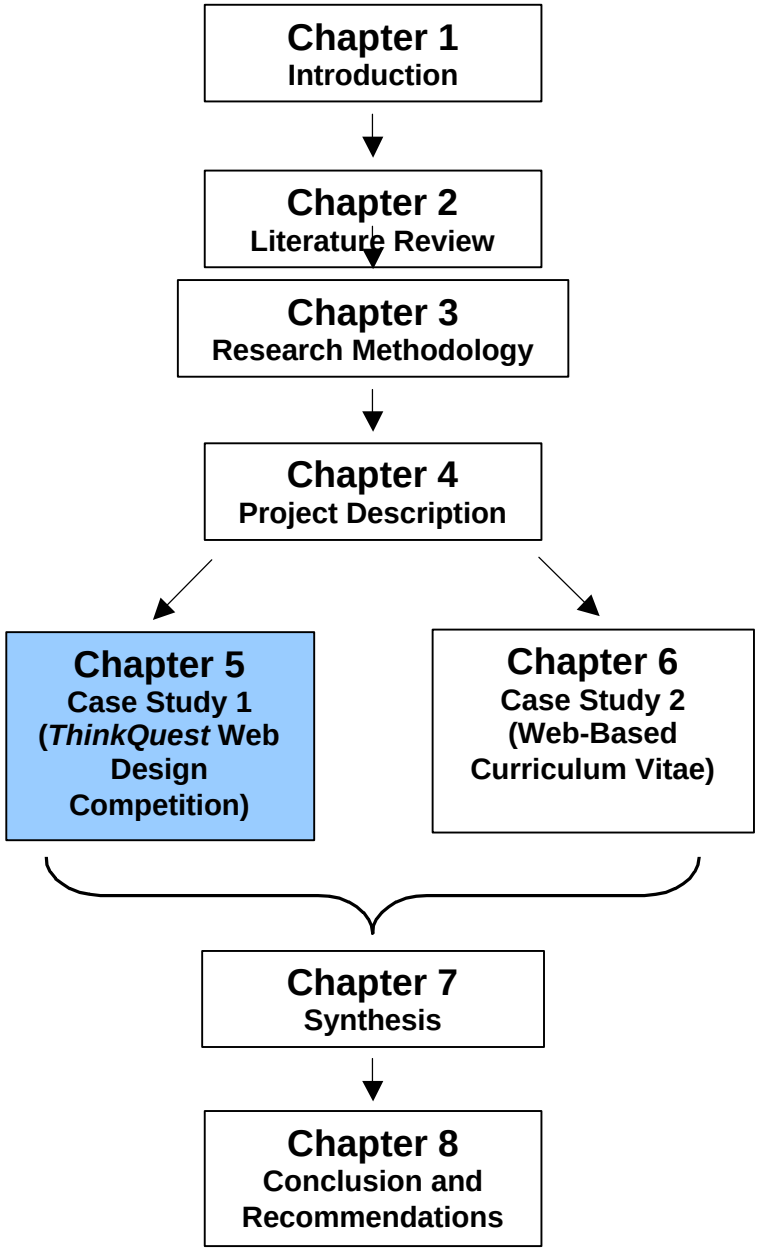
Chapter 5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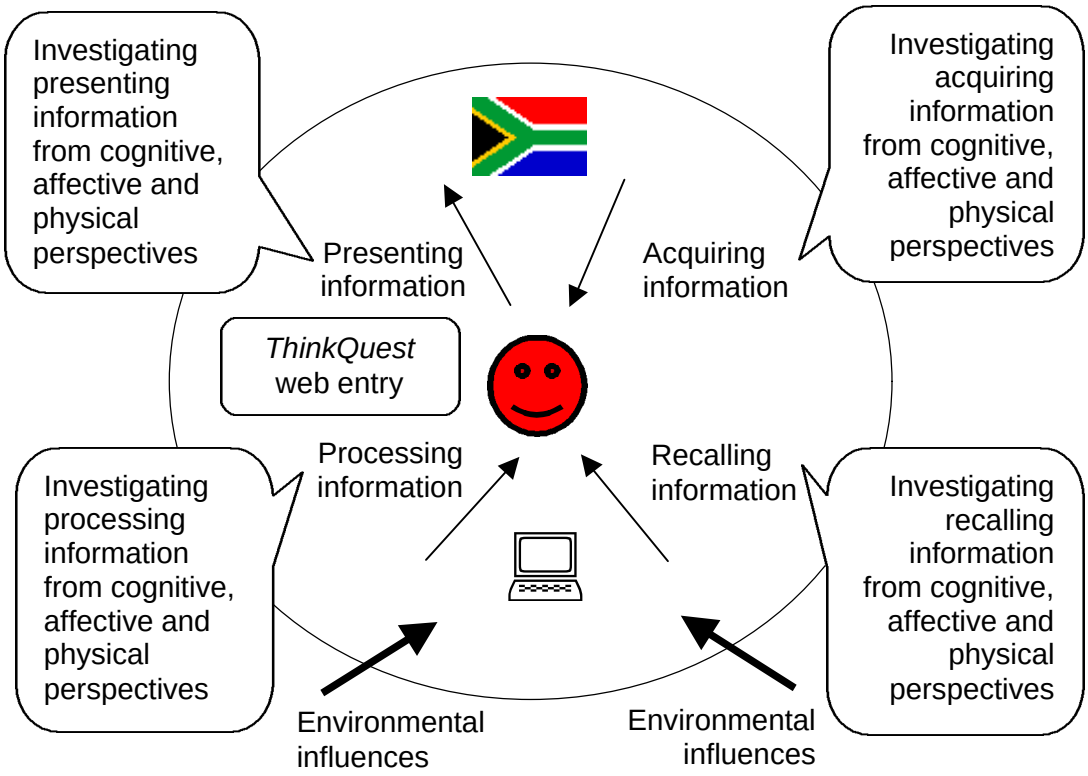
Chapter 5 Case Study 1 - *Thinkquest* Web Design Competition

1 Introduction

This case study describes how learners interacted with information in a digital environment *at a distance* when they created entries for the *ThinkQuest* web design competition. The *ThinkQuest* web site was completed by a team, members of whom far apart or *at a distance*, hence collaboration was by digital means such as email, chat, IRC, ICQ, etc. The profile for the analysis of the *ThinkQuest* web entry and the process of creating it comes from the profile developed and tabulated at the conclusion of Chapter 2, Tables 2 - 26, 2 - 27 and 2 - 28. The aim of the research is to report on how South African Further Education and Training (FET) learners acquire, recall, process and present information in a digital environment from cognitive, affective and physical perspectives. Figure 5 - 1 illustrates the investigation in this chapter as the PHS learners in a digital environment create their *ThinkQuest* web sites influenced by external forces.

Figure 5 - 1 Interaction with information as the learners create their *ThinkQuest* web entries



This chapter

- examines the participants of the case study, the data collection methods and the process of creating the *ThinkQuest* entry;
- analyses the completed entries;
- describes the measures taken to ensure validity and reliability; and
- concludes with a summary of the whole case study.

2 Participants

This section provides statistical data on the entrants who took part in the *ThinkQuest* web design competition. The diversity among the learners is shown in this statistical data. The following are discussed:

- Numbers of learners who completed the entry and questionnaire
- Distribution of learners by race and gender
- Numbers of learners who submitted their entries
- Ownership and use of digital devices

The learners who took part in the competition at Pinelands High School (PHS) were members of two classes, Grade 10D and 11D. Both classes were compelled to complete a project as it contributed to their year mark for Computer Studies Standard Grade (SG). Grade 11D were encouraged to take part in *ThinkQuest* but those who wished to were permitted to do the Red Cross Children's Hospital activity book instead. Learners in Grade 10D requested to take part in *ThinkQuest* although some chose to do the *Use of Information and Technology (ICT) in a … business: A case study* instead. The numbers of learners in this chapter refer to those who participated in the competition only.

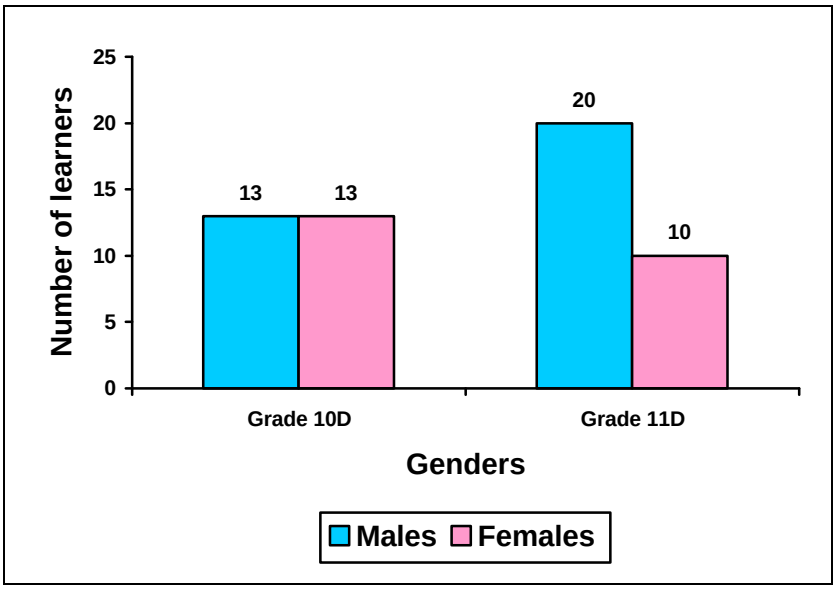
After completion of their web entry they had to complete a questionnaire (Appendix I) describing their experience in creating the site. Much of the data in this case study was collected from this questionnaire and their direct words are quoted. The numbers of learners completing the different parts are tabulated in Table 5 - 1.

Table 5 - 1 Number of learners who completed *ThinkQuest* and questionnaire

Completed …	Class	No of learners	%
Web site[6]	10D	17	65
	11D	25	83
	Total	42	75
Questionnaire *about* the process of creating the web site	10D	25	96
	11D	29	96
	Total	54	96

The genders of the learners in the two classes are illustrated in Figure 5 - 2. Grade 10D had an equal number of males and females. Grade 11D had more males than females.

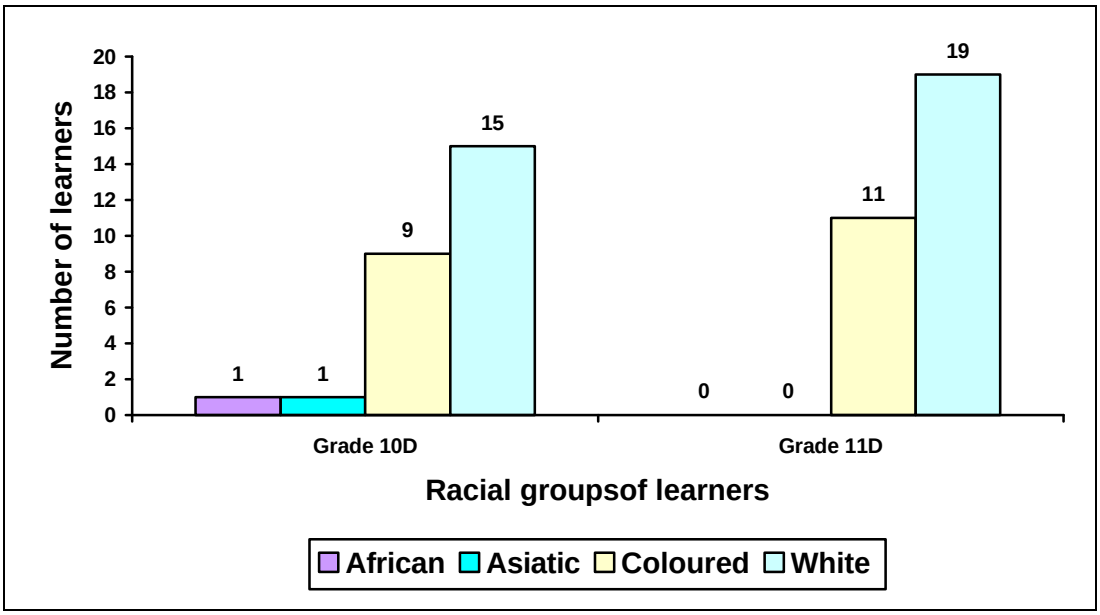
Figure 5 - 2 Gender distribution by class



The racial distribution of the two classes whose learners took part in the competition is illustrated in Figure 5 - 3. By far the largest racial group in both grades 10D and 11D is White.

[6] Completion of the web entry means completing and uploading it within the competition time constraints.

Figure 5 - 3 Racial distribution by class



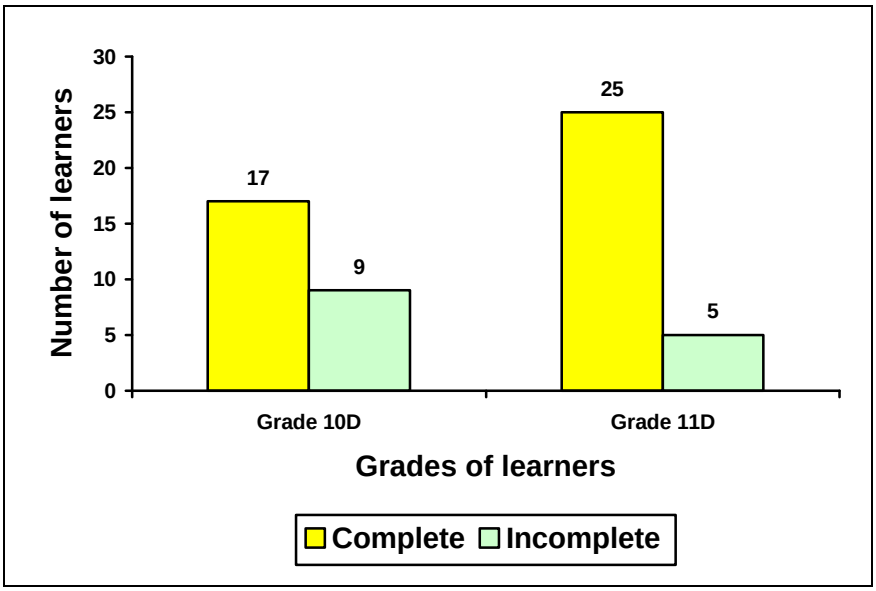
The genders and racial distributions are tabulated in Table 5 - 2. Of the two grades by far the largest racial group is White, whilst in Grade 11D males outnumber the females.

Table 5 - 2 Gender and racial distributions of learners

			African	Asiatic	Coloured	White
Grade 10D	**Male**	13	1	1	3	8
	Female	13	0	0	6	7
	Total	26	1	1	9	15
Grade 11D	**Male**	20	0	0	8	12
	Female	10	0	0	3	7
	Total	30	0	0	11	19
Total		56	1	1	20	34

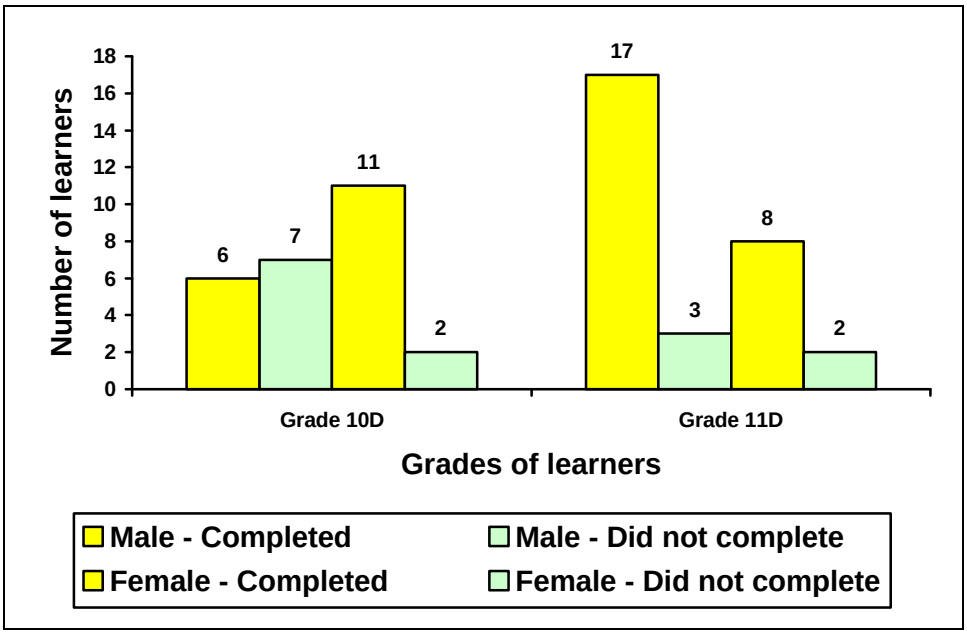
The numbers of learners who successfully completed and submitted their web entries are illustrated in Figure 5 - 4. Completed entries means completed and uploaded to the *ThinkQuest* web server in time. There is a large difference between the classes in the numbers of learners who successfully completed their entries.

