcher suggests that the integration of EE themes in the school subject may probably enhance learners' awareness of household waste management. However, teachers' knowledge-based in teaching is important for the effective implementation of Environmental Education. Teachers should be committed to teaching Environmental Education and they need a good knowledge base with an in-depth understanding of the environment and its associated problems (Robottom, Malone & Walker, 2000). Teachers need to impart knowledge and conscientious learners about waste management at a young age which should be the foundation or training on waste management programmes. Furthermore, learners are expected to become future decision-makers at young ages, and their present decisions impact the success and sustainability of future waste management.

In response to high consumption rates and waste production in Nigeria, the Premier International School embarked on a waste management project which focused on the application of the 3Rs (Suleiman, Alumu, Ommo-osagie & Garba, 2015:431). The Premier International School successfully managed its waste by sensitising learners on waste management issues and implementing awareness campaigns focusing on minimisation, reduction, and recycling household waste (Suleiman *et al*., 2015:436). Correspondingly, teaching learners and equipping them with waste management strategies could have a positive environmental impact. Schools have to take it upon themselves to develop awareness in learners so they become active in waste management.

In Ghana, Miezah, Obiri-Danso, Kadar, Fei-Daffoe and Menssah (2015:16) report that traditional ways of household waste management are successful when waste generators partake actively in waste management in their communities and comply with waste handling principles. These principles, it is argued, can be taught at school and integrated into the curriculum.

In Morogoro, Tanzania secondary teachers' knowledge levels about knowledge on Environmental Education were examined (Kira & Kafanabo, 2016:2). The findings revealed that teachers lacked knowledge on how to integrate EE themes in other school subjects. Groves and Pugh (1999 cited in Kira and Kafanabo 2016:2) suggest that teachers' lack of knowledge and delivering flimsy information might confuse content passed on to learners. Hence teachers need to be adequately trained and have the necessary knowledge and skills to impart knowledge on EE themes to capacitate and enrich the learners, a notion which is supported by Kalid (2009 cited in Kira & Kafanabo, 2017:4) referring to the importance of subject content knowledge of environmental issues as well as pedagogical content knowledge to integrate EE in other school subjects.

Learners' environmental knowledge develops at a young age, and once formed, is entrenched as an attitude and value (Asunta, 2003 cited in Damerell, Hove & Milner-Oulland, 2013:2). A study conducted in Seychelles, recommends that teachers introduce environmental themes to learners at a young age so that the knowledge acquired by the learners will help develop knowledge, attitudes, and values to maintain sustainable waste-managed environments. The study suggests that learners' environmental education results in behaviour change with these learners being effective agents within their households and immediate community (Damerell *et al.,* 2013).

2.4.3 Integrating the Theme of Household Waste Management in CAPS Subjects

As children's attitudes towards the environment develop at young ages, once developed and mastered they tend not to change (Piaget, 1963:52). By the age of nine, learners can think and reason logically. Hence the importance of teaching learners about EE issues so that they can develop an awareness of their environment and learn to solve environmental problems by applying their logical thinking abilities.

Taking this into account, learners may deal with household waste management at a young age. In this regard challenges facing the country, need environmentally sensitive and environmentally sustainably cautious citizenry. Therefore, it is important to integrate EE themes in the school curriculum to equip learners with adequate knowledge and skills to maintain green schools to save resources and maintain household waste-free environments.

The National Environmental Management Waste Act, (NEMWA, 2008) (Act no. 59 2008) emphasises enforcing waste management regulations to protect the environment and health of humans (Godfrey & Oelofse, 2017:6-7). However, studies conducted on household waste management indicate a huge consumer lifestyle in low-income areas resulting in escalated volumes of food waste compared to high-income households who spend more on other items than on food. This could mean that schools located in low-income areas probably suffer the consequences of the community's food consumption habits which may result in food waste that needs to be properly managed (Martins, 2007 cited in Oelofse & Nahman, 2012:10).

The Republic of South Africa National Environment Waste Act (2008) (Act no. 59, 2008) in its integrated waste management strategy (IWMS) (2010), endorsed education and awareness on waste to be crucial and key components of any country's waste management. As a result, the integration of EE themes in the CAPS subjects is important in the school curriculum for learners to be effective in waste management issues surrounding their schools and communities. Furthermore, the role of institutions to educate learners at young ages to be responsible citizens who partake in EE issues responsibly cannot be overemphasised. The European Panel on Sustainable Development supports the development of children's positive environmental relationships to solve environmental problems with passion and refrain from treating EE issues as an alien (Van Niekerk, 2014:20). Therefore, it can confirm that learners are future environmental problem-solvers and decision-makers and their future impact on EE issues is influenced by their present childhood knowledge and awareness of EE problems.

Landfilling is considered the most efficient and least costly means of waste management in South Africa. However, due to limited land close to waste generation sources, landfilling ceases to be efficient (CSIR, 2011:4). Of interest is that countries

such German, Sweden and Canada consider land filling unlawful (Oelofse & Nahman, 2012:8). South Africa is trying to take a similar stance by diverting household waste to composting to cope with waste management obligations. Probably this could work effectively when schools adopt the same approach of handling waste management issues; however, education is the key.

A study conducted in Tswane by Kamara (2006) revealed low levels of knowledge pertaining waste leading to low participation in various waste management methods such as sorting, recycling, and disposal of waste (Mwiinga, 2014:18) and a study conducted in Cape Town by Nshmirimana (2014) indicates negative attitudes of residents towards solid waste management which emanates from lack of awareness on solid waste management. Both studies concluded that the community's participation in waste management and involvement in environmental issues were dependent on knowledge, population size, and income of households. This implies the involvement of learners in EE themes such as waste management is vital to encourage learners' active participation in waste management initiatives and programmes.

The Eco-Schools Programme, implemented in 47 countries, emphasises environmental awareness in schools and communities (Cincera, 2013:118). Teachers work with the learners in this programme to minimise waste and actively participate in recycling with very little waste being disposed of by participants. The Eco-Schools Programme supports the community's waste minimisation and promotes the school's policy of implementing natural household waste management strategies. In South Africa, 853 schools in nine provinces are members of the Eco-Schools Programme as per WESSA Eco-Schools Newsletter (2018).

As previously indicated, Newcastle faces similar challenges with the implementation of sustainable waste management implementation as stated in the Newcastle Municipality Integrated Plan (2015). This has prompted the waste management section to engage schools and communities in waste management. Hence schools must encourage learners' EE awareness by integrating the theme of household waste management and implementation in CAPS subject.

Educating children about the environment has a ripple effect in that it can be influential and enhance environmentally sustainable attitudes in their parents and the immediate community (Damerell *et al.,* 2013:5). De Jager (2014:444) concurs and

suggest that negative attitudes of others may be influenced by educating young children to lead and exhibit positive attitudes, behaviours, and values acquired at a tender age. Furthermore, environmental problems and challenges of waste management which affect communities and countries may be dealt with when learners are fully aware, knowledgeably skilled with appropriate values of dealing with EE issues like household waste management. As result, the school must integrate EE themes such as household waste management in the CAPS subjects and empower learners with household waste management knowledge. Loubser (2014:59) confirms that the Department of Basic Education (DBE) emphases the integration of EE concepts in every CAPS subject; hence the research question for this study: *What are the secondary teachers' views regarding learners' awareness on household waste management in New castle South Africa?*

2.5 CHAPTER SUMMARY

In conclusion, the review of the literature assisted in exploring and understanding household waste management globally and nationally, focusing on challenges, initiatives, and strategies as well as EE integration in schools subject both in other countries and in South Africa.

CHAPTER 3

THE THEORETICAL FRAMEWORK

3.1 INTRODUCTION

In the previous chapter, literature on waste management was reviewed which led to under covering challenges faced globally. Besides, the chapter reviewed the literature on how the theme of household waste management can be integrated into school subjects. This chapter explores various theoretical perspectives to build an understanding of theoretical perspectives regarding learners' awareness of household waste management. These theories were used to interpret the teachers' views and to situate the study within the theoretical context of the body of knowledge. The researcher reviewed theories that could assist in finding the gaps in the literature

(Creswell, 2014) and these included socio-cultural theory, place-based learning, and social learning theories, each of which are explored below.

3.2 SOCIO-CULTURAL THEORY

Socio-cultural theory clarifies that knowledge does not only deal with mental processes, it addresses the holistic teaching of humankind to be responsible members of society (Stetsenko, 2004:501). In this regard, strategies that shape and bring change to the individual, need to provide knowledge, shape attitudes, and promote behaviours enhanced by education and awareness programmes.

To further dissect the socio-cultural theory of learning, Vygotsky's central point of mediation with the social environment develops the child's personality which makes the child a social being (Haenen, Schrijnemakers & Stufkens, 2003:249). Vygotsky (1978:359) considers the process of learning academic concepts and personal/everyday concepts to be different in that everyday concepts are acquired due to an individual's interaction with the social environment. This means that everyday concepts are learned through others, such as the concept under study, which can be developed as a result of the learner's social interaction with adults, peers, or objects while academic concepts are scientific and acquired owing to the teaching and learning process. Vygotsky's sociocultural theory advocates for learner's active involvement in the quest for knowledge rather than the teacher-learner transmission of knowledge (Doolittle, 1997:85).

A learner's everyday concepts are basically dependent on his/her life experiences while academic concepts develop during the process of teaching and learning (Vygotsky, 1994:365). Based on Vygotsky's stance, learners' concept of the study phenomenon can probably be influenced by their exposure to household waste management experiences. Learners' social interaction with peers or adults and learners' development is embedded in the mediation which fosters psychological functions that emerge on the outside of an individual firstly and later inwardly, shaping the individual's personality. Hence the learners' interaction with other learners could probably shape and transform them inwardly towards household waste management issues.

Learners have to be proactive in acquiring knowledge based on social issues surrounding them, such as the phenomenon under investigation. The researcher considered that a combination of everyday concepts and academic concepts should help learners' active involvement in the management of household waste. Similarly, Vygotsky elaborates on personal concepts and academic concepts as being linked and united since the formulation of academic concepts influences the already existing personal concepts and results in a change. Hence the two concepts are intertwined. Step-by-step teaching of learners provides them with a foundation and orientation on what needs to be studied at the onset until the learner reaches a stage of operating independently. Vygotsky (1978:57) indicates that the interaction of learners with the social environment develops knowledge. The social environment comprises the relationships, the culture, and the society with whom the individual interacts. The social environment has a significant influence on household waste management behaviour. The social environment includes cultural background, socio-economic status of the community, institutions, and organizations, such as schools, workplaces, and community organizations, access to social support networks versus social isolation.

Mwiinga (2014:8) community education, support groups, awareness programmes, workplace incentives, and social marketing campaigns are some of the ways of enhancing awareness on social issues. These strategies may yield positive attitudes and promote awareness to engage in household waste management. Furthermore, the physical environment which could be the natural environment or man-made environment depends on the availability of waste management facilities to deal with waste. Before sensitisation of the community about waste management, physical facilities should be a priority. Because of this awareness campaigns and initiatives to

educate communities about proper waste disposal should focus on changing attitudes and perceptions towards proper waste disposal and management. As a result, it is important to teach household waste management to learners so that they learn to take care of their environment.

Cole (1996:111 cited in Haenen *et al.,* 2003:252) explains Vygotsky's term 'zone' as children's interaction with peers, adults, or any significant other to enable the children to fit well into the real world. It is in the 'zone' that teachers can stimulate learning which provides the basis for actual cognitive learning to take place. Hence teachers play a substantial role in the teaching and learning process of the learners with teachers' initial guidance of learners into the learning process equips them with methods and skills of solving problems on their own (Galperin, 1982 cited in Haenen *et al*., 2003:249). Household waste management may be probably promoted when teachers guide learners and leave them to take control in dealing with the issue independently. On one hand, Vygotsky's zone of proximal development (ZPD) promotes cognitive development that results in independence due to lower level development, whereas development of cognitive upper level promotes learning that takes place when the teacher or any knowledgeable individual gives instruction (Doolittle, 1997:88).

On the other hand, instruction plays a pivotal role in cognitive development (Doolittle, 1997:88). Therefore, a teacher's role is to give clear precise instructions to develop learners' cognitive abilities and create awareness on social issues that involve learners. Trying to change negative or positive knowledge previously acquired by learners, might pose challenges with de-teaching what was learned, being cumbersome.

Vygotsky's ZPD encourages learning that happens when learners work independently due to cognitive development. In the ZPD, Vygotsky does not emphasize cognitive development, but human learning which takes place through interaction with others. Vygotsky's stance is that human learning always changes based on the learner's interaction with others, ZPD emphasizes changes which take place when learners collaborate and interact with one another. Doolittle (1997:85) supports the idea by arguing that knowledge transmission can be a result of teacher-learner or peer-peer interaction which promotes culturally acceptable behaviour (Doolittle, 1997:88). From a socio-cultural perspective, language is seen as a tool that individuals use to socialise with others. Through socialisation, learners assist each other in performing shared

tasks with social interaction fostering the learner's performance through the ZPD, the distance between what individuals can achieve independently and what they can achieve with assistance from others. Knowledgeable and skilled individuals at a higher-level assist those who are less capable or less knowledgeable. In this regard, teachers and other knowledgeable individuals can probably inculcate knowledge of household waste management in learners.

The crucial element in the ‘zone’ is the development or change which is dependent on the learners’ interaction with the social environment that shapes their behaviour in a culturally accepted manner (Vygotsky, 1987:48). The cultural meaning is interdependent on the social systems where the learners are actively involved in making meaning of cultural activities which the learners acquire by their active involvement in social interactions in the environment. Conversely, the zone always changes as learners collaborate with other learners, leading to a change in values, attitudes that are culturally accepted.

Social interaction yields new and elaborate mechanisms that are advanced and can be attained through collaborative scaffolding (Vygotsky, 1989:61). In this regard, learners expand their knowledge and abilities when they participate in problem- solving. The ZPD is stimulated when peers interact either in groups or pairs (Ohta, 1995 in Lee, 2004:84), and due to collaboration, learners gain knowledge with the assistance of others. Ohta (2000 cited in Lee, 2004:84) argues that the ZPD is affected by the expertise of the peer or any other expert, the nature of the task, and the goals of the learners. In this study, learners’ knowledge of household waste management can probably be acquired through the learners’ social environment. Learners emulate what happens in their social world. What the learners are taught at school or imitate from their social context and culture promotes awareness of household waste management.

The socio-cultural theory emphasises the zone of proximal development which is the development of an individual’s abilities to solve problems on their own (Vygotsky, 1978:58). In the school context, teachers, peers, or any experienced personnel can provide support or inform learners about household waste management and learners can embark on developing strategies for solving the problem. Vygotsky’s social-cultural theory emphasises the context in which social activities happen, in this case, the school setting and it is in this familiar setting that learners can shape and change their thinking,

attitudes and values. In the school context, the teachers may enact the household waste management practices and develop awareness in learners which could be passed on to the family and the community as well as to succeeding generations (Shabani, 2016:80).

Haenen *et al.* (2003:246-248) explain that the socio-cultural learning theory claims that when learners first come to school to seek knowledge, they are not blank slates. They already have prior knowledge which can assist teachers to build on to what the learners already know. However, prior knowledge can be resistant to change. In this regard, it is the researcher's view that prior knowledge of household waste management promotes culturally acceptable behaviour that can be emulated by others in their social environment.

3.3 SOCIAL LEARNING THEORY

This study$$ is further guided by the social learning theory since the phenomenon under investigation was to explore the teachers' views regarding learners' awareness of household waste management. McLeod (2016:6) explains social learning theory to be behaviour that is learned from the social environment through observation of role models. The models can be teachers, family members, peers, or television models, and the people whom learners admire. Social theorists such as Bandura (cited in Goslin, 1969:220) firstly perceived observational learning to involve imagined and verbal presentations and secondly, verbal coding which emphasises verbal presentations more than visual imitation. This observational learning is influenced by the attention that is drawn to modeled behaviour which attracts the observer.

The conditions in which the modeled behaviour happens should be conducive, motivating, and rewarding in a social environment so that learners can pay attention to it. Social factors determine behaviour demonstrated by models in the social environment to draw learner's attention (Goslin, 1969:222). Learners master behaviour that is repeated over some time; hence the retention of observational behaviour is dependent on the frequency of the role models' behaviour. Social learning theory considers the behaviour of the most significant models to be influential even though there is no direct interaction between the observer and the models since the behaviour has power and is of great value (Ross & Ross, 1963b cited in Goslin, 1969:223). This implies learners can imitate household waste management behaviour influenced by what they observe from their role models.

Similarly, Pritchard (2009:10) affirms that repeated behaviour comes as a result of positive reinforcement, whereas punishment can be an effective strategy to reduce negative behaviour. Teachers can shape learners' behaviour by rewarding positive actions while negative actions receive a reprimand. Learners need to see value in rewards. Pritchard (2009:10) states that critics of the rewards strategy believe that rewards may lead to loss of interest in a particular behaviour or learning. Conversely, incentives or rewards should not be focused on particular individuals only, but distributed to all deserving learners. Skinner in Prichard (2009:11) supports the idea of focusing on rewards more than punishment for repeated behaviour to happen. In this regard, the teaching and learning environment should support and promote positive values and behaviour regarding household waste management.

Bandura (2001:9) encourages the self-directedness of learners which fosters the moral reasoning of participants into activities through self-directed processes. Learners need to be encouraged to engage in activities which direct them towards morally right actions, in this case, management of household waste, whereas Piaget (mentioned in Powers, 2004:18) stresses learners' intrinsic motivation to be a fundamental element to learning which needs to come from within the learner not based on the teacher's motivating activities. Place-based teachers base learning on community activities which trigger the interest of the learners to participate in solving environmental issues rather than non-concrete issues. The practicality of household waste management can probably prompt learners to take initiative in developing and implementing household waste management strategies.

Modeling has motivational impacts based on promotion and punishment of behaviours (Bandura, 1986 cited in Goslin, 1969:276), and parents who are warm and rewarding are good role models for their children eliciting favourable behaviour in their children (Bandura & Huston, 1961; Mischel & Grusec, 1966 cited in Goslin, 1969:223). In this regard, parents play a significant role in modelling behaviour on environmental issues such as household waste management.

Bandura's social learning theory is based on mediation where knowledge is passed on from one person to another (McLeod, 2016:1). In this study, for example, learners are expected to acquire knowledge values, and skills through the integration of the theme of household waste management into other CAPS subjects. The researcher expects that teachers should be able to impart knowledge regarding household waste

management that has an influence on learners' behaviour in addition to being role models to their learners. Learners pay attention to their models and later copy and imitate what they have observed (McLeod, 2016:1-2). If the behaviour is reinforced or rewarded, learners repeat the behaviour whereas non- rewarding of the behaviour may result in a negative performance of the behaviour (McLeod, 2016:2).

The social learning theory is an interpretive approach in which ontology of reality is a social aspect or subjective, based on human beliefs and values. Conversely, Broadbent (1998 cited in Bell, 2011:101) states that social constructivists regard knowledge to be acquired due to social interactions. In this view, learners need to socialise with individuals who are knowledgeable in household waste management and from whom knowledge can be gained. On the contrary, I would argue that theories of learning based solely on assumptions of learners being taught by teachers, usually in a classroom, do not provide an adequate framework for them to think and act independently to solve problems faced in the environment in which they live.

In this study, learners are expected to imitate the behaviour of their role models on household waste management. Based on the social learning theory, which emphasis learning through observation and imitation rather than simply hearing things, may have a positive impact about household waste management. Learning is effective if a new behaviour of household waste management is modeled by their school teachers, peers, or parents at home. In this regard, learners will perform household waste management when they observe this in their role models.

