

Educational perspectives on learner awareness of hazards and disasters

Simon Takalani Rambau

A thesis submitted in partial fulfilment of the requirements for the degree of Philosophiae $Doctor \ (PhD)$

in

Curriculum and Instructional Design and Development

Faculty of Education

University of Pretoria, South Africa

Supervisor: Dr LD Beukes

Co-Supervisor: Prof. WJ Fraser

March 2011



"As we go about our daily business, the solid Earth seems safe enough, but there's far more going on beneath the surface than meets the eye. Things can change in a devastating flash through floods, earthquakes and other disasters that displace or kill the whole communities of people. The more we understand the natural forces that control the familiar landscapes of water, rocks and soils the better we can calculate – and minimise – the risks to people and property." (Frost-Killian, 2008: 28)



Acknowledgements

My heartfelt appreciation go to the following individuals and organizations:

My wife, Refilwe for her patience and support throughout the study period. My sons Khuthadzo and Rendani, who had to keep up with restless father always having a computer on his lap instead of them. My Sisters Mashudu, Mutshinyane, Azwefarwe and brother Pandelani for their unwavering support and encouragement.

The Academy of Science of South Africa (ASSAf) for sponsoring data collection for this study especially Professor Robin Crewe, the ASSAf President and Professor Roseanne Diab, the Executive Officer who were always ready to assist when I was in need of help as well as the support from colleagues.

The team that agreed to participate in the pilot study, Mpho, Eunice, Nthabiseng, Zuki and Daphney.

Dr LD Beukes the Supervisor and Professor William Fraser, co-supervisor for the patience and guidance always ready to intervene when I hit rock bottom.

Most importantly this effort is dedicated to my mother Marandela, who even though she cannot read and write, has instilled in all her children perseverance and the importance of striving for the sky irrespective of limitations and barriers.

I Thank You

i



DECLARATION OF ORIGINALITY

This document must be signed and submitted with every essay, report, project, assignment, dissertation and/or thesis.

	er of student: SIMON TATALANTI RAMBAY
Full nam	es of student:
Student	number: 969-7151
Declara	Mon '
1,	I understand what plagiarism is and am aware of the University's policy in this regard.
2.	i declare that this <u>fuests</u> (eg essay, report, project, assignment, dissertation, thesis, etc) is my own original work. Where other people's work has been used (either from a printed source, internet or any other source), this has been properly acknowledged and referenced in accordance with departmental requirements.
3.	I have not used work previously produced by another student or any other person to hand in as my own.
4.	I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.
TANDIE	URE STUDENT:



the editing room P O Box 3066 Milbank Road 3624

28 March 2011

TO WHOM IT CONCERNS

PROOFREADING OF DISSERTATION

Educational perspectives on learner awareness of hazards and disasters

Student: Simon Takalani Rambau

Student number: 9627151

For the degree: Philosophae Doctor in Curriculum and instructional

design and development.

.

I have proofread this dissertation indicating errors of spelling, grammar tense and syntax. I have suggested improvements in punctuation and style.

I have also pointed out where the meaning is not clear and in some instances I have made suggestions to correct the lack of clarity.

I have offered suggestions for the appropriate format for citing the works and ideas of other authors.

Where the format is not consistent I have pointed this out.

I have indicated areas in the referencing and bibliography that do not conform to conventions.

Yours faithfully

Gavin Storrie

B A (Hons) UED

031 765 2020 083 759 9209 g.storrie@gmail.com



ABSTRACT

The global community is experiencing an increasing number of disasters that ranges from earthquakes, floods, storms, epidemics, fires, landslides, hurricanes, tsunamis and social conflicts that result to loss of life and properties. South Africa is dominated by localised incidents, such as wild fires, seasonal flooding, droughts and accidents in the mining industry. Resource-poor communities such as those residing in many parts of South African informal settlements, currently live with a range of stresses and risks including climate risks, HIV/AIDS and access to insecure land.