Figure 5 - 4 Learners who completed their entry in time



As illustrated in Figure 5 - 5, proportionally more males than females in Grade 10D did not complete their entry. In Grade 11D the proportion between males and females not completing the entry, is almost equal.

Figure 5 - 5 Genders of learners who completed their entry



The number of complete and incomplete team entries is illustrated per grade in Figure 5 - 6. The incomplete entries are those that were not uploaded to the *ThinkQuest* server before the closing time, although they were completed and stored

on the school's network within a few days of the cut off. Only one of the initial entries was never completed.

Figure 5 - 6 Number of completed team entries per grade

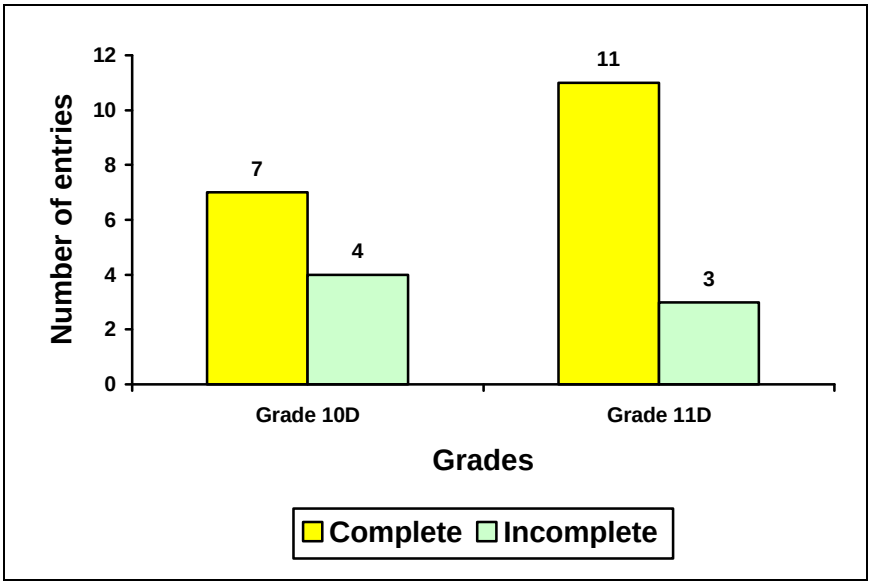


Table 5 - 3 and Table 5 - 4 illustrate how digitally experienced the learners are. They completed the *I own* and *I can* survey discussed in Chapter 4, indicating how many digital devices they owned and how many activities they were able to perform. The data below does not reflect the digital abilities of all the learners who took part in the *ThinkQuest* web design competition but sufficient data is provided to indicate that these learners are familiar with popular digital devices and activities. There is not an appreciable difference between the two classes although they are a year apart in age.

Table 5 - 3 Digital devices owned, out of a maximum of 24

Grade	Average	Maximum	Minimum	Total learners surveyed
10D	12 devices or 50%	19	5	22
11D	14 devices or 58%	21	10	19
Average	13 devices or 54%	20	8	21

Table 5 - 4 Digital activities able to be performed, out of a maximum of 16

Grade	Average	Maximum	Minimum	Total learners surveyed
10D	9 activities or 56%	14	4	22
11D	12 activities or 75%	16	9	19
Average	11 activities or 68%	15	7	21

3 Data collection methods

In order to ensure reliability, consistency and dependability of the results, multiple methods of data collection were used, tabulated in Table 5 - 5. The instruments used to collect the data were observation, an event log, the questionnaire, digital document analysis and interviews.

Table 5 - 5 Data collection methods

Instrument	Activity
Observation	• The learners were observed in the computer laboratory during the discussion of the topic. • The learners were observed in the computer laboratory during the final days before uploading.
Event log	The following were noted: • Learners who emailed me and the reason. • Learners who phoned me on my cell phone before the uploading. • Mothers who discussed their children's lack of work during the year.
Questionnaire	• On submission of the entries the 54 learners who had complete or incomplete entries were asked to complete a questionnaire, Appendix I, evaluating their partner(s) and the management of the project with particular reference to team work, marks, computer skills used, time management, place of work, sourcing and using material, giving and receiving assistance, pride, motivation and technical problems. • The questionnaire was examined and the information keyed into a database that was then analysed and queried. The results are statistically presented throughout this chapter to illustrate how the learners interacted with the information.
Digital document analysis	All the complete and incomplete web entries were collated and put onto a CD and the network for closer examination and analysis by learners and myself. The entries or digital documents were systematically examined using the Windows Find function and the eye, by the learners and myself and detailed in a spreadsheet, Appendix K. The following were counted: • Every animated gif made with*CoffeeCup Firestarter* or *Flash*, animated gif made with *Gif Animator* or similar, drop down box, feedback form, guest book, jigsaw puzzle, quiz, rollover, thumbnail, tile puzzle and crossword; • Every animated clipart gif, static pictures, sound clip, video clip and graphic background; • Shared borders, frames and image maps were noted; and • Spelling mistakes, levels of information, structure, amount of information and technical quality were noted.
Interviews	• Parents were interviewed at parents' meetings informing them of the importance of the competition and urged to encourage their children.

The web entries were systematically documented and analysed through the various data collection instruments.

4 Process of creating the *ThinkQuest* entries

The case study focuses on how learners interacted with information when they created an entry for the *ThinkQuest* web design competition with respect to cognitive, affective and physical perspectives. The following section discusses the process of creating the entry, viz. introducing it to the learners, their registration and progress and the final submission. The description of the process is limited as the learners were meant to create the entry at home without my assistance. The full analysis based on the learners' experiences and documented via the questionnaire (Appendix I) follows this section.

4.1 Background

The *ThinkQuest* web design competition was given to Grade 11D as their annual project at the beginning of the 2001 school year together with all their tasks and tests for the first term, see Appendix B. Grade 10 were given their term work and project at the beginning of the term, see Appendix A, but learners in Grade 10D asked if they could enter *ThinkQuest* as they had heard of it the previous year when two learners from Grade 10 had taken part in the competition and reached the international semi-finals.

There was excitement and trepidation on the part of the two classes, Grade 10D as they knew nothing about the World Wide Web; and Grade 11D as they had an inkling of the work ahead. The learners were told a number of times that the web site

- had to be done without teacher involvement;
- had to be completed on time;
- had to be completed in the learners' own time; and
- had to be created at home, as most of the computers at school available to learners did not have access to the World Wide Web.

The learners had to

- form teams of two or three, preferably with those from different cultural groups or *at a distance*;
- find coaches to guide them in the making of the entry;

- create an entry on a topic concerned with Cape Town;
- officially enter their team on the *ThinkQuest* web site; and
- upload their completed entry to the *ThinkQuest* server.

Conditions discussed with the learners included the following:

- I refused to be a coach to any *one* specific team.
- Although my computer had access to the World Wide Web, I have never been able to upload or FTP any page from that computer hence it was not really available for the project.
- Working *at a distance* was problematic, so the learners were encouraged to make teams with those who lived nearby or within local telephonic distance.
- I stipulated that the topic of the entry had to be about Cape Town. It was felt that it was a known topic and the teams could help publicise their own city. Various possible topics were discussed with the learners.

The instruction sheet, Appendix E, was given to the two classes, and the same instructions put on the school network and uploaded to the Internet. For a number of the learners the hyperlinked lessons and tasks on the school computer network were the only 'web sites' they had ever seen. In hindsight the learners were very adventurous, as more than nine tenths of the learners had not ever made a web page before.

4.2 Start

The registration of the entry had to take place by the third week of the second term. Registration was problematic as the *ThinkQuest* site was difficult to navigate and unclear in many respects, and learners underestimated the level of detail required in registering. The two learners who had taken part in the competition the previous year helped their classmates navigate the site during Computer Studies class time on my computer that was linked to the Internet. My computer had poor access speed but a number of teams did manage to register during class time. After half completing their registration many of the teams came prepared with parent and coach details, registering their coaches on their behalf. It became apparent that parents were inveigled into being coaches, although they did not know about the Internet or the responsibilities as coaches. Two teams from Grade 10D were unable to complete their team registration at the *ThinkQuest* site as they left it too late. They were then told to have their sites hosted at Geocities, a server where web sites

could be hosted at no expense. All Grade 11D learners managed to complete their team registration in time.

4.3 In progress

Once the hurdle of entry registration was over, time should have been put to good use to collect data for the sites. The learners were informed that they had to hand in ten typed pages of content early in the second term although only three teams did so.

The term progressed and the learners were gently reminded at irregular intervals to work on their web sites. No checks were made as to how they were progressing. The Grade 10D learners were given one week or five lessons tuition in *FrontPage*. The Grade 11D learners had been taught *FrontPage* in many guises during the first term, see Appendix B and Table 5 - 6.

Table 5 - 6 Web-authoring skills learned by Grade 11D

Skills learned	Task number	Task name
Learned how to make a simple web site	Task 2	Web site about Yourself
Learned how to add hyperlinks and bookmarks within a page	Task 5	Creation of an HTM or HTML glossary
Adapted a previously made *JavaScript* quiz to create their own quiz	Task 6	Web-based quiz *(JavaScript)*
Added a previously made *JavaScript*-class file and image to a page to create a puzzle	Task 8A	Puzzle *(JavaScript*)
Created animations with *Gif Construction Set* and *PaintShopPro*	Task 8B	Gif animations
Created a data *Access* page suitable for adding material or comments	Task 8C	Data access page
Revised web-based skills	Test 11	Practical examination on web-authoring

The year progressed, the autumn break came and went, the mid-year winter holiday loomed and the learners were again gently reminded to work on their *ThinkQuest* entry that was due in August.

4.4 Submission

In the last week before the cut-off date the Grade 11Ds were away from school doing job shadow[7] and the Grade 10Ds at a school camp. I checked the entries on the web, and in horror frantically brought problems to the attention of some of the learners by email. I had a total of six cell phone calls after hours and four during the school day and 14 email messages to my home or school email address, concerning how to upload the web site. The *ThinkQuest* closing date was extended[8] at the time the learners returned from their week away which gave them time to sort out problems. The learners had a great deal of trouble uploading their sites. The three girls and two boys from 10D stayed away from school desperately trying to complete and upload their sites. One learner in Grade 11D stayed away from school, hurriedly working at home to finish his site.

When the Grade 10D and 11D classes had uploaded their sites there was a collective sigh of relief. It had been extremely stressful as it had been left so late by most learners, and many had had technical problems with uploading. Table 5 - 7 is a list of the completed entries and their URLs plus the number of Grade 10D and 11D learners per team.

'Completed entries' means completed and uploaded to the *ThinkQuest* web server in time.

[7] Grade 11 learners spend one week shadowing a person in the employment market, watching them do their work and getting an idea of what it is like in the working world.
[8] There was a power failure in the Pinelands area, and as a result the *ThinkQuest* organisers gave those teams from Cape Town extra time.

Table 5 - 7 Completed entries

Class	Title	No of learners per team	URL
10D	*BMXing in South Africa*	2	http://library.thinkquest.org/C0123623/
10D	*Dance clubs in Cape Town*	3	http://library.thinkquest.org/C0123624
10D	*Foetal alcohol syndrome*	1	http://library.thinkquest.org/C0127302/
10D	*Restaurant guide to Cape Town*	2	http://library.thinkquest.org/C0129748/
10D	*Special needs schools in Cape Town*	3	http://library.thinkquest.org/C0122631/
10D	*Tales @ the table*	3	http://library.thinkquest.org/C0123626/
10D	*Tourist guide to Cape Town*	3	http://library.thinkquest.org/C0125940/
11D	*Beaches in Cape Town*	2	http://library.thinkquest.org/C0122101/
11D	*Genesis animation*	1	http://library.thinkquest.org/C0111614/
11D	*Kramats of the Western Cape*	1	http://library.thinkquest.org/C0120708/
11D	*Planet Mars*	3	http://library.thinkquest.org/C0122083
11D	*Sculpture in Cape Town*	1	http://library.thinkquest.org/C0122583/
11D	*Soul of District Six*	2	http://library.thinkquest.org/C0118982/
11D	*Teen hair of Cape Town*	2	http://library.thinkquest.org/C0120888/
11D	*Tourism and whaling in Hermanus*	2	http://library.thinkquest.org/C0121860
11D	*V & A Waterfront*	2	http://library.thinkquest.org/C0122349/
11D	*Where eagles fly: the South African airforce in 2001*	3	http://library.thinkquest.org/C0110164/
11D	*Xtreme sports in South Africa*	3	http://library.thinkquest.org/C0119007/

A number of teams did not manage to complete their entry, see Table 5 - 8, although their entries were used for the analysis.

Table 5 - 8 Incomplete entries

Grade	Title	No of learners
10D	*Cape drugs*	3
10D	*Cape Town: The Mother City*	2
10D	*Hiking trails in the Western Cape*	2
10D	*Sportsman's guide to the Western Cape*	2
11D	*Cape cuisine*	2
11D	*Lifestyles of three typical teenagers in Cape Town*	3
11D	*Old Mutual*	3

Table 5 - 9 tabulates the problems of the Grade 10D and 11D teams that did not manage to complete their entries. Other teams had problems but managed to upload their entries whether complete or incomplete, well done or poorly done.

Table 5 - 9 Reasons for not completing their entries

Grade	Team specific reasons for not completing the entry
Grade 10D	• Working as a team, uploading the site, working with frames, lack of motivation • Team problems and lack of motivation • Incorrectly naming the index file 'homepage' and having files hyperlinked back to it; and when that problem was corrected and the site worked well, the *ThinkQuest* technical people did not move the entry to the permanent server correctly and the whole site disappeared. • Sickness in the family and lack of motivation
Grade 11D	• Team problems • Motivation • Hyperlink problems to do with frames

Many of the joys and frustrations of the learners became apparent in the questionnaire (Appendix I) about their experience of taking part in the competition. As tabulated in Table 5 - 9 lack of motivation and team problems were given as the major reason for incompletion of entries. There was much excitement when *Sculpture in Cape Town*, one of the entries, reached the international semi finals although it did not reach the finals.

5 Analysis of the process and product of the *ThinkQuest* entries

The aim of this chapter is to investigate how FET learners interact with information in a digital environment, *at a distance,* in this case create a web site. The perspectives of acquiring, recalling, processing and planning, and presenting information come from the behaviours and activities discussed in Section *6, Synthesis and profile,* in Chapter 2.

5.1 Cognitive perspective

The following section examines how the learners interact with information in a digital environment from a cognitive perspective particularly looking at acquiring, recalling, processing or planning, and presenting information while creating an entry for a web design competition, *at a distance*.