3.4 PLACE-BASED THEORY

Place-based theory also foregrounded this study. Place-based theory centres on the environment where the learner is socialised. Political, ecological, social, and ideological factors have an impact on learning and this can either be positive or negative (Dewey cited in Kleederman, 2009:2-3). The importance and benefits of place-based learning depend on the learners, teachers, and community. Teachers need to use the physical aspect of the environment, social aspect, and surrounding to gain knowledge which can be used as the source.

Sobel (cited in Kleederman, 2003:3) claims that place-based learning theory can be understood as being based on the natural environment and includes cultural, social, economic conditions, environmental health behaviours, and proper waste disposal,

which are all believed to improve when the environment and policies support healthy choices, individuals are motivated and educated to make those choices (World Health Organisation, 1986). Educating people to make environmentally healthy choices when environments are not supportive cannot be effective in behavioural change. In this inquiry, place-based learning theory underpins the focus of this study by stipulating how individuals interact with their social environment to gain knowledge and skills, which enable healthy physical environments with household waste is properly managed.

Place-based theory has the following guiding principles on how learners acquire knowledge to solve problems (Dolmans *et al.,* 2005:734). **Learning should be a constructive process** where knowledge acquisition happens through their active involvement in the learning process. Learners' perceptions and experiences should build their world view knowledge by taking initiative in the learning process. **Learning should be self-directed** stresses that learners should take initiative in learning and set goals of dealing with problems. Learners need to plan, execute, and monitor that their set goals are achieved. In this regard, learners take initiative and responsibility in solving problems rather than waiting for the teachers to initiate the learning process. (Dolmans *et al*., 2005:733).

Learning should be a contextual process that focuses on the context in which learning takes place as this determines the kind of knowledge attained and how that knowledge is used. The principle considers that learner's knowledge acquisition takes place in a stimulating and conducive context which enhances self-initiative in knowledge seeking. In this regard, learners should be self-motivated and be responsible for their knowledge attainment, not wait for the teacher to transmit it and the environment where learning takes place should be motivating (Dolmans *et al*., 2005:733).

Learning should be a collaborative process where learners share ideas by interacting with one another in groups. When learners work in groups, share ideas based on the same goals and interests, it results in a better understanding of the phenomenon and goal achievement. Interaction of learners in a group enhances learning since each learner contributes to the set task. This implies that the place-based theory advocates that learners become problem solvers and take initiative in their knowledge acquisition and discover new knowledge, thus expanding on their

existing knowledge (Dolmans *et al*., 2005:733). Furthermore, the idea of teachers stimulating learners' interests towards self-directed learning in place-based learning, concurs with Vygotsky's theory of socio-cultural theory, which promotes the scaffolding of the learners. In this regard, teachers present learners with problems and monitor that learners are stimulated and interact among themselves to solve the problems. In light of the place-based principles, learners' awareness of household waste management may happen due to the application of the principle that learning should be a contextual process. A school context should motivate learners' awareness of household waste management. Stimulating learning conditions should be provided by teachers for learners to actively participate in self-directed and self-initiated knowledge acquisition of household waste management.

This study was further guided by the principle that learning should be a constructive process. Learners should participate actively in constructing knowledge and making meaning of what they learn, based on their experiences and interaction with others. Learners' active involvement and participation in household waste management should yield awareness of the phenomenon.

According to Dolmans *et al*. (2005:734) to stimulate the learning process, learners need to be confronted with problems that should be clarified before they engage in them. During an engagement with the phenomenon, learners discover new things about the phenomenon, yet some of the information could be what they already know. Learners' active involvement in the learning process happens due to problems that stimulate their interest to acquire new knowledge such as the problem of household waste management in Newcastle schools. This phenomenon could be the driving quest for new knowledge.

Dolmans *et al*. (2005:734) state that teachers play an important role in motivating the learners towards self-directed learning. Teachers monitor and ensure that the learning process takes place and further provide scaffolding for learning by encouraging the interaction of learners, providing clarification, questioning, and enforcing knowledge application. Self-directed learning can be achieved by active learner involvement rather than teacher transmission of knowledge.

Group work acts as a stimulus for dealing with problems (Dolmans *et al*., 2005:734). Problems discussed in small groups, asking or answering questions, collaboration and interaction help learners to work together in dealing with problems, while problems

also act as a stimulus directing learners towards achieving their set goals; however, teachers as facilitators and group work as a stimulus for learning do not necessarily channel learners towards self-directed learning. Sometimes too well-structured problems, close-ended problems, and too easy problems or the assessment of a problem do not provide learners with prior knowledge to actively become involved in self-directed knowledge acquisition. Similarly, when teachers are over directing or passive, the learning process does not happen effectively and dysfunctional learning occurs.

Implementation of problem-based learning is vital as poor implementation hinders learners' stimulation towards collaborative and constructive self-directed learning (Dolmans *et al.,* 2005:735). Furthermore, well-structured, open-ended, and complex problems stimulate learners' prior knowledge; hence learners should be engaged in challenging problems that stimulate their interest in gaining new insight and knowledge on the problem. Problems exposed to learners should be challenging, stimulating so that learners take control and full responsibility working independently yet with guidance from the teacher. This helps to stimulate self-directed learning and may result in learners taking the initiative and full responsibility for household waste management issues in their schools and community.

3.5 CHAPTER SUMMARY

The socio-cultural theory; social learning theory and place-based theory foregrounding this study gave direction to the study and were discussed in depth.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

The purpose of this chapter is to present an overview of the research methodology used in this study exploring how secondary school teachers in Newcastle promote learners' awareness of household waste management. The chapter begins with a discussion on the research paradigm and the assumptions underpinning this inquiry. The chapter then introduces the research approach and gives reasons for its choice. Thereafter, the research design, a case study, is described. Data collection is introduced and discussed in detail as is data analysis. The final sections of the chapter are dedicated to measures of trustworthiness and ethical considerations. This chapter aims to situate the inquiry amongst the existing knowledge on learners' awareness of household waste management taking into consideration the most suitable design and method to get the most appropriate data that will give the most informed results (Creswell, 2014).

4.2 RESEARCH METHODOLOGY

Methodology refers to ways of obtaining, organising, and analysing data (Polit & Hugler, 2004:233) and besides, it depends on the nature of the research question (Karfman cited in Mouton & Marais, 1996:16). The methodology is regarded as the theory appropriate in scientific decisions involving research methods, methodological limitations, data collection, and data analysis methods (Burns & Grove, 2003:488). Henning *et al*. (2004:36) claim that a methodology is a group of methods that are complementary to one another, that enhance the collection of data and data findings to answer the research question and fit the research purpose. Furthermore, Holloway (2005:293) claims that methodology provides a framework of theories and guiding principles on which procedure and methods are dependent, whereas Kothari (2004:8) explains research methodology as a step-by-step way of solving the research problem. Researchers need to adopt relevant methods and techniques, which are crucial elements, to deal with the research problem.

Researchers need to know which research methods, techniques and research assumptions underlying the study are relevant procedures applicable to address the research problem (Kothari, 2004:8). Kothari (2004:8) further alludes to the fact that researchers need to design a methodology suitable for each research problem. Research methodology does only not comprise methods but constitutes a wide spectrum of elements inclusive of research design and logic for selecting certain methods and techniques and why the researchers choose certain methods in their study instead of others. All this should lead to research results that can be understood and reflected upon by the researcher and others.

In this study, the research methodology follows Creswell (2014) where research methods are a plan and procedures for research which specify and clarify the steps from broad assumption stipulating detailed data collection methods, analysis, and interpretation. As such, the researcher needs to be conversant with the methods to apply relevant methods to the inquiry under study.

4.2.1 Research Paradigm

Guba (1990:17) considers a research paradigm to be a set of beliefs that guide action, made up of epistemologies, philosophical assumptions, and ontology which shape the researcher's inquiry (Guba 1990 cited in Creswell, 2007:17). A research paradigm aims to define approaches to Social Sciences research (Taber, 2013:287).

Philosophical research is guided by different paradigms which include positivist, interpretivism, critical research paradigm (Ryan, 2018:130). The study was embedded in the interpretivism paradigm to investigate learners' awareness of household waste management in selected secondary schools in Newcastle, South Africa. Henning *et al.* (2004:20) indicate that knowledge is constructed through observing the phenomena and then giving descriptions of people, beliefs, values, and reasons to create meaning and understanding of the topic under investigation. Interpretivism focuses on gaining insight into the participants' worldview by relying on the perspectives of the participants about their reality (Henning et al., 2004:20). The researcher understands the life experiences of the researched by engaging and observing their activities and drawing meaning of the participants' world (Carr & Kemmis, 1996:88; Henning *et al*., 2004:4).

Positivists believe there is only one reality which can be tested and presented statistically, whereas interpretivists believe in subjective, multiple socially constructed realities (Guba & Lincoln, 1994; Lincoln, Lynham & Guba, 2011) in Dean, 2018:3). The ontological view or stance depends on what is investigated (Hathaway, 1995 cited in Dean, 2018:3). Denzin and Lincoln (2011 in Dean, 2018:3) explain that positivists qualify, test, measure, and look for causes and effects in knowing reality, while interpretivists generate knowledge from context using a wide range of research tools and techniques to gain an in-depth understanding of the studied phenomenon.

Participants express understanding of the world in which they live (Creswell, 2007:20); thus, the interpretive paradigm allows the researcher to understand the world view of the participants through their perceptions and experiences. The researcher uses these experiences to construct knowledge and understanding from the gathered data. Pioneers of the interpretivism paradigm disapproved of the existence of universal standards for research. They believed that there is no particular right or wrong method to acquire knowledge (Smit, 2001:219).

Therefore, no rigid (controlling) approaches were used in this study to gain insight into the teachers' views regarding learners' awareness on household waste management instead, the paradigm and methods the researcher employed allowed in-depth understanding of the participants' world views as participants different perspectives were explored. The researcher used the interpretive lens to explore the teachers' views on learners' knowledge regarding household waste management in selected secondary schools of Newcastle, South Africa. Also, an understanding of the context where the inquiry is conducted is critical and crucial for the interpretation of gathered data (Willis, 2007:4). This understanding depends on reality constructed from the social context.

Conversely, interpretive critics criticise interpretivism for dwelling on set philosophies however, Yangon and Schwartz (2014 cited in Dean, 2018:3) disagree with the criticism by indicating interpretivists have developed rigor, quality, and trustworthiness to oppose critics' arguments. The use of an interpretive paradigm in this research was based on the belief that the participants become actively involved in all the phases of the processes. According to Creswell (2007:20), participants seek understanding of the world in which they live like this is critical in the interpretation of the data gathered

as suggested by Willis (2007:4). This is based on the belief that reality is socially constructed.

Ontological Assumption

Maree (2014:52) states that ontology is reality or what is true and how we come to know. In this case, it was recognised that the researcher believed that reality is socially constructed and that learning happens through the interplay between the subject and object of this study. Qualitative researchers' reality features in a variety of ways depending on the researcher's view. Different realities are allowed and embraced by qualitative researchers. Various perspectives of the participants' views are captured and considered by qualitative researchers to be a reality (Creswell, 2007:16-17). The ontological assumption concerning household waste management was unveiled by probing the teachers' views on learners' awareness of household waste management. In this study, the researcher's ontological assumption was based on the participants' perspectives on learners' awareness regarding household waste management issues.

Epistemological Assumption

Epistemology refers to knowledge about a phenomenon (Maree, 2014:52). Epistemology answers how we come to know, how we can discover and know the truth. Creswell (2007:18) states that in qualitative studies, the researchers capture and record a variety of realities based on information, which are words from individuals' or participants' perspectives about their lived experiences. With the epistemological assumption, the researcher worked closely with the participants to understand their way of life and their views concerning their lived experiences. Hofer and Pintrich (1997:88) state that the epistemological perspective is the pursuit of true knowledge. In pursuit of knowledge on the phenomenon under investigation, the researcher embarked on establishing the relationship that existed between the researcher and what was real and the way truth is sought. With this in mind, this study searched for valid true knowledge by exploring teachers' views regarding learners' awareness of household waste management gained by the close interaction of the researcher with the participants.

Axiological Assumption

Every researcher works towards bringing value to the inquiry. Researchers record their values and biases to bring what is real and the truth in qualitative studies. (Creswell, 2007:18). In this

study, the researcher assured true value by capturing and recording the truth based on the topic of inquiry. What the researcher presented as an interpretation of the study represented the participants' lived experiences.

Rhetorical Assumption

Qualitative researchers use rhetorical assumptions in writing (Creswell, 2007:19). A personal and literal form of writing makes use of the first-person pronoun 'I' and rhetoric makers understand and explore the meaning and discover in writing the significance of the study guided by the research question. Qualitative rhetoric terms like transferability, credibility, dependability, and confirmability prevail whereas in quantitative studies the prevalent terms are validity, generalisability, and objectivity are used.

4.3 Research Approach

Researchers use different research approaches that suit the inquiry of their investigation. Qualitative, quantitative, and mixed methods approaches may be used by researchers depending on the study. Henning *et al*. (2004:3) state that the quantitative approach controls the elements and the actions of the participants, furthermore pre-determined data collection instruments, designed by the researcher are used.

Stake (1995:37) clarifies the differences between quantitative and qualitative research approaches based on the purpose of the phenomenon and the researcher's ability to gain and construct knowledge. Furthermore, qualitative inquiry is inductive, provides data which is analysed descriptively and in-depth while the quantitative approach is deductive and provides a hypothesis at the beginning of the inquiry Stake (1995:37) with numeric data being collected and analysed statistically. A combination of qualitative and quantitative research approaches is regarded as mixed methods (Creswell, 2014). Mixed methods are a way of triangulating and bridging gaps that may be omitted in qualitative and quantitative data collection sources (Creswell, 2014). The researcher assumes that focusing on qualitative or quantitative alone may not yield valid, trustworthy, and in-depth data.

In qualitative inquiries, the outcomes of the study, due to the participants' perspectives of their world reality and the researcher's interpretations of the findings, are not possible to predict (Lincoln & Guba, 1985). Domegan and Fleming (2007:24) explain that a qualitative approach explores the phenomenon and the problem where in-depth exploration about the problem is required. Naturalists in qualitative studies believe reality exists in parts that are reliant on each other, which implies the participants and the researcher depend on each other for knowledge dissemination and acquisition (Anney, 2014:273). The qualitative approach clarifies what happens, why it happens, and the way it does. Language and words that come from the participants bring about social reality from the perspective of the participants (Leedy & Ormrod, 2010:135). In other words, the qualitative approach captures language and words that come from the participants about their lived experiences in a natural setting (Neuman, 2011:174) and besides, the qualitative approach investigates meaning and understanding of social problems of individuals or human states (Creswell, 2014).

Merriam (1998) stipulates that in qualitative studies, the researcher is the principal data collection instrument who engages deeply with the participants and makes multiple interpretations of the participants' perspectives about their world view. The researcher as the primary instrument for data collection is concerned with the meaning the participants provide concerning the topic of inquiry. This view is supported by Holloway (2005:20) who asserts that qualitative approach researchers investigate experiences of the participants' perspectives of their lived experiences and analyse and interpret the words that come from the participants.

In this study, the researcher selected a qualitative approach to gain new insights, obtain or increase knowledge and understanding and sought to explore and understand the phenomenon through teachers' views regarding learners' awareness of household waste management in the context of selected secondary schools in Newcastle. The researcher, therefore, entered the research field wanting to understand the phenomenon from the participants' perspective on their lived experiences in a natural setting, provide new data regarding the phenomena in the context (Creswell,1994:45) and become involved and immersed in the phenomenon to understand it further. The researcher's deep engagement in the study helped in gaining knowledge comprising dense descriptions from the narrative data gathered from the participants, to interpret and portray their experiences, to have insightful and

understanding of the inquiry however, immersion could not be obtained without the researcher-participant trusting relationship. The relationship was built through the development of interpersonal skills.

However, a qualitative approach has its disadvantages. This is confirmed by Driessnack (2005:112) who argues that qualitative research generally takes more time to collect data than quantitative research. This means that this method is time-consuming in a broader sense of gaining credible knowledge when the researcher spends time immersed in the research field.

4.3.1 Research Design

The research design is a distinctive framework clarifying how data regarding the study will be gathered (Loubser, 2014) or it can be defined as procedures of how the inquiry gets conducted and research paradigms and case studies are discussed (Creswell, 2014). Mouton and Marais (1996:175) explain that a research design is a guide on how the inquiry will be conducted which shows all the steps on how the inquiry will be shaped. McMillan and Schumacher (2010:102) consider a research design as a plan and way of selecting participants, the research field, and the data collection methods. The main aim of a research design is to have credible research results (McMillan & Schumacher, 2010:441). The philosophical assumption that researchers bring into the study are the strategies used in the research and this study, the approach is a qualitative case and follows a case study design to examine selected secondary teachers' views regarding learners' awareness of household waste management.

A case study is an empirical study that deals with real-life situations where boundaries between the phenomenon and context are not clearly defined and a variety of evidence are used (Yin, 1984:23). A case study allows the researcher to carefully investigate a particular phenomenon in a particular context usually a small area with a few individuals located in a geographically-selected area, exploring a real-life situation. According to Yin (1994:2), a case study can be used in an inquiry when the research question answers *how* or *why* questions or when the researcher has little or no control over behaviour and when the phenomenon being studied entails a general problem in a real-life situation. A case study can be an explanatory, exploratory, or descriptive analysis of a person, group, project, or institute (Creswell, 2007). Yin (1993:22) case studies can be single or multiple according to their numbers. A multiple

case study explores a bounded system by using in-depth data collection methods, employing multiple data sources, and reporting descriptions of themes. Case studies can be embedded or holistic. An embedded case study has more than one sub-unit, while in a holistic case study; a global programme of organisation is contemplated (Yin, 1994:13).

Yin (1994:13) argues that a case allows an inquiry to maintain the holistic and meaningful characteristics of real-life events. Therefore, the case study approach is imperative in situations where contextual situations of events are studied and where the researcher has no control over the events as they unfold. Case study, as a research strategy, should comprise specific methods for collecting and analysing data which are directed by clearly stated theoretical assumptions. Furthermore, data should be collected from different sources and trustworthiness should be ensured.

As a result, case studies are crucial in Social Sciences to explore and understand behaviour in-depth. This study wanted to understand a social problem which is household waste management hence the engagement of a case study. Yin (1994:13) affirms that qualitative case studies can be used to explore and understand problems holistically which are in contrast to quantitative studies which limit the holistic understanding and in-depth clarity of social behaviour problems. This has led to case studies gaining popularity as research tools. As a result, in this inquiry, the researcher used a case study to explore the phenomenon to understand the perspectives of the participants on household waste management.

In a case study, the topic of inquiry is explored as a unit of a system. The system may be a group of people, documents, or any social entity bonded by parameters stipulating place, time, and any information that can be gathered within the boundaries (Stake cited in Henning *et al*., 2004:32).

Creswell (2008:476) identifies a case study to be an in-depth study of a bounded system that involves an individual, a group of individuals, activity, events, or process based on intensive data collection. Hence the importance of establishing whether to employ a single-case study or a multiple-case study before data collection to address the research question. The primary purpose for choosing a case study was to explore the particularity of a single case, in this case, the views of secondary

teachers regarding learners' awareness of household waste management in Newcastle in contrast to a multiple case study. A multiple case study is where a case is investigated for similarities and differences in more than one case. In each case, boundaries should be specified. An exploration conducted within the cases helps the researcher compare the findings in the cases and the important factor in choosing the cases carefully to draw similar or contrasting results in the cases (Yin in Baxter & Jack, 2008:550). A multiple case study refers to conclusions that result from a group of cases and are appropriate where the inquiry understudy exists in different situations therefore, conducting different case studies on the same problem under investigation can be appropriate for verification of the results (Yin, 2003:101). A multiple case study allows for replication of more than one case to separately ascertain emerging constructs and complementary aspects of the phenomenon under study (Creswell, 2007) and is beneficial in understanding the issue under investigation; however, a multiple case study is time-consuming and requires extended resources Creswell (2007).

