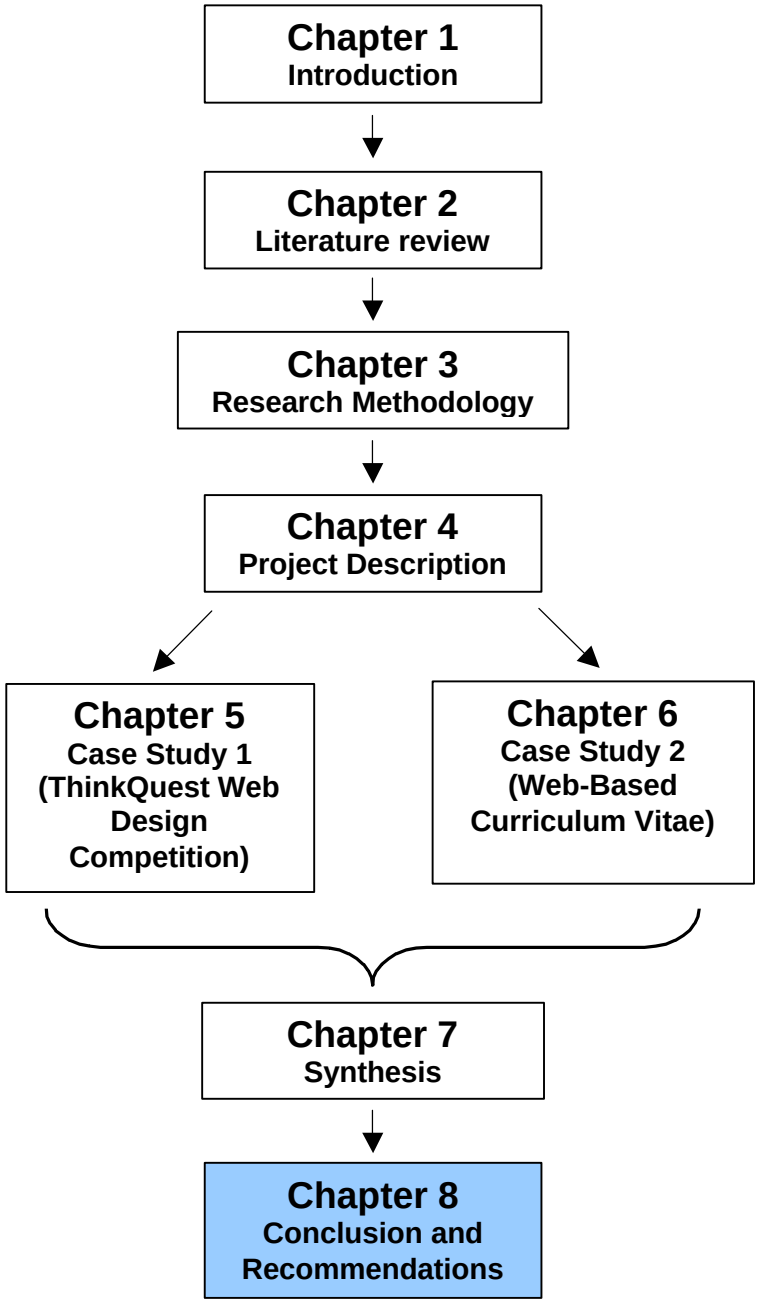
Chapter 8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Chapter 8 Conclusion and Recommendations

1 Introduction

This research began when a problem emerged in the computer classes at PHS where learners 16 years and older were taught. The problem evolved into the research problem 'How do South Africa Further Education and Training learners acquire, recall, process and present information in a digitally enabled environment?'

In order to address the problem, the following research questions were identified and examined:

- What is a digital information environment in the field of education?
- How have a changing society and advances in technology influenced the way South African FET learners interact with information in an educational environment?
- What is meant by cognitive, affective and physical perspectives with reference to interaction with information?
- How do South African FET learners interact with information in a digital information environment from cognitive, affective and physical perspectives?

This chapter concludes the research into the problem. The following section presents answers to the identified questions.

2 Answers to research questions

2.1 Research question 1: What is a digital information environment in the field of education?

The educational digital information environment was described and defined in Chapter 2. The information found in such an environment is presented via electronic or digital means and it has a hypermedia format which encompasses multimedia and hypertext.

2.2 Research question 2: How have a changing society and advances in technology influenced the way South African FET learners interact with information in an educational environment?

How a changing society and technology has influenced the way learners interact with information in an educational environment was discussed in Chapter 2. The research commenced by investigating recent changes in society and how they have influenced young people. *Generation X* is influenced by changes in society, and the *Net* and the *Child of Chaos* generations influenced by technology. Today's youth, besides being influenced by the *X Generation* through their parents who were born in the early years of that generation as well as themselves being part of the tail end of that generation, are also influenced by technology. In addition South African youth are also influenced by the political and economic events in South Africa.