5.1.1 Acquiring information

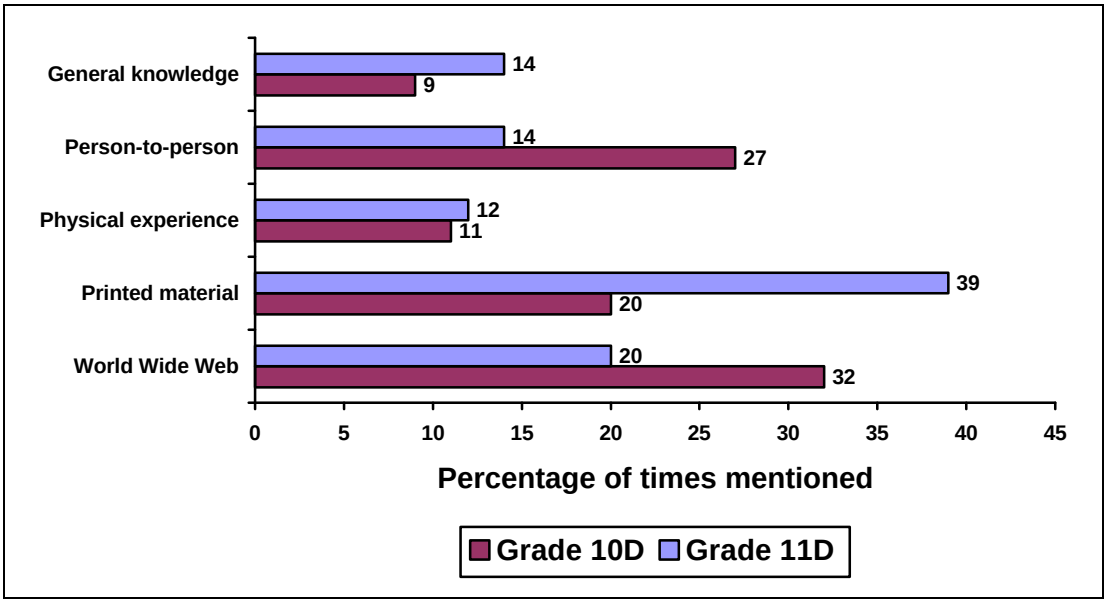
The learners acquired factual content in order to create the web entry, acquired web-authoring skills and recalled previously taught web-authoring skills.

5.1.1.1 Acquiring factual content

The learners acquired their information from a variety of sources ranging from personal general knowledge, asking knowledgeable people, visiting the subject areas and browsing the World Wide Web, to using a variety of printed sources. The sources of information of the two classes are graphically described in Figure 5 - 7.

- Grade 10D - More learners from this grade used the World Wide Web as a source and asked knowledgeable people, than Grade 11D.
- Grade 11D - Used a great deal of printed sources which was a bit surprising as the learners were meant to create new innovative sites about unique topics, not put printed material, i.e. books, on the World Wide Web.

Figure 5 - 7 Sources of information used by learners in creating their web sites



One of the features of and rationales for *ThinkQuest* was to create in web format information not currently found on the Internet; hence the learners collected their own information or copied it from a variety of print sources. Perhaps the reason that so few learners used the Internet to collect information was because they did not have access to the World Wide Web in class, had no model to follow and the high cost of accessing the World Wide Web from home. Many of the learners used print material, as it was easy to obtain. Other learners created their own information

through physically visiting places and interviews. Those new to web-authoring used information mainly from the World Wide Web and those experienced in web-authoring from printed resources.

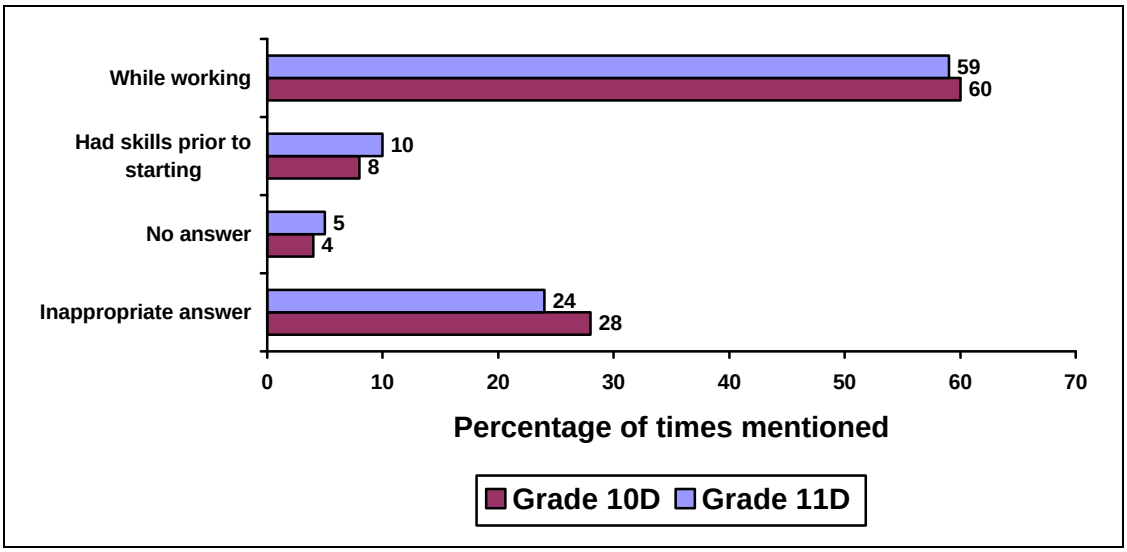
The excerpts below illustrate the learners' use of information sources:

- We have been on the hikes, so we new most of the info. (Grade 10D male)
- We phoned people who knew or we found out ourselves. (Grade 10D female)
- On the Internet and from the guides at the places also in one or two books. (Grade 10D male)
- The information I get came from the Internet. XXX got a booklet all about the Cape. XXX was meant to get photographs but in stead she came with pamphlets. (Grade 10D female)
- We used maps, went to the beaches and looked on the Internet. (Grade 11D male)
- I went to see most of the sculptures in Cape Town, took photos and looked the sculptors up in books and wrote about their particular works. I didn't find much information on the internet but the Frank Joubert Art Center's Library has a lot of modern books on Art. They were a great help. (Grade 11D female)
- Mainly the Gov. SANDF web site and books on the subject. (Grade 11D male)
- I got the information from brochure that I found on Hermanus and also because I have been there so many times that I knew a lot about Hermanus. (Grade 11D female)

5.1.1.2 Acquiring web-authoring skills

At the commencement of the project many learners did not know how to use web-authoring software. The learners were creating the web entry on their own under the guidance of their coaches but, from the questionnaire it was apparent from the responses about 'Help' that their coaches had few computer skills and gave very little technical support. The majority of the learners in both classes acquired the skills to use the software as they designed their web pages, illustrated in Figure 5 - 8.

Figure 5 - 8 Acquiring web-authoring skills



- Grade 10D - The two learners who indicated they had web-authoring skills prior to creating the site may have misinterpreted the question.
- Grade 11D - The four learners who thought they had the skills prior to commencing the web site, were all male - their comments are below. An interesting observation was that three of these four learners did not produce entries of quality in terms of skills. They seem to have not exerted themselves to learn interesting new skills as seen by their comments below:
  - I had all the skills that were required. (Grade 11D male)
  - I already had all the skills and didn't learn anything in terms of skills. (Grade 11D male)
  - I did have most of the skills. I could have done (and I think I have) the whole thing by myself. I learnt new design tactics (Concepts) from other people, mostly people I shadowed (Grade 11D male)
  - I did it last year and therefore already had all the skills. (Grade 11D male)

5.1.2 Recalling information

The learners did not have to recall information but rather create information. They did have to recall the skills about how to author a web site from lessons learnt earlier in the year.

- Grade 10D - The learners recalled their short one week session of lessons on web-authoring
- Grade 11D - The learners recalled the many lessons in web-authoring taught in the first term, illustrated in Table 5 - 6.

5.1.3 Processing, planning, structuring and amount of information

The ways in which the learners planned the web site with reference to the structure used and the amount of information included are examined in the following section.

5.1.3.1 Model or structure

The web entry was structured in the following way:

- Information was arranged on pages under titles. The learners divided the content into manageable amounts for each page. Similar types of information were found on each page.
- The entries had a clear logical structure as the sites were of known and understandable topics.
- Information arranged at two or more levels, a fairly sophisticated feature, was used in nearly all the sites. Two entries in Grade 10D and two in 11D did not structure their entry on two levels. A web site with two levels means an initial Home page with links to, for example, Topic1, Topic2, Topic3, and then links from a Topic page to a Subtopic page and so forth.
- Frames were not used successfully by any group in Grade 10D but instead caused many problems. Most of the Grade 11D web sites used frames. Frames had not been taught in class to any group.
- Image maps were only found on two web entries, one to point users from a signpost to a beach (*Beaches in Cape Town*) and the other to point users from a map to kramats in the Peninsula (*Kramats of the Western Cape*).

5.1.3.2 Amount of information

Most of the web sites had a great deal of information and the learners appeared to have taken much trouble to create their own content or source it from somewhere else. The Grade 11D learners had more content in their web sites than the Grade 10D learners.

- Grade 10D - Three of the 10 web sites had a great deal of information, two probably copied their information from print or web sources, but one site (*Special needs schools in Cape Town*) was created and sourced from scratch.
- Grade 11D - Six of the thirteen sites had a great deal of information: one site looked as if was a copy from a book and the remaining five looked as if they were created from a number of sources and transmediated from other media forms. The two web sites on *Planet Mars* and *Xtreme sports in South Africa* had very little content.

5.1.4 Presenting information

The following section will discuss how the learners presented information looking at the surface features of the entries with reference to spelling, the look of the pages, the tone of the sites and the multimedia features used.

5.1.4.1 Spelling

There were spelling errors in a few entries. It would appear that the coaches corrected the worst of the errors or the learners working in groups saw the errors and corrected them themselves before uploading. The worst errors were found in *BMXing in South Africa*, *Dance clubs in Cape Town* and *Lifestyles of three typical teenagers in Cape Town*, sites that did not have much coach involvement.

5.1.4.2 Pages

Information was presented on pages in the following ways:

- The entries were made up of hyperlinked pages from the main, home or index page to other pages.
- Each web consisted of from seven (*Planet Mars*) to more than 100 (*Sculpture in Cape Town*) pages.
- In addition to text, most pages had illustrations in the form of scanned pictures and thumbnails as well as a few interactive features such as quizzes or animations.
- The length of the individual pages was not too long and did not require much scrolling down.
- Most of the pages were full of images and / or text.

5.1.4.3 Tone

The learners were positive about their topics and wrote with conviction. They had been charged with making web sites about their city and country and there was a sense of pride in most of the entries.

- The topics were important to most of the learners and their enthusiasm was evident. The two entries that showed the most enthusiasm were *Teen hair of Cape Town* and *Special needs schools in Cape Town*. Only two entries were not about Cape Town or South Africa, and they were *Genesis Animation* and *Planet Mars.*
- The learners endeavoured to be politically sensitive and wrote with the American browser in mind. There was some confusion in trying to explain 'Coloured'

people and other racial or cultural groups. The creators of the site on *Dance clubs in Cape Town* tried to indicate the racial or cultural group which frequented specific clubs: They called Coloured people 'Indian' which is not correct. The creators of the site wanted to be politically and culturally correct but did not succeed.

- The creators of the site on *Cape Cuisine* had much difficulty explaining the different racial or cultural groups and their distinct gastronomic preferences. They did not want to offend anyone but wanted the information to be culturally correct. They spent so much time worrying about this aspect of the site they did not get their frames correct.

5.1.4.4 Presenting information

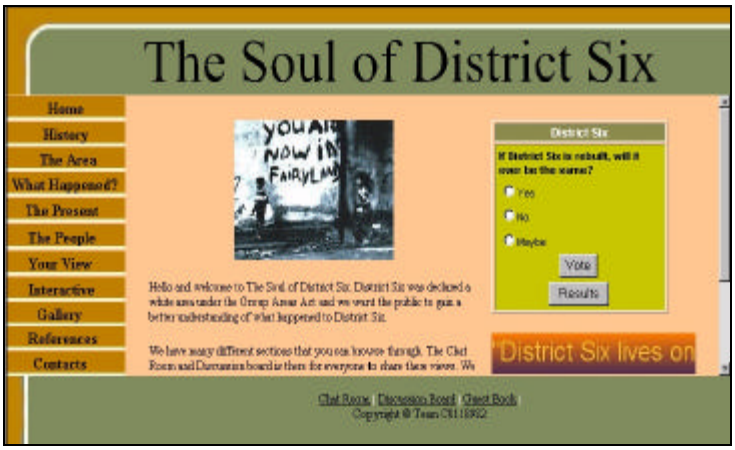
The following section will examine how the learners presented information in various multimedia formats including graphic, static and interactive features developed by the learners. This data is based on all but two of the sites created for the competition, even though not all were uploaded in time. *Old Mutual* and *Foetal alcohol syndrome* are not included in this analysis.

5.1.4.4.1 Graphic features

The learners were challenged by the topic of the web entry and used images to add content. In general, the entries had a suitable balance of images to text.

- Original, specially selected photographed and scanned images were used in *Beaches in Cape Town*, *Teen hair of Cape Town, Tourism and whaling in Hermanus*, *Special needs schools in Cape Town*, *Tourist guide to Cape Town* and *Lifestyles of three typical teenagers in Cape Town.*
- Photographs taken with a digital camera were used in *Hiking Trails in the Western Cape.*
- Scanned images from books were used and collages created in *Where eagles fly: the South African airforce in 2001.*
- Images from books and web sites were used in *Soul of District Six* and *Kramats of the Western Cape* to create *Shockwave* or *CoffeeCup Firestarter* type animated images.
- No clipart images were observed.

Figure 5 - 9 Home pages from the *ThinkQuest* sites



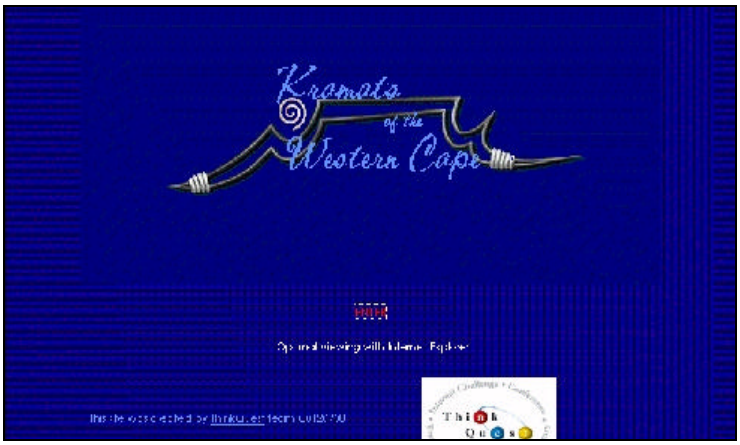


Figure 5 - 10 Images from the *ThinkQuest* web sites

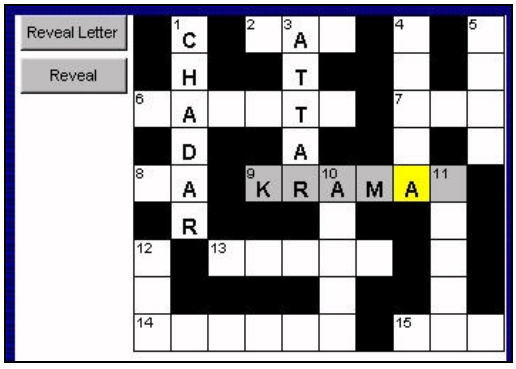
Links in a frame

Tile puzzle

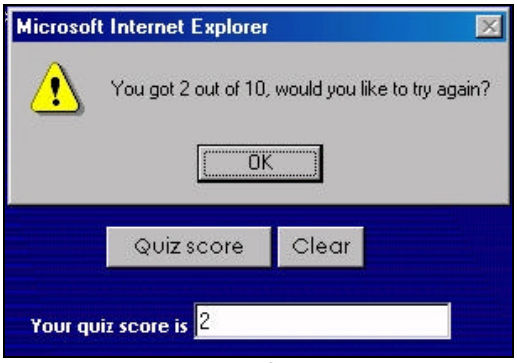
Links to enlarged pictures
Soul of District Six

Mouse over links to files

Scanned image
Teen hair of Cape Town



Interactive crossword puzzle



Quiz
Kramats of the Western Cape

5.1.4.4.2 Static features

Static or very easy to insert features found in the entries were:

- Illustrations used by every entry.
- A video clip unsuccessfully used in one entry.
- Sound clips used in one entry (*Tourism and whaling in Hermanus*)
- Background colours used in most entries. One site, *Lifestyles of three typical teenagers in Cape Town,* used animated images as a background.
- Animated clipart pictures were not observed in the entries.