It is for this reason, that a single case study was deemed most appropriate for the study where a group of individuals or a system bounded in a specific place, in a particular time, with unique characteristics is studied in-depth (Stake, 2008). Creswell (2014) agrees with Stake who considers a single-case study to be an in-depth exploration of a system or individuals bounded by activities or events. Finally, Yin (1994:2) explains that when rare or unique events in cases are critically investigated it is a single case study. This inquiry was based on a unique study of secondary teachers' views regarding learners' awareness of household waste management in Newcastle and aimed at 'thick' descriptions of the phenomenon under study (Yin, 1994:14). This thick description gives the researcher access to multiple interpretations to understand the study in-depth.

On one hand, a single case study can be used to test theory where theory is either challenged or extended, the truthfulness and relevance of theory are verified (Yin, 2009:46). On the other hand, a single case study is important when it pertains to a unique case, such as the case under study, as could reveal relevant information of the inquiry by observing and analysing the phenomenon that has not been previously studied (Yin, 2006:46). Single case studies are relevant for different single experiments or circumstances, such as the case under investigation regarding

learners' awareness of household waste management. A single case study was considered suitable for this study since it dealt with the aim and the research question of the study (Yin, 2009:47) and examined teachers' views regarding learners' awareness of household waste management in three selected secondary schools of Newcastle, South Africa.

4.3.2 Selection of Participants

Sampling, the selection of research participants from the entire population who will participate in the inquiry, involves decisions about people, settings, events, behaviour, and social processes to be observed (Neuman, 2011:241). According to Bryman and Bell (2007:63-77), the population represents the universe of unity from which the participants are selected. This view is supported by Teddlie and Yu (2007:77) who state that selection of participants should be in a naturalistic setting involving participants who will provide knowledge and in-depth information to answer the research question about their lived experiences. This means that selection of participants with particular characteristics who provide information on the topic of inquiry is of significance (McMillan & Schumacher, 2006:159).

The researcher selected particular elements from the population that provided information about the topic of interest and as such, teachers who teach particular subjects were selected to address the purpose of this research. Morrow (2005:255) aligns with this view and confirms that participants are deliberately and purposefully selected to provide rich informative data on the topic of inquiry. Participants who are experienced in the phenomenon under investigation, based on the research question are selected (Alvi, 2016:32). The selected secondary schools and teachers located in Newcastle municipality under the Amajuba district met the specific criterion of the investigation.

The target population of the study was three (n=3) secondary schools and (n=9) teachers who were currently teaching Natural Sciences, Social Sciences, and Life Orientation in Grade eight. One teacher for Natural Sciences, one teacher for Social Sciences, and one teacher for Life Orientation were participants in each of the three secondary schools. The three secondary schools were selected from a high-income, low-income area and periphery-urban in Newcastle are to have an in-depth understanding of the learners' awareness regarding household waste

management. To avoid bias and conflict of interest, the participants in this study were not from the researcher's workplace.

The map below shows Amajuba District extracted from the Newcastle Integrated Plan (2015) indicating where Newcastle is located, a place for this study's data collection.

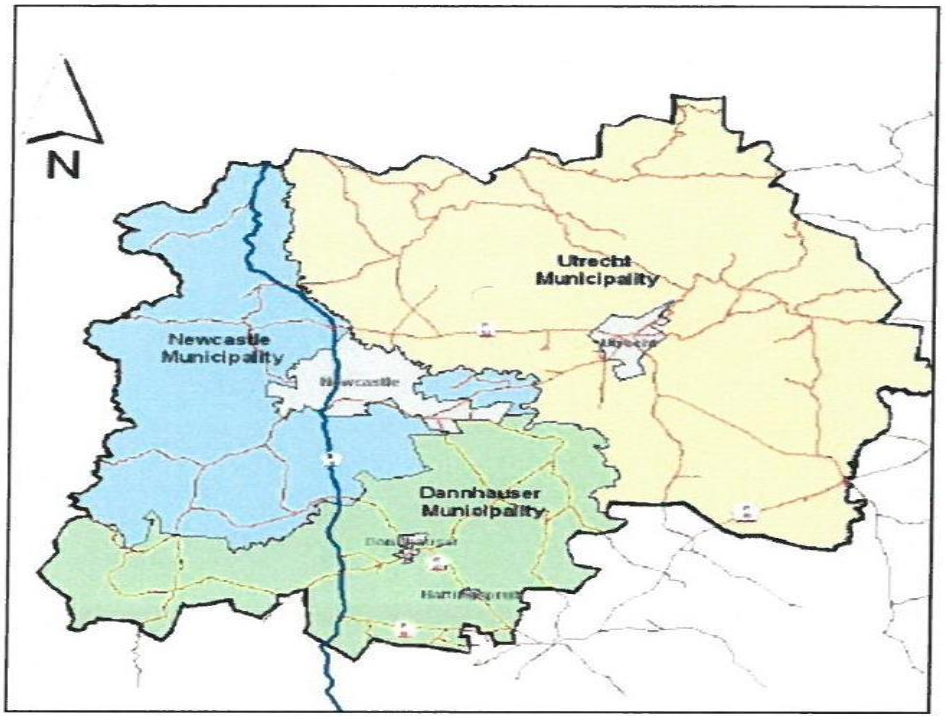

Figure 4.1: Map of Amajuba District

4.3.3 Data Collection

Stake (1998) and Merriam (1998) concur that a case study researcher must capture data from multiple sources, which means that different tools should be used to gather data.

In a qualitative inquiry, the researcher spends time exploring the setting of the inquiry, participants and documents are studied using specific tools and techniques to gather in-depth data based on the inquiry (McMillan & Schumacher, 2010:322). In this study, data were collected using semi-structured interviews, document analysis, and non-participatory observation. The use of different data collection tools curbs bias when only one method is used (Creswell, 2014).

4.3.3.1 Interviews

An interview is a conversation based on the world view of participants aimed at gathering information on a particular topic that is subject to interpretation (Kvale, 1994:74). To take it a little further, an interview is when two parties engage in an expandable conversation aiming at attaining in-depth data on the topic of inquiry in which interpretation is based on the information gathered (Schostak, 2006:54). Some researchers indicate that an interview is not a simple tool to administer, hence when used in Social Sciences; it should be carefully selected to yield desired data for the study. Furthermore, the purpose of interviewing is to find out what is on someone else's mind (Creswell, 1994).

In qualitative studies, interviews explore the beliefs, views, motives, experiences of participants, and provide a deeper understanding of the phenomenon (Gill, Stewart, Treasure & Chardwick, 2008:292). Probing participants concerning their perspectives on the topic of inquiry helps the researcher understand what was on the minds of the participants about household waste management in schools.

Four types of interviews can be used in Social Sciences namely: focus group interviews, unstructured interviews, structured interviews, and semi-structured interviews. Focus group interviews can comprise mixed gender and age groups of six to ten members. Members who are familiar with each other may feel comfortable expressing their experiences, beliefs, or perspectives yet members might feel comfortable to divulge sensitive information to a stranger than to a group member they are familiar with (Gill *et al.,* 2008:293). The sampled population focuses on the topic under investigation (Barbour & Schostak, 2005:46). Unstructured interviews use open-ended questions that are less controlled. Flexibility and freedom to both the interviewee and interviewer to expand on follow-up questions for a better understanding of the responses on the phenomenon prevails (Gubrium & Holstein, 2002:35).

Structured interviews are comprised of yes or no answers. In such an interview both the interviewer and the interviewee have minimal freedom to expand and probe further or express themselves. Structured interviews administer predetermined clear, precise questions which are asked to all the participants. Interview questions require short and clear answers (Alshenqeeti, 2014:40). In contrast, semi-structured interviews allow unexpected spontaneous responses with the researcher allowing an exploration of the

freedom of the interviewee's perspective on the phenomenon under study (Ryan, Coghlan & Cronin, 2009:310). Semi-structured questions entail several key questions which the interviewer asks to gain a deeper insight into the study. (Gill *et al*., 2008:201).

Semi-structured interviews are more flexible than structured interviews and provide freedom for the interviewer to question further and interviewee to elaborate on responses (Rubin & Rubin, 1995:88 cited in Alshenqeeti, 2014:40); hence they allow divergence in question-answer between the researcher and the participants to explore the problem further (McMillan & Schumacher, 2010:206). Semi-structured interviews allow unanticipated responses from the interviewee which means that participants have the freedom to respond concerning the phenomenon under study (Ryan *et al.,* 2009:310). A checklist is recommended for this kind of interview as a way of probing further to accumulate deeper data and understanding of the phenomenon (Berg, 2007 cited in Alshenqeeti, 2014:40).

In this study, the researcher used face-to-face, semi-structured interviews to gather data from the sampled secondary school teachers. The interviews were deemed appropriate to obtain first-hand information about learners' awareness on household waste management, theories foregrounding the phenomenon awareness of learners on household waste management, integration of the theme of household waste management in other CAPS subjects, the challenges and successes of integrating the theme of household waste management in Natural Sciences, Social Sciences and Life Orientation subjects and strategies to integrate the theme of household waste management in Natural Sciences, Social Sciences and Life Orientation subjects to enhance learners' awareness.

- **Conducting interviews**

A broad or general question usually starts an interview. The researcher plays a crucial role in encouraging the participants to talk or elaborate on specific issues and by using body language as nodding the head to show interest in what is uttered. Participants may be encouraged to elucidate on the discussion topic (Burns & Grove, 2003:285). The interviewer follows up with questions to understand the phenomenon deeper and get the true meaning of the participants' world view. The researcher used an interview schedule to guide the semi-structured interviews (*cf*. Appendix G)

The interviewer needs to probe and encourage the interviewees to divulge more information for the researcher to get to the core reality of the issue under investigation. In this study, probing was neutral to avoid bias in the participants' responses. Gubrium and Holsten (2002:17) emphasise that the researcher and the interviewee should build a smooth understanding during the interview as events unfold naturally. The researcher should show eagerness by following the interviewees' verbal and non-verbal meanings and following the content. Encouraging the interviewees to speak and showing interest in their responses helped the interviewer to gain more information on this study and where clarity was required, the interviewer probed.

Interviewees reveal relevant information based on the topic of inquiry in a natural way and substantiate their responses giving the in-depth meaning of their words (Polit & Hungler, 2004:248). In this study, the researcher set the interviewees at ease and made them relax before engaging in the interview.

4.3.3.2 Non-Participatory Observation

McMillan and Schumacher (2010:350) stipulate that during observation, which happens naturally in a natural setting, the behaviour is captured to understand the phenomenon being studied. The purpose of the study guides what needs to be observed and captured based on the research question and problem (McMillan & Schumacher, 2010:210). What needed to be observed and recorded were specific happenings related to the research question or problem. The researcher designed a schedule on how and when the observation of household waste management would be conducted in the selected secondary schools. In this single-case study, the behaviour of the teachers in integrating the theme of household waste management in other CAPS subjects to enhance learners' awareness was captured. The researcher observed teachers while teaching in Grade eight classes during teaching and learning periods in schools. The focus was on how the theme of household waste management is integrated into Natural Sciences, Social Sciences, and Life orientation to enhance learners' awareness. The surrounding school premises were also observed to identify household waste management-related activities. The researcher used an observational checklist to capture all data (*cf*. Appendix H)

4.3.3.3 Document Analysis

Document analysis was used to bridge the gaps in data after semi-structured interviews were conducted and a non-participatory observation was completed. Documents analysis provided in-depth and informative data on the integration of the theme of household waste management.

Curriculum and Assessment Policy Statements (CAPS) for Natural Sciences, Social Sciences, and Life Orientation subjects were analysed for content on the EE theme of household waste management. Both new and old documents are reliable sources of information as long as they relate to the study topic and the main research question (Henning *et al*., 2004:99). Also, teachers' lesson plans, assessment records, and other relevant documents such as School Environmental Policies, were analysed to identify sections that uphold learners' awareness of household waste management.

Curriculum and Assessment Policy Statements (CAPS) for Natural Sciences revealed that the theme on *Ecology* (DBE, 2011:36) where learners investigate the interactions and interdependence within the environment could integrate a section on waste management and its effect on the environment. CAPS Social Sciences for Grade 8 a theme on *Settlement and land use* (DBE, 2011:27) where learners are required to identify and discuss a social or environmental issue. This could pertain to an issue such as household waste management. Finally, the Life Orientation CAPS about Grade eight were analysed to identify EE themes that relate to household waste management. In this subject, *Health, social, and environmental responsibility* is the theme that relates to environmental health issues, which could incorporate the theme of household waste management. Suggested aspects to be included are an acknowledgment of *Earth Day* focusing on the preservation of the environment, finding ways of being kinder to Earth, and developing and implementing an environmental health programme (DBE, 2011:18). This analysis aligns with participants' responses in the interviews.

The researcher used a document analysis checklist (*cf.* Appendix I) to collect data which was later analysed through the use of themes and categories.

4.3.4 Data Analysis

Babbie and Mouton (2004:4) describe data analysis as the process concerned with reducing the amount of collected data to provide meaningful statements of information.

In this study, data analysis involved a logical and systematic searching and arranging of all the data collected from interviews, observation, and document analysis. Adder, Mellenberrgh, and Hand (2008:15) consider data analysis as a process of inspecting, cleansing, transforming, and modeling data to discover useful information, suggesting conclusions, and supporting decision making. McMillan and Schumacher (2014:355) propose that qualitative data collection and data analysis are interwoven with data analysis starting during the data collection process. Neuman (2011:510) refers to thematic analysis as involves working with codes to identify patterns, similarities, and differences in them. Data collected through interviews was transcribed and concluding notes were written during the data analysis process. Field notes and transcripts were critically examined and synthesised. Qualitative data from interviews and observation were analysed and interpreted into themes by comparing responses from individual participants and meanings established to lay the foundation for coding.

In this study, data were analysed thematically starting with specific data and ending with categories and patterns. Themes and conclusions thereafter arise (Neuman, 2011:510). Data were organised into manageable themes, trends, and relationships. This was done to understand various elements of data through inspection of relationships between concepts, constructs and to see whether there were any patterns or trends that could be identified or isolated to establish themes in the data.

The researcher read through the codes several times, grouping themes into categories. Rice and Ezzy (1999) support that careful reading and further re-reading of data helps in the identification of patterns within the data such that emerging themes formulate categories for analysis. Unfitting words and phrases were left out until other words or phrases emerged which were linked to them to form categories. Creswell (1994) stipulates that thematic analysis provides categories of related topics where major concepts or themes are identified to establish a rich deep description of the phenomena being studied. Categories were examined and checked to see how they related to the research question and reduced categories identified familiar data and made the categories manageable. The researcher arranged and refined the themes, organised them into categories several times until all codes were placed correctly and

that they answered the research question. The frequency in which an idea or description appeared was used to interpret the importance or emphasis of the problem.

4.4 MEASURES OF TRUSTWORTHINESS

Streubert, Speziale, and Carpenter (2003:364) define trustworthiness as the achievement of validity and reliability of qualitative inquiry when the study accurately portrays the participants' experiences. Qualitative researchers ensure quality, truthful research findings which are dependent on the perceptions of the participants about their lived experiences (Guba cited in Krefting, 1990:216). Establishing the truth about the findings based on the information provided by the participants about their lived experiences is considered to be a true value (Krefting, 1990:216).

To obtain truthful, consistent research findings, participants need to gain trust in the researcher to provide relevant information on the investigated inquiry. The time spent in the research field with the participants allows rich and in-depth data patterns to be identified until reaching data saturation (Lincoln & Guba, 1985 cited in Krefting, 1990:217) and provides the researcher with adequate information about the participants' lived experiences. Ruby (1980 cited in Krefting, 1990:218) views prolonged relationships in the research field with the participants as critical since the close relationship between the researcher and participants may enhance biased data based on the researcher's perceptions, background, and experiences. In this study, the researcher spent adequate time in the research field to gain an understanding of the phenomenon; however, a too-close relationship was avoided to ensure that informed data collection was not hindered.

In qualitative studies, the trustworthiness of data can be determined by using the criteria of dependability, transferability, credibility, and confirmability to ensure the trustworthiness of the inquiry's findings whereas quantitative researchers base their findings on reliability objectivity, and validity Guba (1981 cited in Anney, 2014:272).

Dependability is attaining the same research findings under the same conditions or circumstances (Merriam, 1998:205). Dependability is enhanced when research findings are reached with similar participants in a similar context and can be achieved when the researcher takes full control of the data collection methods and the

decisions. The true value of the findings can be realised by attaining first-hand information from the participants' perceptions of their lived experiences (Anney, 2014:272).

The criterion of true value was applicable in this study because data was collected qualitatively, based on the participants' perspectives about the phenomena of inquiry. In this study, dependability was established by the researcher taking full control of the data capturing, methods, and auditing the data collection methods. The researcher ensured that the research process was logical, well-articulated, audited, and addressed the authenticity of the data. Also, the description of the context and circumstances under which data were collected ensured consistency and accountability.

Transferability refers to the extent to which the qualitative research findings can be applied or transferred to other contexts with similar participants (Bitsch, 2005:85). Purposefully selected research participants can provide thick descriptions of data which results in transferable research findings. Thick descriptions of research findings brought to light how best the inquiry context can fit well in other contexts. To have well-informed decisions, Li (2004:305) says a thick description of data and rich details on methodology and content should be included in the report writing. Applicability of findings in other context yield similar results in another context which means that research findings from one context can provide similar findings in a context outside the inquiry parameters yet there are similarities in context (Lincoln & Guba, 1985 cited in Krefting, 1990:217). Applicability of the research findings to another context with similar participants yields transferability.

In this study, transferability implied that the findings of teachers' views regarding learners' awareness on household waste management in Newcastle could be transferred to other contexts and participants outside Newcastle and similar results would be attained.

In qualitative studies, the extent to which data collection and data analysis are believable and trustworthy is termed *credibility.* Credibility can be achieved by checking if the participants' information conforms to the research findings (Lincoln & Guba, 1985:314). *Credibility* is established when the captured data is original information from the participants and the research findings solely from the participants are not influenced by the researcher (Lincoln & Guba, 1985:314). Prolonged fieldwork

with the participants establishes credibility as participants gain trust in the researcher and divulge sensitive information that the participants might not have provided at the beginning of the study (Ruby, 1980 cited in Krefting, 1990:218). The researcher spent enough time in the research field to gather words and language from the participants' views and observed the phenomenon adequately to avoid bias. McMillan and Schumacher (2010:379) allude that trustworthy evidence of data mainly happens in the field but it is also important that pattern-seeking is drawn from the data provided not biased researcher's assumption.

Credibility in this research was assured using triangulation of different methods of data collection, such as semi-structured interviews, observation, and documentary analysis.

Confirmability is when research findings can be authenticated by others as true findings of the participants' world view. In this regard, confirmability is assured when research findings can be approved by other researchers and the participants' confirmation of non-subjectivity or bias in the research findings result in confirmability. Research findings need to be based on the participants' captured data and should be free from bias or any influence (Krefting, 1990:216).

In this regard, the researcher provided evidence from auditing which collaborated with the findings and the interpretations. To reduce the effect of the researcher's bias, triangulation of methods was applied and the research findings verification was done by member check. Lincoln and Guba (1985:85) affirm that to improve the quality and true value of the inquiry, research findings should be sent back to the participants to verify if the findings are a reflection of the information that was provided by the participants. The researcher ensured that in the reporting the data was free from bias and not based on the researcher's perspective or experience.

