

Chapter 5

Findings, recommendations and implications of the investigation on learners' awareness of hazards and disasters

5.1 Introduction

This chapter focuses on the significance of the study and its implications for educational policy change regarding the inclusion of hazards and disasters in classroom teaching. The intention here is to revisit the research questions and the conceptual framework discussed in Chapter one in the light of data presented and discussed in Chapters two and four. Throughout this chapter an interpretive narration is provided in order to explain and describe what contribution this study has made to the scholarly fraternity and to hazards and disaster education for school learners.

At the beginning of this study it was mentioned that the aim of the enquiry was to explore how education, in particular curriculum and instructional design, contribute to learners' awareness of hazards and disasters. This main research question was divided into five sub-questions: what hazards and disasters are prevalent in South Africa, to what extent are South African communities vulnerable to those hazards and disasters, how does the South African National Curriculum contribute to learners' awareness of hazards and disasters, would integrated teaching and indigenous knowledge enhance learners' awareness of hazards and disasters, and what other teaching strategies should be used to enhance learners' awareness of hazards and disasters.

In addressing these sub-questions, data were collected through questionnaires and interviews and analysed, using a combination of qualitative and quantitative strategies to make sense of the information emerging from these sources. Data collected through interviews and questionnaires were triangulated with data emanating from the literature review to determine whether there are any similarities, differences or corroboration recorded in Chapter four. A summarised version of the findings and recommendations focusing on significance and implications of the study is discussed in this final chapter of the study.

5.2 Summary of the problems that led to the study

In Chapter one section 1.3 it was indicated that climate change researchers predict that the incidence of disasters will increase, considering the unpredictable nature of climate. This has proved to be true in South Africa considering the pronouncements in the literature; and media reports (both print and electronic) with some of the articles reported in chapters two and four. The interview participants confirmed the increase in the incidence of disasters and one could even say that a high rate of awareness of the prevalence of disasters amongst educators was reflected in responses discussed in section 4.2.2. To emphasise this point, Vogel et al. (2007:349) maintain that:

climate-related catastrophes, such as the 2003 floods, heat waves in Europe, the 2005 hurricanes in the USA, Mexico and Cuba, and the persistent droughts and floods in Africa, Australia and Asia, as well as non-climatic high-impact events such as the 2004 Asian tsunami and the 2005 earthquake in Pakistan hold a mirror up to the world showing its continued exposure to destructive natural forces.

As the final report was being prepared in August 2010 more devastating floods were reported in China and Pakistan. An IOL online news bulletin of 24 August 2010 reported that:

Two people had died and about 500 residents had been left homeless after a fire at the Overhill informal settlement in Kleinmond. Approximately 270 and 280 shacks were burnt to the ground.

The IOL online news of 24 August 2010 further reported that:

floods and associated disasters, such as mudslide in China, miners trapped due to floods in Pakistani, more than 800 Pakistanis who died because of floods, Europe hit by floods and North-west Korea affected by floods as well.

This data as well as the discussions in Chapter two provide substantial evidence to say that South Africa and the global community are experiencing an increase in the number of hazards and

disasters. This has serious implications for education which has to respond to societal challenges and ensure that learners are able to navigate their way through life. One important thing to note here is that while the incidence of disasters is increasing there is a need to teach learners about these catastrophic events and ensure that they understand and know what needs to be done during the events.

In section 1.3 it was stated that Ronan and Johnston (2001:1060) argued that:

lack of awareness and knowledge, combined with unrealistic risk perceptions, has a negative impact on preparedness and responses to disaster warnings and that hazard education programmes helps children to increase awareness, knowledge, and more realistic risk perceptions significantly.

The Disaster Risk Reduction Begins at School, the National Disaster Management Framework Enabler 2 and the National Curriculum Statements take cognisance of the fact that learners should be taught about hazards and disaster topics to enhance their preparedness and resilience. Hence this study sets out to determine how South African education, in particular curriculum and instructional design, contribute to learners' awareness of hazards and disasters.

A conceptual framework was discussed, which included the increasing number of disasters world-wide, the vulnerability of communities, the need for ensuring that communities are prepared and resilient when faced with disaster outbreak. The framework went further to explore some educational factors contributing to learners' awareness of hazards and disasters and here national curriculum, learning programme design, integrated learning and indigenous knowledge were interrogated and tested through questionnaires and interviews. Irrespective of opposing views from scholars such as Green (2007) and Botha (2010) that indigenous knowledge as it is currently is not beneficial for South African schools, the NCS has included IKS as one of the principle of the new dispensation. These scholars views that IKS is not beneficial to schools stem from the fact that the pronouncement are made through policy but they have not been followed up. Based on the available limited scholarly data in South Africa and data collected from other countries, my belief is that indigenous knowledge and local knowledge have a role to play in risk

reduction amongst school learners. Integrated learning also has the potential to help learners develop awareness of hazards in their environment, and preparedness and resilience towards disasters.

Figure 2.4 summarised factors included in the conceptual framework and indicated the link amongst them. From the framework it is clear that education through curriculum and instructional design, which include indigenous knowledge and integrated teaching could enhance learner awareness and preparedness which subsequently helps in ensuring that learners become resilient when faced by disasters. The absence of education on hazards and disasters results in loss of life and property. While it should be mentioned that education in itself cannot prevent disasters from happening and stop loss of lives, it can assist learners to heed the warning signals and if they find themselves in the centre of disasters, they can adopt survival strategies.

5.3 Summary of the research question and sub-questions

The first sub-question was concerned with what hazards and disasters are prevalent in South Africa. The respondents were asked whether there was a likelihood of disasters occurring in their area while the interview participants were asked what disasters were prevalent in South Africa. The literature consisting of print media, scholarly publications and policy documents was consulted to investigate whether it made mention of disasters that are prevalent in South Africa.

The second sub-question enquired about the extent to which South African communities are vulnerable to disasters. The questionnaire respondents were not asked directly about the extent to which South African communities were vulnerable to disasters but the general comments made by educators in the questionnaires were checked to determine if there was any reference to the vulnerability of South African communities concerning disasters. The interview participants were asked to give their views of whether South African communities are vulnerable to disasters. Literature sources were reviewed to determine if they made any reference to the vulnerability of South African communities to hazards and disasters.

The third sub-question was concerned with whether hazard and disaster education should be integrated into the national curriculum. In the questionnaire, educators were asked whether hazards and disasters should be integrated in the national curriculum while the interview participants were asked the same question. Educators were also asked at what level the integration should occur. A review of literature sources such as scholarly publications, policy documents and media articles was conducted to determine whether hazards and disasters should be integrated in the national curriculum.

The fourth sub-question related to whether indigenous knowledge and integrated teaching strategies should be used to enhance learners' awareness of hazards and disasters. Both the questionnaire respondents and interview participants were asked whether these two strategies should be used to enhance learners' awareness of hazards and disasters and literature sources were reviewed to determine what they contain about the two strategies.

Through the fifth sub-question, the questionnaire respondents and interview participants were probed as to what views they had on other strategies that could enhance learners' awareness of hazards and resilience of disasters. Literature sources were consulted to identify possible teaching strategies and the identified strategies were then used to probe questionnaire respondents on whether they had used any before. Interview participants were asked whether there were other strategies that could be used to enhance learners' awareness of hazards and disasters.

5.4 Summary of the aim and objectives of the study

As stated in Chapter one, the aim of this study was to determine how education, in particular curriculum and instructional design, contributes to learners' awareness of hazards and resilience to disasters. After scrutinising literature on disaster risk reduction, a number of concepts emerged which were used to develop sub-questions that would ensure that the problem was properly addressed. From the sub-questions the following objectives framed the course of this investigation:

- Review documents and other literature to identify disasters that are prevalent in South Africa and those that are likely to occur.
- Determine the extent of South African communities' vulnerability to disasters.
- Determine how the South African National Curriculum Statements and other regulatory documents make provision for teaching learners about hazards and disasters.
- Solicit the views of educators and disaster education specialists on the importance of enhancing learners' knowledge and skills of hazards.
- Determine whether learning strategies such as indigenous knowledge and integrated teaching would enhance learners' awareness of hazards and resilience to disasters.
- Determine how other instructional design strategies could inform and enhance learners' awareness of hazards and resilience to disasters.

5.5 Findings of literature review on the contribution of education

In addressing the *first sub-question*, Shaluf's (2007) disaster tree was used as a consolidated list of disasters affecting the global community. For South Africa, researchers such as Mgquba and Vogel (2004), Reid and Vogel (2006), Vogel et al. (2007), Napier and Rubin (2002), Ronan and Johnston (2001) as well as Frost-Killian (2008) identified prevalent disasters. It was found that floods and fires are the most prevalent disasters in South Africa followed by other disasters such as epidemics, accidents, droughts, heat waves, lightning, extreme cold weather, etc. Although South Africa has so far not experienced any disaster of the magnitude of a tsunami, the Haiti earthquake or hurricane Katrina, the South African communities should not live in comfort thinking that catastrophic disasters will never happen to the country, as disasters, such as hurricanes or volcanoes, or any disaster for that matter, can happen at any time.

To complement the ideas generated by these researchers, the South African policy documents such as the Green Paper on Disaster Management of 1999, the Disaster Management Act of 2002, the National Disaster Management Framework of 2005 and guidelines for the implementation of National Curriculum Statements give an indication as to what is happening within the country with regard to disaster education issues. Although these sources acknowledge that South Africa has not experienced huge disasters like tsunamis, hurricanes and earthquakes,

the sources nevertheless stress that South Africa should have disaster risk reduction plans from all sectors of society in order to minimise the loss of life and property in case disaster strikes.