5.1.4.4.3 Interactive features

One of the aims of the competition was to create a web site with interactivity. This proved difficult, as none of the learners knew programming languages that facilitate real interactivity. In this context, interactive features refer to features that react to input and were developed by the learner. Interactive features therefore do not include animated clipart images although, technically, they are interactive.

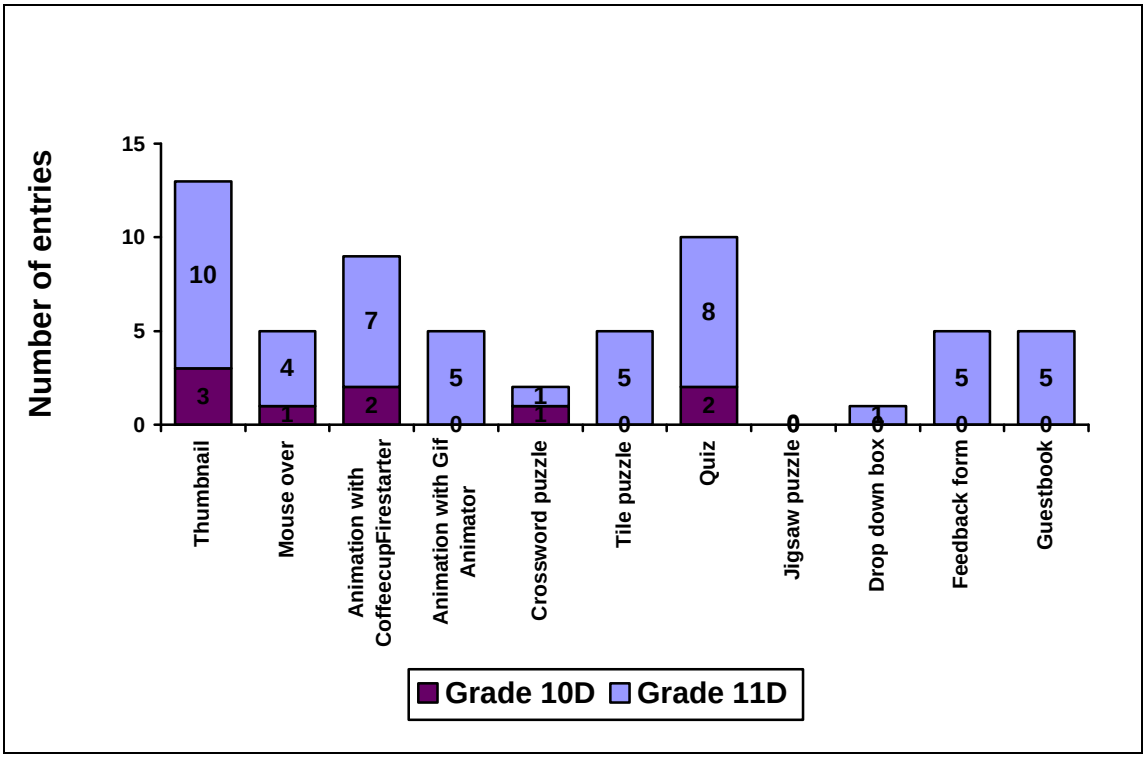
The interactive features complemented the text and content of the entry. Apart from the thumbnail, in general the learners did not use many interactive features in their entries as seen in Table 5 - 10.

Table 5 - 10 Use of interactive features by Grades 10D and 11D

Feature	Total number used[9]	Average number used per entry
Thumbnail	413	17.96
Mouse over	23	1.00
Animated gif made with *CoffeeCup Firestarter* or *Flash*	23	1.00
Animated gif made with *Gif Animator* or similar	8	0.35
Crossword puzzle	2	0.09
Tile puzzle	5	0.22
Quiz	10	0.43
Jigsaw puzzle	0	0.00
Drop down box	1	0.04
Feedback form	5	0.22
Guest book	5	0.22

The most commonly used interactive feature was the thumbnail followed by the quiz, tabulated in Table 5 - 10 and illustrated in Figure 5 - 11.

Figure 5 - 11 Numbers of entries who used the interactive features



As seen in Figure 5 - 11 the learners used many images in the form of thumbnails, mouse overs, animations and tile puzzles probably because they enjoyed looking at the graphics and making the interactive features. Grade 11D used more features because they had been taught how to make them. JavaScript quizzes were used by Grade 11D because they were encouraged to add interactivity in as many ways as possible, and these learners had been taught how to make quizzes.

5.1.5 Summary of interaction with information from a cognitive perspective

The manner in which the learners cognitively interacted with information while involved in the process of creating their entries *at a distance* was discussed in the preceding section. The findings are summarised and tabulated in Table 5 - 11.

[9] The numbers may not be totally accurate although they were checked by teams of learners.

Table 5 - 11 How the learners cognitively interacted with information during the process of creating the *ThinkQuest* entry

Cognitive perspective	Cognitive interaction
Acquiring information	• Learners used a variety of sources to acquire information for the entries. • Learners gained web-authoring skills while they created the entries.
Recalling information	• Learners recalled their web-authoring skills in order to commence creating their entries.
Processing / planning information	• Learners modeled or structured their entries logically. • Most of the learners created entries arranged with pages and hyperlinks at two levels using higher-level thinking skills. • Frames were not used successfully by Grade 10D, although Grade 11D learners used them successfully. • Few learners used image maps. • Learners were able to create the text-based information and content required.
Presenting information	• There were relatively few spelling errors. • Entries were made up of a number of illustrated and linked pages of text. • Graphic and interactive features complemented the content. • Entries exhibited pride and enthusiasm for the topics. • There were relatively few interactive features in the entries. • Entries created by Grade 11D had more interactive features than Grade 10D.

Table 5 - 11 summarises how the learners cognitively interacted with information when creating the *ThinkQuest* web site *at a distance*. There is little data either on how the learners acquired information, as they were not observed as they created the web site or on how they recalled web-authoring skills. The learners created and presented web sites with a usual structure, with sufficient information, with relatively few exciting interactive features.

Table 5 - 12 indicates where the cognitive behaviours and activities tabulated in the literature review, Table 2 - 26 in Chapter 2, and the way in which the learners created the web sentries *at a distance,* have common ground:

✓ indicates where the literature review and the activity concur.

X indicates where the literature and the activity do not concur.

⇨ indicates where the activity was not found in the literature.

NA indicates where it was not applicable in this situation.

In Table 5 - 12 the behaviours and activities of acquiring, recalling, processing and planning, and presenting information and the form of cognitive behaviour or activity

come from the behaviours and activities discussed in Chapter 2, in Section *6, Synthesis and profile*. They are then compared with the way in which the learners created their *ThinkQuest* web entries.

Table 5 - 12 Comparing cognitive behaviour or activity from the literature with the way in which the learners created their *ThinkQuest* web entries

Cognitive perspective	Cognitive behaviour or activity from the literature review	Common ground	Interaction with information while creating the *ThinkQuest* web entry
Acquiring information	• Able to source material in digital environment with sophisticated search strategies	NA	• No data on how the learners sourced material.
	• Absorb material quickly as individual learners are accommodated	NA	• Learners were not required to learn material.
	• Critical of content of resource material	NA	• Learners did not exhibit critical evaluation of resource material although the material selected for their entries was usually well selected.
	• Prefer acquiring information from graphic images in preference to text	NA	• No data on the resources from which the learners acquired information.
	• Know where to find information on a screen	NA	• No data on where the learners found information on a screen.
	• Not found in the literature review	⇨	• Learners gained web-authoring skills as they created the entries.
	• Not found in the literature review	⇨	• Learners used a variety of resources to obtain information, those new to web-authoring mainly from the World Wide Web and those experienced in web-authoring from printed resources.
Recalling information	• Recall of screen-based material difficult	NA	• Learners were not required to recall screen-based material.
	• Short term memory assisted by sensory features of digital environment	NA	• Learners were not required to remember content, apart for the skills for the development of the CV.
	• Recall text on screen in chunks and not with the bigger picture	NA	• Learners were not required to remember text on screen.
	• Literate in non-verbal environment	NA	• Learners were not required to recall information in a verbal or non-verbal environment.

Cognitive perspective	Cognitive behaviour or activity from the literature review	Common ground	Interaction with information while creating the *ThinkQuest* web entry
	• Long term memory assisted by organisation of digital environment	NA X NA	• Learners were required to recall web-authoring skills but it is not sure how those skills were recalled. • Grade 11D learners seemed not to have recalled the multimedia features taught in class. • Not clear how the learners recalled web-authoring skills as the web was created *at a distance*.
Processing and planning information	• Plan creating digital projects	✓	• Structure of the entries does suggest planning.
	• Build mental models of the learning material	NA	• Learners were not required to learn material.
	• Use higher-level thinking skills	✓	• Higher-level thinking skills were used in structuring the webs on two levels, a format found in most webs. Frames, indicating higher-level thinking skills, were used by a number of learners although Grade 10D learners were not successful. Quizzes found in half of the entries indicated higher-level thinking.
	• Visually process a number of programs at once	NA	• Not observed.
Presenting information	• Cognitive processing of screen-based material superficial	X	• Few entries had spelling errors.
	• Able to communicate their understanding of the subject matter in multiple formats	X ✓	• Although one of the classes had been taught a number of different formats, the learners did not communicate their content in multiple formats as they did either did not know how or they did not think to do so. • Learners were able to create text-based content.
	• Develop own symbols and abbreviations for communicating	NA	• Not observed.
	• Transfer of learning to other contexts takes place	NA	• Not certain if this has taken place.
	• Use authentic language in developing digital projects which assists information processing	NA	• Could not be observed as the learners did not develop their projects where they could be observed.

As indicated in Table 5 - 12 very few of the behaviours or activities found in the literature review were *present* in the creation of the web site *at a distance*. The following behaviours or activities were those present in Table 2 - 26 where the cognitive profile of a South African FET learner in a digital environment was tabulated based on the literature review, and in the creation of the *ThinkQuest* web entry:

- Plan creating digital projects
- Use higher-level thinking skills
- Able to communicate their understanding of the subject matter in multiple formats

Cognitive behaviours or activities present in the *ThinkQuest* entries but *not found* in the literature review were:

- Learners gained web-authoring skills as they created the entries.
- Learners used a variety of resources to obtain information, novice users preferring the World Wide Web and experienced users print material.

Table 5 - 12 illustrates that there was little concurrence between the literature review and creation of the *ThinkQuest* web entry, however the process of the creation of the *ThinkQuest* web site did not exhibit many behaviours or activities that exhibited cognitive behaviour or activity.

5.2 Affective perspective

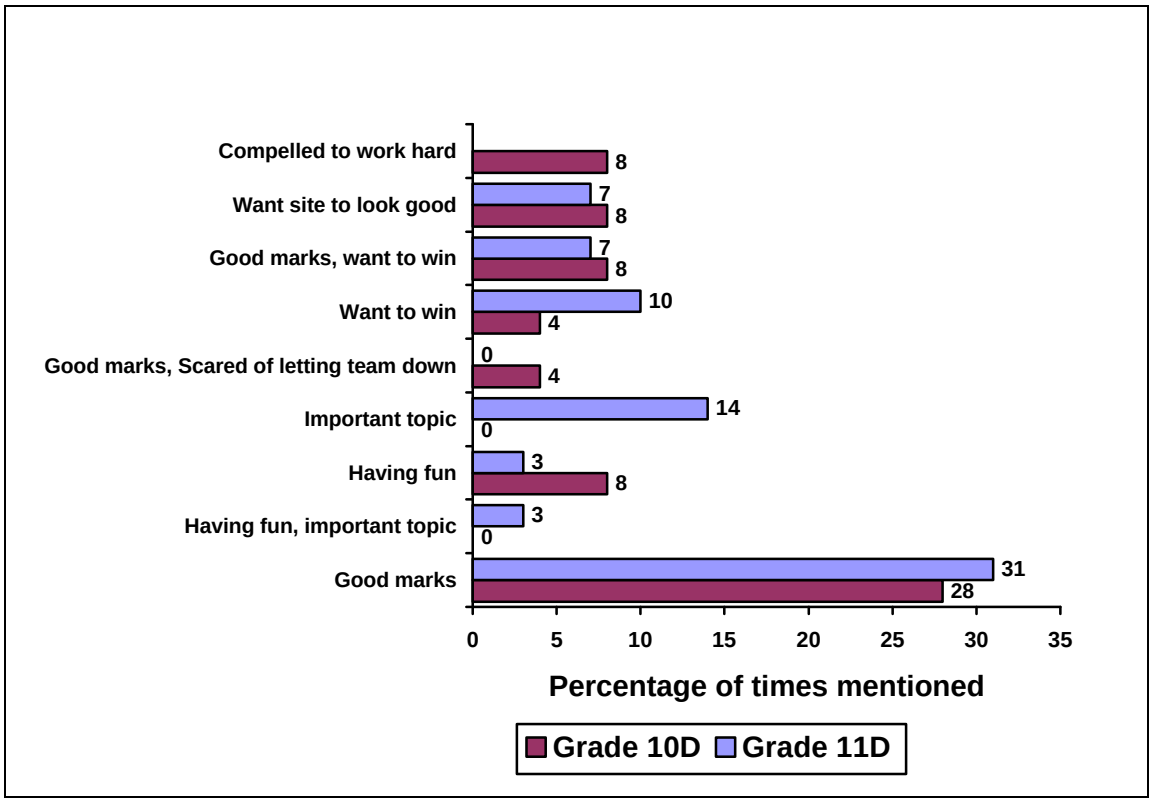
The following section will examine how the learners interact with information in a digital environment from an affective perspective, looking particularly at motivation, the influence of peers, time and mental state while creating their *ThinkQuest* web site. The web site was meant to be created *at a distance* which meant that the learners were not meant to have face-to-face contact when creating the site.

5.2.1 Motivation

Learners in both Grades 10D and 11D indicated that marks and grades were major factors in working so hard on their entries, illustrated in Figure 5 - 12.

- Grade 10D - The main motivating reasons of marks and grades were compromised by misunderstanding the question and providing inappropriate answers. It is not clear how so many learners misunderstood the question.
- Grade 11D - In addition to working hard for grades and marks they were also motivated by working on a topic they perceived as important.