Merriam (1998) states that *validity* in qualitative studies is the application of multiple data sources to compare data, member checks, giving feedback to participants to verify the authenticity of the collected data, prolonged observation, clarification of the researcher's assumptions, world view and theoretical assumption from the beginning of the study help to validate the inquiry's findings.

In this investigation, the researcher used ecological validity which on one hand Neuman (2011:456) proclaims to be the degree to which the participants' social world,

described by the researcher, matches with what the participants' setting or the information extracted from them. The study had ecological validity since the events occurred naturally. In this case, data that was collected from the participants on household waste management was expected to concur with what happens in the participants' natural context. The researcher's presence did not affect the participants' daily procedures and besides, the presence of the researcher during data collection was not supposed to alter or change what always happens in the schools.

To ensure validity in data collection, tools must evaluate what they are supposed to evaluate (household waste management) with validity referring to the truthfulness of the data that is gathered (Henning *et al*., 2004:148). In this inquiry, the data which the researcher collected was aimed at correlating with the actual reality about household waste management in the social world, which is the school. The researcher ensured validity by checking the research questions, theoretical interpretation of the findings. Validity was also be enhanced with the use of audio recorders for detailed descriptions of data from the participants on the phenomenon under investigation (McMillan & Schumacher, 2014:354).

Triangulation is demonstrated when the researcher's information confirms the participants' perspectives about their worldview. Streubert et al. (2003:39) state that in qualitative inquiries, accurate presentation of participants' information or experiences is the purpose of rigour. Triangulation refers to the corroboration of data from one data source to another and can be used to validate the research results and to discover the truth in the data collection process (Brannen, 2004:314). Triangulation can be realised when multiple data sources, multiple participants, and multiple methods such as interviews, observation document analysis, and member checks are employed to compare multiple participants' perspectives on the same issue to achieve a better understanding of the phenomenon (Yin, 2003).

In this qualitative case study, the triangulation of multiple data collection methods was used to confirm and validate the research process. When one method did not correlate, the researcher employed an alternative one to increase validity, gather rich data, and maximise reliability. Triangulation provides a wider understanding of the phenomenon although not a complete one, hence the argument as to whether triangulation provides qualitative researchers adequate methods to verify their findings

(Ritchie & Lewis, 2003:44). Hence using a variety of data collection tools consolidated the findings and established triangulation, resulting in articulating and substantiating reliable results.

4.5 ETHICAL CONSIDERATIONS

Creswell (2014) states that research ethics are moral principles and a set of rules which guide research to adhere to and promote the humane and sensitive treatment of research participants in the study. The research design involves criteria for the selection of informative participants, properly selected research strategies, and adherence to research ethics. Ethical guidelines include informed consent, voluntary participation, confidentiality, risk or harm, confidentiality (McMillan & Schumacher, 2010:420). The study involved humans hence it was ethical for the researcher to protect the rights and wellbeing of the participants in the investigation (McMillan & Schumacher, 2010:117). Application of what is ethical and legal for the protection of the participants is imperative. Before the research, the researcher applied for and was granted ethical clearance from UNISA CEDU (*cf.* Appendix A) and the Amajuba Department of Education (*cf.* Appendix C) for purposes of data collection.

4.5.1 Informed Consent

According to Creswell (2014), informed consent implies providing the participants with adequate information about what the study is all about, the expected time of the participants' involvement in the study, the procedures to be followed, possible advantages and disadvantages of participation, dangers which participants may be exposed to and trustworthiness of the researcher's communication with potential participants. Henning *et al*. (2004) state that the researcher needs to be open and honest with the participants by providing an explanation about the purpose of the study and in what way the information collected from the participants will be used. The aims and benefits of the study need to be revealed to the participants. A written informed consent form with accurate and complete information about the goal of the study was provided to participants (*cf.* Appendix E). To ensure that participants fully comprehended the details and purpose of the study, the information was read to them, and they were allowed to ask questions.

The researcher informed the participants about the instruments and the role they would play in the inquiry. The participants were fully aware that as participants in the study, it was voluntary and they were free to withdraw at any time. There was no penalty for participants who wished to withdraw.

4.5.2 Voluntary Participation

The researcher informed the participants that taking part in the study was voluntary, not compulsory. McMillan and Schumacher (2010:118) state that the participants should not be forced or coerced to participate. In the study, their participation was voluntary and participants who chosen to participate were free to participate or not. Participants voluntarily partook and provided information on the study without the researcher compelling them.

Guillemin and Gillam (2004:271) also affirmed that participation in any inquiry should be at all times voluntary. The information about voluntary participation and the potential impact of the research was communicated to participants beforehand. Prior information offered the participants the opportunity to decide whether they wanted to engage in the study or not. The participants took part in this study with full knowledge that there would be no costs which they would incur as a result of this study but that the study may not benefit them directly as individuals, but the schools, communities, and the society at large. Furthermore, the researcher informed the participants that the study was solely for academic purposes and that it may not benefit them in person but is of significance to Newcastle communities, the Department of Basic Education, and the broader society.

Struwig and Stead (2001:69) regard deception as misleading participants, deliberately by providing misrepresented facts or withholding some information from them. It also involves offering incorrect information for the participants to partake in the study. Deception takes place when the researcher misleads or coerces participants through verbal language or the actions of the researcher may disturb certain aspects of the setting. The participants were informed at all stages and the data were a true representation of what transpired during data collection in this study. The findings of the study will be made available electronically and also in a published article(s).

4.5.3 Participants' Harm or Risks

The ethical consideration of social research is that it must bring no harm to participants

(Babbie & Mouton, 2007:27). Possible risks occur in everyday situations. In this study, the researcher considered the potential risks related to the study. The researcher must protect the participants against any possible harm or causing them discomfort (Creswell, 2003:64). This study was considered low-risk because it involved adult non-vulnerable participants older than 18 years. The only foreseeable risk was the inconvenience of time since the participants were adults (teachers) with busy schedules; however, the inquiry was not sensitive therefore non-sensitive questions were asked requesting personal information in this inquiry during face-face interviews semi-structured interviews. This study neither caused harm nor exposed the participants to risks or had detrimental consequences for participants. The study did not reveal embarrassing information or expose the participants to any form of danger.

Furthermore, participants were informed that they could withdraw as soon as they felt uncomfortable at any stage of the research. In case of any risk encountered during data collection, the researcher was to inform the College of Education ethics committee and the supervisor.

4.5.4 Confidentiality

Confidentiality refers to non-publicity or divulging to others of participants' gathered information (Polit & Hungler, 1999:143). Data collected should be protected such that its aspects are not linked to a particular person or institution for anonymity. Additionally, data sources should only be known by the researcher who guarantees anonymity and confidentiality. In this study, the names of the schools and the participants were not revealed. Codes and pseudonyms were used to protect the identity of the participants and schools where data was collected.

Neuman (2011:119) states that the participants' identity should not be revealed but remain anonymous. In this inquiry, the researcher used pseudonyms to conceal who the participants were to protect their dignity. The data that the researcher collected in the field was kept confidential. The researcher explained to the participants that confidentiality was paramount and would be observed. Confidentiality involved keeping the information gathered from the participants private and not divulged to non-participants to view or analyse; however, the data collected was used for the purpose

of this study only. In this study, collected data and the research findings will be stored safely in a locked cupboard for five years; however, if participants challenge the findings, these documents will be available for verification.

4.6 CHAPTER SUMMARY

The primary focus of this study was to explore secondary teachers' views on learners' awareness of household waste management in Newcastle, South Africa. This chapter outlined the research design and methods used in this study. A qualitative approach with a single case study guided the research process. A variety of data collection methods were used and included semi-structured interviews, non-participatory observations, and document analysis. Data were analysed through thematic analysis and provided depth in understanding the views of participants. The chapter also included a discussion on the issues of trustworthiness and ethics.

CHAPTER 5

ANALYSIS, FINDINGS, AND DISCUSSIONS

5.1 INTRODUCTION

The previous chapter presented the research design and methods that the researcher utilised to conduct the empirical study to realise the aim of the study. This chapter presents findings from data collected from semi-structured interviews, non-participatory observation, and document analysis. The findings are qualitatively presented in line with study objectives to answer the main research question: *How do secondary teachers in Newcastle promote learners' awareness of household waste management?* The theoretical framework (socio-cultural theory, social learning theory, and place-based theory as discussed in Chapter 2) underpinning this study and the literature review, were used to guide the study discussion. The first aspects of the empirical findings highlight the profiles of the participants.

5.2 PROFILE OF PARTICIPANT TEACHERS

As outlined in the research ethical clearance, all participants signed the consent form before the interviews; non-participatory observation and document analysis were started. All participant teachers agreed to participate and provide the relevant documents. The true value of the findings can be realised by attaining first-hand information from the participants' perceptions of their lived experiences (Anney, 2014:272). In this study, data was collected from the same participants based on their views concerning their lived experiences.

The researcher collected data using triangulation as indicated above. All participant teachers were given pseudonyms and referred to as Teacher#1- Teacher#9. Their profiles are presented in Table 5.1 below:

Table 5.1: Profile of participants of Natural Sciences, Social Sciences and Life Orientation teachers in the study

Pseudonym	Subject taught	School location	Male/Female
Tp#1	Natural Sciences	peri-urban	Female
Tp#2	Social Sciences	peri-urban	Female

Tp#3	Life Orientation	peri-urban	Male
Tp#4	Natural Sciences	low-income area	Female
Tp#5	Social Sciences	low-income area	Female
Tp#6	Life Orientation	low-income area	Male
Tp#7	Natural Sciences	high-income area	Female
Tp#8	Social Sciences	high-income area	Male
Tp#9	Life Orientation	high-income area	Female

It can be deduced from the table that there are nine Grade eight teachers of Natural Sciences, Social Sciences, and Life Orientation sampled to participate in this study. Six of the teacher participants were female. In all three schools, Natural Sciences teachers were female, whereas two females and one male teach Social Sciences in the sampled schools. In the periphery-urban area and low-income area, Life Orientation teacher participants are male with one female Life Orientation teacher participant in a high-income area school. This reflects that there are more female teachers teaching subjects such as Natural Sciences and Social Sciences than male teachers teaching those subjects in the schools, irrespective of the area of location of the school.

5.3 PRESENTATION OF FINDINGS

According to McMillan and Schumacher (2014:355), qualitative data collection and data analysis are interwoven. Data analysis starts during the data collection process and involves the organisation of themes into categories based on the participants' conceptions of their lived experiences (Creswell, 2014).

In this study, the interview data were analysed thematically (Neuman, 2011:510). Data were organised into manageable themes and category relationships, which enabled the researcher to understand various elements of data through inspection of relationships between concepts, constructs, and to see whether there are any patterns or trends. The thematic analysis provides categories of related topics where major concepts or themes are identified to establish a rich deep description of the phenomenon being studied (Creswell, 1994), in this case, household waste management. The themes were arranged, refined, and organised into categories until

all codes were correctly placed. Categories were examined for correlation with the research question and further organized to ensure that they represented data and addressed the research questions.

Table 5.2: Emergent themes and categories from semi-structured interviews

	Research Questions	Categories	Themes
1.	How do teachers understand household waste management?	Teachers' understanding of household waste management	1. Teachers' perception of household waste management 2. Importance of household waste management
2.	How do Natural Sciences, Social Sciences, and Life Orientation teachers integrate the theme of household waste management in their subjects to enhance learners' awareness?	Identified CAPS themes related to household waste management	1. Teachers' knowledge of CAPS related themes 2. Effect of lack of awareness on household waste management themes
3.	What training have teachers received to integrate household waste management in Natural Sciences, Social Sciences, and Life Orientation?	Teachers' training to integrate household waste management in their subject	1. Trained teachers in integrating household waste management 2. Knowledge of integrating household waste management
4.	What strategies can be used to integrate the theme of household waste management in Natural Sciences, Social Sciences, and Life Orientation to enhance learners' awareness?	Teaching methods/ approaches used when teaching their subjects	1. Teachers' identification of teaching methods 2. Effectiveness of teaching methods in developing problem-solving skills
5.	What are the benefits of integrating the theme of household waste management in Natural Sciences, Social Sciences, and Life Orientation?	Benefits of teaching the concept of household waste management	1. Learners' knowledge acquisition of household waste 2. Environmentally responsible citizenry

6.	What are the challenges of integrating the theme of household waste management in Natural Sciences, Social Sciences, and Life Orientation subjects?	Challenges of integrating household waste management in their subjects	1. Inadequate learner participation in household waste management theme 2. Insufficient knowledge, resources, and time

5.3PRESENTATION OF FINDINGS FROM THE INTERVIEW DATA

The broader themes that were identified were: teacher understanding of household waste management; identified CAPS themes related to waste management; teacher training to integrate household waste management in their subjects; benefits of teaching the concept household waste management to learners in a school setting; teachers' challenges of integrating household waste in their subjects.

The first theme to be discussed below has two categories, based on the teachers' broader understanding of the concept of household waste management as it relates to their conceptualisation of household waste management and the importance of teaching the theme of household waste management to learners.

5.3.1Category 1: Teachers' understanding of household waste management

The category reflects Grade eight teacher participants' conceptions of household waste management in a broader scope. It depicts the participants' understanding of what household waste management entails.

Theme 1: Teachers' perception of household waste management

Teacher participants had various perceptions of what household waste management entails as indicated below:

> *It's the way we manage waste like ah- garbage (with a loud voice). It's the way we manage waste. Yes, how we manage garbage* Tp#1.

Although the teacher participant was not willing to elaborate on her understanding of the management of waste, demonstration of some understanding of the concept prevailed.

Tp#2 had a different understanding of the concept of household waste management:

> *I understand household waste management to be something that a person can do in their household to manage the waste. Maybe use the things that can be*

defined as waste. They can recycle or reuse them again. So in that case there will be waste management or maybe if they have trashcans or can find places where they can deposit the waste so I think that is waste management for me Tp#2.

Tp#2 showed some understanding of possible ways to deal with waste and stated that some waste can be thrown away without mentioning other possible ways of managing household waste. This indicates that the teacher participant's understanding of household waste management lacks depth.

Sharing a similar view of what household waste management entails was Tp#5 who indicated that:

Household waste management I think is where you are talking about the waste materials that you find in your school like papers that are dropped by the learners or their littering just anyhow. If you want to manage that paper you just pick it and by using recycling bins and take it to the place where they do recycling. I think that's what I understand by household waste management Tp#5.

Notably, Tp#7 mentioned that household waste management entails how waste is separated according to type.

Tp#1, Tp#2, teacher Tp#5, and Tp#7 showed some understanding of what household waste entails although without much detail.

Tp#4 her perceptions of waste management at school:

In my view, I think it simply involves the sustainability of the school. We sustain the school as when we see litter around our school there are papers around because there are shortages of bins. So, what I understand about household [waste] management is to sustain and take care and take good care of the school Tp#4.

Tp#4 regards household waste to be the sustainability of the school without elucidation on the management of waste. Tp#4 thinks littering in the school is a result of a lack of bins. This reflects a limited understanding of what household waste management entails.

Teacher participants continued offering their perceptions:

It's mostly the refuse where refuse that we have like, like for instance all our garbage like the black bins black bags or anything like that and also anything electronic that we use at home we no longer require and that is regarded as

waste and also our sewer that can be regarded as waste as well Tp#8*.*

That entails all the waste that we use in the house. That means as a housewife you need to know what is in the kitchen and also the outside of your house. Example are your different plastics, your containers, packaging in and outside also what need to go into your dust-bins and the environment outside your house where you put your dust-bins teacher participant Tp#9

Household waste management I think it has a very bad influence around the school like the communities, to us the waste management but the household when there is dirt around the school, when there is dirty among the school, like the community it's dirty outside Tp#3*.*

It seems that in some cases, participants only referred to waste produced in the house. However, teacher participants perceived that waste harms the environment: *Waste has a bad influence around the school. They learn the dirt outside school they come with it here at school and entails it here.* The teacher participant implied that learners bring materials to schools which then are discarded as waste.

It appeared that Tp#3, Tp#8, and Tp#9 had misconceptions of what household waste management includes, and besides, they lacked an in-depth understanding of the concept of household waste management. Misconceptions of concepts may lead to incompetency in knowledge dissemination. A study conducted in Morocco, Tanzania reveal a lack of knowledge on EE themes probably lead to confusion in the information disseminated to the learners (Kira & Kafanabo, 2016:2). Robottom (2000) argues that teachers need to have sound knowledge and understanding of EE themes in or to impart knowledge to learners.

Theme 2: Importance of household waste management

The importance of household waste management was discussed by teacher participants. Tp#1 mentioned that the learners need to know that they should not throw away waste. But they should be taught that it needs to be managed properly because some of the waste can be used to make compost and even papers, with the correct method can decompose. It can be concluded that Tp#1 thinks it is important to integrate waste management themes in their subjects for learners to develop knowledge about waste and for learners to be aware of waste management strategies integration of household waste. As a result, participants had an understanding of the

importance of integrating household waste management in school subjects agrees with Nargund-Josh (2013;57*)* integration of household waste management in school subjects yields positive results in waste managed environments.

With a similar view, other teachers felt that it is important to integrate waste management themes in their subjects so that learners are informed about waste. *I think it is important to teach household waste management so that learners get information on household waste management* Tp#2*.*

> *Yes, I think it's important because it affects our health. If we live in a dirty place, we get sick immediately and so many diseases that are around the world currently, so we must always stay in the clean place* Tp#3*.*

Tp#4 considered the importance of teaching household waste management and understood the effects of waste on the heath:

> *It is, very, very important. Even if it's not integrated, I believe that, and eh- what do you call it? Environmental management [education]. I think it must stand on its own as a learning area or as a subject because when you teach you to know you must teach them when they are still young so I have that belief that it must stand on its own not integrated. I think learners will take it seriously because everyone even if they are a commercial person if you take that route of being under commerce it is also there. If it can stand on its own as a subject or learning area learners will take it seriously* Tp#4.

Tp#4 emphasised the importance of Environmental Education as an independent subject and not being integrated into other subjects so that learners will value the concepts. Another teacher emphasised the importance of teaching about household waste management to learners at a tender age:

> *Yes, it is important. Kids do not know the impact of dispositing waste, you know so they need to be taught at an early age as to how to manage waste and some of the waste that we use at home is reusable and some of it you can even make money out of it like for instance plastic, tins and glass bottles that you can use that you can collect then recycle and make money by recycling* Tp#8*.*

Ullah *et al.* (2013:35) argue that Environmental Education should be taught at early ages and be an integral part of teaching to equip learners with the knowledge, shape their attitudes and values to partake actively in engaging in waste management activities that

protect their environments. Tp#8's opinion was that teaching child about household waste management at an early age may help them to make a living by using waste materials in a profitable manner, such as recycling waste:

> *It's important, very important eh-, you know learners are coming from different backgrounds so we must try in class teaching them about household waste management. There is a lot that they will be learning so that they can take that knowledge maybe and produce what you have taught them in class into their environment different environment to their homes so it's very important so there is a lot that learners can learn from the classroom situation and maybe bring a change when they practice that in different homes* Tp#6.

Tp#6, as well as Tp#9, though it was fundamental to teach household waste management because learners can gain knowledge that can help in producing items out of waste materials:

> *I think so, that is where our children come from and if they may not be that. When they start doing that and they are not growing up with that as an adult they will not give through. They do so, I think that is very important that we can start from an early age in the house where the family is and then cascade it through to friends and people who come and visit and they see you are doing that they will also start doing it. I think it's important. That also teaches them responsibility because responsibility starts with us, not with somebody else and if they want to have a future, they have to start thinking of what they have to do on our planet* Tp#9.

The participant implied that if children are not taught waste management when they are still young, they will not be effective in managing waste when they are adults.

The importance of knowledge acquisition on household waste management equips learners to be responsible for their environments in the future as also indicated by Tp#5 and Tp#7.