In summary, Arnold (2002:4) has given a summary of factors that are most likely to produce hazards during the 21st Century that include population growth; environmental degradation; global warming; deforestation; infectious diseases; hazardous materials; chemical warfare; nuclear materials; economic imbalance and cultural tribalism. On issues of vulnerability this study found that population growth and economic imbalance contribute to disaster in relation to the mushrooming of informal settlements. All the ten factors identified by Arnold (2002) are important disasters and need to be considered for effectively reducing the effects of disasters. Infectious disease is discussed in the next sections and thereafter the vulnerability of informal settlements. Indigenous knowledge and integrated teaching are given attention as insights emerging from the study.

Napier and Rubin's (2002) article on the contribution of informal settlements and poverty to disasters was discussed in Chapter two. They discuss the increasing number of informal settlements, aggravated by a lack of proper housing and economic conditions. Regarding the contribution of environmental degradation, global warming and deforestation resulting in disasters, scholars such as Barnard and Underhill (2010), Bollig and Schulte (1999), Van der Walt (2010), Hellier et al. (1999), Reid and Vogel (2006) and Pelling and Uitto (2001) are of the opinion that these aspects are serious and need to be given the attention they deserve.

Having been involved in three forums that discussed the biosecurity issues in Hungary, Uganda and Johannesburg between 2008 and 2009, I have come to the realisation that chemical warfare and nuclear materials pose a serious threat that could easily wipe out the entire community in South Africa as part of human-made disasters. However, these aspects are not the focus of this study. Acutt (2004) and *Railway Africa News* (2006) provide evidence to support the views presented by interview participant P9 relating to hazardous materials and chemical spillages. These present another challenge for all South African citizens but for informal settlement residents the possibility of them being affected is huge because they have built their shacks next

to rail tracks and major roads without considering the legally required distance between the houses and the roads.

Cultural tribalism referred to as xenophobia in this study was also mentioned during interviews and some scholars such as Shaluf (2002), Mgquba and Vogel (2004) and Trim (2004) also mention that it could result in loss of life. Reflecting on South African xenophobia, the International Organisation for Migration (2009) reported that:

Violence against foreign nationals did not begin with the May 2008 attacks. Since 1994, hundreds of people have been harassed, attacked, or killed because of their status as outsiders or non-nationals. For many within and outside of government, previous attacks were an unfortunate but largely insignificant by-product of South Africa's rapid social transformation and integration into the global economy. This perception was rapidly dislodged in May 2008. The ferocity, intensity and scale of the violence against outsiders were extraordinary in both their scope and the attention they attracted. What started as but another isolated anti-foreigner attack in Alexandra on 11 May, quickly spread to other townships and informal settlements across the country. After two weeks, and the deployment of the army, the melee had subsided. In its wake, 62 people were reported dead; at least 670 wounded; dozens raped; more than 100 000 displaced; and millions of Rand worth of property looted, destroyed or appropriated by local residents.

All these disasters are possible and one wonders whether an education system could manage to include every possible disaster, imagined or real as part of school curricula. While we expect educators to teach learners about all disasters mentioned here and those that are specific to environments, it should be noted that it would be difficult for educators to cover them all. The new education system in South Africa, based on OBE, which aims to teach learners problem solving and thinking skills could be a panacea to the challenge for educators to cover all disasters. The role of educators would be stimulate the learners' thinking by sharing with learners information about commonly known disasters and ask them to gather data on any other hazards that could affect their community focusing on the nature of the hazard itself and how to respond when it becomes a disaster. Facilitating this type of learning is possible and it does not need or expect educators to do more than what is expected of them as learning facilitators.

The *second sub-question* looked at the extent to which disasters listed in the previous paragraph affect South African communities. It has been discussed in Chapter four that King (2000), Gaillard (2007: 534), Napier and Rubin (2002:3), Reich (2006:796), Pelling (2003) and Mgquba

and Vogel (2004:34) stress the fact that poverty contributes to vulnerability of communities and this is reflected in structurally poor houses and vulnerable areas which increase the chances of these communities to become victims of disasters. Reid and Vogel (2006:196), Mgquba and Vogel (2004:37) and Napier and Rubin (2002:5) argue that communities residing in informal settlements are more vulnerable and are the ones who suffer the greatest losses compared to their counterparts in established formal settlements.

From the argument advanced above, it is clear that issues of poverty increase the risks of communities to suffer greatly during disasters. While the issue of poverty and informal settlement is overemphasised here, it is important to note that disasters affect everyone indiscriminately and could wipe-out the entire community both rich and the poor as with the Haiti earthquake and the 2004 tsunami. One however, will have to take note that in the literature review it was reported that other communities who become aware that their area could be affected took steps such as building stronger structures and evacuating when they heard the first warning signals either from scientific or traditional alarms. Hazards and disaster education and awareness programmes for schools are needed to help learners to respond and become resilient to disasters.

Disaster preparedness plays a crucial role in ensuring that communities at risk adopt traits to assist them to live in harmony with the prevalent hazards. Where communities cannot avoid a disaster, resilience plays an important role to ensure that the community continues living irrespective of the losses. Resilience has been explained in Chapter two and indicated as a possible ideal to aspire towards. Resilience though has some challenges such as the fact that learners sometimes do not have power to change their situation, like evacuating an area that is deemed as hazardous or rebuilding their house so that it could be resilient. However in Chapter two it was noted that Shaw et al. (2004:41) are of the idea that if learners are taught about disasters they will share with their parents what they learned and even ask more questions related to the topic.

The *third sub-question* was concerned with how the national curriculum caters for the teaching about hazards and disasters. The Hyogo Framework of Action 2005 – 2015 and the National

Disaster Management Framework stipulate that disaster risk reduction should be integrated into school curricula. According to the ISDR (2007:14) the *Disaster Risk Reduction Begins at School* campaign, increasing hours allocated to disaster preparedness in the regular school curriculum and organising sensitisation and education presentations to be given at schools, would increase learners' awareness of hazards and disasters. A review of the National Curriculum Statements Grades 0 to 9 and 10 to 12 indicated that only Grade 7 has learning outcomes explicitly related to hazards and disaster content while in Grades 10 to 12 only Geography learners would be able to learn how to shoulder the impact of disasters. There are also some indications which emerged from literature and interview responses that the inclusion of concepts such as environment, deforestation, water and industrialisation provide educators with opportunities to include hazards and disasters.

The problem with this status is that most educators only teach what is prescribed in the curriculum and translated into textbooks. Anything that is not in the textbook will not be taught to learners. This point was emphasised by one of curriculum specialist in section 4.4.3 and has also been noted in the literature as well as discussed in section 1.3 of this study where Vandeyar and Killen's (2007:101) views were discussed. The issue arising from this state of affairs is that learners could go through from preschool to Grade 6 without knowing or understanding anything about hazards and disasters. Since it would then be just one grade to learn about hazards and disasters, those who choose learning streams other than Social Sciences in their senior phase, might not learn as much as is needed to make them resilient during disasters.

The aim of the *fourth sub-question* was to determine how indigenous knowledge and integrated teaching strategies enhance learners' awareness of hazards and disasters. A literature review was conducted and views of 150 educators were solicited through a closed-ended questionnaire as well as asking the interview participants their views on these two phenomena. Below are the responses as an attempt to address the sub-question.

The literature is silent on integrated teaching as it is a new principle in South Africa and where it has been implemented there is not much peer-reviewed literature that reports on the principle. There is however, some literature discussed in Chapter two where researchers conducted

empirical studies to determine the effectiveness of OBE and curriculum reforms in South Africa in relation to the principle of teacher collaboration or integrated teaching. Botha (2002), Jansen (1998, 1999), Fiske and Ladd (2005), Rogan and Grayson (2003), Rogan (2007), Cross et al (2002) and Vandeyar and Killen (2007) maintain that the curriculum reforms are not being implemented in many of South African schools. The study was informed by scholars such as Aredondo and Rucinsky (1997), Ranby and Potenza (1999), Loepp (1999), Robinson and Schaible (1995), Venville et al. (2001) and Gehrke (1998) who promote collaborative teaching or integrated teaching as it is referred to in this study. The comment made by R6 on the role of school organisational culture in implementing integrated teaching is supported by Creese (2005) who maintains that school organisational structures seem to discourage the culture of developing interaction and shared knowledge with fellow teachers.

It was reported in the conceptual framework section in Chapter two that scholars such as Briggs (2005), Agrawal (2004), Rautela (2005), Stevenson (1996), Gaillard (2007), Gupta and Sharma (2006), Snively and Corsiglia (2001) and Hellier et al. (1999) support the idea of including indigenous knowledge as a teaching strategy that could enhance learners' awareness of hazard and disaster education. While some of these scholars have argued that there is the dilemma of whether to have a separate discipline focusing on indigenous knowledge or one integrated into the mainstream education and scientific fields, this study noted that indigenous knowledge should be integrated in all learning areas. Another issue about indigenous knowledge that is a bone of contention is that the knowledge is disappearing with older generations, while the younger generation is not interested in preserving such knowledge. In the literature discussed above it was noted that there is a need to document indigenous knowledge so that it can be preserved for later generations and be used to determine how those generations survived disasters that were prevalent then.