The traits of the major generations were examined with respect to character, family life, the future, peers and technology; and then their consequences for the way in which young people interact with information. Based on the literature it was found that

- Learners need material in visual format.
- Learners need to find or create their own learning content.
- Learners need fast access to learning material as they have no time to waste.
- Learners need learning material that has long-term career value.
- Learners are motivated by technology used in information interaction.
- Learners must do things.
- Learning is social, therefore noise is inevitable.

The chapter concluded with the development of a profile based on how the learners interact with information from cognitive, affective and physical perspectives as they acquire, recall, process and present information motivated, influenced by peers, manage time and their mental state.

2.3 Research question 3: What is meant by cognitive, affective and physical perspectives with reference to interaction with information?

For the purpose of the research the different perspectives are defined as illustrated in Table 2 - 13 in the literature review and used in the analysis of the learners' activities when they created their web sites. The areas of cognitive, affective and

physical perspectives in an education environment encompass the way the learners intellectually interact with information, their emotions as they interact with the information and those around them, and how they physically interact with information.

2.4 Research question 4: How do South African FET learners interact with information in a digital information environment from cognitive, affective and physical perspectives?

The research was conducted at PHS, a South African school with a diverse learner population body with learners 16 years and older in the digital environment of the computer laboratory. The school and learner body was described in Chapter 4 in order to provide context to the case studies. The rich description of the school, learners and their usual work in the computer laboratory has contributed to the credibility and authenticity of the research by showing commonality in its diversity.

In Chapter 3 the methodology of doing case study action research was investigated and note taken of measures to ensure reliability and validity. To protect myself from finding what I expected, the participants and peers examined the work and it has been informally reviewed by a number of people. The participants and peers examined the work prior to the change of names of the participants, so they were able to identify the learners.

The learners at PHS, in their usual class work, took part in two case studies described in Chapters 5 and 6 where they created web sites. Learners with a range of skills, ages, academic abilities, prior experience, etc., took part in the case studies which had many different management formats such as *at a distance*, *contact* environment, clear instructions, specific or open-ended instructions, examples, etc. tabulated in Table 4 - 12. The learners and their usual class work were described in Chapter 4.

On the basis of the findings in the literature review in Chapter 2, the two case studies investigated the way in which learners interacted with information from cognitive, affective and physical perspectives as they acquired, recalled, processed and presented information, motivated, influenced by peers, time and mental state. The two case studies, the *ThinkQuest* web entry and the web-based CV, examined

the way (process) in which approximately 86 learners created the web sites as well as the products of the web sites.

The two case studies were synthesised in Chapter 7 and tabulated in Tables 7 - 2, 7 - 3 and 7 - 4 from cognitive, affective and physical perspectives. The synthesis indicating how learners at PHS interacted with information while creating their web sites was then compared with the profile developed in the literature review, Tables 2 - 26, 2 - 27 and 2 - 28, in Tables 7 - 5, 7 - 6 and 7 - 7. The following section examines the findings of the synthesis in light of the literature review.

3 Findings

The following section compares the findings from the synthesis of the two case studies with the literature review and notes where they support the literature, where they differ, where they support it with additional information, and where the literature review makes no mention of particular activities.

3.1 Conclusive evidence

Both case studies *support* the literature with respect to the following activities in Table 8 - 1 from cognitive, affective and physical perspectives, therefore we know they are true.

Table 8 - 1 Conclusive findings

Perspective	Processing	Activity
Cognitive	Processing or planning information	• Higher-level thinking skills were evident in conceptualising and creating the webs with levels of information, frames, image maps and interactivity.
Affective	Influence of peers	• The learners supported and helped each other for no ulterior purpose. • Learners shared ideas and skills they had learned.
Physical	Processing or planning of information	• The learners interacted with each other much of the time. • The learners worked and interacted with those on either side of them although it was not required. • The learners shared features with those on either side.

3.2 Recommended further research

Both case studies *oppose* the literature with respect to the following activity in Table 8 - 2 therefore we question the literature and recommend further research.

Table 8 - 2 Oppose the literature

Perspective	Processing	Activity
Cognitive	Processing or planning information	• Preplanning of the work was not evident. The learners created the webs as they worked.

Both case studies *support the literature but with additional information* with respect to the following activities tabulated in Table 8 - 3, therefore we recommend further research.

Table 8 - 3 Support the literature, with additional information

Perspective	Processing	Activity
Cognitive	Presenting information	• Academically strong and experienced learners were able to communicate the content in multiple formats.
Affective	Motivation	• The learners were intrinsically motivated to create a web site, particularly when it was relevant to their lives. • The learners were extrinsically motivated, to obtain good marks. • Novice and academically challenged learners were motivated by managing to create a web with its content and graphical interface, whereas experienced or academically bright learners were more motivated to obtain good marks.
	Mental state	• The learners accepted errors and resolved their own problems, up to a point. • Experienced learners pushed the boundaries of the programs, learning new features, while novice learners explored up to a point.