> *I think it is important. It is always important so that the learners will know the importance of household material or management* Tp#5.

> *Yes, it is. We tend to just see waste as a commodity. We don't think of the consequences of excess waste and what it does to the environment and the way it does once it leaves our house it's not our responsibility and it's nice to teach*

kids to implement waste management Tp#7*.*

All the nine teacher participants mentioned that it is important to impart knowledge on household waste management to learners and gave various reasons for the importance of teaching household waste management to curb excess waste and sensitise learners about the effects of waste and teach them responsibility. This view is in line with Martinez-Borreguera *et al*. (2019:18) who allude that integration of household waste management in schools promotes pro-environment sensitive behaviour channeling learners to assume responsibility for their environments.

Teacher participants in all three schools had different views of what house waste management entails. Taking care of the environment to have sustainable environments, the participation of households in recycling, reuse and providing recycling bins for waste separation, garbage no longer required in the homes, and keeping the homes clean were some of the opinions of the participants on what household waste management entails. However, there were some misconceptions and a lack of knowledge of what household waste management entails.

5.3.2 Category 2: Identified CAPS themes related to household waste management

This category is based on the teacher participants' awareness of CAPS themes, their ability to identify CAPS related themes in their subjects, and the impact this has on the teaching of their subjects.

Theme 1: Teachers' awareness of CAPS related themes

Teachers had varied responses about CAPS related themes with some indicating that there was no inclusion of household waste management as a theme:

> *No-, no waste management theme* Tp#1
>
> *No, I teach L.O. No. we don't deal, we don't have that topic. What we focus on mostly we teach them their gender equity, how they behave, but there is no topic which deals with household waste management. No* Tp#3*. Yet*
>
> *A topic that relates to household waste management, it is mostly a topic that refers to the management of the environment rather than the waste because it has like, environmental degradation, something like that. Yes, it associates the most with the environment rather than the waste part. It's Environmental degradation which is associated with soil erosion and stuff* Tp#2*.*

No, nothing is covered on a household, waste management in S.S. I think the one topic that we have it's in L.O. I don't know if it has been mentioned there, but it's in L.O. term two if I'm not mistaken. Not, that I'm aware of, but no, in my years of teaching, no Tp#8.

No, there is not. Environmental studies, maybe, but not in detail waste management. Yes, there is not a clear topic in the syllabus that we got waste management Tp#7*.*

Tp#6 acknowledged that household waste management is not included in the curriculum, but as a teacher, one tends to incorporate the values of waste management in Life Orientation:

Not exactly, but mostly when you are a class teacher that is whereby you teach your learners from your class eh, how to maintain the classroom clean Tp#6*.*

However, Tp#4 mentioned that household waste management does come into some sections of the curriculum:

Yes, there is this part of Environmental studies, it's a little bit part. It's ecology, but it's not I think in grade nine yes, it is under Environmental Science. Yah there is an environmental topic Add science. It's the last section, but it's not clear especially in grade nine, but in Grade 10 yes, there is that part. In grade eight we have it, but it is not as. It's not, a small theme. So, I think if whoever is designing the curriculum, can design it in such a way that it can be a study on its own. It's there in N.S. but there is nothing much on it. I have that view of having it as a subject on its own Tp#4*.*

It seems there is a topic included in the Natural Sciences curriculum although it does not include much detail on household waste management, the participant suggested that Environmental Education should be an independent subject.

Yes, I can think of pollution, pollution as you know pollution is divided into- into-into four. Land pollution is where we do littering to make our environment tidy. So, to manage that household waste management is to make our learners aware that is not good to make littering because it makes our environment untidy. Tp#5

This participant identified land pollution as a type of pollution that should be addressed to ensure a waste-free environment.

Tp#9 explained that recycling and reuse have been taught at times:

> *Yes, there is especially last term and term two we teach the kids that recycling and reuse are very important. We teach them also how to do it although the attitude of some kids does not. They take that as a very big joke* Tp#9.

However, it seems that the participant found that learners did not take the subject seriously, displayed negative attitudes towards recycling and reuse, and did not show commitment.

To sum up, Tp#2, Tp#4, and Tp#9 managed to identify themes related to household waste management in their subjects but in one case, it was suggested that Environmental Education be included as a subject. Teachers need to know concepts for effective learning to take place (Kira & Kafanabo, 2016:2). Knowledge concepts may help teachers to identify themes in their subjects related to household waste management.

Theme 2: Effect of lack of awareness on household waste management themes

As previously indicated, teachers reported that there were no themes in their subjects which dealt with household waste management:

> *At grade 8 N. S. no, no, no, 'cause we only dealt with photosynthesis' the Biotic and biotic factors that is living and non-living and the solar system-sun that's all that we did. We were never. No topic is related to household waste management, nothing at all indicated Tpt#1.*

> *We, yes there is no topic because our focus in L.O. we focus on proceeding in everyday life, achieving better things for themselves, so there is no topic related to cleanliness* Tp#3*.*

Tp#8 implied that the theme of household waste management is not integrated into his subject of Social Sciences:

> *I think the fact that it is covered in grade eight in L.O I think that that would be the only explanation, even though I don't believe we have we're talking about it and we should talk about it and we should talk about it a little more because it is only covered in grade eight. You know from grade eight up to grade 12 we don't talk about such. We don't have such a topic* Tp#8*.*

Although some teachers indicated that there was no topic related to household waste

management in their subjects, Tp#2 explained that she brings practical examples to her Social Sciences lessons, related to what learners are familiar with within the environment.

> *Mostly, I bring it when I make practical examples because the learners need to learn something that they can associate with them in their environment that they live in. If I'm teaching about the topic maybe it says, it touches basic environment, the cleanliness of the environment and also how to manage the environment, I need to make an example that will be associated, them. Something on their reality* Tp#2*.*

Tp#7 indicated that even though there was no clear topic related to household waste management:

> *When we talk about the biospheres of different parts of the environment, we talk about why it is important to preserve a good and clean environment* Tp#7*.*

Tp#4 integrates the theme of household waste management when teaching her subjects of Natural Sciences, but she explains that it is not an independent theme but falls under the topic of Ecology:

> *Yes, you can integrate it in all subjects that you are teaching especially I'm a Natural Sciences teacher. I'm also teaching Life Sciences as well so I'm trying, by all means, to infuse it although it's not on its own, but under Ecology. I think it's there on sustainability, environmental sustainability so I try by all means to tackle it across the subjects that I'm teaching* Tp#4*.*

And Tp#5 also found ways to bring in the theme of household waste management into Social Sciences:

> *Yes, we do bring as I have indicated in the last question eh- in Social Sciences we talk about pollution as I have already said we talk about land pollution which is eh- specifically land pollution. Yes, land pollution* Tp#5*.*

One teacher suggested that this theme only comes in the Grade 10 curriculum:

> *No, not yet, not yet in our theme especially in S.S. No in S.S. grade eight maybe in other classes I think in grade 10, grade 10 they pollution, types of pollution* Tp#6*.*

Tp#6 reported talking to learners about cleanliness in Life Orientation so that learners

can practice healthy habits in their homes. However, in the previous category, the the teacher indicated that there are no themes related to household waste management but does address the issue of cleanliness with the learners.

> *I said before that when you teach them about classroom cleanliness that is where you pass this thinking or this knowledge that even if what you are teaching them in class they must then practice again then when they are at their homes or their houses that is whereby you try to integrate what they are doing in class about cleaning. They must also do in their houses or wherever they are living* Tp#6*.*

Piaget (1963:52) attitudes shaped and mastered at tender ages are carried through adult life. Tp#9 indicated that learners need to acquire knowledge of household waste management at an early age which is why she integrates the theme of household waste management in her subject of Life Orientation:

> *We teach them from an early age even in term one, two, three, and four. We try to put the topic right through because if we talk about the house status then we bring in the theme of recycling and stuff like that the example I used this morning about water bottles and also PET* Tp#9*.*

In a nutshell, teachers' understanding of what household waste management entail has a bearing in their identification of the theme of household waste management and how the theme can be integrated into their particular subjects.

In the Leyte division, secondary school Philippines' lack of knowledge on household waste management was due to the lack of integration of the theme in the school subjects (Ramos & Pecajas, 2016:1462). All teacher participants in School A stated that there were no themes related to household waste management probably owing to lack of knowledge while teacher participants in School B identify topics like Ecology and Pollution as being part of the curriculum and in School C two teacher participants cited that there was no clear topic and one participant stated that Recycling and Reuse is a topic that is related to household waste management. Kiraz and Farat (2016:23-24) argue that to enhance environmental awareness on EE themes in primary schools. Middle schools and secondary schools need to integrate EE themes into the curriculum. This may bring about the knowledge of EE themes.

Based on teacher participant responses, the researcher captured the following photographs in all three schools showing the negative impact of teacher participants'

failure to identify themes that could help curb waste in the environment.

Photograph 1 illustrates pollution at the entrance of School A which pollutes the environment and exposes learners and the community to health risks.

Figure 5.1: Photograph 1 - Waste dumped at the entrance of the school

At School B, a way of getting rid of rubbish is burning; however, this causes air pollution, health hazards to learners as well as harm to the environment.

Figure 5.2: Photograph 2 - Burning of waste within the school premises

In-School C, most of the bins contained mixed waste and was not separated or sorted

for recycling purposes.

Figure 5.3: Photograph 3 - Mixed waste in rubbish bins at school

It seems that even if the theme of management of household waste is partly integrated into subjects at school, this knowledge is not being put into practice.

5.3.3 Category 3: Teachers' training to integrate household waste management in their subjects

The category reports on the training of teachers to integrate household waste management in their subjects. The themes that emerged are trained teachers in integrating household waste management and knowledge of integrating household waste management. Haingura (2009) and Mokhele (2011 cited in Kruger, 2018:2) concede that EE if is not included in the training of teachers. In support of this Kira & Kafanabo (2016:2) argues that the quality of teachers depends on their training. Hence many teachers encounter challenges in successfully integrating EE themes, such as household waste management, in their subjects.

Theme 1: Trained teachers in integrating household waste management

Tp#1, Tp#3, Tp#7, and Tp#8 reported that they had not received any training on how to integrate the theme of household waste management in their subjects and some indicated that they had no training on EE. In contrast, teacher training colleges in Tanzania offer Environmental Education in their syllabus to address environmental issues in the communities (Kira & Kafanabo, 2016:2). Tp#3 explained that *I was not*

specifically trained. I use teaching experience while Tp#2 responded that she *was trained mostly in Geography.*

Tp#6 indicates that he uses life experience in teaching the Life Orientation subject, while Tp#5 came across the theme of household waste management while studying BEd Environmental Education and Tp#4 was not trained but *received this theme when I was doing my honours degree.*

Theme 2: Knowledge of integrating household waste management

The previous theme indicated whether teachers had undergone training for the integration of EE themes into their subjects with TP#1, Tp#3, and Tp#8 not undergoing training to integrate household waste management in their subjects. This theme explains how each teacher uses specific training, both formal and informal in their teaching:

> *Usually, when we attend workshops, they just tell us how to deliver the content, but they don't give you the methods on how you have to deliver the content. So, I wasn't trained. Some of the things I learned on my own* Tp#4.

This teacher implies that she is aware of the theme of household waste management and has knowledge on environmental themes, but independent learning has been her training.

Tp#5 implies that she is aware of the theme of household waste management and has knowledge on environmental themes within her subject of Natural Sciences:

> *In N.S. especially when we are talking about our health because some people you find that some people will take that household waste management and throw to the rivers where some people use that water which comes from the rivers.* Tp#5

Tp#7 has had no training but has sourced information from a variety of sources to ensure she is knowledgeable:

> *We have never been sent on the course. I'm needy. My information I got from e-books and Facebook and all the themes that I like to go on because I like the environment, I read a lot of books and I come from a farm environment also. Also, I relate to my dad. He is a farmer and that is why I read a lot of things like that, but we have not been sent out to a course to a specific course. It's only the*

career courses that make of Tp#7.

while Tp#6 draws on experience:

> *I was not trained, but due to the experience of teaching L.O., I have learned to bring some realistic situations in class so that our learners can know about different aspects of life* Tp#6.

Teachers are instrumental in guiding learners through the learning process and promote learners' abilities to engage independently in problem-solving (Haenen *et al.,* 2003:249). Hence teachers' proper training in integrating EE themes is imperative.Tp#2 was trained to integrate household waste management in her subject of Social Sciences:

> *Geography part of my training because it was divided as you know S.S has History and Geography, so at some point we were taught about Geography alone and then I was trained to know everything about the environment and to manage it as well. Yes, so basically* Tp#2.

The responses to both Themes 1 and 2 indicate that in most cases teachers were not specifically trained to integrate EE themes such as household waste management in their subjects of Natural Sciences, Social Sciences, and Life Orientation. However, some have extended their knowledge through informal training, interest, reading while others come across topics such as EE in their studies. Yet Akinbote (2007:67) alludes that the competence of teachers depends on their training.

5.3.4 Category 4: Teaching methods/approaches used when teaching their subjects

Teacher participants' identified teaching methods/approaches that they use in their teaching. This category contains two themes: teachers' identification of teaching methods and the effectiveness of teaching methods that develop learners' skills of problem-solving.

Theme 1: Teachers' identification of teaching methods

The teaching and learning process has moved from a teacher-centered to a learner-centered approach. This means that a range of teaching methods and strategies need to be employed to ensure quality learning.

It seems that the dominant teaching method is based on a traditional approach:

I use the telling method, question, and answer method Tp#6.

However, at times, the teacher incorporates other methods:

It depends, they change. Sometimes I teach, I use the lecture method, where I'm the one who is teaching those learners they are listening and taking important stuff and then after that, they will use a question and answer method. I will be using it to know if my learners have understood what I was teaching them or not. So the only way I would know before I assess them in something that is written we have to have verbal communication with them where I check whether they were listening whether they understood very well or if I have to do the topic again or if I have to move on because I understand that it is very important for me to know and be sure that they have learned what I was saying to them. So, I use the lecture method, question, and answer method in most cases. Sometimes discussion method, maybe on other days I just group them so that they can just share ideas with their peers. They discuss and they do presentations. Tp#2

Interacting with peers through discussion is a good way to develop knowledge:

One is telling, but mostly the most method that we normally use is discussion whereby you sometimes group your learners in different groups or it will be just a class discussion. You ask a question they raise their hands then we discuss a specific topic just to find out how much they know. If it is something that they do like that this household management you must want to find out how do they do in their different homes. Tp#5

I think it's the learner/teacher-centered method because when you took the number as much as the school kids, they do have that knowledge so we just talking them in group discussions about it, and learners can show whatever little bit of knowledge that they have when it comes to household waste management. Tp#8

In some cases, teachers begin with a focal point prompt:

I try by all means to engage the learners. I don't believe in telling them. Sometimes I come with something that will acquire them to be fully involved rather than using the telling method. Usually, I brought something like a picture like a study that you are doing like maybe I will come with a chart where learners

discover on their own. Let's say I have got a chart with papers all around where and I ask learners; what is wrong with this picture? Maybe they tell me, some papers need to be collected. They have to discover for themselves.

Tp#4

And in other cases, teachers source material which could add value to the lesson:

I use different methods. I don't believe in reading out of the book. So, I like to read a lot so that I can have more information than the learners. I use u-tube a lot. Tp#9

However, many teachers are reliant on the textbooks for the activities, but were unable to explain the teaching method used in the lesson:

We did a lot of activities, we did a lot of activities yes, after, I conducted the lesson I gave them an activity based on that topic. Activities found on the textbook Classwork and homework. Tp#1

A couple of teachers were a little confused with the questions and were unable to give an idea of the methods used in the teaching and learning process:

Apparently, but one of the methods I don't know the names of methods, is a direct method/approach and there is another not democratic. I'm not a democratic teacher. I know. It depends on the class Tp#7.

This year the method I use because I teach L.O so normally I use only the textbook, only the textbooks. I tell the learners to take out your textbooks and exercise books so I then say open to the page-(meaning he tells learners the page that they should open) then I *tell them the topic which we are doing, cause this year I only teach only L.O. so it's only textbooks.* Tp#3

In-School A, Tp#1 confused the method with activities, and Tp#3 confused the method with resources. Tp#2 seemed to be clear with teaching methods. In-School B, all teacher participants clearly stated the methods they use when teaching their subject. In-School C, Tp#8 referred to teacher-learner centered methods, but without any further clarification, while Tp#7 and Tp#9 did not appear familiar with teaching methods.

Noting the participants' responses, it can be concluded that not all teachers were able to identify teaching methods and alternative methods and approaches which would enhance the teaching and learning process. A study conducted in Morocco, Tanzania

revealed that teachers' lack of knowledge may lead to confusion in content delivered to the learners (Kira & Kafanabo, 2016:2). In this regard, the researcher considers that poor training of teachers' bearing on teachers' knowledge, what and how they teach.

Theme 2: Effectiveness of teaching methods in developing problem-solving skills

One of the aims of education is to facilitate the development of skills where learners identify and solve problems and make decisions using critical and creative thinking (DBE, 2011):

> *…I use a question and answer method. I will be using it to know if my learners have understood what I was teaching them or not ... Sometimes discussion method, maybe on other days I just group them so that they can just share ideas with their peers. They discuss and they do presentations* Tp#2.
>
> *the most method that we normally use is discussion whereby you sometimes group your learners in different groups or it will be just a class discussion. You ask a question they raise their hands then we discuss a specific topic just to find out how much they know. If it is something that they do like that this household management you must want to find out how do they do in their different homes* Tp#5.
>
> Based on the information given on previous category 2 Teacher Tp#2 and Tp#5 use teaching methods such as discussion that develop problem-solving skills. One of the guiding principles of learning is the collaboration of learners in groups. Interaction enhances the sharing of ideas in achieving tasks set goals when each group member contributes (Dolmans, 2005:733).

Besides, participants in all the schools appeared to be using almost the same print resources which are charts, pictures, magazines, photos, textbooks, and publications. Participants further talked about electronic sources such as the internet, e-books, overhead projectors, and u-Tube. Chalkboards and dustbins were mentioned by some of the participants. In some cases, the participant did not appear familiar with teaching resources but this could be a result of inadequate resources at the school. Although most of the participants identified the resources that they use in teaching their subjects, integration of household waste management is lacking and the development of vital skills such as problem-solving and critical thinking requires the use of a variety of

teaching methods.

5.3.5 Category 5: Benefits of teaching the concept household waste management

Category 5 relates to the benefits of the theme of household waste management particularly with learners' knowledge acquisition and developing environmentally responsible citizenry.

Theme 1: **Learners' knowledge acquisition of household waste**

To become environmentally aware and responsible for their environments, learners need to be equipped with knowledge about household waste management to understand the impact of waste on the environment. In Japan, Taiwan, UK and Hong Kong sensitizing business stakeholders, alerting the government on waste management schools have the responsibility of imparting knowledge (Chow *et al., 2011:7)*.

> *Teaching household waste management makes the learners have a clear understanding of what we are talking about. A clear picture you can put it like that* Tp#1*.*

> *I think that's how it should be. It is supposed to be integrated because cleanliness is important for everyone to always keep aware that they must keep clean in the environment, area where they are, they must be clean because it affects the health. They might end up getting sick because of dirtiness. To make* [learners aware], *to educate our learners about household waste management. You educate, you teach the learner in totality* Tp#6. Environmental education in school subjects enhances learners' knowledge of household waste management. (Hattie, 2003 cited in Kaya & Elster 2018:83). The teaching of EE themes such as household waste management may improve cleanliness in the environment.