Sub-question 5 probed whether educators have or have not used other teaching strategies to enhance learners' awareness of hazards and disasters. The Hyogo Framework for Action 2005 – 2015 (2005) was used as a basis for promoting the inclusion of disaster risk reduction knowledge in relevant sections of school curricula at all levels. Scholars such as Rogan and Aldous (2005), Rogan (2007), Vandeyar and Killen (2007), Botha (2002) and Jansen (2009) identified strategies

such as experiential learning, visual representation of subject matter, excursions, etc. as effective ways of enhancing learners' knowledge and awareness of hazards and disasters. Jansen (2009) shares his experience regarding the question that puzzled him for a long time, namely how do the Afrikaans students develop deep cultural values and knowledge in their veins? He came to the conclusion that schools, churches, playgrounds and family activities play a crucial role by consistently inculcating the same ideals to learners. To frame this in Jansen's (2009:70) words:

The modes of transmission of knowledge are multiple, complex, mediated by numerous variables, they include both informal means of transmission such as food, stories, songs, friends, and speaking native language as well as formal means such as educational, religious, political, cultural, and charitable activities.

The literature clearly propagates multi-strategy teaching to enhance learners' awareness of hazards and disasters. My proposition here is that integrated learning could enhance learners awareness of hazards and disasters. It has been explained in Chapter two that integrated learning is equated with integrated teaching, collaborative teaching and team teaching although in some instances these might not mean the same thing. The proposition of using integrated teaching assumes that educators from different learning areas will meet and develop a learning programme on hazards and disasters that includes content from all learning areas.

My view is that the literature findings provided important and relevant data that helped in framing questions used during the interview and questionnaires data collection. There is not much literature on the topic, although some have written scholarly articles about some important parts of the research question. For example, there are scholarly articles on disaster reduction and curriculum issues but few on the contribution of school education on disaster risk reduction. However, literature findings created a good platform for data collection from interviews and questionnaires. One of the greatest input concerning the study relates to the arguments put forward by Slattery (2006:214) proposing for a curriculum for interdependence and ecological sustainability which supports interconnectedness of knowledge and traditional education thereby creating a basis for this study to explore the integrated teaching and indigenous knowledge as possible instructional design elements to determine how education contributes to learners' awareness of hazards and disasters.

5.6 Findings of the empirical investigation

As indicated above, South Africa like many countries is experiencing devastating disasters and with climate change and the prevalence of many hazards not forgetting the vulnerability of informal settlements, the incidence of these disasters will increase which means that something will need to be done to reduce the effects of disasters on communities. It has been pointed out in Chapter two that education and awareness are key to addressing some of these challenges. Considering the curriculum scholars views that curriculum reforms are driven by numerous forces such as political authority, globalisation, social imperatives and economic development, hazards and disasters is well positioned to serve as a key driver for curriculum change, in this instance regarded as curriculum integration which has been extensively discussed in Chapter two and four. This argument carries much weight considering that disasters prevent economic development, disturbs the social fabric of communities, are a global phenomenon, More importantly the argument urges the political authority to safeguard the wellbeing of society.

As discussed in Chapter three, both quantitative and qualitative strategies were used to collect data for addressing the main research questions. The quantitative data were collected through questionnaires distributed to schools located in informal settlements found in Gauteng, the Western Cape, KwaZulu-Natal, the Eastern Cape and North West Province. A total of 150 educators completed the questionnaires with thirty from each province. An in-depth analysis of the results from the questionnaires is discussed and a summarised version of the findings is reported in the next section of this chapter.

The qualitative data collection strategy adopted for this study was through individual interviews with curriculum coordinators, disaster management specialists and disaster management lecturers. Ten participants were interviewed and their responses were recorded in Chapter four of this study. Section 5.6.2 discusses the findings of the qualitative data collection. The qualitative data collection was complemented by document analysis of policy publications and some scholarly work as discussed in the previous section of this chapter. The participants provided important evidence that was complemented by other data collected through questionnaires and document analysis.

5.6.1 Findings of the quantitative study on learner awareness of hazards and disasters

If positive responses are to be regarded as an indication that the questionnaire respondents affirm that education does contribute to learner' awareness of hazards and disasters, one can conclude that 73.8 percent of the respondents agree that education does contribute to learners' awareness of hazards and disasters. Unfortunately this is not the case as one has to look at each sub-question in isolation and consider the variables emerging from discussions. For the first sub-question, which looks at the prevalence of hazards and disasters, it was reported in Chapter four that 95.3 percent of the respondents agreed that South Africa was likely to be hit by disasters. If the general comments relating to this sub-question are considered, disasters such as floods, forest and shack fires, road accidents, storms, medical waste dumps and drought could be considered prevalent in South Africa.

The second sub-question looks at the extent to which South African communities are vulnerable to disasters. There was no direct question relating to this sub-question and as reported in Chapter four, some of the questionnaire respondents made comments that relate to the vulnerabilities of communities. Issues such as communities living in shacks located in informal settlements, building houses with mud bricks and learners having access to medical waste dumps give an indication of the extent to which communities are vulnerable to disasters.

The third sub-question is on the inclusion of hazards and disaster learning outcomes in the curriculum; 98 percent of all questionnaire respondents agreed that the inclusion of hazards and disasters in the school curriculum is essential, which affirms the importance of this topic. The three respondents who made additional comments stated that hazards and disaster should be taught to learners from Grade 1 up to Grade 12. The other respondents maintained that hazards and disasters should be integrated into Life Orientation teaching. Some regard hazards and disaster education as a separate learning area.

In response to the fourth sub-question, it was noted that indigenous knowledge and integrated teaching strategies are partly included as teaching instruments by educators. It should, however,

be noted that this does not directly relate to the teaching of hazards and disasters but indicates some form of awareness of the need for using these strategies to enhance learners' knowledge of hazards and disasters. The general comments as well reflected that respondents appreciated the value of using different strategies. One respondent stated that they have not collaborated to design learning programmes on hazards and disasters while another respondent stated that this questionnaire has generated his interest to teach learners about hazards and disasters and to get them talk to their families about the hazards and disasters. To some extent, the comments from educators provided some insights that managed to close the gap created by the use of closed-ended questions especially the dichotomous questions.

The fifth sub-question was divided into four questions; the first one focusing on giving learners opportunity to observe real life or visual representations of a phenomenon was recorded as question 5 on the questionnaire. The second one focused on teaching learners to identify hazards and disasters and was recorded as question 7 on the questionnaire. The third question probed whether learners discussed what they have been taught with their parents and was recorded as question 9 in the questionnaire. The last question focused on teaching learners to respond appropriately when faced with disasters and was recorded as question 10 in the questionnaire.

From the responses to question 5 on real-life experiences or a visual representation teaching strategy, one can conclude that 55.5 percent of educators from the five provinces used learners' real-life or visual representations in their classroom while 44.7 percent did not. The conclusion that can be drawn from question 7 responses is that 71.3 percent of educators who responded to the questionnaire are aware of the need for learners to identify potential hazards in their environment. The response to question 9 of the questionnaires showed that 64.6 percent of the respondents did ask learners to discuss what they have learned with parents even though it was not related to hazards and disasters while only 35.4 percent of the respondents did not involve parents in enriching their learning. Regarding the response to question 10, the percentage of educators who responded that they did teach learners to respond to disasters is 80 percent but to what extent they taught learners ways of responding to disasters was not made clear owing to the limitations of the questionnaire.

The findings of the fifth sub-question were that the majority of educators used other strategies to enhance learners' awareness of hazards and disasters while some did not. It is cautioned, however, that the percentages recorded above should not be seen in isolation from the comments and interview responses as they could be misleading. The educators were not probed as to how many times they have used the teaching strategies discussed above and whether they were related to teaching learners on topics of hazards and disasters. The quantitative data, however, provide relevant evidence to show the awareness of using teaching strategies to enhance learners' awareness of hazards and disasters.

In general, data collected through the questionnaire, although important for the study, had some limitations. It could have been enhanced if some of the educators who responded were interviewed to gather deeper insight rather than limiting the responses to yes or no answers. Nevertheless, the statistics provided in this section are essential because they help to support the literature findings. If the responses are compared with the literature findings one realises that there are some level of awareness amongst educators about the need to enhance learner awareness of hazards and disasters. The question of how much knowledge of disasters do educators have was not tested nor was whether they will start to include disasters in their teaching. The data on the prevalence, inclusion in the national curriculum and the use of different teaching strategies was useful to indicate that education is important in ensuring that learners are aware of hazards and disasters. Educators affirmed that the inclusion is important both in the curriculum statements and in the classroom teaching, which is a good indication that they are receptive to the idea of including hazards and disasters in their teaching.

5.6.2 Findings of the qualitative study on the contribution of education to learner awareness of hazards and disasters

With reference to the issues pertaining to sub-question 1, the categories that emerged strongly from the interview responses were floods and fires followed by droughts and accidents - industrial, road, rail and spillages. Two respondents identified HIV/AIDS as a hazard while new hazards such as fog along the N4, cold weather, heat waves, water quality and epidemics such as rift-valley fever and foot and mouth disease show that South Africa experiences many hazards

that could easily result in disasters. What emerged strongly from P2, P6 and P8 is that there is a need to differentiate the concept *hazard* from *disaster* as they mean two completely different things. In actual fact P2 and P8 maintained that the questions were wrong by asking about disasters and P2 suggested that the interview guideline should refer to hazards and vulnerability, while P8 stated that it should focus on disaster risk reduction. However, the question was posed as to what hazards and disasters are prevalent in South Africa and the respondents were expected to say which are hazards that are prevalent in South Africa and which are disasters.

The responses to sub-question 2 by interview participants revealed that most of them acknowledged that South Africa was vulnerable to disasters such as floods, road accidents, forest and shack fires, trucks and rail spillages. Almost all participants (P2, P4, P5, P6, P7, and P8) maintained that human-induced incidences such as building houses next to river banks are the ones that make the country vulnerable to disasters. Participants P3 and P9 viewed peoples' tendency to stand and watch at the accident scene as another trait of vulnerability, as people might be affected if a dangerous material could be accidentally released. These are just some of the traits that make South Africa vulnerable to disasters. It is essential to mention P2's observation that poverty is another aspect that makes communities vulnerable to disasters.