While disaster relief has been at the forefront for quite a long time, communities are increasingly looking at disaster risk reduction as the best solution to safeguard human lives and property. Scholars and policy makers are relying on disaster preparedness and resilience as strategies to ensure disaster risk reduction. Disaster education has emerged as a pinnacle for both the preparedness and resilience by teaching communities about the prevalence of hazards and associated vulnerabilities.

The aim of this investigation was to determine how education in particular, curriculum and instructional design contributes to learners' awareness of hazards and disasters. A mixed method research was used to address the question combining questionnaires, interviews and document study as data collection strategies. The questionnaires were distributed to 150 educators from schools located in informal settlements of Ivory Park in Gauteng, Brits in North West Province, Isipingo in KwaZulu-Natal, Bizana in the Eastern Cape and Khayelitsha in the Western Cape. Interviews were conducted with 5 curriculum specialists, 3 disaster specialists and 2 disaster lectures.

The findings of the investigation is that the South African National Curriculum Statements explicitly prescribe hazards and disaster learning outcomes only for Grade 7 Social Science and is silent in other grades and learning areas. Some scholars pointed out that there is no adequate translation of curriculum policy provisions to classroom practice in South Africa, which raises questions on the extent to which learners from South African schools are taught about hazards and disasters as prescribed in the National Curriculum Statements. The investigation also found that educators are overburdened with administrative work and would not be in the position to collaborate with one another



to develop learning programmes and to teach indigenous knowledge or hazards and disasters.

In this study, it is argued that for education to make effective contribution to learners' awareness of hazards and disasters, the national curriculum should focus on the broad learning outcomes used as guideline to develop learning programmes for disasters and hazards that are provincial, district and local areas specific. The development and teaching for hazards and disasters should be specified in all grades across all learning areas. Another argument presented in this study is that the National Disaster Management Centre should play a crucial role in mobilising other stakeholders involved in disaster risk reductions to develop learning programmes as they have hands-on experience of managing disasters so that alleviate the burden for educators to be gathering data for learning programme development.



Concepts

- 1. Curriculum
- 2. Instructional Design
- 3. Hazards
- 4. Disasters
- 5. Vulnerability
- 6. Resilience
- 7. Informal Settlements
- 8. Indigenous Knowledge
- 9. Local Knowledge
- 10. Integrated teaching and learning