> *Household waste is becoming an epidemic. Waste is a problem. Household waste is increasing. Limited places to store the waste it's also being limited. Look at the dumpsite in Newcastle, they are struggling to put these waste, waste, and waste products* Tp#7*.*

> *I think it's because in most cases how dirty our town and people are not aware of the impact that the waste has on the environment itself because if you go to*

the township and we have people that are breeding cars I mean sorry cows and all other sorts of household animals. So at the end of the day if people dispose of their waste anyhow it harms the environment and it also harms the animals like for instance now like the drought and stuff cows tend to eat plastic that people just dispose of like that so that is why I feel that or that is why we should be talking more about this topic so that people can be aware at an early age the impact of waste on the environment Tp#9.

Although some participants indicated that there are no themes related to household waste management in their subjects, some had integrated household waste management as a thus because they see waste being a problem in Newcastle. They acknowledge that there is a lack of space to deposit waste, which emanates from a lack of knowledge of waste management.

Based on the participants' views it can be concluded that the participants acknowledge the importance of integrating the theme of household waste management to develop a love of the environment and as waste is increasing, to ensure that effective management leads to clean environments free from diseases. Inclusion of EE themes in the school subjects promote knowledge acquisition on household waste management (Hattie 2003, cited in Kaya & Elster 2018:83)

Theme 2: Environmentally responsible citizenry

The curriculum states the importance of equipping learners, irrespective of their socio-economic background, race, gender, physical ability, or intellectual ability, with the knowledge, skills, and values necessary for self-fulfillment, and meaningful participation in society as citizens of a free country (DBE, 2011:4). The teachers explained their role in developing responsible citizens:

Because I see the significance of my learners to know about their environment and also so that they can do something and be part of the managing their environment so that they know if they are saving things or treating the environment good, it's not for this time only as in now, but it is for their children, for the future. Something that they need to know so that they take care of their environment because this environment is the one that feeds us and provides us with many things which we don't have without it. They need to know Tp#2. Integration of Environmental Education in the curriculum in Primary schools,

Middle schools, and leaners' enhancement of knowledge and awareness on EE themes (Kiraz & Farat 2016:23-24). This implies that learners' acquired knowledge on Environmental issues may help them to deal with environmental problems such as household waste.

You teach learners how they should behave in life so that why there is this integration because you must, teach your learners to know what they should do or what they should expect in life because they will be growing. They will be one day mothers. They will be fathers. When you teach them at this earlier stage this household waste management, it will help them when they are grownups, so that they can pass on the knowledge they learn from school to their children Tp#3.

Participants stated that it is important to develop responsible future citizens and one way would be to create awareness of important issues such as ensuring a sustainable environment. Supporting this view Damerell *et al.* (2013:5) emphasise educating learners about the environment promotes and develops attitudes towards sustainable environments. Integrating household waste management in CAPS subjects would empower learners' waste management knowledge and awareness at early stages and sensitise learners about the impact of waste on their health.

5.3.6 Category 6: Teacher challenges in integrating household waste management in their subjects

Teacher participants encountered different challenges in integrating household waste management in their subjects. Based on the category of challenges that teachers face in integrating household waste management, the themes of inadequate learner participation and insufficient knowledge, resources categories emerged.

Theme 1: Inadequate learner participation in household waste management theme

Teachers raised several issues relating to learner participation:

Yes, the main challenge I can say is from the response of the learners, their participation, not all of them are willing to share about their environment Tp#2.

Sometimes there are challenges because you remember when I said sometimes, we discuss the issues so one problem first is communication that our learners have. Sometimes they are shy to express themselves so it becomes difficult

maybe because we use this English language to communicate, to discuss things. Sometimes you do not get what you want from them (noma), (meaning or) *what you expect from them. Sometimes you find that your discussion is around a certain group of learners. So, it means you are not getting what you want from the learners if they do not all participate. That is the most problem when you are integrating this topic. In my subject mainly is communication. Some of them are secretive. They, think that you want to discuss their family things in class* Tp#6*.*

Different challenges in integrating the theme of household waste management are experienced by teacher participants. Tp#2 mentioned learners' unwillingness to participate while Tp#6 indicated challenges of learners failing to express themselves using the language of teaching and learning which is English.

Theme 2: Insufficient knowledge, resources, and time

To integrate the theme of household management in CAPS subjects could prove to present challenges for teachers:

Yes, there are, some of the learners who are not familiar with waste management. To familiarise the learners, we need to be workshopped [in-service training] *as teachers so that we will know what to say as teachers, even if we don't have much information on household waste management, yes* TP#1*.*

Yes, because I have to integrate with other Learning Areas such as N.S. that's all I can say. Otherwise, I was not trained for N.S. that's why I said there are challenges, there are challenges. To my subject no, especially as I am a person who used to read newspapers, watch T.V. I see how to manage, that manage household waste management. I'm not a stereotypical person Tp#5*.*

I think yes and no because there are certain themes that we can touch but the time limit there is a busy schedule in the CAPS curriculum doesn't allow two practical and two academic periods. We have to work extremely fast to cover the curriculum Tp#9*.*

The no part as I have said it's a busy schedule. The curriculum is a busy schedule and because of the limitation of periods that we only have two academics periods and it makes it very difficult to correlate just to finish everything in time. You have to work extremely hard especially with senior classes. Grade eight is a little bit more relaxed, but because they come from primary school and they are not used to the fast pace. You have to repeat a lot of stuff so you have to work extremely

hard to finish everything. So we try to touch most of the stuff, but I think it's not enough.

The challenges on integrating household waste management in their subjects include learners' lack of knowledge on household waste management, teachers not trained to integrate household waste management in their subjects, the unwillingness of learners to share their environmental issues, limited time to cover the overloaded CAPS curriculum and working efficiently to cope with the overloaded curriculum and teacher-learner medium of communication. One participant suggested that learners at Grade eight-level have just moved from primary school and have as yet not adjusted to the pace of work expected in secondary school.

Challenges to waste control in schools were also highlighted:

I would say, to tell you the truth in this school that I am at, there is a challenge in some of the classes they don't have these bins, so when I tell them to pick/to clean up they tell you, sir, "where are we going to throw the things?" Then they go outside and throw outside in the bins. So that is a challenge we have in other classes because they don't have bins. They have to take them and go outside and come back to the class after throwing Tp#3*.*

Dlamini *et al.* (2017:4) Distribution of services and facilities based on economic status and geographical location have caused problems and imbalances as an emanating from policies that segregated citizens and even distribution of resources. In some schools where there were no dust bins in the classroom, litter was observed under learners' desks and some of the litter piled at the corners of the classroom. In some schools, old drums were used as rubbish bins but waste piled up. Schools had to resort to burning most of the waste as in some low-income areas, the Municipality only collects waste once a month hence the area was loaded with waste.

Photograph 4 indicates the type of rubbish bin utilised in School B with no evidence of recycling.

Figure 5.4: Photograph 4 - Mixing waste and littering in the rubbish bin

Recycling was not being practiced at schools and as a result, food was being thrown away with other household waste. Uncovered leftover food waste attracts flies and is detrimental to health, as seen in school B.

Figure 5.5: Photograph 5 - Learners' discarded food waste

5.3.7 Teacher suggestions and reflections

In addition to the above themes, participants were asked a variety of question which result in the suggestion of strategies to integrate EE themes in their subjects

Teachers noted that it was easy to prescribe methods for other teachers but that the use of each method or approach was dependent on the content and the context.

However, participants listed various methods such as question and answer; explanation, and discussion with learners. However, to sum up, participants indicated that they are aware that there is a lack of knowledge of waste management in schools whereby teachers need to inculcate the knowledge and skills in learners. In addition, participants suggested that for practical purposes, schools should provide a good number of waste-bins, provide colour-coded recycling bins, monitor cleanliness, invite experts to come and teach learners, have awareness campaigns, encourage teachers in engaging in recycling projects, and involve the families and community in household waste management. A further suggestion was for learners to bring recyclables to schools where they could either be recycled or reused in a subject such as Art.

Participants also reported on several initiatives that have been introduced over the years in their schools.

At School B, Tp#6 stated that the school committee collected waste in the classrooms every Friday and learners separated waste. However, the researcher was at the school on Friday and captured photographs 4 late in the day. TP#6 also mentioned that the Department of Social Development provided the school with waste cleaning materials.

The bottle top project, in collaboration with (Sweethearts), the wheelchair foundation, was conducted in School C in exchange for wheelchairs, but this project has now ended.

One participant referred to the School Educational Environmental Programme (SEEP) which was implemented at Fasimba primary school in KwaZulu Natal in 2016, but not in the sampled schools.

Eco-schools programe promotes learner awareness of Environmental issues in a bid to minimise discarded waste (Cincera 2013:118) whereas in the UK prorammes such as Love Food and Hate Waste and WRAP increase public awareness on waste management (Cole *et al.,* 2011:7). Teachers reported that at times, stakeholders become involved in assisting them in developing learners' awareness of household waste management. Tp#1 in school A and T#4 in school B explained that the Department of Environmental Affairs (DEA) assisted teachers in developing learners' awareness of household waste management.

To ensure that the teaching and integration of the theme of household waste management are effective, participants suggest that training of teachers is crucial, that

the theme be incorporated into all subjects and particularly in Life Orientation. It was felt that teachers should impart knowledge on household waste management and importantly, that household waste management be inclusive in the learners' education process. It was felt that household waste management should be taught from an early age and that learners are involved in community clean-ups, awareness campaigns, recycling projects, and using waste products to recycle creatively.

In conclusion, participants expressed concern of learners' lack of knowledge on household waste management that emanates from a lack of training of teachers to integrate the EE theme of household waste management. It is suggested that household waste management be included as a topic in CAPS subjects and be taught from an early age throughout the learners' education process.

5.4 PRESENTATION OF FINDINGS FROM NON-PARTICIPATORY OBSERVATIONS

In non-participatory observation, the researcher observed participants and their engagement with their everyday activities or actions and recorded what was observed (Henning *et al*., 2004:81-82). McMillan and Schumacher (2010:350) stipulate that during observation, whatever happens naturally in a natural setting is captured to understand the phenomenon being studied. Non-participatory observation involves the researcher taking notes, based on activities or behaviour in a structured or semi-structured fashion without the researcher's active involvement in the participants' activities and allows events to unfold naturally (Creswell, 2014).

In this study, the researcher observed teachers while teaching in Grade eight classes during teaching and learning periods in schools. The focus was on how the teachers integrated the theme of household waste management in Natural Sciences, Social Sciences, and Life orientation CAPS subjects to enhance learners' awareness. The researcher used an observation checklist (*cf*. Appendix H) and focused on how the management of household waste was integrated into CAPS subject and applied in the surrounding school premises.

The categories that were identified in non-participatory observation were aligned with categories from the interviews and views were aligned. These included teachers' understanding of household waste management; identified CAPS themes related to waste management; teacher training to integrate household waste management in

their subjects; benefits of teaching the concept household waste management to learners in a school setting; teachers' challenges of integrating household waste in their subjects.

5.5.1 Category 1: Teachers' understanding of household waste management

The themes emerging from this category on Teachers' understanding of the theme of household waste management included teachers' misconceptions of household waste management and the importance of household waste management.

Theme 1: Teachers' misconception of household waste

Drawing conclusions from participants' interviews regarding what household waste management entails, the researcher found that some teacher participants had misconceptions about household waste management. Tp#4 talked about sustainability without elucidating and further considered insufficient dust-bins resulting in littering of the school while Tp#8 defined waste without showing insight into what household waste management is.

Theme 2: Importance of household waste management

Concerning the participants' views expressed during interviews teachers' understanding of household waste management indicated that learners need to be informed and be knowledgeable in household waste management. Tp#6, Tp#8 and Tp#9 mentioned the importance of learners' knowledge acquisition of household waste management whereas Tp#3 emphasised the need for the theme household waste management to be included as a topic in the CAPS curriculum for learners to realise its importance while Tp#3 indicated the effects of waste on humankind emanating from lack of knowledge of waste management. Republic of South Africa, National Environment waste Act, (Act no 59 2008) endorses education that brings awareness to learners about issues affecting their communities. Hence it can be concluded that all participants realised the value of household waste management and the importance of knowledge of household waste management for both teachers and learners for the theory to be applied to the practice. As can be seen from the previous photographs, household waste management was not being effectively applied in all sampled schools.

5.5.2 Category 2: Identified CAPS themes related to household waste management

Teachers' identification of household waste management theme and lack of awareness categories emerged from the category identified CAPS themes related to household waste management.

Theme 1: Teachers' identification of household waste management theme

Based on interview data, Tp#2 mentioned environmental degradation, Tp#4 identified household waste management to be related to environmental degradation, TP#5 referred to pollution, and Tp#9 identified recycling and reuse. Other participants were unable to identify themes in their subjects that are related to household waste management.

Theme 2: Teachers' lack of awareness on CAPS themes related to household waste management

The data collected during interviews shows that some teacher participants could not identify themes related to household waste management. Tp#1, TP#3, and Tp#6 mentioned that there were no themes related to household waste management. Tp#8 stated that in Social Sciences no theme relates to household waste management except in Life Orientation and Tp#7 indicated that there was no clear topic related to household waste management in her subject.

Only two participants partially integrate the theme of household waste management in their teaching. Tp#9 in the high-income area talked about the management of plastics by showing learners a video although she only focused on plastic waste without mentioning the other types of household waste. Tp#6 in the low-income area asked learners questions on recycling and a few learners participated in trying to answer the questions. However, both participants had nothing in their lesson plans indicating what they were teaching. The rest of the participants in all three schools did not seem to integrate household waste management when teaching their subjects.

5.5.3 Category 3: Teachers' training to integrate household waste management in their subject

Trained teachers in household waste management integration in CAPS subject and teachers' lack of training to integrate household waste management were identified in the interview data collection.

Theme 1: Trained teachers in household waste management integration in CAPS subjects

Taking into account participants' responses in the interview data, it seems that teachers had not undergone specific training on integrating household waste management in their subjects. Response from Tp#2 and Tp#5 indicates that they had received some trained concerning integrating household waste management in their respective subjects of Natural Sciences and Social Sciences.

Theme 2: Teachers' lack of training on household waste management integration

Tp#3, Tp#7, and Tp#8 specified that they had not undergone training on how to integrate the theme of household waste management in their subjects. Tp#6 uses teaching experience to integrate household waste management in his subject and even though Tp#4 encountered the theme of household waste management in her postgraduate studies and no formal training, she was able to bring it into her subject.

According to the researcher's observation, teachers were challenged in integrating the theme of household waste management in teaching their subjects including those who had been trained to integrate EE themes in their subjects. This could be the lack of content knowledge or pedagogical content knowledge or they lack the skills of integrating the theme.

5.5.4 Category 4: Teaching methods/approaches used when teaching their subjects

Learning should happen as a constructive process (Dolmans *et al*., 2005:733). This reflects on the teacher's ability to select teaching methods that stimulate learners' active involvement in the learning process in gaining knowledge. Hence the following themes surfaced from the category on teaching methods/ approaches used when teaching and included identification of teaching methods and teachers' use of a variety of teaching methods.

Theme 1: Identification of teaching methods

In the lesson presentations that the researcher observed, teacher participants used similar methods of teaching. Tp#1, Tp#2, Tp#3, Tp#4, Tp#5, p#8 and Tp#9 used question and answer method while Tp#7 focused on explanation and question and

answer methods. During the interviews, methods such as discussion, telling and discovery were identified as alternate methods by teacher participants.

Theme 2: Teachers' use of a variety of teaching methods

Teachers used one common method - question and answer, except Tp#7 who used explanation, and question and answer during lesson presentations that the researcher observed although in interviews Tp#5 mentioned telling and question and answer. Tp#6 indicated telling method, question and answer and discussionTp#4 use the discovery method while Tp#1 named lecture method, question and answer, and discussion.

To sum up, the dominant methods of teaching observed during observation of lessons were telling, question and answer, discussion although with little mentioning of aspects related to household waste management and no integration of household waste management for most of the participants. Selected teaching methods need to stimulate and develop critical thinking and problem-solving skill (Dolmans 2005:733). The commonly-used resources were textbooks, the chalkboard and a computer was used by one participant. Although some of the teachers indicated that they had been trained to integrate EE themes and had comprehensive and sound knowledge in the content of their subjects; the theme of waste management was not integrated into the teaching of their subjects. Probably non-integration of the household waste management emanated from their indication during interviews, that there were no themes related to household waste management.

Teachers used case studies, group work, homework class individual activities for their assessment of the content of their subjects, although there was no indication of the integration of the theme of household waste management. In Schools A and B, learners were conducting projects on settlements with no integration of the theme of household waste management. Both schools were observed with lots of waste that was not properly managed.

In all the schools, no strategies were in place for teachers to improve their proficiency in integrating the theme of household waste management in their subjects, and this included participants in School C who expressed their passion for the environment and taught in a school that was well-resourced for teaching and learning. Category 5: Benefits of teaching the concept household waste management

Dissemination of knowledge on environmental issues empowers learners with knowledge and understanding subsequently shapes their attitudes and values in maintaining sustainable environments (Phang *et al.,* 2016:387). Equipping learners with knowledge of waste management may result in waste-free sustainable environments. From this category, the themes of household waste management knowledge and the importance of household waste managed schools emerged.

Theme 1: Household waste management knowledge acquisition

The researcher observed nine teacher participants delivering lessons. Out of all the lessons observed, only Tp#9 tried to integrate household waste management by showing learners a video on different kinds of plastic waste while Tp#6 asked questions on recycling with a few learners trying to answer the questions. The rest of the teacher participants taught their lessons without household waste management integration although, during interviews, one participant identified recycling and reuse as a theme related to household waste management in her subject.

Theme 2: Importance of household waste managed environment

The South African Constitution Bill of Rights emphasises that everyone has a right to a safe and healthy environment. The importance of a clean and safe environment cannot be overemphasised in promoting health.

Based on interview data, Tp#3 highlighted the impact of waste on health. This means that it is important to live in a clean and waste-free environment. Tp#6, Tp#8, and Tp#9 indicated the importance of empowering learners with household waste management at a young tender age to become environmentally responsible adults. This implies that the teacher participants realised the need to have sustainable waste- managed environments.

The sampled schools were observed by the researcher for compliance in terms of household waste management. The results displayed the need for schools to enforce household waste management in learners as the schools appeared not to be applying safe and environmentally friendly practices on waste as reflected in photographs 1 to 5 (*cf.* Figures 5.1-5.5).

5.5.5 Category 6: Teachers' challenges in integrating household waste management in their subjects

Teacher participants indicated a variety of challenges about integrating household waste management in their subjects during interviews and this aligned with observations by the researcher.

Theme 1: Inadequate knowledge of household waste management integration

Based on the participant teachers' misconceptions and insufficient understanding of what household waste management entails and teachers' inadequate training to integrate household waste management in their subject as per interview data, lack of knowledge of household waste management is evident. Household waste management theme was only mentioned partially when two teacher participants in their lessons presentations talked about plastic and the other one asked questions based on recycling. Consequently, all sampled schools did not portray comprehensive knowledge of household waste management.

Theme 2: Learners' lack of interest in learning

The researcher's observations on participants' lessons were that most teacher participants tried to motivate the learners to actively participate in the lessons particularly Tp#1, Tp#2, Tp#3, Tp#4, Tp#7, and Tp#9. However, most learners in all sampled schools did not show interest in what the teachers delivered with only a few learners actively participating. It could be that learners' lack of self-motivation in learning hence negative effects on household waste management knowledge acquisition owing to learners' attitudes. This is also supported by Tp#9 who indicated that learners do not take household waste management seriously (*cf*. Category 5.4.2 theme 1).