The interview participants strongly supported the idea of teaching hazards and disasters at an early school phase with others preferring it to be taught before learners start school; the majority preferred to start teaching learners about hazards and disasters from Grades 3 and 4. Strong evidence emerged from the interviews conducted with participants in relation to the third sub-question that most of them thought that topics on hazards and disasters should be included in the early phase of learning such as the foundation phase where simple basic hazards topics would be taught to learners. It is important to note that P6 felt that there was no depth and width in the learning outcomes on cyclones, earthquakes and other hazards such as floods and fires. Learners were taught only basics and it was up to the educator to include how to respond when they found themselves affected by fire, floods, storms, earthquakes or volcanoes as listed in the NCS. The integration is in most instances explicitly stipulated only in Social Science. It would be beneficial if the inclusion entailed all learning areas

The interview responses for the third sub-question have provided essential data to decide whether hazards and disasters should be included in the national curricula. Some of the respondents pointed out that learning outcomes on hazards and disasters are already included in the NCS. However, there are adequate data to determine whether they are integrated in classroom teaching. While humanities and Social Science, in particular Geography, have some provisions on hazards and disasters, from the questionnaire respondents' point of view, it seems that those that teach hazards and disasters in other learning areas do so of their own accord as it is not prescribed in the NCS.

The interview participants responding to the fourth sub-question supported the integration of indigenous knowledge but pointed out the challenges concerning its inclusion in classroom teaching. One such challenge relates to the fact that the knowledge is not documented anywhere and it will pose a challenge for educators to go out looking for people with such knowledge. Other challenges include that some of the knowledge, since it is not scientifically tested, remains potentially a myth and if taught to learners it might mislead them or put them in danger. Lightning was used as an example where some indigenous communities believe that it is a product of witchcraft and the only way to avoid being bewitched is to consult a traditional healer. In some instances examples were given which, if used, can raise learners' awareness of dangers associated with some hazards. The examples include the eclipse, the flight pattern of swallows and reading signs of animals.

The fifth sub-question considers what other teaching strategies are used to enhance learners' awareness of hazards and resilience to disasters. Most of the respondents supported the idea of using a variety of strategies to teach learners about hazards and disasters and some strategies included inviting a disaster management expert or emergency response officer to visit the schools and present talks to learners, and taking learners to dolomitic areas or an area that has been destroyed by fire. As indicated in Chapter four in one of the schools I visited, a teacher asked her learners to define disasters through drawing or collecting pictures of disaster events. She displayed the learners' work on the walls and it was very stimulating. The different depictions of disasters definitely contributed to learners' becoming aware of disasters. There is indeed a need to capture these isolated cases where educators go out of their way to motivate

learners while contemplating important issues about their environment. It is therefore of the utmost importance for disaster management institutions to work with school management and to raise learners' awareness through developing and disseminating learning materials such as videos, biographies and diaries of disaster management efforts. Furthermore, disaster management centres and institutions of higher learning should apart from contributing to the development of learning materials such as textbooks, posters and learning programmes, organise exhibitions of disasters that have occurred in the past. Learners from different schools could visit the displays to learn more about issues related to disasters that cannot be taught in the classroom.

In summary, the interview participants have provided relevant data, which one can now compare with the literature study and questionnaires findings to determine whether education in particular, curriculum and instructional design contributes to learner awareness of hazards and disasters. The contribution of data collected from curriculum and disaster specialists reveals that while the inclusion is important there are some critical issues that need to be considered such as the fact that educators are being bombarded with new techniques and are expected to do administrative work. From these data, I am of the view that there is much that still needs to be done to ensure that learners' awareness, preparedness and resilience to disasters is attained. Some challenges have been identified such as using new teaching strategies when educators are not yet ready to use them and stretching the contents of hazards and disasters to include every day things that learners should appreciate such as access to water, healthcare, food and education which play an important role during disasters.

5.7 The significance of this study to the South African education system

As a researcher the question that is occupying my mind is what new insight has this investigation contributed to the body of scholarly knowledge. While the entire report from the problem statement, the literature review, research methodology, data collection and analysis, to the research findings and recommendations serves as the contribution of the entire study, this section will highlight a few specific and the most outstanding insights emerging from the investigation. There is a need to not only focus on taxonomies of disasters which is at the level of knowing how many disasters are there and just listing them, but to go deeper and identify which ones are

affecting South Africa and those that are affecting specific communities. This is significant for learners as it will teach them not only to identify hazards in their communities but it will also help them to read warning signals. If they are caught unaware, they would have learnt that they need not force their way home but should seek an appropriate shelter closer by. This might include the fact that if there is lightning or storms they should not take shelter under tall trees, or during heavy rains they should not go closer to rivers or dams. It could also include not playing near what could be sinkholes or old mines.

The critical outcome that needs to be achieved by learners upon learning about hazards and disasters is to develop awareness, preparedness and resilience. Awareness implies that learners should know about different types of disasters that could affect their area and spot any possible hazard or warning signals for disaster. Preparedness has to do with knowing what needs to be done to avoid causing disasters and responding appropriately to avoid being affected by disasters. Resilience has to do with what could be done during and after the disaster. All these concepts are important and need to be reflected in the national curriculum. Based on the data discussed in Chapters two and four, my proposition is that awareness, preparedness and resilience to hazards and disasters could be attained by using indigenous knowledge, integrated teaching and specialised learning programme design and development. This proposition is informed by the NCS as the three concepts have been identified as the core principles of South African educational reform.

The inclusion of indigenous knowledge into the classroom is important and essential for learners to help them understand that their culture is important and needs to be valued. While there are diverse cultures in South Africa engaging learners to share their culture and the contribution it has made to development is crucial. For example the use of traditional medicine combined with current scientific medicine and how people in the past lived in harmony with nature. Indigenous knowledge could also be used to illustrate how past generations relied on water coming out of streams but emphasise why this trait is no longer possible because of water pollution by mine acids, medical waste and chemical disposal and that other rivers are used for sewerage disposal or have leaking pipes as in indicated in section 4.3.4. The expected outcome here is that learners will respect water and stop littering dams and other water sources.

One takes note of Green (2007) his critique of IKS that it is good on policy but its implementation is not convincing as there are lots of questions to be answered. Botha (2010) is concerned about the contradiction that will arise from the national NCS learning outcomes focus on Eurocentric and traditional knowledge which might confuse learners. Also to consider is the increasingly multiracial classroom in South Africa that might make it difficult for the teacher to reconcile what learners are taught in their homes and what is in their learning programme. Irrespective of these challenges indigenous knowledge has a role to play in enhancing learners awareness of hazards and disasters.

The inclusion of integrated learning in the NCS is meant to enable learners to gain a holistic view of the learning phenomenon and in this case awareness, preparedness and resilience to hazards and disasters in South Africa. In this study the concept of integrated learning has been used interchangeably with integrated teaching, curriculum integration, team teaching, teaming and collaborative teaching. While each terms could have its specific meaning, in this study the terms used to denote a process where all or most learning areas contribute to just one topic. For example a learning programme on HIV/AIDS as suggested by one of the interview participants could be designed to include Mathematics, Language, Life Orientation, Social Science, Economics and Management Sciences and Natural Sciences educators. Each educator would focus on her specific learning outcome but the topic is the same.

Asked whether this teaching strategy would work, interview participants felt that it would overburden educators who were already swamped with administrative work. I am however confident that if implemented this strategy would have the fruitful impact of enhancing learners' awareness, preparedness and resilience to hazards and disasters. The way forward is to initiate a pilot study to collect data from schools that have used this strategy and to sample a few schools where this strategy could be implemented to see if it improved learners' knowledge and understanding of hazards and disasters in relation to awareness, preparedness and resilience.

The NCS also makes provision for a learning programme to be developed which seems like replacing the old textbook. The significance of a learning programme is that it is not developed

for commission purpose and also that it could be developed by practitioners and educators instead of the old textbook developed by experts or university professors. It is meant to be engaging to the learner and teaching key skills such as problem solving, critical thinking and reflection rather than providing facts. The learning programme is important and its use should be encouraged as it gives learners a different dimension and if integrated learning is used it will enrich learners' knowledge and understanding of the connectedness of life.

The study has major implications for educational change in South Africa in that firstly, it calls for revisiting the national curriculum to ensure that hazards and disasters are included as learning outcomes for some grades in foundational, intermediate and senior phases. Secondly, the study makes the proposition that the use of indigenous knowledge and integrated learning should be fast-tracked. Learning programme design should be encouraged through inviting practitioners, educators and learning area experts to contribute to its development. possible way is to initiate a pilot study in all provinces to determine whether the propositions made here are effective. The study will include sampling schools, training of educators to use the principles of integrated learning and indigenous knowledge, data collection and analysis and an announcement the findings.

5.8 Other insights emerging from the study

Generally, the new insight which emerged relating to curriculum design and development is that the South African national curriculum has been ever changing since 1994 and every time a new Minister is appointed, a review committee is set to advice on the curriculum reform needs. This curriculum change is in line with findings from literature as reported in Chapter two that curriculum is ever changing and also drives change in society. The implication here is that the suggested curriculum change could be part of the next review committee recommendations.

It has been mentioned in the policy document review that one of the NCS's principles is to give educators the flexibility to design their learning programmes to integrate local context. Almost all curriculum specialists have confirmed this point but whether it is being implemented is

debatable. Educators are overburdened by administrative tasks and do not have the knowledge and skills to undertake the mega task of designing learning programmes.