Figure 5 - 12 Motivating factors

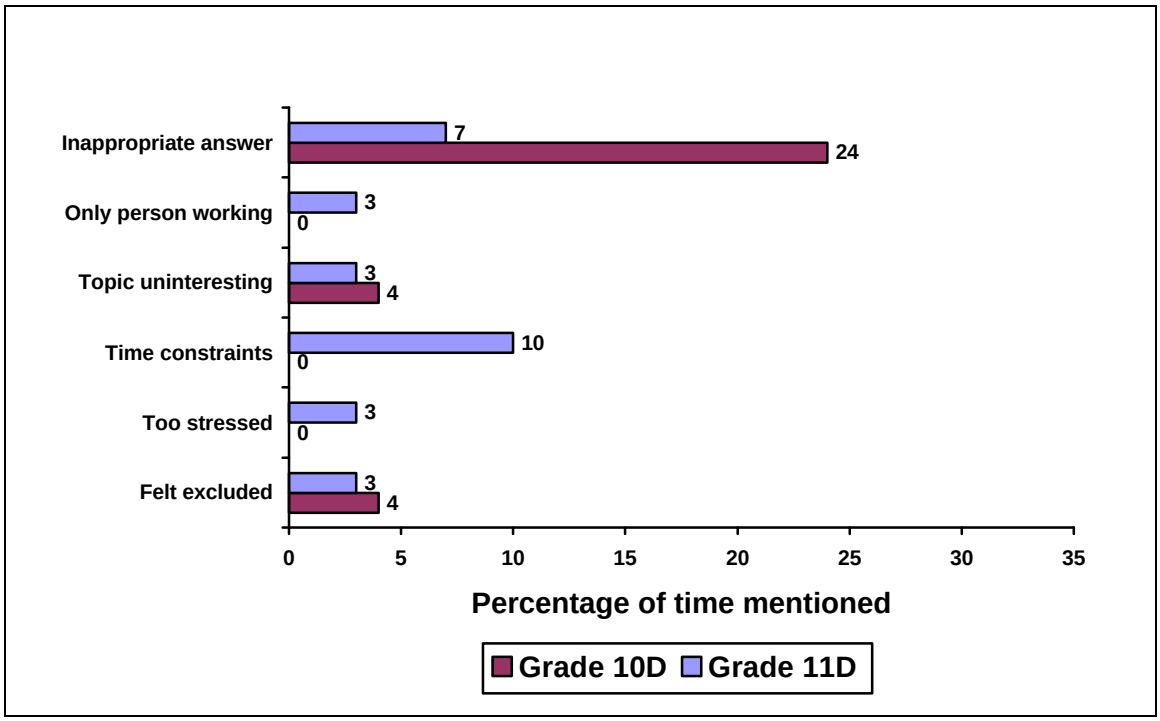


Comments from the learners concerning their reasons for working hard are given below:

- It is an important project as it counts for one fourth of the year mark and there is a chance of wining a lot of money. (Grade 10D male)
- It counted a lot of marks and I try my best to score high in projects as it is easy marks as they would say. (Grade 10D female)
- I put in this effort because it is for end of year marks. (Grade 11D male)
- Because I care very much about my marks and I know that I have to produce good work to get good marks. (Grade 11D female)
- It is a touchy subject for the people who lived there and now it is only memories. What we are trying is to put their memories on more that just paper. (Grade 11D male)
- XXX is one of my favourite topics, so it was a pleasure researching about it all. (Grade 11D female)

Figure 5 - 12 is not representative of all the learners in both classes, nor does it include the data of all the learners. Figure 5 - 13 provides data to complete the total number of learners. Figure 5 - 13 gives the reasons why some learners were not motivated while working on their *ThinkQuest* web entries. The high number of inappropriate answers is also indicated.

Figure 5 - 13 Reasons why learners were not motivated



Lack of motivation and negative feelings towards the competition were shown only by male learners:

- I put in enough effort, but because of the miss communication and the anti-socialisation it was not put to use. (Grade 10D male)
- Time was always a problem. Fitting thinkquest into a busy day was difficult. (Grade 11D male)

5.2.2 Influence of peers

The learners were meant to work in groups of two or three members. In an effort to describe the study, the following topics were considered:

- selection of team members;
- groupings of team membership;
- reasons for selecting team members;
- working with team members;
- team conflict;
- finding and giving assistance; and
- allocating marks to team members.

5.2.2.1 Selection of team members

The learners were able to have two or three partners. As seen in Table 5 - 13 most learners (13) took one partner, and 10 took two partners. The one-person teams

either had a partner *at a distance* which was not successful, or a silent partner at PHS.

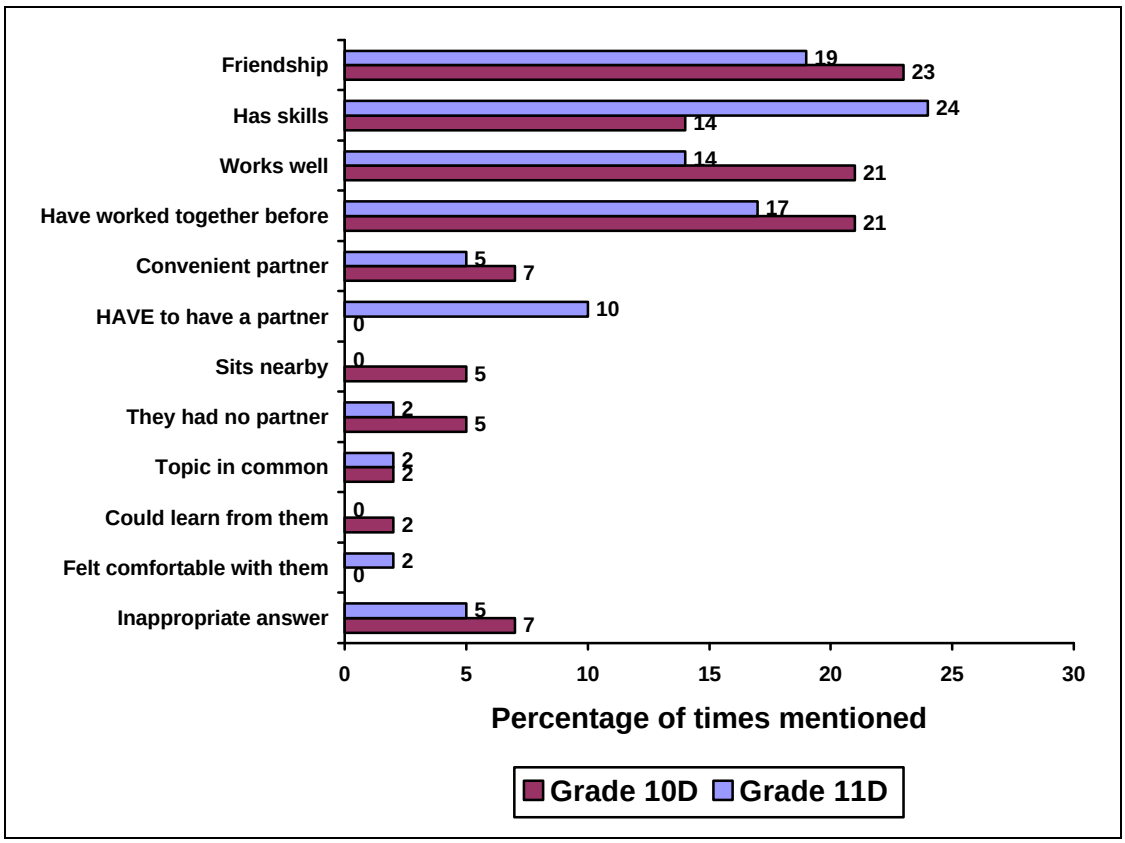
Table 5 - 13 Sizes of team entries

Team entries	One-person teams (officially had a partner)	Two-person teams	Three-person teams
Grade 10D	2	6	4
Grade 11D	3	7	6
Total	5	13	10

Figure 5 - 14 illustrates that the people who were selected for the team partners were friends, possessed the required skills, worked well and were known to the team members. Ranked the four most important factors in selecting team members were:

1. Friendship - 21%
2. Have required skills - 19%
3. Known to work well - 18%
4. Have worked together previously - 15%

Figure 5 - 14 Reasons for selecting a member for the team



5.2.2.2 Working with team members

The two classes doing *ThinkQuest* reported positive things about working with their team members.

- Grade 10D - The majority of the learners made positive comments about working with the partners in their teams. Three learners indicated they would never work with the same people again: from observations one male learner had great difficulty working in a team, and two female learners did not really commit themselves to the project. The learner who tried to work with a partner overseas was completely unsuccessful. The rest of the Grade 10D learners reported that they enjoyed working with their team members.
- Grade 11D - These learners reported similar findings. The majority of learners had positive things to say about working with their team members and cited various reasons. One male learner who was meant to work with an overseas team member did not have a good experience - there seems to have been a lack of communication.

5.2.2.3 Team conflict

Conflict experienced while creating the site was not reported nor brought into the classroom.

- Grade 10D - When asked if there had been any conflict and if so, how was it resolved, the learners indicated no conflict. However I observed that there could have been conflict in three of the 11 teams:
- One male who did little work in his entry, was not admonished but just ignored.
- One female who did no work was phoned and the required work explained to her. When no work resulted she was then ignored.
- Another female learner was not admonished and continued with her lack of commitment.
- The lack of conflict or squabbles showed either lack of desire for conflict, or acceptance of team problems. No conflict was brought into the classroom. The other team members just shouldered the extra work on their own.
- Grade 11D - The questionnaire reported conflict in two Grade 11D teams. The responses in the data collected in the questionnaires did not reflect what I heard about the situations in one of those teams. I heard that they had a very unpleasant conflict which was most distressing to those who observed. In the computer laboratory that conflict was never observed, although the participants

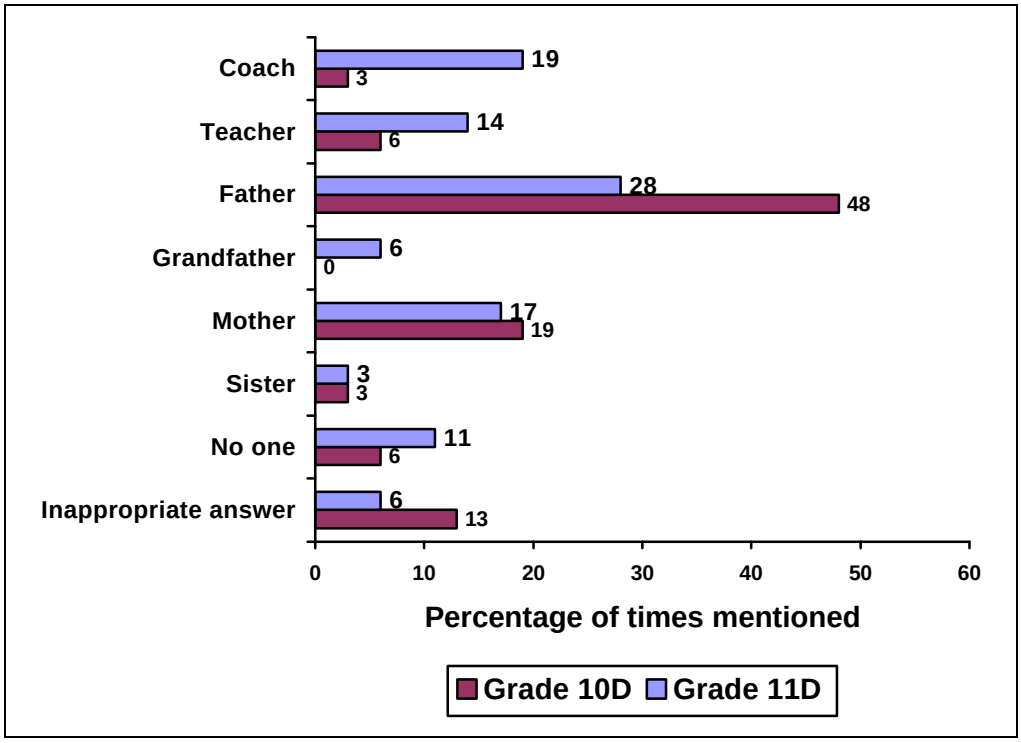
sat near each other. The group were the same gender and of the same racial grouping, so neither gender nor race was responsible for causing the conflict.

In all teams the stress or conflict experienced on working at weekends and after school on their *ThinkQuest* entry was not brought to the computer laboratory and did not appear to influence class work.

5.2.2.4 Finding and giving assistance

The *adults* who assisted the learners the most were parents. The parents assisted the learners more than the coaches, illustrated in Figure 5 - 15, although the assistance given was not of a technical nature.

Figure 5 - 15 Adults who helped the learners



The assistance given by adults was of a supportive non-technical nature as seen below:

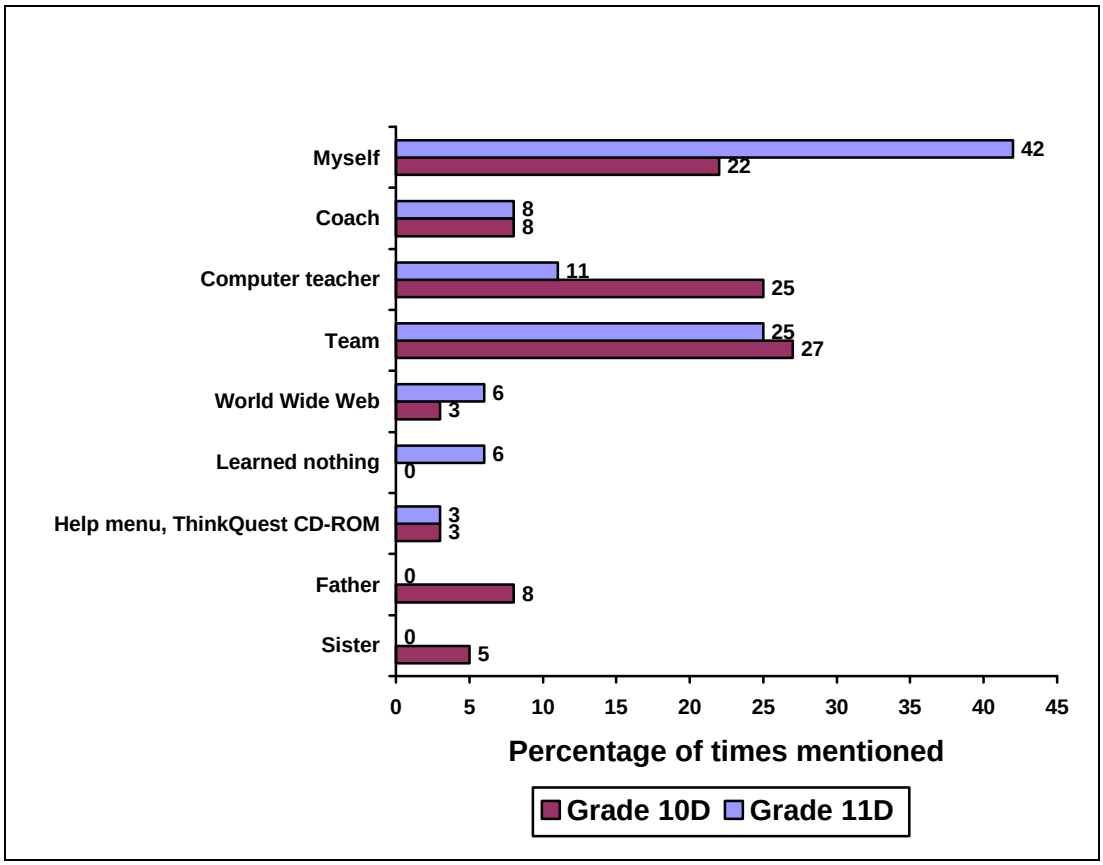
- He helped me by telling me not to stress and relax. He also helped me handle stressful situations. (Grade 10D male)
- By motivating us to carry on trying and with the computer problems. (Grade 10D female)
- He gave me pointers, he got me some information and he even got me FrontPage 2000. (Grade 10D male)
- Interviews, views and layout suggestions. (Grade 11D male)
- If I was stuck, or had a major problem, he gave me suggestions and tips. Sometimes he showed me how to do things, but then I had to go and do

the actual thing myself. Nothing was done for me by him. (Grade 11D female)
- Transport, spell checker (Grade 11D male)

Those *features*, i.e. people, situations, etc. which helped the learners acquire extra computer skills are illustrated in Figure 5 - 16.

- Grade 10D - Learners new to computers depended on their team or teacher to teach them the new computer skills.
- Grade 11D - Experienced computer users taught themselves.