In all the schools, it was observed that not all learners were fully engaged in learning during lessons particularly in periphery of-urban and low-income schools due to large numbers in the classes of over sixty learners. Only a few learners were actively involved in the lessons, while the rest did not concentrate and showed little interest in what the teachers delivered despite teachers trying to motivate them to participate. In the high-income school, a lot of teaching resources were available including a computer in every classroom for the teacher's use and several learners actively participated in discussions and answered question. However, the rest of the learners lacked self-motivation and showed little interest in learning, but it might be due to the presence of the researcher who was a stranger to them.

5.6 PRESENTATION OF FINDINGS FROM DOCUMENTS ANALYSIS

In qualitative studies, public and private documents prevail to elicit data based on the theme that is studied (Creswell, 2014). Neuman (2011:362) holds that qualitatively any document old or new, electronic or printed is considered valuable as long as it relates to the research question.

In this study, the researcher analysed Curriculum and Assessment Policy Statements (CAPS) for Natural Sciences, Social Sciences, and Life Orientation subjects for Grade eight to identify Environmental Education themes that relate to household waste management. Additionally, School Environmental Policies were analysed for the identification of sections that uphold learners' awareness of household waste management. Other documents that were analysed include lesson plans and assessment plans for Natural Sciences, Social Sciences, and Life Orientation. The researcher used a document analysis checklist to collect data related to household waste management (*cf.* Appendix I). The researcher also requested access to the school environmental policy from the school principals while the rest of the documents were provided by the subject teachers on request.

A wide range of categories that were identified in non-participatory observation was: aligned with those emerging from document analysis and included teachers' understanding of household waste management, identified CAPS themes related to waste management, teacher training to integrate household waste management in their subjects, benefits of teaching the concept household waste management to learners in a school setting and teachers' challenges of integrating household waste in their subjects

5.6.1 Category 1: Teachers' understanding of household waste management

The category of teachers' conceptualisation of household waste management is reflected in the themes of limited knowledge of household waste management and limited knowledge of household waste management.

Theme 1: Importance of household waste management

The NCS National Curriculum Policy and Assessment Statement (CAPS) Senior Grades 7-9 for Natural Sciences, Social Sciences and Life Orientation, Teacher

participants' lesson plans and assessment records were analysed. The NCS National Curriculum Policy and Assessment Policy Statement (CAPS) Grade 7- 9 for Natural Sciences, Social Sciences and Life Orientation outlines the general aim of using "Technology and Science effectively and critically showing responsibility towards the environment and health of others" (DBE, 2011:4). As a result, this aim depicts the importance of developing environmental awareness so that learners take responsibility for maintaining a waste-free environment taking into consideration the health of others. Unpacking of the aim gives direction for the teacher to use scientific and technological techniques to incorporate EE themes such as household waste management to protect the environment and human health. Bourguignon (2015:3) support the view by arguing that most municipal household waste needs to be managed properly to prevent a negative impact on health. Hence teachers must inculcate in learners' knowledge of the importance of household waste management. Alarmingly, all teacher participant lesson plans did not refer to household waste management even though responses from teacher participants in interviews indicated that it is important to teach household waste management to learners.

Theme 2: Limited knowledge of household waste management

All the nine participant lesson plans and assessment records analysed reflected no planning for lessons on household waste management or lessons where the theme of household waste management was being integrated. This could indicate that teachers limited knowledge of household waste management as a theme limited them from including it in their teaching.

5.6.2 Category 2: Identified CAPS themes related to household waste management

The category identified CAPS themes related to household waste management reflected the themes of inadequacy in the identification of CAPS themes related to household waste management and lack of awareness on household waste management in related topics and its integration. Theme 1: Lack of awareness on household waste management related topics

The concepts of environmental degradation, ecology, environmental studies, pollution recycling, and reuse were reported by a few teacher participants as related to household waste management. Although the above-mentioned topics did relate to

household waste management, some of the participants could not identify the themes and understanding of household waste management. Hence most of the teachers were not aware that the mentioned themes related to household waste management and did not integrate them into their subjects, as indicated in their lesson plans and assessment records.

Theme 2: Integration of the theme of household waste management in CAPS subjects

The participants' lesson plans and assessment records reflected no planning or assessmenton household waste management in CAPS themes related to household waste management. Tp#2 and Tp#5 gave learners a project on the topic of settlements which could be related to household waste management. Surprisingly, both Tp#2 and Tp#5 did not include the concept of household waste management in the planned project. The researcher's analysis of the teacher participants' lesson plans and assessment records evidenced that the integration of the theme of household waste management in CAPS subjects is lacking.

5.6.3 Category 3: Teachers' training to integrate household waste management in their subjects

As previously indicated, training is vital to ensure quality education. Themes emerging from the category include the training of teachers to integrate household waste management in their subjects.

Theme 1: Few trained teachers in household waste integration

In document analysis, there was little evidence of training of teachers, which could have included pre-service training or postgraduate training, as recorded in teachers' qualifications, nor was there any indication of continuous professional development or even collaborative cluster training. Further, quality teachers depend on training (Akinbote, 2007:25). Thus teachers need to be properly trained to disseminate knowledge to the learners. Tp#2 and Tp#5 were the only participants who indicated that they were trained to integrate household waste management in their subjects. Tp#2 currently teaches Social Sciences in the periphery-urban and T#5 teaches Social Sciences in the low income. Theme 2**:** Teachers lack the training to integrate household waste management

Document analysis revealed that participants' lesson plans and assessment records did not include the integration of the theme of household waste management. This could stem from a lack of training to integrate household waste management as a theme. Surprisingly, even the teachers trained in EE issues such as household waste management did not indicate the integration of household waste management in their lesson plans ad assessment records.

5.6.4 Category 4: Teaching methods/approaches used when teaching their subjects

The category of teaching method/approaches used when teaching their subjects raised include the themes of a variety of teaching methods and teachers' selection of methods promoting critical thinking.

Theme 1: A variety of teaching methods

In combination with observations of lessons, the researcher analysed the participants' lesson plans and their selection of teaching methods. As reported earlier, Tp#2, TP#6, and TP#7 used teaching methods such as the telling method, question and answer method, and discussion with each participant using their preferred teaching method.

Theme 2: Teachers' selection of methods promoting critical thinking

Analysis of the lesson plans for Tp#1, Tp#3, Tp#7, and Tp#9 did not indicate the teaching methods used in delivering their lessons. The researcher concluded that the teacher participants were not familiar with teaching methods because the same participants, during interviews, found difficulty in identifying the methods that they used in teaching their subjects. Proper selection and implementation of teaching methods are important in stimulating thinking and imparting knowledge. (Bell, 2011:88).

5.6.5 Category 5: Benefits of teaching the concept of household waste management

The category benefits of teaching the theme of household waste management comprised the themes of household waste management knowledge acquisition and the development of problem-solving skills.

Theme 1: Household waste management knowledge acquisition

During lesson observation, it was evident that only a couple of teachers had relevant

content knowledge on household waste management. Tp#9 tried to integrate the theme of household waste management in her lesson when she discussed plastic and Tp#6 asked questions on recycling. This implies that teachers need to acquire and develop content knowledge on waste management to disseminate knowledge of household waste to learners. Document analysis proved that there was no evidence on the integration of the theme household waste management in the Teacher participants' lesson plans. That could mean teacher participants lack knowledge of the theme and are unable to integrate the theme of household waste management in their subjects.

Theme 2: Development of problem-solving skills

The National Curriculum Policy and Assessment Statement (CAPS) Senior Grade 7-9, for Natural Sciences, Social Sciences and Life Orientation documents the general aims states that learners need to identify and solve problems and make decisions using critical thinking (DBE, 2011:5). To solve environmental problems such as household waste management, learners' critical thinking skills in solving problems need to be developed. Hence teachers need to develop learners' problem-solving skills by taking responsibility in designing lesson plans and programmes promoting learners' problem-solving abilities.

5.6.6 Category 6: Teachers' challenges in integrating household waste management in their subjects

Teachers' challenges in integrating household waste management in their subjects are depicted by a lack of school environmental policy and insufficient knowledge.

Theme 1: Lack of school environmental policy

Document analysis revealed that none of the sampled schools had developed a school environmental policy to guide the school on environmental issues. It seems that South Africa has no overall environmental education policy, but schools, in line with projects such as the Eco-Schools Programme, are encouraged to develop and implement school environmental policies. Sampled schools' lack of possession of school environmental policy probably contributes to the issue of lack of household waste managed schools, learners' lack of knowledge and awareness, and teachers' not including the theme of household waste management in their subjects.

Theme 2: Insufficient knowledge

Based on participants' misconceptions on the theme of household waste management, lack of training of teacher participants in integrating household waste in their subjects, teacher participants' lesson plans and assessment records reflected no integration of household waste management in their subjects, the researcher concluded that this reflects lack of household waste management knowledge.

Documents such as the National Curriculum Policy and Assessment Statement (CAPS) Senior Grade 7-9, teachers' lesson plans, and assessment records were analysed. The CAPS documents for Natural Sciences, Social Sciences, and Life Orientation state that some of the aims of education are to identify and solve problems and make decisions using critical thinking, use technology, and Science effectively and critically. Further show responsibility towards the environment and health of others and demonstrate an understanding of the world as related systems by recognizing that problem-solving contexts do not exist in isolation.

Analysis of participants' lesson plans did not reflect the integration of the theme of household waste management and as household waste management is a cause for concern in schools, it seems that learners are not given the opportunity of acquiring and developing knowledge which means that problem-solving and critical thinking skills have not been developed and as such learners will not be in a position to engage in household waste management in addressing the problem.

As stated earlier that some participants had given learners a project on settlements, there was no indication of integration of the theme of household waste management. Surprisingly, two participants' assessment plans had records of integration of household waste management although their lesson plans did not reflect what was later assessed.

Furthermore, none of the schools had any documents that confirmed that the schools were working in collaboration with other stakeholders to enhance learners' awareness of household waste management. Similarly, none of the participants had documents as proof to improve their proficiency in integrating the theme of household waste management. Also, none of the schools had an environmental policy in place and it seemed as if none of the schools were working with organisations that supported EE, such as the Eco-Schools programme as per document analysis.

5.7 CHAPTER SUMMARY

This chapter presented findings on data merging from semi-structured interviews, observations, and document analysis. Findings, presented as categories and themes, highlighted teachers' understanding of what household waste management entails, its importance in ensuring learners' awareness and promoting a waste-free environment that is sustainably managed. However, teachers portrayed that their knowledge with regards to household waste management was lacking and most of them had not undergone training on how to integrate the theme of household waste management in their subjects which hinders their efficiency to impart adequate knowledge on the theme of household waste management. Interviews and observations revealed that although teachers used a variety of teaching methods, they were not effective with developing a learner-centered approach that would engage all learners and develop skills of problem-solving and critical thinking emphasized in the Grade 7-9 CAPS documents.

Although teacher participants indicated the benefits of integrating the theme of household waste management in CAPS subjects, analysis of the curriculum revealed little indication of inclusion of the EE theme. Dolmans et al. (2005:735) advocate teacher guidance to learners for learning to take place although teachers were thus faced with challenges in integrating the theme of household waste management in their subject and besides, there was little evidence of how household waste management was being implemented in schools to ensure learners' knowledge acquisition on the phenomenon under study and to promote a healthy, waste-free environment.

CHAPTER 6

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

6.1 INTRODUCTION

- The previous chapter presented the analysis of data that was obtained through semi-structured interviews, non-participatory observations, and document analysis according to the emergent themes. This final chapter begins with a summary of the literature review and the theoretical framework guiding the research. In an attempt to answer the main research question:- *What are the secondary teachers' views regarding learners' awareness of household waste*

management in Newcastle South Africa? The research findings, according to the research questions, are synthesised. In the final sections, limitations to the study are presented and recommendations are offered.

6.2 SUMMARY OF LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Household waste management is a global problem. Both developed and developing nations encounter the same problem particularly as a result of population and economic growth (Han *et al.,* 2017:947). Waste emanates from escalated urbanisation rates and an escalating increase in population. Schools also encounter waste management challenges which include a lack of awareness and knowledge on household waste management and attitudes towards waste management.

Solid waste includes paper, plastic, tins bottles, food packaging containers, and leftover food all of which are commonly found in schools. Household waste found in schools emanates from littering and learners' activities which are exacerbated with increasing numbers of learners at school (Oloruntoba *et al.,* 2011:25). Household waste management is a challenge in most schools with some schools embarking on campaigns to lessen the amount of waste generated focusing on the 3Rs - reduce, reuse, and recycle.

In South Africa, the Curriculum and Assessment Policy Statement (CAPS) emphasises that teachers should integrate Environmental Education (EE) themes into CAPS subjects (DBE, 2011). This aligns with Licy *et al*. (203:48) who support imparting knowledge of EE themes, such as household waste management, to young people. It is crucial to engage the youth to develop awareness even though challenges may arise. Although young people seem to lack interest in engaging and effectively solving environmental problems, it is important to include EE issues in CAPS subjects to equip learners to take on the role of solving environmental problems in their communities.

Three theories underpinned this study namely: socio-cultural theory; social learning theory and place-based theory, each of which is summarised below.

The socio-cultural theory advocates that learning happens through observation of models in the environment. The models could be people that the learner looks up to such as teachers in school, peers, television models, or family members. The significant people that learners observe have an influential role in the learners'

behaviour (Vygotsky, 1978:58). In the school context, the teachers, any experienced personnel, or peers can provide support or inform learners about household waste management and learners embark on solving the problem of waste. Socio-cultural influence makes humans proactive in dealing with problems and in this case, it is the learners' initiative, derived from the knowledge that addresses environmental issues significant in their surroundings. Also, **social learning theory** emphasizes rewards for good behaviour (Pritchard, 2009:10). In other words, positive reinforcement encourages the repetition of the learners' behaviours. Thus, positive reinforcement-based on good behaviour on waste management may promote a good attitude to waste and develop effective management of household waste in schools.

Place-based learning emphasizes that the learner's social environment has a bearing on learning (Dewey in Kleederman, 2001:2). Social, economic, political, cultural, and ecological impact positively or negatively on the learning process (Sobel in Kleederman, 2009:3). The place-based theory is guided by the principles of learning as a constructive process, self-directed learning, learning as a contextual process, and learning as a collaborative process. Learners' ability to work together and seek knowledge depends on the situation and environment where they are for learning to happen.

In this study, the theories that foregrounded this study act as guidelines for household waste management knowledge dissemination and acquisition for learners to be empowered with the necessary knowledge and skills guided by teachers, who are supposed to be their role models. Again, shared EE knowledge taught in their CAPS subject needs to assist learners to acquire and develop knowledge, skills, attitudes, and values which they would use to work towards environmental problem-solving in their schools and communities as per grade 7-9 CAPS documents.

6.3 SYNTHESIS OF THE RESULT FINDINGS

In this section, a synthesis of the research findings is given, guided by each of the research questions.

6.3.1 RQ1: How do teachers understand household waste management?

Teacher participants had different understanding and perceptions of what household management entails. The views of the participants on the concept of household waste

management portrayed a limited understanding of the concept. Only a few participants had a clear idea of what household waste management entails with some thinking that household waste management has to do with the management of the home and some thinking that household waste management is about cleanliness. Misconceptions of the concept of household waste management depict a lack of knowledge on household waste management. Teachers are expected to be knowledgeable in the content that they deliver to the learners as learners look up to the teachers for guidance and knowledge (Mcleod, 2016:1).

This study concluded that teachers conceptualize household waste management differently with some misconceptions based on what household waste management entails. Teachers' lack of understanding of household waste and its management harms the teaching of the theme and integrating it in the CAPS subjects. However, teachers still consider household waste management as an integral theme to enlighten learners.

6.3.2 RQ2: How do Natural Sciences, Social Sciences, and Life Orientation teachers integrate the theme of household waste management in their subjects to enhance learners' awareness?

A few participants identified themes related to household waste management in their subjects while some stated that there were no themes and did not deal with the topic while other participants mentioned that the themes were not related to their subjects.

In some cases, participants identified EE themes such as environmental degradation, ecology, environmental studies, pollution, recycling, and reuse which could be integrated in their subjects. However, because most participants had an inadequate understanding of what household waste management entails and because of their inability to identify themes related to household waste management, they were unable to integrate the theme in their subjects. Two participants partly integrated the theme of household waste management in their teaching, one through a Powerpoint presentation on plastic and one through a discussion on recycling.

Identification of CAPS themes related to household waste management seemed a challenge to some teachers. The researcher concluded that the teachers' barriers in the identification of CAPs themes related to household waste management emanated

from the teachers' limited understanding of what household waste management entails. Hence, teacher participants' lack of adequate knowledge on household waste management, their misconceptions on what household waste management entails hinders the integration of the theme in their subjects.

6.3.3 RQ3: What training have teachers received to integrate the theme of household waste management in Natural Sciences, Social Sciences, and Life Orientation?

Singhirunnusorn, Donnilakorn, and Kaewhanin (cited in Mwanza, Mbohwa & Telukdarie, 2018:618) state that awareness and knowledge are crucial for waste management to happen. Hence teachers need the necessary knowledge to impart to learners with regards to household waste management and this knowledge is gained through training.

Only two participants stated that they were trained to integrate EE themes such as household waste management in their subjects. One teacher had completed a BEd honours degree in Environmental Education and has a passion for the environment, whereas the rest of the participants were not trained to integrate EE themes in their subjects. Participants rely on their teaching experience while others use personal experience to try and integrate the theme of household waste management in their subjects.

As most participants were not trained to integrate EE themes in their subjects, knowledge, and skills to integrate the themes are lacking. Hence the Department of

Basic Education has a role to play to empower teachers with the necessary knowledge and skills to integrate EE themes, such as household waste management, in their subjects for learners to be aware of environmental issues in their communities and how to solve problems regarding their environments.

Teaching learners from an early age to be responsible for future citizens is part of the aim of education. This implies that teachers need adequate knowledge and skills to impart knowledge to learners at early ages (Simsekli, 2004:226). The study concludes that teachers' lack of training in the integration of EE themes, such as household waste management, in their subjects hinders full delivery of the content on household waste management and needs to be addressed through a variety of training initiatives and

continuous professional development.

6.3.4 RQ4: What strategies can be used to integrate the theme of household waste management in Natural Sciences, Social Sciences, and Life Orientation to enhance learners' awareness?

Several teaching strategies were used when teaching Natural Sciences, Social Sciences, and Life Orientation and included explanation, learner discovery, discussion, telling, question and answer, and note-taking although household waste management was not included by most teachers. Some of the participants' teaching methods stimulated learners' active involvement in problem-solving and critical thinking, advocated by the place-based learning theory (Dolmans *et al.,* 2005:733). This implies that some participants ensure that the teaching methods that they use develop learners' problem-solving skills. Of concern is that some participants could not distinguish between methods and teaching resources displaying a lack of knowledge.

Although teachers used different methods in the teaching of their subjects, these tended to be more traditional approaches. The incorporation of a variety of methods and the use of a wide variety of resources should be used to stimulate active involvement by the learners and promote the skills of problem-solving, critical and creative thinking, the ability to work individually or as a group, in collecting, analysing and critically evaluating information and to effectively communicate findings (DBE, 2011:5). Teachers' teaching methods should develop learners who will use their knowledge and skills to solve environmental problems encountered in their environments.

6.3.5 RQ5: What are the benefits of integrating the theme of household waste management in Natural Sciences, Social Sciences, and Life Orientation subjects?

As previously indicated, escalating waste production is a global concern (Cincera, 2013:118), and to address the issue, the starting point is the education of the youth. Participants indicated the need for learners to be aware of and have knowledge of household waste management as it is important to inculcating knowledge of EE themes at the early stages of learners' development. Developing learner awareness and ensuring that the principles are put into practice has major benefits for the school,

the surrounding community, and ultimately the environment. This speaks to the notion that learning has an application and, in this case, that is the application of waste management in the immediate environment.