The role of designing learning programmes is currently left to consultants who develop textbooks for schools distributed nationally with much provincial input. This is not sufficient; there has to be input from the district level to ensure that curriculum design takes into consideration the local development of learning programmes. More work needs to be done to determine the feasibility of this approach, to investigate which countries have implemented the approach and what the benefits and impact of such an approach are. It might be beneficial for the national education department(s) to have abroad guidelines in the national curriculum for teaching about hazards and disasters. The provincial department will then streamline the national guidelines to fit the provincial situation and the district offices will focus on examples that are relevant to their environments.

If this approach is followed it will help address some of the complaints from educators as recorded in the comments section that they are expected to teach learners about cyclones, volcanoes and earthquakes which rarely happen in their area but have to ignore local types of disaster. The idea of localising curriculum was even mentioned by a curriculum specialist from Northern Cape who indicated that in his province the NCS is interpreted as giving them the leeway to decide what they should focus on as a province.

Boyce's (2000:256) argument could be used to support the localisation of curriculum:

Vulnerability to natural and technological disasters is to a large extent a public issue: such disasters typically strike communities, not isolated individuals. By the same token, measures to reduce vulnerability are to large extent public goods. Many measures to reduce disaster vulnerability are impure public goods, which when provided to one are provided to others, but not equally provided to all.

The NDMC stands a good chance of taking the matter of designing learning programmes to enhance learners' awareness of hazards and disasters for all grades into its own hands and even to lend support to higher education institutions in developing future educators to take the matter of the awareness of hazards and disasters seriously.

5.8.1 The prevalence of epidemics as leading to disasters in South Africa

It has been emphasised in Chapter four and in the section above that floods, fires and droughts are the major disasters experienced in South Africa. There are, however, silent catastrophic epidemics which initially were not taken seriously as deserving to be categorised as disasters. Mayosi et al. (2009) and Bradshaw et al. (2003) discuss how communicable and non-communicable diseases should be categorised as burdens in South Africa and how they can quickly turn South African public health into a nightmare and crisis needing attention. According to Arnold (2002) the largest disaster of the 20th Century was caused by an infectious organism of which little is known except that it was labelled Spanish flu in 1918 which left approximately 100 million people dead. Epidemics are continuing to be major disasters considering that by now HIV/Aids has now led to the death of more than 12 million people worldwide.

During the process of empirical data collection, the responses from the interview participants (P2, P8 and P10) raised a new concern. They stated that HIV/AIDS is an epidemic that is experienced in the country and that learners need to know about it so that they can respond appropriately to avoid being victims of this scourge. Upon going back to the literature review, I noticed that scholars such as Mgquba and Vogel (2004) and the UNDP (2004) policy document mention HIV/AIDS as a disaster. Other literature mentions only epidemics as a disaster which affects communities. I then went back to do a literature review to determine whether HIV/AIDS could be categorised as a disaster in South Africa. From the literature review it emerged that the epidemic is devastating the country as reported by scholars like Wojcicki and Malala (2001), Bachmann and Booyen (2003), McDonald and Schatz (2006), Susser and Stein (2000), Martin (2005) and Martin and Williamson (2004). Although society is aware of the effects of HIV/AIDS, it has nevertheless not been declared a disaster, probably because of the limitations and connotations in the definition of the concept 'disaster'. While responses to the questionnaire and the associated general comments from educators never mentioned anything about HIV/AIDS, it has strongly featured in three interview participants. According to an online

Havard⁴ publication, a disaster is any serious disruption of the functioning of a society causing widespread human material or environmental losses which exceed the ability of a society to cope using only its own resources. The HIV/AIDS epidemic could be considered a disaster in a number of nations, especially in sub-Saharan Africa. This idea of HIV/AIDS as a disaster is supported by numerous researchers as indicated above who were discussed in Chapter two. Like other disasters, the epidemics should be included in the curriculum of the foundation, intermediate, senior and higher education phases and learners should be taught about HIV/AIDS from the earliest age to tertiary education with more targeted interventions in the communities, including the youth that are not in schools.

Participant 8 identified other epidemics such as rift-valley fever, foot and mouth disease and avian flu. Other interview participants only generalised the epidemics singling out HIV/AIDS. Arnold (2002) identifies infectious diseases that develop into pandemics such as Ebola, Hepatitis C, Hantavirus, Rotavirus and other re-emerging infections such as cholera, malaria and yellow fever acknowledging that the 1918 global influenza was the worst. Bradshaw et al. (2003) identify some of the diseases that could result in a disaster such as tuberculosis, diarrhoea, respiratory infections, diabetes, heart diseases and bacterial meningitis and state that HIV/AIDS tops the list in terms of the number that die from it. Mayosi et al. (2009) add cardiovascular disease, lung disease, cancer and depression on the list but also emphasise diabetes and HIV/AIDS as the greatest killer diseases.

Some of the epidemics such as HIV/AIDS and cholera are already integrated in the national curriculum but as has been discussed most educators teach only what is in their textbooks; they do not seek additional information or resources to enrich the existing information in the textbooks. My favourite approach is for public institutions involved in outreach initiatives to develop a learning programme or what could be called a learner workbook that could be used by different grades similar to the one authored on behalf of the Water Research Commission. Learners could be taught about basic safety principles of washing their hands, covering their

⁴ This article can be accessed online at <http://www.hsph.harvard.edu/psb205/hiv/AIDS-as-a-disaster.htm>, retrieved on 12 August 2009

mouths with their hands when they cough and avoiding contact with anyone showing symptoms of a particular disease and always being on the alert.

5.8.2 Vulnerability of informal settlements and associated educational requirements

While most literature on informal settlements focuses on the vulnerabilities and how these settlements are mushrooming in South Africa, there has been little if any focus on the type of education learners residing in these vulnerable places should receive. The assumption is that informal settlement learners are given the same education as all other learners in South Africa; if this is so, crucial information that could help learners survive in these places is being omitted from school education.

The four pictures depicted in section 1.1, 2.1, 2.2 and 4.1 were analysed and discussed in Chapter four as evidence of the vulnerabilities of South African informal settlements. The question that remains is what learners from informal settlements should be taught about the vulnerability of their habitat. There is no chance that learners from these areas could change the minds of their parents as it is because of poverty that they reside in these environments. However, there is much that learners from these areas could be taught, such as not to dump waste on drainage pipes or storm water pipes as well as warning them not to play on the rubbish dumps or eat any of the waste. Learners need to be warned about the danger of used condoms, needles and bandages; water from dams and rivers should be boiled before it is drunk. Learners could also be taught not to play with candles, paraffin or gas or to drink anything from unidentified bottles that have not been inspected by adults because people use milk and household containers for paraffin, herbal medicines and other dangerous materials such as oils, liquid soaps and chemicals. There are so many things that learners need to be taught about; some educators teach these voluntarily

5.8.3 The need to include indigenous knowledge to enhance learner awareness of hazards and disasters

The value of indigenous knowledge for learners cannot be over emphasised. What needs to be illustrated here is that developments are going on in other departments, like the policy documents on indigenous knowledge systems as a separate field developed by the Department of Science and Technology National Indigenous Knowledge Systems Office (NIKSO)⁵ and the integration of indigenous knowledge research into the existing field, such as biosciences, health sciences etc. by the Council for Scientific and Industrial Research (CSIR) and other research institutions. These developments touch on the arguments about the dilemma of indigenous knowledge advanced in the literature review by Agrawal (2004), Briggs (2005) and Rautela (2005) complemented by responses from interview participants. One of the NIKSO programmes as indicated in the link provided in the footnote 2 below is a bachelor degree on IKS launched first at the University of Zululand and on the verge of being introduced to other universities in South Africa. This new development regarding indigenous knowledge means that mainstream education should prepare learners regarding indigenous knowledge so that those who pursue their study in the field will have a good background of the phenomenon rather than having to start learning it at tertiary level.

It is difficult to pinpoint what aspects of indigenous knowledge should be used to enhance learners' awareness of hazards and disasters because such knowledge has not been recorded. The United Nations Environmental Policy unit that initiated a programme to collect information in partnership with the Russian Association of Indigenous Peoples of the North (RAIPON) could serve as an example to design a programme for including indigenous knowledge in school teaching. The project includes indigenous knowledge about warning signals for natural disasters and how to cope and lessen their impact. The project further intends to raise awareness and enhance understanding of the application and use of traditional knowledge in disaster management.

⁵ For more information on NIKSO, follow this link <http://nikso.dst.gov.za/dd/about-nikso>

According to Kamara (2006) indigenous knowledge is a precious resource that continues to contribute to knowledge about environmental conservation and natural disasters. What prompted this view is the information collected from the Russian indigenous communities who have indicated that blizzards, strong winds, wild fires, floods and freezing temperatures are the gravest concerns to residents. They describe how the appearance and colour of the sky, dogs rolling on their backs and crows circling the flocks are indications that something horrible might happen. For example, if a reindeer is seen running at night it might be testing its legs before danger. One resident from the Russian communities even narrated how the community was once saved from volcano ash by observing flocks of birds flying in a specific direction and the community followed the birds without first finding out what was happening.

This notion of observing nature and animals is supported by Arunotai (2008) who maintains that the Moken of the Surin islands communities were saved by a legend and keen observing skills of nature:

On the morning of Sunday December 26, 2004, the Moken of the Surin Islands observed a sudden change in the sea level. This occurred without any change of weather and it was considered a very unusual phenomenon. For several Moken elderly, it signalled the coming of “seven rollers”, a legend that has been passed down for generations. The whole community ran up to the hill behind the village very quickly, and all survived the tsunami disaster though the entire village was swept away along with a few boats.