Acronyms

AIDS Acquired Immune deficiency Syndrome

DBE Department of Basic Education

FIFA Federation for International Football Association

HIV Human Immunodeficiency Virus

ICSU International Council on Science previously known as the

International Council for Scientific Unions

IKS Indigenous Knowledge Systems

IOM International Organsiation for Migration

ISDR International Strategy for Disaster Reduction

NCS National Curriculum Statements

NDMC National Disaster Management Centre

NQF National Qualifications Framework

OBE Outcomes-Based Education

SAQA South African Qualifications Authority

SABC South African Broadcasting Corporation

SARS Severe Acute Respiratory Syndrome

TB Tuberculosis

XDR TB Extreme-Drug Resistant Tuberculosis

MDR TB Multi-Drug Resistant Tuberculosis

UN United Nations

UNAIDS Joint United Nations Programme on HIV/AIDS

UNEP United Nations Environmental Programme

UNESCO United Nations Education, Scientific and Cultural Organisation

USA United States of America

UK Unite Kingdom



Figures, Tables and Pictures

Figures

Figure 2.1	Disaster tree depicting the overview of disasters by Shaluf (2007)	24
Figure 2.2	Depiction of hazards that took place in 2008,	
	www.infoplease,com/world/disasters	26
Figure 2.3	Comparison of formal and informal settlements nationally and in four	
	major South African cities by Napier and Rubin (2002:5)	37
Figure 2.4	The conceptual framework emanating from the literature study	78
Figure 4.1	Chart display of educator responses on the likelihood of their area being	
	affected by disasters	116
Figure 4.2	Chart display of educator responses in relation to the inclusion of hazards	
	and disaster learning outcomes in the national curriculum	138
Figure 4.3	Chart display of educators' responses to determine whether they teach	
	learners about disasters in schools	148
Figure 4.4	Chart display of educators' responses to whether they include the teaching	
	of hazards and disasters in their learning areas	149
Figure 4.5	Chart display of educators' responses to the use of an integrated teaching	
	strategy to enhance learners' awareness of hazards and disasters	149
Figure 4.6	Chart Display of educators' responses to the inclusion of indigenous	
	knowledge as a teaching strategy to enhance learners' awareness of	
	hazards and disasters	151
Figure 4.7	Chart display of educators' responses to exposing learners to observe	
	real-life or visual representation of disasters	167
Figure 4.8	Chart display of educators' responses to teaching learners to identify	
	potential hazards in their environment	168
Figure 4.9	Chart display of educators' responses to checking whether learners	
	discuss what they have been taught with parents	169
Figure 4.10	Chart display of educators' responses to whether they are teaching learners	
	ways in which to respond appropriately when faced by disasters	170
Figure 4.11	Chart display of consolidated educators' responses to learner's awareness	
	of hazards and disasters	179



Tables

Table 2.1	The NQF Education and Training Band adapted from SAQA position	
	paper (2001)	59
Table 3.1	Scientific paradigms and their elements (Healy and Perry:2000)	83
Table 3.2	Table depicting the link between the research questions, research methods and data collection sources	107
Table 4.1		107
Table 4.1	Triangulation of data collected through interviews, questionnaires and literature study	183
	Pictures	
Picture 1.1	Depiction of Ivory Park Informal Settlement situated next to multiple	
	storm water pipes and heavy electric cables	14
Picture 2.1	A picture of Khayelitsha shacks built next to the railway track	35
Picture 2.2	Ivory Park informal settlement depicting shacks, high voltage electric	
	cables and sewerage pipe running over some shacks	39
Picture 4.1	A depiction of vulnerabilities at Khayelitsha informal settlement	180



TABLE OF CONTENTS

	Section	Page No.
	Acknowledgements	i.
	Personal Declarations	ii.
	Ethics Clearance	iii.
	Statement of the editor	iv.
	Abstract	v.
	Concepts	vii.
	Figures, Tables and Pictures	viii.
	Acronyms	X.
1.	Chapter 1: The need for enhancing learners' knowledge and	
	skills for responding to hazards and disasters	
1.1	Introduction	1
1.2	Background to the study	2
1.3	Problem statement	7
1.4	The main research question and secondary research questions	12
1.5	Rationale for the study	12
1.6	Significance of the study	13
1.7	Aim and objectives of the study	15
1.8	Conceptual framework guiding the empirical data collection for the	
	study	15
1.9	Research design and methodology	20
1.10	Conclusion	21
2.	Chapter 2: Literature review on the contribution of education	
	to learners' awareness of hazards and disasters	
2.1	Introduction	22
2.2	Overview of disasters	22
2.3	The conceptual framework elements guiding the investigation	31
2.3.1	The importance of addressing vulnerability in disaster reduction	31



2.3.2	Enhancing learners' resilience to disasters through education	42
2.3.3	Raising awareness of disasters through education	46
2.3.4	Raising disaster awareness through indigenous and local knowledge	51
2.3.5	The role of national education in raising awareness of hazards and	
	disasters	56
2.3.5.	1 The role of curriculum in enhancing learners' awareness of hazards	
	and disasters	60
2.3.5.2	2 The role of instructional design in enhancing learners' awareness	
	of hazards and disasters	71
2.4	The need for empirical data to address the questions arising from	
	literature study	76
2.5	Summary of key issues emanating from the literature study	76
2.5.1	The conceptual Framework for the study	77
2.6	Conclusion	78
3.	Chapter 3: Research approach, strategies and methods applied	
	during the course of the investigation	
3.1	Introduction	80
3.2	Research design: qualitative, quantitative and mixed method	
	research	80
3.3	Data collection through documents review, questionnaires and	
	interviews	88
3.3.1	An overview of data collection methods used in this study	88
3.3.2	Data collection through literature and document review	90
3.3.3	The use of questionnaires as a data collection tool for this study	90
3.3.3.	The reliability of data collected through the questionnaires in	
	this study	92
3.3.3.2	2 Validity of phrasing the questions as depicted in the	94
	questionnaires	
3.3.4	Data collection through interviews	99
3.4	The research sample that applies to this investigation	102
3.4.1	Research sample for questionnaires	102