Suggestions for developing learners' awareness could be through the participation of schools in the Eco-Schools programme that promotes awareness on environmental issues such as household waste management. Participation in such a programme would facilitate the inclusion of the theme of household waste management in the curriculum to be taught by all teachers

Some participants recommended that household waste management be included in the subject of Life Orientation while some participants thought every teacher needed to integrate the theme across the subjects so that learners understand the essence of household waste management. Although integration of the theme of household waste management in subjects is crucial, its feasibility is at stake without proper training of teachers to implement it.

Further suggestions are that learners should participate in community clean-ups to ensure that learners become aware of the increasing amount of waste dumped in the environment, particularly in the school surroundings. Inactive participating, learners become sensitised and in line with placed-based learning, positive action reinforces positive behaviour. This means that learners could continue to manage waste in their surroundings through a change in behaviour and could result in developing environmentally responsible future citizens.

On a practical note, participants suggested that the benefit of learning about household waste management would be improved by the provision of dustbins and recycling bins to develop learners' awareness in their schools. Mwanza *et al*. (2018:618) confirm that lack of waste management facilities results in waste deposited in landfills. The provision of recycling bins could sensitise learners on household waste management and the effective use of recycling bins could mitigate or curb waste sent to landfills.

The study has concluded that the integration of the theme of waste management across the subjects can enhance learners' awareness of household waste in addition to other environmental issues that could affect their schools. This awareness could then lead to learners playing a pivotal role in environmental problem-solving in their immediate environments.

6.3.6 RQ6: What are the challenges of integrating the theme of household waste management in Natural Sciences, Social Sciences, and Life Orientation subjects?

Participants had mixed opinions based on the challenges of integrating household waste management in their subjects. A major challenge previously mentioned, is the teachers' lack of knowledge of environmental issues and the inability to integrate EE themes in their subject. This stems from a lack of training, as previously indicated. In terms of actual teaching, participants identified learners' unwillingness to discuss community environmental issues and it may be that learners are not confident or they lack knowledge on EE issues related to their environment. It seems that learners are also hesitant to become involved in discussions. Communication barriers due to the language of teaching were also cited as a challenge as learners are reluctant to express themselves in the language of teaching and learning for fear of facing ridicule from peers; however, at Grade 8 level, one would assume that the LoLT would be in place.

A major issue that was raised relates to the availability of teaching resources. Many schools are poorly or under-resourced and have no access to the internet or public libraries to find relevant resources to support their teaching. Availability of teaching resources could empower willing teachers to gain knowledge on EE themes and even distribution of resources amongst schools may assist teachers who were not trained to integrate EE themes in their subjects to gain knowledge that can further be imparted to the learners.

As a result, this study acknowledges that challenges do occur, but concludes that these are surmountable with the involvement of stakeholders, public organizations, the community, the Department of Basic Education, the school and the teachers themselves.

6.4 LIMITATIONS

This inquiry focused on teachers' views regarding learners' awareness of household waste management in selected secondary schools of Newcastle. The researcher was restricted to exploring only three secondary schools owing to time and limited financial resources. Grade eight teachers of Natural Sciences, Social Sciences, and Life Orientation were participants in this study. The researcher did not involve all the teachers teaching these subjects in the other grades as a result of the limited time that

was scheduled for this inquiry.

6.5 RECOMMENDATIONS

6.5.1 Recommendations for the Department of Basic Education

The findings of the study indicate only a few teachers were trained to integrate EE themes such as household waste management hence it is imperative for the DBE to:

- facilitate the training of teachers for the teachers to impart knowledge on household waste management to the learners;
- provide refresher courses on content delivery and integration of other themes in teaching; and
- design programmes, in collaboration with the DEA, Municipality, and other stakeholders, to capacitate teachers and learners with knowledge of household waste management.

6.5.2 Recommendations for schools

The findings of the study indicate that as the youth are the future, it is imperative that EE awareness is created and that knowledge is imparted. It is suggested that:

- all schools develop an EE policy for compulsory involvement of EE themes in all subjects for themes like household waste management to be effectively taught;
- EE knowledgeable stakeholders are invited to workshop teachers on household waste management; and
- household waste management awareness campaign programmes are designed and implemented with incentives to motive learners' full engagement in waste management.

6.5.3 Recommendations for Natural Sciences, Social Sciences, and Life Orientation teachers

The study reveals that many teachers have little knowledge of EE issues and have not received training on how to integrate EE themes into their subjects. It is suggested that:

- School Management Teams (SMT) need to facilitate teachers' in-service training on EE themes such as household waste management.

- Teachers use the internet; have access to resources provided by environmental stakeholders and the DBE to equip themselves with the necessary knowledge for use in their teaching.
- Committed teachers register for short- and long-term studies on environmental education.

6.5.4 Recommendations for Further Study

This study was limited to only three secondary schools due to time factors and limited financial resources. It is recommended that:

- the future study includes more secondary schools to partake in the study for applicability of results and findings.
- future study focuses on teachers' and learners' views on household waste management.

6.6 FINAL WORD

The study aimed to explore the views of secondary school teachers concerning learners' awareness of household waste management in Newcastle, South Africa. Awareness of learners' awareness on household waste management can be promoted through the cooperative engagement of the DBE and other stakeholders working with schools and teachers to impact knowledge on household waste management to develop sustainable household waste managed schools through the implementation of the 4Rs.

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APPENDICESAPPENDIX A: Research Ethics Certificate

UNISA university of south africa

UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2019/05/15

Ref: **2019/05/15/55725945/19/MC**
Name: Ms K Moyo
Student: 55725945

Dear Ms Moyo

Decision: Ethics Approval from 2019/05/15 to 2022/05/15

Researcher(s): Name: Ms K Moyo
E-mail address: 64027848@mylife.unisa.ac.za
Telephone: +26 097 808 3286

Supervisor(s): Name: Dr A Mawela
E-mail address: lebelldm@unisa.ac.za
Telephone: +27 12 429 4433

Title of research:

Secondary teachers' views regarding learners' awareness on household waste management in Newcastle, South Africa.

Qualification: M. Ed in Environmental Education

Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period 2019/05/15 to 2022/05/15.

*The **low risk** application was reviewed by the Ethics Review Committee on 2019/05/15 in compliance with the UNISA Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.*

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.

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Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the UNISA College of Education Ethics Review Committee.
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.
7. No field work activities may continue after the expiry date **2022/05/17**. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:

The reference number **2019/05/15/55725945/19/MC** *should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Kind regards,

Prof AT Motlhabane
CHAIRPERSON: CEDU RERC
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APPENDIX B: Request permission letter- Department of Education

Request for permission to research Amajuba District, Newcastle secondary schools.

Title: Secondary teachers' views regarding learners' awareness of household waste management in Newcastle, South Africa.

Date 5 March 2019

The Head of Department

Department of Education

Kwazulu Natal

Dear Dr. E.V. Nzama

I, Khumbulani Moyo am researching under the supervision of Dr. A.S Mawela, a senior lecturer in the Department of Curriculum and Instructional Studies towards MEd in Environmental Education at the University of South Africa. We have no funding for this study. We are inviting you to participate in a study entitled Secondary teachers' views regarding learners' awareness of household waste management in Newcastle, South Africa.

The study aims to explore teachers' views regarding learners' awareness of household waste management in selected secondary schools of Newcastle, South Africa.

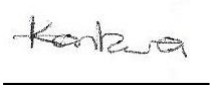
Your department has been selected because the study involves secondary school teachers to be participants in this study. The study will entail observation of the schools' premises; documents analysis and conducting interviews with Grade eight teachers of Natural Sciences, Social Sciences, and life orientation. The interviews will be audio recorded.

This study may be useful to the Department of Basic Education schools regarding learners' awareness of household waste management. The study may further contribute to identifying gaps in knowledge that should help with how the curriculum is taught to integrate household waste in other CAPS subjects. Furthermore, learners' awareness of household waste management could contribute to waste-free schools and be extended to their community of Newcastle and the entire society.

There will be no potential risks because the topic is not sensitive and the data will be captured from the participants during the day at the workplace (schools of the participants). There will be no reimbursement or any incentives for participation in the research.

Feedback will entail the researcher going back to the participants with the findings of the inquiry to check if the results reflect the data that was captured from the participants.

Yours sincerely



Khumbulani Moyo

APPENDIX C: Approval from the Department of Education

education

Department:
Education
PROVINCE OF KWAZULU-NATAL

Inquiries: Phindile Duma Tel: 033 392 1063 Ref.:2/4/8/2014

Ms K Moyo
Thuthukani School
PO Box 1121
Empangeni
3880

Dear Ms. Moyo

PERMISSION TO CONDUCT RESEARCH IN THE KZN DoE INSTITUTIONS

Your application to conduct research entitled: **"SECONDARY TEACHERS' VIEWS REGARDING LEARNERS' AWARENESS ON HOUSEHOLD WASTE MANAGEMENT IN NEWCASTLE, SOUTH AFRICA"**, in KwaZulu-Natal Department of Education Institutions has been approved. The conditions of the approval are as follows:

1. The researcher will make all the arrangements concerning the research and interviews.
2. The researcher must ensure that Educator and learning programmes are not interrupted.
3. Interviews are not conducted during the time of writing examinations in schools.
4. Learners, Educators, Schools, and Institutions are not identifiable in any way from the results of the research.
5. A copy of this letter is submitted to District Managers, Principals, and Heads of Institutions where the Intended research and interviews are to be conducted.
6. The period of investigation is limited to the period from 30 September 2019 to 01 October 2022.
7. Your research and interviews will be limited to the schools you have proposed and approved by the Head of Department. Please note that Principals, Educators, Departmental Officials, and Learners are under no obligation to participate or assist you in your investigation.
8. Should you wish to extend the period of your survey at the school(s), please contact Miss Phindile Duma at the contact numbers below.
9. Upon completion of the research, a summary of the findings, recommendations, or a full report/dissertation/thesis must be submitted to the research office of the Department. Please address it to The Office of the HOD, Private Bag X9137, Pietermaritzburg, 3200.
10. Please note that your research and interviews will be limited to schools and institutions in the KwaZulu-Natal Department of Education.

Amajuba District

Dr. EV Nzama
Head of Department: Education
Date: 30 September 2019

...Championing Quality Education - Creating and Securing a Brighter Future

KWAZULU-NATAL DEPARTMENT OF EDUCATION
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Facebook: KZNDOE….Twitter: @DBE_KZN….Instagram: kzn_education….Youtube:kzndoe

APPENDIX D: Request permission letter- School Principal

Request for permission to research Amajuba District, Newcastle secondary schools.

Title: Secondary teachers' views regarding learners' awareness of household waste management in Newcastle, South Africa.

Date 5 March 2019

The Principal

Newcastle

Dear Sir/ Madam

I, Khumbulani Moyo am researching under the supervision of Dr. AS. Mawela, a senior lecturer in the Department of Curriculum and Instructional Studies towards MEd in Environmental Education at the University of South Africa. We have no funding for this study. We are inviting you to participate in a study entitled Secondary teachers' views regarding learners' awareness of household waste management in Newcastle, South Africa.

The study aims to explore teachers' views regarding learners' awareness of household waste management in selected secondary schools of Newcastle, South Africa.

Your school has been selected because the study involves secondary school teachers to be participants in this study. The study will entail observation of the schools' premises; documents analysis and conducting interviews with Grade eight teachers of Natural Sciences, Social Sciences, and life orientation. The interviews will be audio recorded.

This study may be useful to the Department of Basic Education schools regarding learners' awareness of household waste management. The study may further

contribute to identifying gaps in knowledge that should help with how the curriculum is taught to integrate household waste in other CAPS subjects. Furthermore, learners' awareness of household waste management could contribute to waste-free schools and be extended to their community of Newcastle and the entire society.

There will be no potential risks because the topic is not sensitive and the data will be captured from the participants during the day at the workplace (schools of the participants). There will be no reimbursement or any incentives for participation in the research.

Feedback will entail the researcher going back to the participants with the findings of the inquiry to check if the results reflect the data that was captured from the participants.

Yours sincerely

Khumbulani Moyo

APPENDIX E: Request for the teacher to partake in the study

Date 5 March 2019

Title: Teacher

DEAR PROSPECTIVE PARTICIPANT

My name is Khumbulani Moyo. I am researching under the supervision of Dr. AS Mawela a senior lecturer in the Department of Curriculum and Instructional Studies towards Med at the University of South Africa. We have no funding for this study. We are inviting you to participate in a study entitled: Secondary school teachers' views regarding learners' awareness of household waste management in Newcastle, South Africa. The study aims to explore teachers' views regarding learners' awareness of household waste management n selected secondary schools of Newcastle, South Africa.

WHAT IS THE PURPOSE OF THE STUDY?

This study is expected to collect important information that could be useful to the Department of Basic Education and teachers on how to integrate household waste management in other CAPS subjects and may contribute to waste-free schools which could be extended to the community at large as well as society. This study may not benefit you as an individual however, schools, the community, and society.

WHY AM I BEING INVITED TO PARTICIPATE?

You are invited because the Study focuses on Natural Sciences, Social Sciences, and Life orientation teachers whose CAPS subjects are supposed to integrate household waste management theme. I obtained your contact details from the school principal. Nine(9) teachers will be individually face-to-face interviewed for approximately 30 minutes.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

The study involves semi-structured interviews which will be audiotaped for data analysis purposes. Open-ended questions will be asked during the interview.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason.

ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

This study is not sensitive hence there will be no negative consequences. Furthermore; you will not be exposed to any physical harm as a result of your participation because you will partake in this study during the day at your workplace for your safety. The only inconvenience will be your spare time which will be requested for this study. The researcher does not anticipate any form of injury due to this study in case of any eventualities the researcher will inform the head of the school immediately.

WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

You have the right to insist that your name will not be recorded anywhere and that no one, apart from the researcher and identified members of the research team, will know about your involvement in this research. Your name will not be recorded anywhere and no one will be able to connect you to the answers you give. Your answers will be given a code number or a pseudonym which you will be referred to in the data, any publications, or other research reporting methods such as conference proceedings.

The researcher, supervisor, transcriber, and external coder of the data will be the only research team who will have access to the information you will give, however, a confidentiality agreement will be signed by the transcriber and external coder for non-information disclosure and submitted to the Research Ethics Review committee for

review. Otherwise, records that identify you will be available only to people working on the study unless you permit other people to see the records.

Anonymous data that will be collected from you may be used for a research report, journal articles, or conference proceedings, but participants will be protected and not be identifiable in such reports which may be submitted for publication.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

Hard copies of your answers will be stored by the researcher for five years in a locked cupboard in the researcher's secured room which is only accessed by the researcher. This will be done for future research or academic purposes; electronic information will be stored on a password-protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. After the researcher's future studies, hard copies will be shredded and soft copies will be permanently deleted from the hard drive of the computer using a relevant software programme.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

There will be no costs that you are expected to incur neither payment nor reward due to your participation in this study. The study is solely for academic purposes.

HAS THE STUDY RECEIVED ETHICS APPROVAL

This study has received written approval from the Research Ethics Review Committee of the Education and Curriculum Studies, UNISA. A copy of the approval letter can be obtained from the researcher if you so wish.

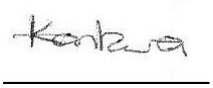
HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, please contact Khumbulani Moyo on 0744 588 907 or email 55725955@mylife.unisa.ac.za the findings are accessible for five years.

Should you require any further information or want to contact the researcher about any aspect of this study, please contact Khumbulani Moyo on 0744 588 907 or email khumbubrendon@gmail.com

Should you have concerns about the way in which the research has been conducted, you may contact Dr. AS Mawela contact on 012 4294381 or email mawelas@unisa.ac.za

Thank you



Khumbulani Moyo

APPENDIX F: Participant consent form

I,_____(participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits, and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications, and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree with the recording of data by semi-structured interviews, document analysis, and observation.
I have received a signed copy of the informed consent agreement.

Participant Name & Surname (please print)

_____

_____

_____

Participant Signature Date

Researcher's Name & Surname: Khumbulani Moyo

APPENDIX G: Interview schedule instrument

University of South Africa Directorate of Research and Graduate studies

Title**: Secondary teachers' views regarding learners' awareness of household waste management in Newcastle, South Africa**

Questions

1. In your view, what does household waste management entails?

2. In your specific subject, is there a theme that is related to household waste management?

3. If the above answer is yes, mention the themes, and state if you integrate them when teaching your subject?

4. What makes you integrate, and or not to integrate this theme in your subject?

5. Which teaching method/approach do you use when teaching your subject?

6. Indicate some of the teaching resources that you use when integrating household waste management or any theme that is related to it.

7. Were you trained to integrate environmental education themes into your subject?

8. In your view, do you think it is important to integrate a household waste management theme in your subject? Please elaborate on your answer.

9. Are there any challenges of integrating household waste management theme in your subjects?

10. Can you suggest strategies that teachers can use to integrate EE themes such as household waste management?

11. In your own opinion, what do you think can be done to enhance learners' awareness of household waste management?

12. Do you have any projects in and around the schools that promote learners' awareness of household waste management in your school and the surrounding areas?

13. Do you have other stakeholders that assist teachers in learners' awareness of household waste management in your school?

14. Any suggestion that you would like to make about the teaching and integration of household waste management theme in schools?

Thank you for your comments and your time

End of interviews

APPENDIX H: Observation schedule instrument

The researcher will conduct non-participatory observation to the Grade eight teachers who teach Natural Sciences, Social Sciences, and life orientation during contact periods.

The following items will be observed:

1. Teachers' integration of environmental education theme, with specific reference to household waste management into his/her subject

2. The teaching methods/approaches used to teach the integrated theme

3. The teaching resources used when teaching the integrated theme

4. The content coverage of the theme of household waste management

5. Teacher's pedagogical subject content knowledge of household waste management

6 The involvement of learners when teaching

7 The type awareness project as part of the assessment given to learners on household waste management

8. Assessment instrument used to assess learners' activity

9. Challenges that the teacher encounter when teaching household waste management

10. Teachers' strategies towards improving his/her proficiency in integrating household waste management in his/her subject

APPENDIX I: Documents analysis instrument

Date_____

With special reference to CAPS subject, namely Natural Sciences, Life Orientation, and Social Sciences grade eight, the following documents will be checked.

Documents	Yes	No	Comments
Does the teacher have CAPS document(s) of the specific subject(s) indicated above?			
Does the teacher have lesson plans for the specific subject?			
Is there any EE theme including household waste management integrated into any of the lesson plans?			
Which is the dominant teaching method/approach indicated in the lesson plans?			
Are there any teaching resources indicated in lesson plans?			
Does the teacher have any documents that indicate that, he/she has been trained to integrate EE themes into his/her subject?			
Does the teacher have an assessment plan or projects that include assessment of EE themes?			
Does the teacher have any awareness planned project on household waste management?			
Is there any document that confirms that the school is collaboratively working with many stakeholders in enhancing learners' awareness of household waste management?			
Does the teacher have any documents used to enhance his/her proficiency in integrating household waste management the theme in his/her subject?			

APPENDIX J: Proof of editing

To whom it may concern

This letter serves to confirm that editing and proofreading were done for:

Khumbulani Moyo

Student number: 55725945

SECONDARY TEACHERS' VIEWS REGARDING LEARNERS' AWARENESS ON HOUSEHOLD WASTE MANAGEMENT IN NEWCASTLE SOUTH AFRICA

Master of Education

in the subject of

Curriculum Studies

University of South Africa

Supervisor: Dr. A. S.Mawela

Cilla Dowse
15 June 2020

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APPENDIX K: Turnitin report

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by

Khumbulani Moyo

Student number: 55725945

Submitted in accordance with the requirement for the degree of Master of Education

In the subject Curriculum Studies

University of South Africa

Supervisor: Dr A.S. Mawela

June 2020