Figure 5 - 16 Features which helped learners acquire new computer skills



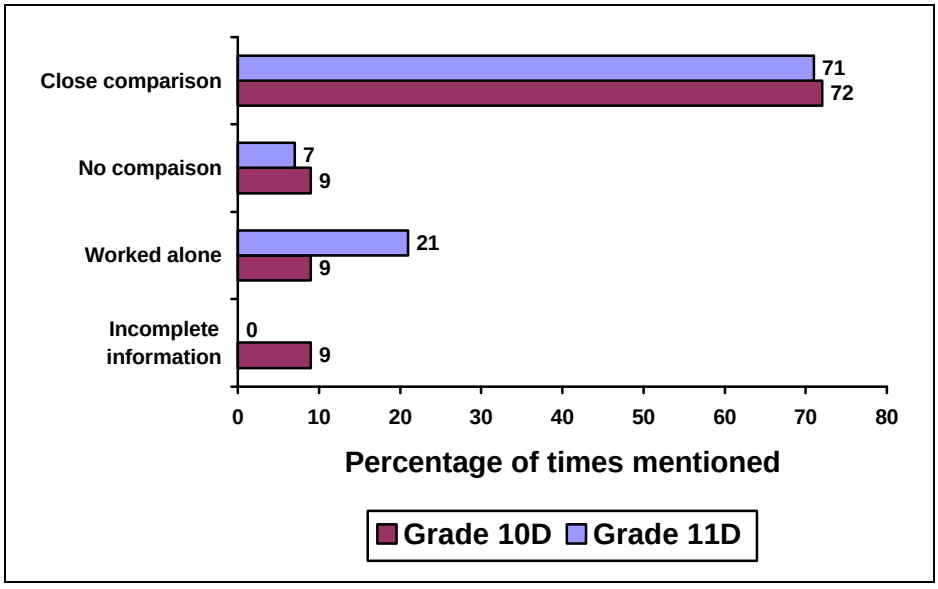
There was little competitiveness among the learners. The assistance given to fellow learners was noted as well as the lack of reciprocal requests for help or anything else - the learners shared what they knew, as illustrated in the quotations below:

- They are kind people and I asked them very nicely (Grade 10D male)
- Miss Miller taught us cause she's our computer teacher and this project was all her idea. My friends helped us because we asked. (Grade 10D female)
- I have no idea. Out of the kindness of their heart. (Grade 11D male)
- Iain [friend] helped me because I asked him to. He has a passion for web design. I taught myself because I had to! (Grade 11D female)

5.2.2.5 Allocating marks to partners

The learners had to allocate marks[10] to their team members and themselves. Grades 10D and 11D indicated knowledge of their own skills and their input to the team effort, as well as those of their team. The marks they gave themselves compared closely with the marks given to them by their team members as tabulated in Figure 5 - 17. The marks of the learners were similar to my observations. In both grades one member of a team felt that they should get marks which differed markedly from the other team members.

Figure 5 - 17 Comparison of team members' marks



The learners were also very kindly disposed towards each other, for example, the learner who was hospitalised and not present for a large part of the work time, was awarded high marks despite her absence.

5.2.3 Managing time

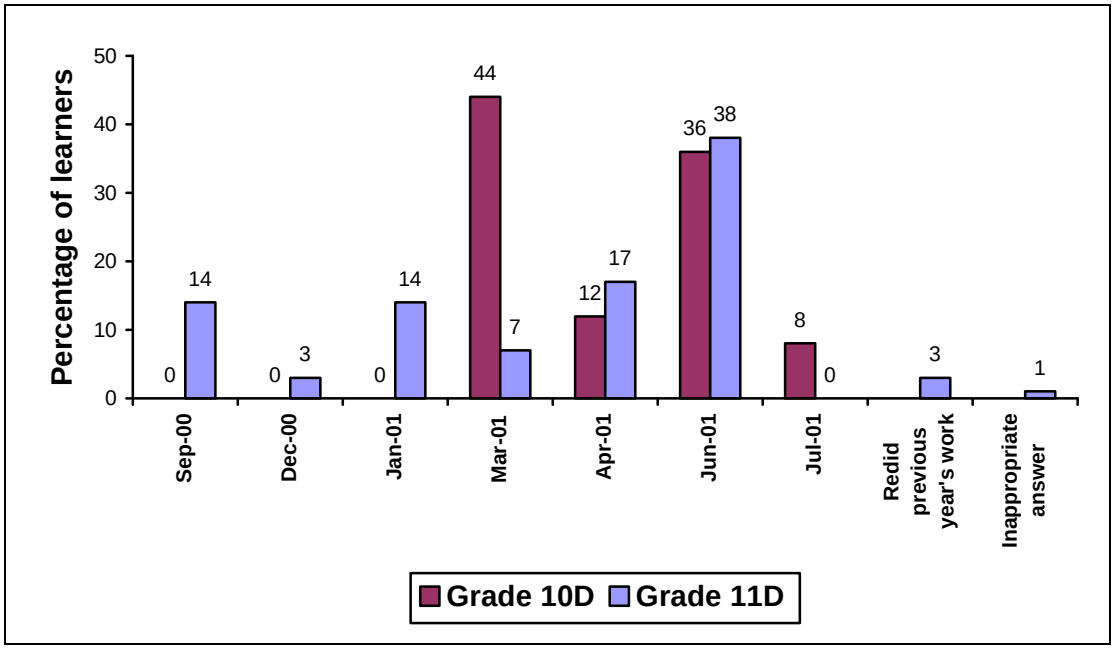
The issue of time was investigated. In Grade 10D 88% of the learners and in Grade 11D 79% of the learners, felt that they had had enough time to complete their entry but had procrastinated and not started when they should have done so.

The grades commenced work at different times, illustrated in Figure 5 - 18.

- Grade 10D - The majority (44%) of learners started work enthusiastically early in March although they were given the project in January.

- Grade 11D - The majority (38%) of learners started work in June although they were given the project the previous September.

Figure 5 - 18 Work commencement month for web entry

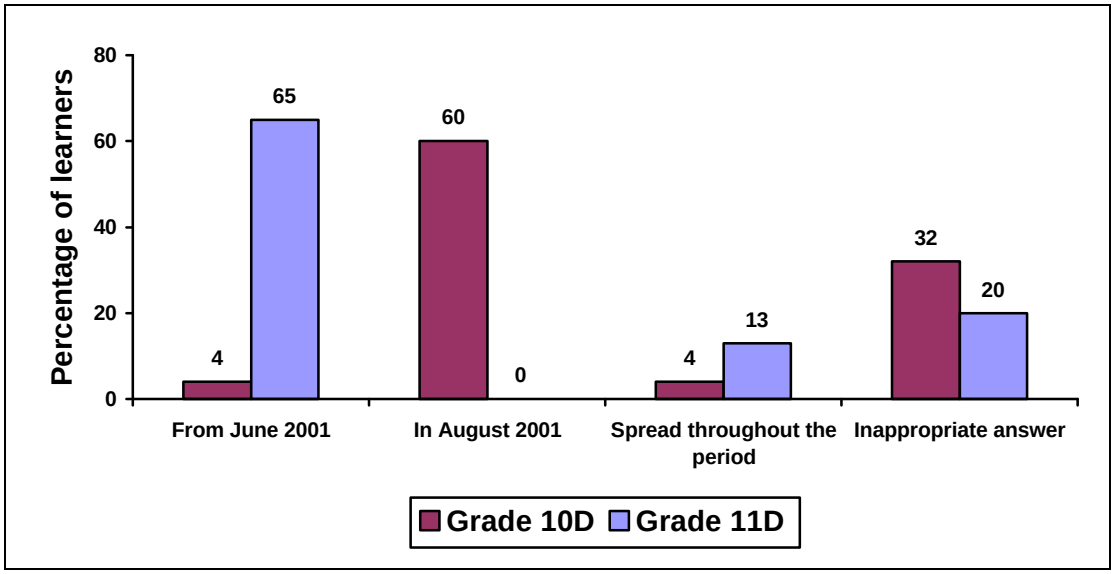


The period when the learners did most of their work is indicated in Figure 5 - 19. The question was not clear to many learners but it is obvious that they left their work until very close to the due date and then did a great deal of work.

- Grade 10D - The learners did most of their work near the due date in August.
- Grade 11D - The majority of the learners did most of their work in June.

[10] A mark is similar to a grade.

Figure 5 - 19 Period when most of the work was done



In general the learners showed a lack of planning and underestimated the length of time required to complete the web site. The learners do not seem to do project planning. About 50% of the learners did various forms of planning, to a greater and lesser extent, consisting of:

- I didn't I just made sure that I would have enough time to fall back on in case something went wrong. (Grade 10D male)
- We didn't really even plan it. We just worked as it came. Which was quite a wrong thing to do. (Grade 10D female)
- We did it in stages first gather the info and then put it on the site the make a few changes to the presentation of the site. (Grade 10D male)
- We planed that the month should have been enough time to get it up and working but due to the network misbehaving our time was shortened. (Grade 10D female)
- With web design, your template changes all the time, and you are constantly incorporating other ideas into your site. We estimated four months of planning and work. (Grade 11D male)
- We didn't really have much of a project plan in that sense. I just felt that by the end of the holidays, I wanted to have all the information and design of the web-site up, and it was. Everything else just followed. (Grade 11D female)
- We divided the work rate by weeks we had to do it. (Grade 11D male)
- When we both had time, we would get together and work on it. In the holidays, we got together when we were both free and went to the Waterfront for the day to take photos and get information. (Grade 11D female)
- We did not plan. We aimed to finish before the deadline. I was amazed that we were able to produce the results that we did. (Grade 11D male)
- We started quite far in advance and thought that we would be finished at the right time. We were finished about a week or two before the deadline but didn't realize that putting it up on the Net would be a problem. (Grade 11D female)

From the above it is apparent that in the creation of the *ThinkQuest* web site the learners

- started enthusiastically, particularly Grade 10D, but that enthusiasm ebbed quickly;
- did the majority of their work near the due date although both classes had more than seven months in which to create the site; and
- showed poor time management skills.

However, what was surprising was that the learner who reached the international semi-finals did most of her work in the last two months before the due date: She worked mainly alone and was passionate about her topic.

When the due date for the *ThinkQuest* web design project drew imminent it was apparent that many of the teams had still not completed their web site nor uploaded it to the *ThinkQuest* server. Only one web site was up with a day to spare, and many learners tried to upload it on the day it was due. On that day the suburb of Pinelands had a power failure so many of the sites did not get uploaded. The teams in the Cape Town area, including Pinelands, were given two extra days to enable them to complete their entries. Those extra days made it possible for all teams who were ready to upload their sites. Had the learners not had that extra time many would not have been able to complete their entry. Most of the last minute problems were caused by technical problems of uploading which had not been foreseen.

5.2.4 Mental state

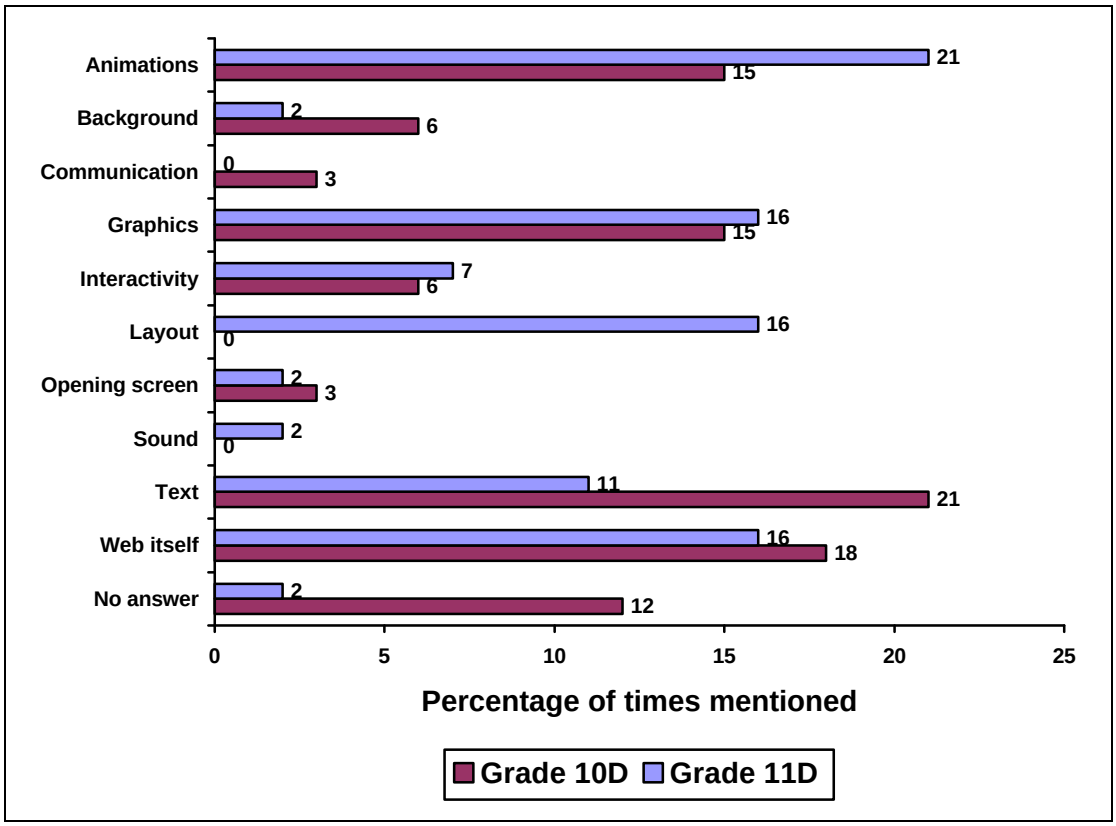
In the following section the joys and frustrations of creating a web site are discussed.

5.2.4.1 Pride and enjoyment

The learners enjoyed themselves creating their entries. Once the initial inertia was overcome they enthusiastically became involved with creating their web site. When they were finished they were asked what they were most proud of in the web site. The findings are illustrated in Figure 5 - 20.

- Grade 10D - The learners were most proud of the text and the information in their site, and the web itself.
- Grade 11D - The learners were most proud of the graphics, animations, layout and the web itself.

Figure 5 - 20 Features in their web sites of which the learners were proud



The enthusiasm, excitement and features that caused pride are exemplified in the following quotations:

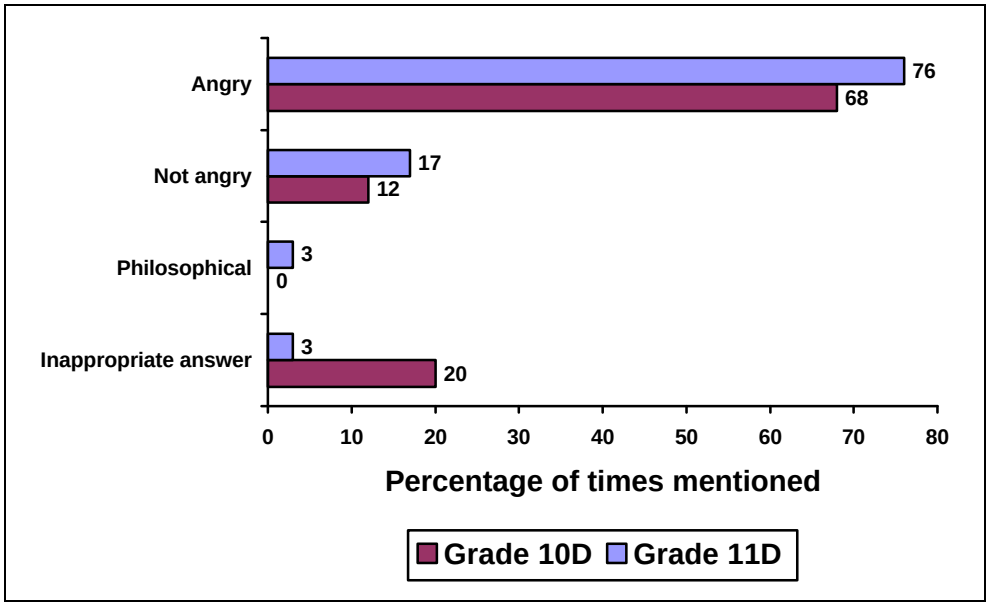
- The fact that we actually managed to make an entire website by our selves, I'm proud of everything. (Grade 10D male)
- Our background. (Grade 10D female)
- We tried our best to make the site and it is the first site we have ever made. (Grade 10D male)
- I think I am most proud of how much information we found about drugs. (Grade 10D female)
- The pictures of the beaches, the intro animation and the signpost. (Grade 11D male)
- The design. I learned so so so much doing this! (Grade 11D female)
- Interactivity. (Grade 11D male)
- Our text and the wonderful colour scheme. (Grade 11D female)

5.2.4.2 Technical problems

While creating the entry, learners in both grades expressed anger towards their computers and printers when they malfunctioned, as illustrated in Figure 5 - 21. The learners who did not experience technical problems with their computers were all male, probably because they managed their computers well and therefore had few malfunctions. The high number of inappropriate answers in Grade 10D may have

been the result of insufficient time to complete the last questions of the questionnaire.