3.4.2	Research sampling for interview participants	103
3.5	Data analysis approach applied in this study	103
3.5.1	Data analysis of the responses retrieved from the questionnaires	104
3.5.2	Data analysis of interviews responses and document study	104
3.5.2.1	Coding of the interview transcripts to enable analysis of	
	interview data	105
3.6	Measures to address validity and reliability of the study	108
3.7	Research limitations for the study	109
3.8	Conclusion	110
4.	Chapter 4: Analysis and discussions of the results of the	
	investigation	
4.1	Introduction	111
4.2	An analysis of data collected to address sub-question 1: What	
	disasters are prevalent in South Africa?	112
4.2.1	An analysis of data collected through literature and policy	
	documents	112
4.2.2	Questionnaire response in relation to the prevalence of disasters in	
	South Africa	114
4.2.2.1	Chart display of educators responses on the likelihood of their	
	area being affected by disasters	115
4.2.2.2	Educators' general comments related to the prevalence of	
	hazards and disasters in South Africa	117
4.2.3	Interview responses in relation to the prevalence of disasters in	
	South Africa	118
4.2.4	Document and picture analysis in relation to the prevalence of	
	hazards and disasters in South Africa	120
4.2.5	Discussions on the findings of questionnaires, interviews and	
	literature review in relation to the prevalence of hazards and	
	disasters in South Africa	122
4.3	An analysis of data collected to determine the extent of South	
	African communities' vulnerability to disasters	125



4.3.1	Educator responses to the extent in which South African	
	communities are vulnerable to disasters	126
4.3.2	Interview responses in relation to the extent to which South African	
	communities are vulnerable to disasters	127
4.3.3	Documents and picture analysis depicting the extent to which the	
	informal settlements are vulnerable to disasters	131
4.3.4	Discussion of the data collected through interviews, questionnaires	
	and literature review to address the extent to which communities	
	are vulnerable to disasters	132
4.4	An analysis of data collected to determine how the national	
	curriculum caters for the teaching of hazards and disasters	135
4.4.1	Literature review to determine how the national curriculum caters	
	for the teaching of hazards and disasters	136
4.4.2	Questionnaire responses in relation to the inclusion of hazards and	
	disasters learning outcomes in the national curriculum	137
4.4.2.1	Chart display of educators' response to the inclusion of hazards and	
	disaster learning outcomes in the national curriculum	137
4.4.3	Interview responses on how the national curriculum cater for the	
	teaching of hazards and disasters in schools	139
4.4.4	Discussions of literature review, interviews and questionnaires on	
	how the national curriculum caters for the teaching of hazards and	
	disasters in schools	144
4.5	An analysis of data collected to determine the extent to which	
	integrated teaching and indigenous knowledge contribute to	
	learners' awareness and resilience to disasters	146
4.5.1	Educators response on the extent in which indigenous knowledge	
	and integrated teaching contribute to learners' awareness of hazards	
	and disasters	146
4.5.1.1	Chart depiction of the educators' response to the teaching of	
	hazards and disasters in schools	146
4.5.1.2	Inclusion of natural and human-induced hazards and disasters in the	