Kamara (2006) concludes that with the disruption of traditional lifestyles and the settlement of indigenous communities, it is a challenge to maintain the continuity of traditional knowledge through transmission from generation to generation. One solution is to find new ways to ensure that this knowledge is not lost, including the development of products to preserve and disseminate traditional knowledge for use in primary, secondary and tertiary education.

I am convinced that if implemented in South African schools this knowledge will make a huge difference to learner awareness of hazards and disasters. Elders could be identified and asked to narrate the stories of how they survived disasters; these could be recorded and used as learning resources. Another option is to get the NMDC and DBE to collaborate and to introduce an award for learners who collect the best indigenous knowledge from their communities. The data collected could be peer-reviewed and published in scholarly magazines. These projects would

not only teach learners about hazards and disasters but would ensure that they valued indigenous knowledge and also respected and appreciated the knowledge that lies with elders.

5.8.4 The contribution of instructional design learners' awareness of hazards and disasters

The NCS principle of the integration of learning gives educators the opportunity to work together in developing learning programmes, thereby ensuring that learners gain holistic knowledge and understanding of subject matter. In this study the concepts of the integration of learning have been included as integrated teaching because for this type of learning to materialise there has to be collaboration of educators from different learning areas. In this investigation it has been found that while educators do collaborate with one another it is on small scale and not coordinated or pre-planned. The interview participants' views were that educators are not ready to use this approach even though it has been implemented in some schools. In higher education this approach works effectively and if it could be implemented in schools, the quality of learning could be enhanced. It is, however, important to note that interview participants pointed out that educators in most instances used only those learning resources that were at their disposal and the textbook is their most highly regarded source. The teaching of hazards and disasters in school could be used as an opportunity to pilot the use of integrated teaching as a teaching strategy.

The four key issues discussed above can be used by the national disaster management centre to develop a learning programme on hazards and disasters for all learning areas and all grades. A Water Learning Programme for Schools project⁶ run by the Water Research Commission which developed a learning programme on water issues for Grades R to 7 could be used as a model to develop a learning programme on hazards and disasters. The learning programme could include indigenous knowledge and prescribe how educators should collaborate with one another to teach learners about hazards and disasters. Although a project of this magnitude would cost much, the benefits that would be accrued would be endless as it would result in learners that appreciated integrated learning, were aware of hazards and disasters, and in educators who were aware of

⁶ The product of the WRC project was a learning programme titled 'Learning and teaching about water in our classrooms: a series of lesson plans for grade R – 7'. Peddie et al. (2008)

hazards and disasters, using collaborative learning or integrated teaching principles and a variety of resources at their disposal.

5.9 Recommendations and implications

The main aim of the study was to determine how South African education, in particular curriculum and instructional design, contributes to learners' awareness of hazards and response to disasters. The overarching findings were reported in the previous section; the two aspects of the education system, curriculum and instructional design, contribute to a greater extent to learners' awareness and response to disasters. The first one relates to the fact that the curriculum should explicitly state the outcomes about hazards and disaster education from the foundation to the intermediary and senior phases. This is essential because it has been ascertained that educators prefer to follow outcomes as prescribed in the curriculum and textbooks. It is therefore recommended that the current curriculum be reviewed and outcomes pertaining to hazards and disaster education be added to the foundation, intermediary and senior school phases. The second finding is that educators rely heavily on learning materials, in most cases packaged as textbooks. The conclusion here is that hazards and disaster education should be included in the textbook development phase with suggestions of strategies that could be used, such as the inclusion of indigenous knowledge, integrated teaching and visual representation of issues related to hazards and disaster management. It is recommended that the disaster management centre and other disaster management institutes collaborate with the Department of Basic Education to develop hazards and disaster education learning material. These efforts are urgent considering an observation made by Chagutah (2009:113) that:

South Africa has frequently been struck by damaging climate hazards which increasingly continue to threaten sustainable development efforts. Moreover, climate models predict that the incidence of major wet events such as floods and cyclones will increase in frequency against the background of a climate change.

Below I discuss the recommendations and implications of this study for the higher education sector, basic education, stakeholders, communities and policy makers.

5.9.1 Recommendations to the Higher Education sector

Scholars such as Arredondo and Rucinski (1997), Ranby and Potenza (1999), Loepp (1999), Robinson and Schaible (1995), Venville et al. (2001), Chambers (1995) and Gehrke (1998), Cross et al. (2002) and Fisher and McDonald (2004) support the principle of integrated teaching. Although they do not directly link it with teaching learners about hazards and disasters, the basis of the link is provided by the National Curriculum Statements which make provision for educators to use integrated learning to enrich learners' knowledge and skills. When asked whether they use integrated teaching as a strategy to teach learners, 44.6 percent of 150 educators who completed the questionnaires affirmed that they do integrate but a follow-up question from some educators revealed that the extent to which integrated teaching is undertaken included a collaboration between two teachers and hardly goes beyond that. Almost all interview participants agreed that integrated teaching would enhance learners' awareness of hazards and disasters. However, some of them had reservations about whether educators have the time and skills to implement this new approach.

- It is against this background that this study recommends that an investigation be conducted to determine how effective the integrated teaching strategy is and what factors contribute to its effectiveness or failures in those schools that have already employed it. Furthermore, it is recommended that a pilot study be conducted in some of the schools located in impoverished areas to determine if the integrated strategy will enhance learners' awareness of hazards and disasters.
- Following from the findings that disaster lecturers recommended that hazards and disasters should be taught in all fields of studies within universities and other tertiary institutions in preparation for future educators and to those that are improving their teaching qualifications, this study recommends that universities should ensure that their educator training programmes have compulsory themes on hazards and disasters for all students being trained to become educators. The university programmes for preparing students to become educators should also encourage the use of integrated teaching strategies.

5.9.2 Recommendations to the Department of Education

In Chapter two it was discussed that the National Curriculum Statements make provision for hazards and disasters only in Grade 7 Social Science learning area, which implies that learners will have to start their schooling and proceed to Grade 7 without knowing anything about disasters. The exception would only occur when an educator goes an extra mile by using other learning outcomes like deforestation, water and safety issues to teach hazards and disasters. This in itself would be a rare thing to do by struggling schools with limited resources and overburdened educators expected to teach in multi-grade classrooms.

As discussed above, Kamara (2006) maintains that learners should be taught about indigenous knowledge's contribution to disaster risk reduction at primary, secondary and tertiary education level. Some interview participants have suggested that hazards and disasters issues should be taught in the foundation phase, some suggest it should even start at home while others favour it to start in Grades 3 and 4 respectively.

- Considering this background information, this study recommends that the national curriculum should include the development and teaching of learning outcomes on hazards and disasters across all learning areas and in all phases that include foundation, intermediate and senior phase as well as higher education.

The main challenge with the recommendation above is that it would have to overcome the concerns raised about the overload and limited resources for educators especially in struggling schools located in informal settlements. A pilot would need to be initiated in this regard so that it could inform curriculum makers before any curriculum change taking place within a period of next five years from 2011.

Some of the interview participants emphasised that disasters are area-specific; this is supported by scholars such as Holloway and Roomaney (2008) who maintain that residents of informal settlements in the Western Cape, as well as elsewhere in South Africa, bear the brunt of extreme weather and associated flooding. Thousands of households in the province and beyond suffer

severe losses caused by informal dwelling fires. During floods and fires poor families suffer significant development setbacks. These disasters are also costly for the affected municipalities and provincial departments, and divert resources from other urgently needed services. Because informal settlements in the Western Cape are diverse, risk reduction efforts will vary from one settlement to another or from one municipality to another, and almost always be tailored to local risk conditions and development capacities.

- In line with the findings above, this study recommends that classroom teaching should be aligned with the vulnerability affecting communities, which implies that teaching in schools located in informal settlements should emphasise safety issues and hazards for learners residing in those settlements. This requires that the national curriculum provides a broad guideline for the inclusion of hazards and disasters. The provincial governments should streamline the curriculum to fit the hazards and disasters in the province while the district and local municipalities work with schools in their surroundings to develop a localised curriculum for the schools in the vicinity.

Other recommendations for the education sector's role in enhancing learners' awareness of hazards and disasters include the following:

- Consider using an integrated teaching (multi-disciplinary) approach where educators of different learning areas team together to teach a similar theme.
- Educators should integrate indigenous knowledge in their day-to-day classroom teaching especially for hazards and disasters education.
- Educators should apply some form of flexibility with regard to the content of the learning programme and ensure that learners are aware of the hazards and disasters prevalent in their area rather than teaching them only the ones listed in the learning material.
- Educators should take a keen interest in the environment learners come from so that they are able to teach them about hazards and disasters that are familiar to them.
- Educators should invite disaster management and emergency response specialists to present talks to learners.

- Schools should create an environment where educators get used to developing their own learning programmes while complying with qualifications requirements;
- Allow educators from different learning areas to team-up and develop an integrated learning programme.
- Schools should attempt to understand hazards prevalent in the area and invite safety officers from disaster management centres to brief learners.