Figure 5 - 21 Emotions expressed when computer malfunctioned



The following comments about malfunctioning printers and computers indicate the learners' frustration with computer technology. The language is most expressive and totally out of character from these non-violent youngsters as seen below:

- VERY FRUSTRATED, $%#&!!!! (Grade 10D male)
- I felt like disconnecting the computer from the wall, and throwing it out of a second story window where it can get smashed to bits and then I will jump up and down on top of the pieces. (Grade 10D female)
- Really angry because we did so much and then it froze so we had to do 3 pages all from the start (Grade 11D male)
- I got so frustrated that I wanted to hit some sense into the computer!! Too many stressful moments in front of the computer brings much tension and anger! (Grade 11D female)

Some of the comments of the Grade 11D male learners who experienced little or no technical problems:

- My PC is very stable. (Grade 11D male)
- That hardly happened. (Grade 11D male)
- It didn't really happen to us! So I would be dismayed because it would have caused even greater problems! (Grade 11D male)
- It didn't (Grade 11D male)

5.2.5 Summary of interaction with information from an affective perspective

The manner in which the learners affectively interacted with information while involved in the process of creating their entries *at a distance* was discussed in the

preceding section. The findings are summarised and tabulated in Table 5 - 14 focussing on motivation, the influence of peers, managing time and the learners' mental state.

Table 5 - 14 How the learners affectively interacted with information during the process of creating the *ThinkQuest* entry

Affective perspective	Affective interaction
Motivation	• Marks and grades were the major motivating factor.
Influence of peers	• Team members were selected because they were friends, and secondly because they have the required skills. • Majority of learners enjoyed working with their team members. • Team conflict experienced *at a distance* was not brought into the computer laboratory. • Parents gave more support than official coaches. • Novice web creators learned a great deal from other team members. • Experienced learners learned by exploring the applications on their own. • Learners were very supportive of their team members. • Learners knew the worth of their own and others' contribution to the creation of the webs.
Managing time	• Learners did not manage time well. • Novice and experienced computer users left the task until very near the due date. • Both groups took a relatively short time to create their web.
Mental state	• Learners were proud of their web entries, both groups were proud that they had managed to create a web, on the World Wide Web, for everyone to see. • Grade 10D learners were proud of the content of the web. • Grade 11D were proud of the interactive features of the web. • Experienced users were less irritated by malfunctioning computers than the novice users were.

Table 5 - 14 summarises how the learners affectively interacted with information and their team members when creating the web entry:

- Obtaining marks was a motivating factor in developing a good web entry.
- Learners selected members of their team from those they knew from class activities. They were supportive of the team members who did most of their work. Parents played a supportive role although they were not of much technical help.
- The learners did not manage time well, leaving the work until the due date became imminent, and then only spending a short time creating the web entry.

- The learners enjoyed creating their web entry and were proud of their entries, experienced web developers for the interactive features of the web and novice developers by the fact that they had created and uploaded a web site.

Table 5 - 15 indicates where the affective behaviours or activities tabulated in the literature review, Table 2 - 27 in Chapter 2, and the way in which the learners created the web entries *at a distance,* have common ground. The behaviours or activities were examined from the perspectives of motivation, the influence of peers, managing time and mental state.

Table 5 - 15 Comparing affective behaviour or activity from the literature with the way in which the learners created their *ThinkQuest* web entries

Affective perspective	Affective behaviour or activity from the literature review	Common ground	Interaction with information while creating the *ThinkQuest* web entry
Motivation	• Intrinsically motivated	✓ ✓ ✓	• Learners were proud of their web entries, both groups were proud that they had managed to create a web, on the World Wide Web for everyone to see. • Grade 10D learners were proud of the content of the web. • Grade 11D were proud of the interactive features of the web.
	• Extrinsically motivated	✓	• Marks and grades were the major motivating factor.
Influence of peers	• Learn in a positive social environment	✓ ✓ ✓ ✓ ✓	• Majority of learners enjoyed working with their team members. • Friendship was the main criteria for team selection, and not marks. • Novice learners learned from each other. • Conflict experienced creating the web was not brought to the classroom. • Learners were supportive of their team members.
	• Critical of their own digital creations, i.e. want to correct and redo, to impress peers	X	• Learners did not exhibit the need to impress others, rather to show what could be done.
	• Learn with group ownership	✓	• They worked and learned with group ownership as they were making a group or team entry.
	• Want the independence to find / create their own learning resources	NA	• Not observed.
	• Not found in the literature review	⇨	• Parents were supportive of their children's work although they did not have many computer skills.
	• Not found in the literature review	⇨	• Learners were knowledgeable about their own computer skills, in comparison to those of others.

Affective perspective	Affective behaviour or activity from the literature review	Contact situation	Interaction with information while creating the *ThinkQuest* web entry
Managing time	• Want useful, relevant information	NA	• Not observed as the situation did not permit it.
	• Want fast access to information resources	NA	• Not observed as the situation did not permit it.
	• Not found in the literature review	⇨	• Learners did not manage their time well, procrastinating until near the due time.
	• Not found in the literature review	⇨	• Both groups took a relatively short time to complete the web.
Mental state	• Do not suffer from computer anxiety	X	• Grade 10D novice users were more stressed by the malfunctioning computers and printers than the experienced Grade 11D learners.
	• Willing to try a number of options and accept error	✓	• Grade 11D learners learned the web-authoring skills more from exploring the packages themselves than other features.
	• Adventurous, creative, ready to explore the digital unknown	✓	• Experienced learners explored packages to learn new skills.

Based on Table 5 - 15 the following activities were *present* in Table 2 - 27 where the affective profile of a South African FET learner in a digital environment was tabulated based on the literature review, and in the creation of the *ThinkQuest* web entry:

- Intrinsically motivated
- Extrinsically motivated
- Learn in a positive social environment
- Learn with group ownership
- Willing to try a number of options and accept error
- Adventurous, creative, ready to explore the digital unknown

Tabulated in Table 5 - 15, behaviours or activities *not found* in the literature review but present at PHS when the learners created their *ThinkQuest* web entry *at a distance* were:

- Parents were supportive of their children's work although they did not have many computer skills.
- Learners were knowledgeable about their own computer skills, in comparison to those of others.
- Learners did not manage their time well, procrastinating until near the due time.
- Both groups took a relatively short time to complete the web.

Table 5 - 15 compared the literature review and when the learners created their *ThinkQuest* web entry at a distance examining it from an affective perspective. There was much concurrence between the affective profile of a South African FET learner developed in Chapter 2, and the way the learners at PHS created their *ThinkQuest* web entry at a distance.

5.3 Physical perspective

The following section will examine how the learners interact with information in a *distance* digital environment from a physical perspective looking at processing and planning, and presenting information with a broad physical perspective.

5.3.1 Processing and planning

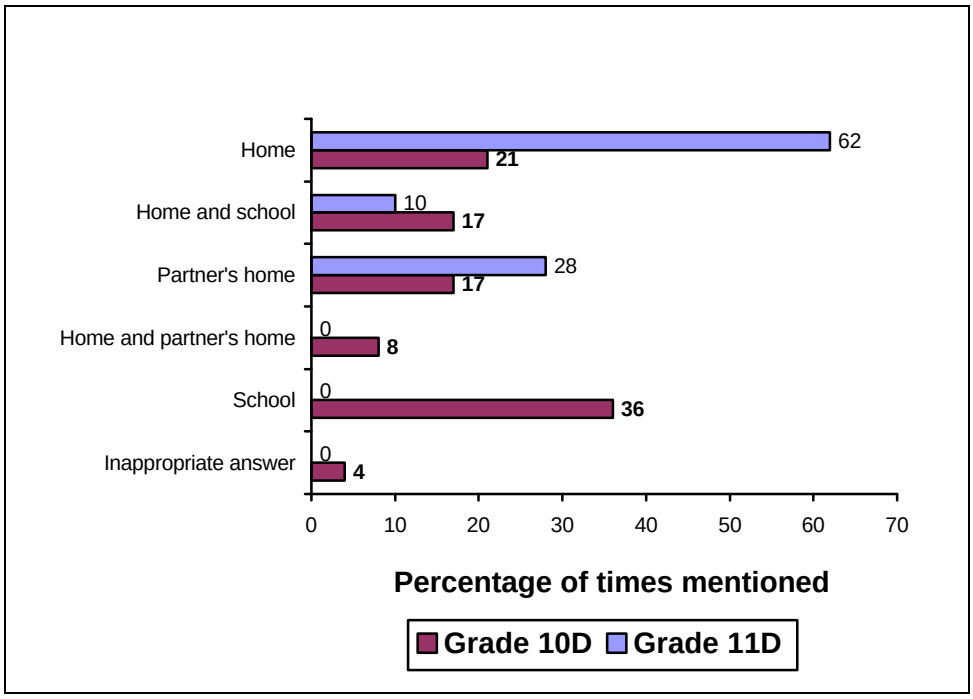
Processing and planning of the *ThinkQuest* entry discusses where the learners worked and why.

The *ThinkQuest* web site was meant to be completed by a team, members of whom were meant to be far apart. Collaboration was meant to be by email, chat, IRC, IRQ, etc. One learner in Grade 10D and one in 11D formed teams with distant persons but they were not successful. Both classes, bar two learners, created web sites with learners at Pinelands High School (PHS), usually a person in their own computer class. (Note that PHS does not have World Wide Web access in the computer laboratory, only email access. Only four slow computers in the media centre have World Wide Web access available for learners' use.) The places where the two classes created their web sites are illustrated in Figure 5 - 22 and the reasons for that decision are illustrated in Figure 5 - 23.

The places where the learners worked are illustrated in Figure 5 - 22.

- Grade 10D - The most common work area was the computer laboratory at school where teams worked together. Note that the learners did not create their web entry in class time in the computer laboratory but rather after school lesson hours.
- Grade 11D - The most common work area was their own homes. Files and completed work were brought to school to be shared with team members. School was not the main place of work as with Grade 10D.

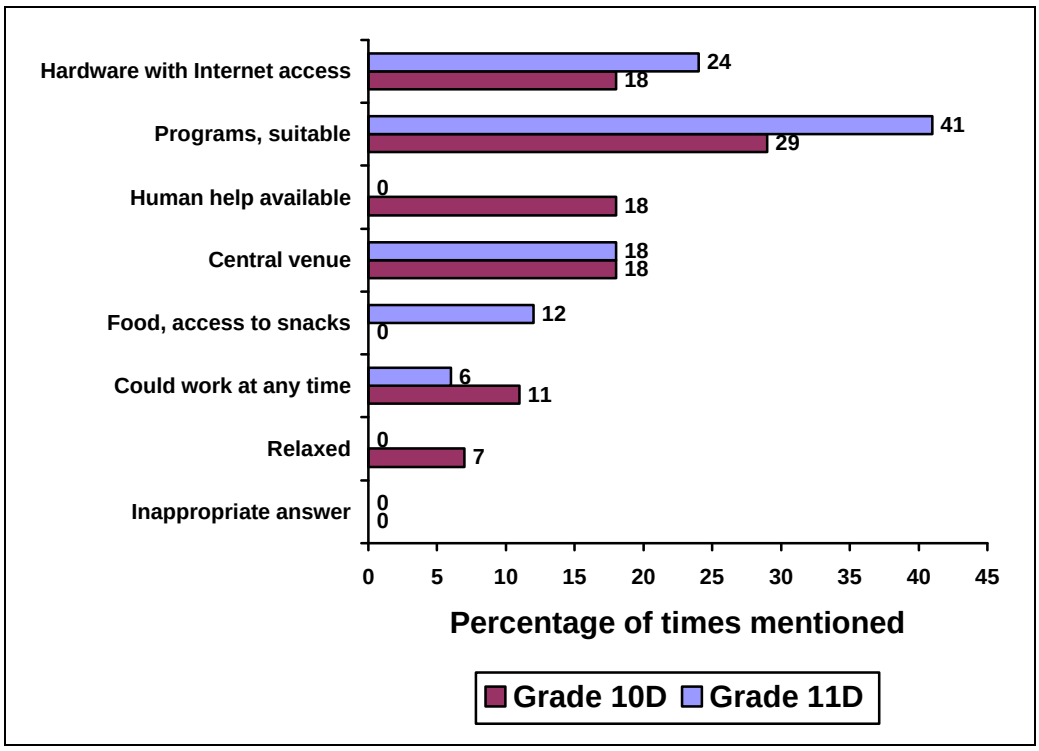
Figure 5 - 22 Work area of learners



An analysis of their responses revealed that the following features illustrated in Figure 5 - 23 were important in determining why the learners preferred to work in particular places.

- Grade 10D - The required programs; then hardware with Internet access, help and a central venue were the most important reasons for working in a particular environment.
- Grade 11D - The required programs and hardware with Internet access were the most important reasons for working in a particular environment, followed by the synthesis of a number of minor factors.

Figure 5 - 23 Reasons for working in a particular environment



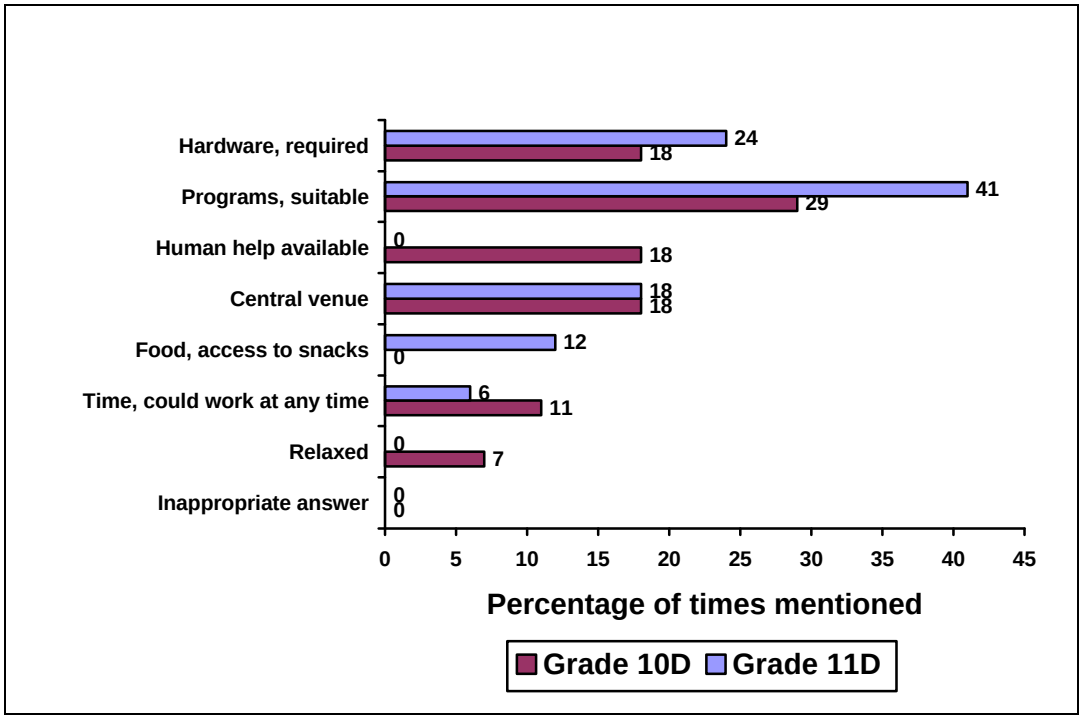
The following quotations illustrate the learners' reasons for working in particular environments:

- It's more relaxed and comfortable than working at school. (Grade 10D male)
- It had all the software requirements we needed. It was also central. (Grade 10D female)
- Comfortable environment and free access to the Internet. (Grade 10D male)
- Well, I couldn't get to his house. (Grade 10D female)
- One always works better in a comfortable surrounding (home), on their own machine. Food, music and your personal choice of programs are available. No people, no unfamiliar programs, no worries. (Grade 11D male)

- It was quiet most of the time and I could always take a break to go and dig in the fridge. But most of the time I would get so involved in my work I would lose track of time and forget to eat!!! (Grade 11D female)

Figure 5 - 24 graphically represents the rationale of the learners with respect to selecting the venue where they worked frequently. The major differences between the two grades are that for Grade 10D help and a relaxed environment are important, whereas in Grade 11D suitable preferred software is important. It must be remembered that Grade 11D knew what could be done as they had had lessons showing the advanced features of *FrontPage* and other software, see Table 5 - 6, whereas Grade 10D were just trying to cope with the basic *FrontPage* application. For both classes, Internet access and a central venue were important factors in selecting a work area. (There is a bit of uncertainty here. I believe that when the Grade 10Ds referred to Internet access they may have meant email access, a method of sending files from one computer to another in a computer laboratory.)