	learning area when teaching learners	148
4.5.1.3	B Educators' response to whether they use integrated teaching	
	strategy to enhance learners' awareness of hazards and disasters	149
4.5.1.4	Educators' responses on the inclusion of indigenous knowledge as a	
	teaching strategy to enhance learners' awareness of hazards and	
	disasters	151
4.5.1.5	Educators' comments on the inclusion of indigenous knowledge	
	and integrated teaching as strategies to enhance learners' awareness	
	of hazards and disasters	152
4.5.2	Interview responses on the inclusion of indigenous knowledge and	
	integrated teaching strategies to enhance learners' awareness of	
	hazards and disasters	152
4.5.2.1	Interview responses on the inclusion of indigenous knowledge and	
	integrated teaching strategies enhance learners' awareness of	
	hazards and disasters	153
4.5.2.2	2 Interview responses to the use of an integrated teaching strategy to	
	enhance learners' awareness of hazards and disasters	158
4.5.3	Discussions of how indigenous knowledge and integrated teaching	
	strategies enhance learners' awareness of hazards and disasters	162
4.6	Empirical data collected to identify other teaching strategies that	
	could enhance learners' awareness of hazards and disasters	165
4.6.1	Educators' response to the question on what other teaching	
	strategies could enhance learners' awareness of hazards and	
	disasters	165
4.6.1.1	Educators' responses to the provision of an opportunity for	
	learners to observe a real life or visual representation of	
	hazards/ disasters incidence	166
4.6.1.2	Educators' response to teaching learners how to identify	
	potential hazards in their environment	167
4.6.1.3	Educators' response to checking whether learners discuss what	
	they have learned about hazards and disasters with their families	168



4.6.1.4	Educators response to whether they teach learners how to	
	respond when faced with disasters	170
4.6.1.5	Comments from educators on the use of other teaching	
	strategies to enhance learners' awareness of hazards and	171
	disasters	
4.6.2	Responses to the question of whether other strategies could enhance	
	learners' awareness of hazards and disasters	172
4.6.3	Discussion on what other teaching strategies could enhance	
	learners' awareness of hazards and disasters	175
4.7	Discussions on whether the empirical data presented has provided	
	conclusive evidence to determine how education contributes to	
	learners' awareness of hazards and disasters	176
4.7.1	Discussion of the educators' response in relation to the main	
	research questions	176
4.7.1.1	Comments from questionnaire responses to whether education	
	contributes to learners' awareness of hazards and disasters	178
4.7.2	Discussions on how the interview responses addressed the main	
	research question	181
4.8	Triangulation of empirical and literature data collected to determine	
	whether education contributes to learners' awareness of hazards and	
	resilience to disasters	182
4.9	Conclusion on the empirical data collection to determine whether	
	education contributes to learner awareness of hazards and disasters	187
5.	Chapter 5: Findings, recommendations and implications of the	
	investigation on learners' awareness of hazards and disasters	
5.1	Introduction	188
5.2	Summary of the problems that led to the study	189
5.3	Summary of the research question and sub-questions	191
5.4	Summary of the aim and objectives of the study	192
5.5	Findings of the literature review	193
5.6	Findings of the empirical investigation	200



5.6.1	Findings of quantitative study on learner awareness of hazards and	
	disasters	201
5.6.2	Findings of the qualitative study on the contribution of education to	
	learner awareness of hazards and disasters	203
5.7	Significance of this study to the South African education system	206
5.8	Other insights emerging from the study	209
5.8.1	The prevalence of epidemics as leading to disasters in South Africa	211
5.8.2	Vulnerability of informal settlements and associated educational	
	requirements	213
5.8.3	The need to include indigenous knowledge to enhance learner	
	awareness to hazards and disasters	214
5.8.4	The contribution of instructional design and development to	
	learners' awareness of hazards and disasters	216
5.9	Recommendations and implications	217
5.9.1	Recommendations to Higher Education sector	218
5.9.2	Recommendations to the Department of Education	219
5.9.3	Recommendations to stakeholders	221
5.9.4	Recommendations to communities	221
5.9.5	Recommendations to policy developers	222
5.10	Implications of the study on enhancing learners' awareness of	
	hazards and disasters	223
5.11	Shortcomings and limitations of the investigation	225
5.12	Suggestions for further research	226
5.13	Summary of the investigations	227
5.14	Conclusion	232
List o	f references	234
Appei	ndix B: Data collection instruments	
Annei	adix C: Approval letters from the Provincial Departments of Education	