5.9.3 Recommendations to stakeholders

Moll (2004:7) maintains that a curriculum should be responsive to the needs of the learner and that some aspects of the curriculum should be tailor-made to suit the environment. To do this, educators should have extensive research skills and good networking skills that would enable them to identify the needs of learners. Currently as discussed in Chapter four, most educators do not have the time or skills to be able to undertake this huge and important task. It is therefore important to bring more stakeholders to assist with the task. It is against this background that this study recommends that:

- Educational and research institutions should encourage students to embark on studies that would generate scientific knowledge on the role of indigenous knowledge in disaster risk reduction.
- Disaster management centres should increase their school safety programme activities.
- Municipalities and health authorities should make educators aware of hazards that could affect learners.
- Research and academic institutions should encourage research on how indigenous communities survive disasters given the fact that they do not have the infrastructural advantages that modern communities have.

5.9.4 Recommendations to communities

Holloway and Roomaney (2008) propose a community participatory disaster risk reduction approach, which involves the entire community. Other participants as well suggested that a community participatory approach should be considered as another way to enhance learners'

awareness of hazards and disasters. Chagutah (2009) maintains that it is now accepted that community problems and solutions should be collectively identified and that participation is regarded as being necessary in order to share information, knowledge, trust, commitment and right attitude in the development, planning and implementation of disaster risk reduction strategies. This implies that all disaster risk reduction strategies including education and awareness could be enriched by this participatory approach. This study therefore recommends that:

- Parents need to be involved as they possess a wealth of knowledge about their heritage which could contribute to their awareness of hazards and disasters and they should share with their children how their great grandparents survived disasters.
- Schools should organise meetings and seminars for parents on safety principles and the need to share constantly with their children their traditional knowledge of how their ancestors survived disasters that occurred during their time.

5.9.5 Recommendations to policy developers

It has been exposed that only Grade 7 Social Science has learning outcomes for hazards and disasters and that educators specifically follow the textbook to teach rather than follow the national curriculum stipulations. Policy makers should regulate that all learning areas include hazards and disaster learning outcomes. Some curriculum scholars were quoted as saying that some educators in South Africa do not implement the stipulations of the current curriculum; instead they follow the old curriculum which focused on rote learning. The information emerging from the study requiring the attention of policy makers relates to the notion of allowing for flexibility for provincial, district and local education authorities to focus on hazards and disaster issues that are relevant to their area. This study recommends that:

- The NCS should specify that educators are allowed to develop their own learning programmes as long as they comply with the criteria set through outcomes.

- Policy makers should initiate seminars that would assist educators to embark on integrated learning and to team-up with colleagues while teaching hazards and disasters.
- The current national curriculum should be reviewed and outcomes pertaining to hazards and disaster education should be added to the foundation, intermediary and senior school phase as well as at post-school level such as FET colleges and universities.
- Educators should be encouraged and taught how to include indigenous knowledge in their day-to-day teaching of hazards and disasters.
- Learning outcomes on safety or awareness of hazards and disasters should be added from the foundation phase to the senior phase.
- Inter-school competitions and cooperation in addressing hazards prevalent should be encouraged in provinces to stimulate learners' awareness.
- Learning area specialists should ensure that when they do evaluation of educators' teaching practice, they include hazards and disasters as a theme for evaluation.

One might close the recommendation to policy makers with an argument by Schilderman (2004:425) that changing the mindset of policy-makers and development agencies involved in those approaches should therefore be a priority. They need to recognize the relationship that exists between development and disasters, and also that the way out of the vicious circle of development contributing to disasters that in their turn set back development is mitigation. They will need to shift some of their budgets from relief and reconstruction towards mitigation; and they will need to incorporate disaster mitigation as an integral part of their development projects and programmes

5.10 Implications of the study for enhancing learners' awareness of hazards and disasters

The findings of this study have far-reaching implications for learners, educators, parents, schools, curriculum coordinators, curriculum developers, textbook authors, curriculum policy makers, disaster management centres and institutions as well as for disaster researchers. The discussions that follow outline the implications for stakeholders:

- Learners should be taught about hazards and disasters from an early learning phase (pre-school and foundation phase) to intermediary and senior phase right through to post-school (FET colleges, universities and school leavers).
- Educators should make use the opportunity provided by the NCS and design flexible learning programmes that would enhance learners' awareness of hazards and disasters. They should also embark on self-empowerment through reading additional resources for enhancing learners' awareness of hazards and disasters.
- Parents should start teaching their children at an earlier age about safety and hazard issues and always complement what educators have taught learners in this regard.
- Schools should create an enabling environment for educators to embark on different activities to enhance learners' awareness of hazards and disasters such as insisting on collaborations among educators and structuring the school organisational culture in such a way that it will enable flexibility for educators.
- Curriculum coordinators should meet provincially and nationally to discuss how the National Curriculum Statements could be aligned with the provincial challenges on hazards and disasters as well as to advise educators about additional teaching resources that could be used in the classroom.
- Curriculum developers should take note that learning outcomes on hazards and disasters should be included in all grades and across all learning areas. Furthermore there is a need for consulting more widely with stakeholders such as indigenous knowledge scholars and textbook authors.
- Textbook authors have a difficult task of balancing the provision of NCS learning outcomes; they need educator expertise and resources while developing textbooks.
- Curriculum policy makers should take into consideration the differences that exist among provinces and provision for deviations and consider as well that educators are overburdened with administrative work on top of their teaching activities.
- Institutions of higher education especially those that train educators, should ensure that the new generation of educators has been trained in integrated teaching and indigenous knowledge.

- Disaster management institutions should produce additional learning resources for schools, similar to those produced by the Water Research Commission which contains lessons for learners from Grade 0 to Grade 12.
- Disaster researchers should investigate better ways to integrate hazards and disasters into the school curriculum and instructional design.

5.11 Shortcomings and limitations of the investigation

In this study two research strategies were used to collect data to address the research problem stated in Chapter one. Like any other research, this study has limitations such as the use of dichotomous (Yes/No) options which is not recommended for a PhD study. Both the numbers of interview participants and questionnaires respondents are not representative of the South African population's views; however, it should be considered that the literature review was done widely and could be representative of all scholarly publications and policy documents.

Whilst South Africa promulgated the National Disaster Management Act in 2002 and the National Disaster Management Framework in 2005, which clearly spells out what needs to be achieved on disaster education and training, there is no approved policy document related to disaster management apart from the safety issues mentioned within the South African School Act. It should, however, be noted that in July 2010, the Department of Basic Education consulted specific individuals to make comments on the proposed draft National Disaster Management Guidelines for Schools to which I had an opportunity to make inputs. This implies that some of the issues raised here as a challenge might be undergoing considerations within the Department of Basic Education.

Another limitation of the study is that while disasters affect the communities in general, this study focuses much on their vulnerability caused by conditions such as poverty. Issues of biases could have motivated this investigation as discussed in Chapter four, the last paragraph of section 4.3.3 where I discussed the vulnerabilities experienced by Portion 9 residents where I spent most of my first years of employment as a teacher. This could have had an influence on

how I interpreted the research findings, however, data were collected from different contexts; five provinces and 47 schools situated in informal settlements.

An analysis of data collected through questionnaires revealed that data collection from learners would have enhanced the findings of this study because it would have pointed out whether learners are aware of hazards and disasters. This could be part of further research in this topic. A closed-ended questionnaire was used to collect data from educators which was limiting in nature because the analysis shows that there is a need for an in-depth understanding of what is the status quo in terms of teaching awareness of hazards and disasters. Probably an in depth interview would have yielded better results. An ethnographic study is needed to extract more insights on the classroom situation and determine which other teaching strategies could enhance learners' awareness of hazards and disasters.

5.12 Suggestions for further research

This study focuses on the national curriculum and the role of educators in enhancing learners' awareness of hazards and disasters. There are other issues that also need an in-depth investigation. Such variables include the school environment (leadership, infrastructure and resources, school culture and support structures), learners' contribution and the involvement of other stakeholders in hazards and disaster education.

Possible research topics emanating from this study include the following:

- The need to determine how the hazards and disasters identified by sub-question 1 could be integrated in the foundation, intermediary, senior and post-schooling phase and across all learning areas.
- There is a need to investigate the vulnerabilities of South African communities to prevalent disasters and those that have not happened so far, such as volcanoes, hurricanes, high magnitude earthquakes and tsunamis.
- South Africa has undergone curriculum change, revision and reviews on numerous occasions and any suggestion to overhaul the curriculum will be met with scepticism and

resistance from curriculum developers and implementers. The challenge here is to find ways to integrate suggested hazards and disasters additions into the existing curriculum. An investigation on the design of learning programmes could shed light on how hazards and disasters might be integrated into classroom teaching without changing the national curriculum provisions

- Disaster and indigenous knowledge scholars need to conduct field studies to gather existing knowledge on how indigenous communities have managed to live in harmony with hazards for so long and how they respond to disaster outbreaks.
- A case study to determine how integrated teaching could effectively enhance learners' awareness of hazards and disasters need to be done.

5.13 Summary of the investigation

In answering the main research question, data collected through the empirical study reveal that national school education has an essential role to play in the teaching of hazards and disasters firstly, by explicitly ensuring that the curriculum includes learning outcomes on hazards and disasters and secondly, by ensuring that educators from learning areas have adequate teaching materials on hazards and disasters.

If Shaluf's (2007: 687) framework of disasters in which he identified three categories of disasters is to be used, South Africa would fit all three categories. The most common natural hazards in the country are floods, droughts and thunderstorms; the human-induced hazards include fires, mine-related hazards and industrial accidents while the third category of hybrid disasters includes health-related disasters such as HIV/AIDS, multi-drug resistant TB and other medical-related diseases prevalent in South Africa as well as conflict-related disasters, such as xenophobic attacks. Something to note here is that some of these do not fit the definition of a disaster and could just be labelled hazards because there has not yet been human and property loss, but they could become a disaster if vulnerability is not addressed. Regarding tsunami disaster, Meiklejohn and Sumner (2005) maintain that South Africa has a relatively steep coast so the country would not experience as much devastation as was recorded in Indonesia during the 2004 tsunami.