No mention was found in the literature with respect to the following activities in Table 8 - 4 found in both case studies, therefore we recommend further research in these fields.

Table 8 - 4 Not found in the literature

Perspective	Processing	Activity
Cognitive	Acquiring information	• The learners acquired the skills necessary for creating the web while they were creating it, while influenced by their peers.
		• The learners used a number of resources for information with novice users preferring the World Wide Web.
	Recalling information	• The learners recalled web-authoring skills through interacting with their peers.
	Presenting information	• Work done as a team presented fewer spelling errors than work done by an individual. Individuals seemed not to have seen their superficial spelling errors.
		• Self-created interactive features complemented the text, and not ready-made features.
		• The learners had difficulty writing the text to add to the webs.
Affective	Influence of peers	• The learners explored features to share the excitement of the feature.
	Management of time	• The learners focused on the work, losing sight of time. • The learners had problems keeping deadlines, particularly those with long lead times.
	Mental state	• Working in a supportive environment the learners did not suffer from anxiety.
Physical	Processing or planning information	• The learners are always physically active using the mouse or keyboard. • Learners keyed in information slowly with errors. • Experienced learners are most particular with respect to software selection.

Based on Tables 8 - 2, 8 - 3 and 8 - 4 further research is recommended to investigate how learners cognitively acquire, recall, process and plan and present information; motivation, the influence of peers, time management and their mental state; and how they physically process or plan information in a digital information environment.

4 Bias

My bias is ensuring that learners achieve their potential academically. I am of the opinion that without the external motivation the learners would not have created web sites of the quality they did. I believe that my bias, openly declared in Chapter 1, may have influenced the results of the research, but guiding learners to achieve their academic potential is fundamental to work in an educational environment. The

research is based in an educational environment so my bias may not have influenced the findings unduly.

5 Recommendations for facilitating the interaction with information by South African FET learners in a digital information environment

The abilities of learners in South African schools range from

- academically bright to academically weak;
- those who use English (the medium of most pull-down and Help menus) as a first language to those who use English as second language or third additional language; and
- experienced to novice computer users.

The major findings of the research were the influence of peers and importance of external motivation in the form of grades or marks on the learners' cognitive, affective and physical learning activities and behaviour in the computer laboratory. Secondary findings indicated the importance of content, examples, instructions, time, mental state, classroom ecology, contact environment and software in the way learners acquired, recalled, processed and presented information.

Based on the preceding research, in order to facilitate interaction with information in a digital environment, educators should endeavour to fulfill the actions tabulated in Table 8 - 5.

Table 8 - 5 Actions to ensure successful interaction with information in an educational digital environment

Factor	Measure
Classroom ecology	• Permit learners to select their own seating positions and keep them for a length of time. • Arrange seating of learners in compact areas, i.e. physically near each other where they can easily work in groups.
Contact environment	• Spend a long period teaching learners in a collaborative environment before requiring learners to do work alone or at a distance.
Content	• Ensure the content of work is personally meaningful to the learners. • Ensure learners are able to use applications well before they are required to change the application format of information to another application format, i.e. before they are required to transmediate information. • Discourage the use of ready-made images, such as clipart, as they seldom add value to the meaning of information in the context.
Examples	• Provide readily accessible examples for the learners to copy and improve upon.
Instructions	• Provide clear instructions with options from which to select. • Make sure learners understand and comprehend the instructions.
Mental state	• Provide a mental environment where exploration is the norm.
Motivation	• Provide motivation for both academically brighter and weaker learners.
Peers	• Utilise peer interaction and support in the teaching methodology.
Software	• Encourage the use of the software available at school so that there are common applications.
Time	• Structure time in the computer laboratory for work. • Plan time usage to cater for fast and slow learners - enough time for slow learners to complete the work while fast learners can spend the extra time on additional facets of the projects that could extend their capabilities even further. • Break work up into easily manageable chunks and set a time limit for each chunk, thus teaching learners to manage time.

6 Conclusion

It is my belief that the research question: 'How do South Africa Further Education and Training learners acquire, recall, process and present information in a digitally enabled environment? has been answered in this thesis to such an extent that other educators will be encouraged to use the information provided to guide other FET learners to acquire, recall, process and present information in a meaningful way in the digital environment.

The literature review has been found to be adequate in a few points, and lacking in many respects to the way learners interact with information in a digitally enabled environment. Recommendations for further research have been made based on Tables 8 - 2, 8 - 3 and 8 - 4 in Section 3.2

It is my belief that the research has been ethically done and the findings are valid and authentic, reliable and credible.