In Chapter one section 1.8 and the framework in Chapter two figure 2.5 it was pointed out that awareness of vulnerability, resilience, indigenous knowledge, the curriculum and integrated teaching are essential for addressing the main research question of the contribution of education in enhancing learners' awareness of hazards and disasters. These concepts were integrated in the questionnaires and the interview guidelines to determine the views of respondents.

Something to note though is that poverty could make communities vulnerable to disaster and this point is supported by researchers such as King (2000), Gaillard (2007:534), Napier and Rubin (2002:3), Reich (2006:796), Pelling (2003) and Mgquba and Vogel (2004:34) who maintain that poverty reflected by communities that build poor structural houses in informal settlements increases their chances of becoming victims of disasters. In South Africa informal settlements are most affected by hazards such as floods, fires and epidemics related to a poor health environment. This is so because most of these settlements are located in areas that are not approved for human settlement such as river banks, mining dumps, dolomitic areas, high voltage locations and near industrial waste sites. Among all data collection sources, the literature, educators' responses and interview responses there is strong agreement that South African communities are vulnerable to disasters. Researchers such as Mgquba and Vogel (2004:36), Bull-Kamanga et al. (2003:193), Fothergill and Peek (2004:90), Alexander (1997:293), Pelling (2003) and Reid and Vogel (2006:195) strongly support the idea that in most cases poor communities are severely affected by disasters.

It is crucial to note that all South African communities are vulnerable to disasters and the conclusion emanating from the second sub-question of this study could be taken from the National Disaster Management Framework which states that hazards are seen as an integral aspect of our environment and include naturally occurring or humanly-induced processes or events with the potential to create loss. Exposure to a hazard need not necessarily mean disaster. It is the level of vulnerability of those who are exposed to the hazard that increases risk and thus the likelihood of a disastrous occurrence. The question that remains to be answered here, and ideal for future study is, "To what extent are school learners vulnerable to disasters occurring in informal settlements?"

The concept *resilience* was not included during data collection through interviews and questionnaires as it is embedded in the concepts of vulnerability, indigenous knowledge and issues of curriculum and instructional design. The UNDP (2004) introduced three factors involved in disaster resilience - taking ownership of disaster risk assessment, educating learners in disaster risk reduction and facilitating the documentation of local knowledge and interpretation of disaster risks. The discussions on the vulnerabilities of informal settlements covered the ownership factor. The second factor relating to education was covered by discussions of the curriculum, integrated teaching and other teaching strategies while the importance of local knowledge was covered through discussions on indigenous knowledge.

From the empirical data collected through the literature study, questionnaire responses from educators and interviews with disaster management and curriculum specialists there seem to be no data that contradict the observation of the Green Paper on Disaster Management (1998) that, like many countries in the world, South Africa is at risk from a wide range of natural, technological and environmental hazards that can lead to disasters such as droughts, floods, major fires, tornadoes, major oil spills and even earthquakes. While it seems that there is awareness of disasters prevalent in the country, there is, however, no evidence that this awareness is transferred to learners; neither has any study been conducted in South Africa to determine the learner's awareness of hazards and disasters. Literature by scholars and policy document suggests that there are problems in the teaching strategies used by educators as reflected in the debates of OBE, C2005 and the NCS implementation.

A review of the South African National Curriculum Statements from Grades 1 to 12 reveals that there is explicit inclusion of hazards and disaster outcomes in Grade 7 and to some extent an implicit inclusion of outcomes that relate to the environment, safety, transportation, water and industrialisation in other grades which educators can utilise to teach hazards and disaster education. Researchers such as and Frost-Killen (2007), Rogan and Grayson (2003), Jansen (1998, 2009) Rogan (2007) and Rogan and Aldous (2005) all agree that while educators follow the prescribed outcomes as listed in the curriculum they nevertheless do not adopt the flexibility given by the National Curriculum provisions such as integration of learning and designing their

own learning programmes. In fact Jansen (2009;197) maintains that smaller and less dramatic changes in curriculum knowledge and ideologies are hard to shift. This could simply mean that learners go through Grade 1 to Grade 6 knowing nothing about hazards and disasters unless an educator goes beyond the listed outcomes and volunteers to teach them about hazards and disasters.

Lidstone's (1996) remarks that natural hazards education is essential for producing a citizenry that is knowledgeable concerning the bio-physical environment and its associated problems, aware of how to solve problems and motivated to work towards their solution, fit well as a concluding statement to the third sub-question of the study. This conclusion necessitates that disaster education should be included during the curriculum development of all grades, from the foundation to the intermediary and senior phases. It is, however, not clear whether the teaching of disaster education should be done in all grades. A further study is needed here to determine what content should feature in what grade.

The principle of indigenous knowledge and integrated teaching have featured strongly in the section that discusses key issues emanating from the study and it has been indicated that a pilot study needs to be conducted, which will look at the development of a learning programme that includes both the principles. The principles are important in enhancing learners' awareness of hazards and disasters. The only challenge is that educators might not be ready for them as they are currently overloaded with administrative tasks and most of them have not been properly trained to implement the new learning principles. As suggested in section 5.7 above, the development of a learning programme on hazards and disasters that cuts across all learning areas and all grades would ensure less work for educators.

A look at the evidence that emerged from the interview participants to address sub-question 5 reveals that excursions, tours, real-life examples, practical illustrations, videos, drawings and games, are some of strategies that were suggested to enhance learners' awareness of hazards and disasters. The most important consideration is that learning should be exciting and involve learners. Some of the strategies include involving parents, inviting an expert to the class and using materials developed by organisations working in similar environments. It is therefore of

the utmost importance for disaster management institutions to work with school management to raise learners' awareness through developing and disseminating learning materials such as videos, biographies and diaries of disaster management efforts. Furthermore, disaster management centres and institutions of higher learning, apart from contributing to the development of learning materials such as textbooks, posters and learning programmes, could organise exhibitions of disasters that have occurred in the past. Learners from different schools could visit the displays to learn about issues related to disasters that cannot be taught in the classroom.

New information that has emerged from the interviews is that there should be close cooperation between curriculum developers, textbook authors and professional development practitioners. The cooperation among these parties will address the disjuncture currently making it difficult to teach learners about hazards and disasters. More data would need to be gathered as to how the three partners could work together in ensuring that learners' awareness and knowledge of disasters is enhanced. The inclusion of indigenous knowledge in teaching should not be left to educators; it should be prescribed in the curriculum and in the textbooks which will then compel educators to teach such content.

In closing, this study has determined how the South African education system, in particular curriculum and instructional design, contributes to learners' awareness of hazards and disasters. Numerous findings were reported in the previous sections that relate to the sub-questions listed in Chapter one.

Regarding the prevalence of hazards and disasters in South Africa, it was found that floods and fires are the most prevalent hazards and disasters followed by accidents, droughts, and epidemics such as HIV/AIDS, storms, fog, sinkholes, chemical spillages and social conflicts which include xenophobia. As far as the extent to which South African communities are vulnerable to the prevalent disasters, the findings were that while natural disasters affect all communities indiscriminately, there are some, referred to as hybrid with some element of human-induced disasters, that greatly affect poor communities, especially those that are living in informal settlements.

With reference to the inclusion of hazards and disasters learning outcomes into the NCS, the findings relate to the fact that the curriculum should explicitly state the outcomes about hazards and disaster education from the foundation to the intermediary and senior phases. This is essential because it has been ascertained that educators prefer to follow the outcomes prescribed on the curriculum. Regarding the use of indigenous knowledge, it has been found that while this knowledge is important in enhancing learner's awareness of hazards and disasters, it nevertheless has shortcomings. Apart from the fact that such knowledge is disappearing, it has not been properly recorded and it has not gone through a scientific testing process. As far as integrated teaching is concerned, the findings of this study are that the teaching strategy is important, and in use at some institutions of higher learning; it has produced marvellous results and if included in classroom teaching it will definitely improve learners' awareness of hazards and disasters. The only challenge though is that educators might not have the time or the know-how to implement this innovative way of teaching.

When all have been said and done, the critical challenge confronting education in South Africa is as summarised by Slattery (2006:226) that moving from environmental concerns to classroom arrangements, from post Katrina rebuilding to an ecological steps of activism there is a concern for curriculum development that recognises interrelationships, deep ecological holistic models which in its own way challenge educators to prioritise global interdependence and ecological sustainability. Slattery (2006:217) concludes that education is one human activity that is profoundly affected by attention to environment and interconnectedness of past, present and future

5.14 Conclusion

The four key areas of interest emanating from the research - HIV/AIDS, informal settlements, indigenous knowledge and integrated teaching are essential in determining the contribution of education to enhancing learners' awareness of hazards and disasters in their communities and developing more respect for the knowledge residing in communities. These areas in turn will contribute to learners taking care of their environment and ensuring that they desist from

engaging in practices that could transform hazards into disasters. The development of a learning programme by the National Disaster Management Centre as discussed in 5.7 above is crucial as it provides an opportunity to ensure that educators implement the principles of the National Curriculum Statements and above all, it will reduce some of the administrative tasks of educators to ensure that the kind of educators envisaged are qualified, competent, dedicated and caring and will serve as mediators and interpreters of learning programmes and materials. The advantage is that the skills that would be acquired during the implementation of hazards and disasters learning programmes could be used in other areas affecting communities, such as drugs and alcohol and HIV/AIDS.

“We shall not cease from exploring, and the end of all our exploring will be to arrive where we started, and know the place for the first time” T.S. Elliot