Figure 5 - 24 Required features for work environment



From the preceding discussion the reasons so many Grade 10D learners spent time in the computer laboratory, after school, working on their *ThinkQuest* web sites, is clear. They needed a central venue and human help, although in the computer laboratory I was seldom called upon to give help. Grade 11D learners worked at

home as their homes had additional software, i.e. *Dreamweaver* and *Flash*, and Internet access which the computer laboratory computers did not have.

5.3.2 Presenting information

The learners had to upload their sites to the *ThinkQuest* server. This was very challenging to the Grade 10D learners and their coaches. The cost of staying on line exacerbated their problems as many of them did not read the instructions on the *ThinkQuest* server clearly. The main problem was that some learners did not call their index page 'index' and the server only accepted that file as the main file; and others did not have the correct path for their graphics so when it was uploaded no graphics were shown.

- Grade 10D - Only seven of the initial 11 entries were uploaded in time, although all were eventually completed.
- Grade 11D - Eleven of the 14 entries were uploaded in time, two were completed after the cut off and one was never completed.

5.3.3 Summary of interaction with information from a physical perspective

The manner in which the learners interacted with information from a physical perspective while involved in the process of creating their entries *at a distance* was discussed in the preceding section. The findings are summarised and tabulated in Table 5 - 16, looking at how the learners processed and planned information, and presented information.

Table 5 - 16 How the learners interacted with information from a physical perspective during the process of creating the *ThinkQuest* entry

Physical perspective	Physical interaction
Processing / planning information	• Novice web creators worked at school whilst experienced web creators worked at home. • Novice learners prefered to work where there was access to help despite other inconveniences. • In the work area access to the preferred personal programs was of paramount importance to experienced users.
Presenting information	• Making a web presented a number of learners with a programming problem related to the correct path. • Uploading the site to the *ThinkQuest* host was a huge technical challenge to the teams and their coaches.

Table 5 - 16 tabulated how the learners physically worked in a digital information environment when creating their *ThinkQuest* web entries. Learners worked at home

or at school depending on their skills, novice users working at school; and experienced learners working at home using their choice of software. Programming and technical problems relating to file paths and uploading of files respectively proved a problem to a number of learners.

Table 5 - 17 indicates where the physical behaviours or activities tabulated in the literature review, Table 2 - 28, and the way in which the learners created the web entries *at a distance,* have common ground. Due to the circumstances of creating the web site *at a distance* few such behaviours or activities were observed.

Table 5 - 17 Comparing physical behaviour or activity from the literature with the way in which the learners created their *ThinkQuest* entries

Physical perspective	Physical behaviour or activity from the literature review	Common ground	Interaction with information while creating the *ThinkQuest* web entry
Processing / planning information	• Work / learn actively doing things	NA	• Opportunity was not presented to observe this.
	• Work / learn in a group with talking	NA	• Opportunity was not presented to observe this.
	• Work with partner, share ideas and copies work	NA	• Opportunity was not presented to observe this, worked in team so not applicable.
	• Not found in the literature study	⇨	• Novice learners prefer to work where there is access to help. • Access to the preferred personal programs was of paramount importance to experienced users.
Presenting information	• No specific information found in the literature review	⇨	• Uploading a web to a server was a great technical problem.

Tabulated in Table 5 - 17 behaviours or activities *not found* in the literature review but present at PHS when the learners created a web site at a distance were:

- Novice learners prefer to work where there is access to help.
- Access to the preferred personal programs was of paramount importance to experienced users.
- Uploading a web to a server was a great technical problem.

There was no concurrence between the behaviours or activities in Table 5 - 17 and those present in Table 2 - 28 where the physical profile of a South African FET learner in a digital environment was tabulated based on the literature review.

5.4 Conclusion of analysis

This thesis describes how learners interacted with information in a digital environment from cognitive, affective or physical perspectives while this case study describes how learners interacted with information in a digital environment from cognitive, affective and physical perspectives *at a distance* when they created entries for the *ThinkQuest* web design competition.

The analysis looked at how novice Grade 10D learners and experienced Grade 11D learners interacted with information from cognitive, affective and physical perspectives while creating their *ThinkQuest* entries. The perspectives used for the cognitive, affective and physical activities were taken from the literature review.

Tables 5 - 18, 5 - 19 and 5 - 20 summarise the way the learners at PHS interacted with information while creating their *ThinkQuest* web entries from cognitive, affective and physical perspectives respectively. In each table the perspective and forms of behaviour or activity are drawn from the literature review, to introduce the way the learners interacted with information. Based on the evidence, in a situation where learners interact with information *at a distance*, the main areas of interaction are in the affective and cognitive areas, tabulated in Table 5 - 18 and Table 5 - 19.

Table 5 - 18 Evidence of interaction with information in a distance educational digital environment from a cognitive perspective

Cognitive perspective	Cognitive behaviour or acitivty	Interaction with information in a distance educational digital environment
Acquiring information	• Learning and mentally processing information	• Learners gained web-authoring skills as they created the entries. • Learners used a variety of resources to obtain information, those new to web-authoring mainly from the World Wide Web and those experienced in web-authoring from printed resources
Recalling information	• Long term memory recalled	• Not observed.
Processing / planning information	• Planning / creating of digital projects	• A level of planning is evident.
	• Use of higher-level thinking skills	• Higher-level thinking skills were used in structuring the webs on two levels, a format found in most webs. Frames, indicating higher-level thinking skills, were used by a number of learners although Grade 10D learners were not successful. Quizzes found in half of the entries indicated higher-level thinking skills.
Presenting information	• Cognitive processing of screen-based material	• Very few spelling errors noted.
	• Ability to communicate their understanding of the subject matter in multiple formats	• Learners did not communicate their content in multiple formats, mainly staying with static images, thumbnails and text-based content.

Table 5 - 19 Evidence of interaction with information in a distance educational digital environment from an affective perspective

Affective perspective	Affective behaviour or activity	Interaction with information in a distance educational digital environment
Motivation	• Intrinsic motivation	• Learners were proud of their web entries: both groups were proud that they had managed to create a web, on the World Wide Web, for everyone to see.
	• Extrinsic motivation	• Marks and grades were the major motivating factor.
	• Types of motivation for different ability learners	• The novice Grade 10D learners were proud of the content of the web. • Experienced Grade 11D learners were proud of the interactive features of the web, although there were few.
Influence of peers	• Social environment	• The majority of the learners enjoyed working with their team members. • Conflict experienced creating the web was not brought to the classroom. • The learners were supportive of their team members. • Friendship was the main criteria for team selection, and not marks. • Novice learners learned from each other. • Learners were knowledgeable about their own computer skills, in comparison to those of others.
	• Critical appraisal of own digital creations	• Learners did not exhibit the need to impress others, rather to show what could be done.
	• Group ownership of created material	• The learners worked and learned with group ownership as they were making a group or team entry.
Managing time	• Time spent on work	• A short time was spent on the entry, having wasted time and procrastinated.
	• Meeting deadlines	• Most of the learners were a few days short of the deadline, i.e. most did not keep to the deadlines.
Mental state	• Computer anxiety	• The Grade 10D novice users were more stressed by the malfunctioning computers and printers than the experienced Grade 11D learners. • Novice learners preferred to work where there was access to help. • Uploading a web to a server was a stressful technical problem.
	• Willingness to explore the digital unknown	• Experienced Grade 11D learners learned the web-authoring skills more from exploring the packages themselves than other features. The experienced learners explored packages to learn new skills.

Table 5 - 20 Evidence of interaction with information in a distance educational digital environment from a physical perspective

Physical perspective	Physical behaviour or activity	Interaction with information in a distance educational digital environment
Processing / planning information	• Work / learn actively doing things	• Nothing noted.
	• Work / learn in a group with talking	• Nothing noted.
	• Work with partner, share ideas and copy work	• This was an integral part of the project.
	• Choice of software	• Access to the preferred personal programs was of paramount importance to experienced users.

The preceding Tables 5 - 18, 5 - 19 and 5 - 30 illustrate how, from cognitive, affective and physical perspectives, learners at PHS acquire, recall, process and plan, and present information in a digital environment *at a distance*. The way in which the learners are motivated and influenced by their peers is described and their mental state noted. To summarise the information:

- Learners gained web-authoring skills while they created the entries. Various sources were used to obtain information, experienced web developers preferring sources other than the World Wide Web.
- The development of web sites lends itself to higher-level thinking skills which were evident in the work. The web sites did not exhibit information in many formats, remaining with the known features of graphic, thumbnail and text.
- Creating their own web site about a topic of their own choice, and placing it in the public domain intrinsically motivated the learners, while the extrinsic motivation of obtaining good marks was also very important to the learners.
- The learners enjoyed working with their partners as a team and kept personal conflicts to themselves, not bringing them to the classroom where they interacted with their *ThinkQuest* partners on an almost daily basis.
- The learners did not plan their work with respect to time, left the work until late, and only spent a relatively short time creating the entry.
- Novice learners were stressed by malfunctioning computers and found emotional security working in an environment where there was technical assistance.
- Experienced learners learned aspects of the web-authoring packages more so on their own than with someone teaching them.

6 Measures to ensure validity and reliability

Measures were taken to ensure validity and reliability. In order to enhance internal validity the strategies based on Merriam (1998, p. 204) and McMillan and Schumacher (1993, p. 391) were used. These strategies included triangulation, long-term observation, member checks or learner validation, field research and looking at researcher's bias.

6.1 Triangulation

In order to triangulate the findings the

- learners were observed as they worked;
- entries were examined by learners and myself to find specific features;

- data was collected via a questionnaire, analysed, collated and then examined by the participants; and
- learners confirmed the data of the case study.

6.2 Observation of the learners

I had the privilege of teaching the Grade 10D learners for the year in which they participated in the *ThinkQuest* web design competition. During this period I observed and got to know them so that I was able to verify the data in the questionnaire. I taught Grade 11D for a full year before they entered the *ThinkQuest* competition, and then the year in which they took part in the competition. During both years I taught the learners one period a day, or every day of the week. I got to know the learners through the long-term teaching and observation.

6.3 Learner validation of the printed case study

The learners were shown this chapter with the statistical data and results of the questionnaire. They were asked to check my interpretation. They looked at the statistics first and found them interesting, and then they looked down at the quotations trying to find if their comments had been chosen. They checked that I had not identified them. The learners did not find anything amiss in the interpretation or, if they did, they did not communicate it to me.

6.4 Field research and questionnaire

The research was done as part of the ongoing aim to improve teaching at the school. The school subscribes to the tenets of Total Quality Management so completing a questionnaire to analyse how things were done is part of usual schoolwork.

Learners were asked to complete the questionnaire found in Appendix I when they had completed the web entry, as data captured from the questionnaire would improve the subject teaching, project work and *ThinkQuest* entry organisation in the future. The learners believed me and completed the entry with honesty, in most cases, see 5.2.2.3, Team conflict, where I am sure the learners did not tell the truth. The following illustrates the faith of the learners in the privacy of the questionnaire, and the open and honest way in which they completed the questions:

> My first partner was apparently xxx xxx. But because you said that this report back was private and based on honesty, I feel that I have to say that she was totally made up. I am the kind of person that works on her own and can't really see myself working with people for such a big project and over such a long period of time. So what I did was approach xxx xxx and my second partner yyy yyy and asked them if I could use them and their names when I entered ThinkQuest because you had to be in a team. Reluctantly they agreed. So they weren't technically made up, but they weren't exactly team members. I hope that this honesty doesn't affect my year end marks because that is the main thing I am worried about. (Grade 11 learner)

When the learners were given the questionnaire I first read it aloud to the learners explaining the few ambiguities. They

- completed the questionnaire in a double-period during class time on computer in total silence and in secrecy;
- did not seem to find anything wrong with the questions and would have complained if they had thought the questions infringed on their privacy or were a waste of time; and
- were aware that I was trying to find a way to improve matters in the teaching and organisation of the subject.

The data collected was read on the basis of knowing the learners, and in conjunction with their partners' answers. Where there were strange answers they were corroborated with that of the fellow team member or in an interview with the learner.

6.5 Researcher bias

My underlying bias, if there is one, is to find a way to get my learners to work well and in the future do well in large projects and in the *ThinkQuest* web design competition in particular.

With my level of experience with the *FrontPage* application and *ThinkQuest* organisation, tabulated in Table 5 - 21, I had time to focus on the learners' interaction with information in creating the competition entry.

Table 5 - 21 Author's knowledge of the *ThinkQuest* competition and web-authoring with *FrontPage* in a teaching situation

Author's knowledge	
Subject	• I have taught the subject Computer Studies Standard Grade (SG) since 1997.
Learners	• Grade 10D learners were in their first year doing the subject Computer Studies SG with me. • Grade 11D learners knew me well as I had taught them for one year already in Grade 10 doing Computer Studies SG. • I taught each class for one period a day, every day of the week, for the whole school year.
ThinkQuest	• The school and I have been involved with *ThinkQuest* since 1998 as seen in Table 5 - 22. • I knew the *ThinkQuest* organisation and mode of operating after three years of judging, and managing the project with one Grade 11 class in 2000.
Web editor	• I wrote tip sheets on the web-authoring application *FrontPage* for the South African *ThinkQuest* organisers and their CD, and knew the application.

The involvement of the school and myself, nationally and internationally, with *ThinkQuest* is tabulated in Table 5 - 22. After so much experience with *ThinkQuest* my comments and evaluation of web entries is based on experience and is considered valid.

Table 5 - 22 Involvement of the author and Pinelands High School in the competition

Year	Author judging	Learner recognition	Mass entries
1998	• National • International	• National - Nothing • International - Nothing	• None
1999	• National • International	• National - Nothing • International - Nothing	• Two learners in Grade 9 enter competition. • Many learners in Grade 12 enter competition for their Matriculation project
2000	• National	• National - Nothing • International - Two learners (one team) in Grade 10 reach semi-finals	• Whole of one Grade 11 class enter competition - ± 30 learners
2001	• International	• National - Nothing • International - Two learners (one team) in Grade 11 reach semi-finals	• Two classes, Grade 10D and Grade 11D, enter competition - ± 70 learners

I have endeavoured to make the results valid and reliable by having the participants openly respond to questions, check information collected and use participants' language.

7 Summary

Case Study 1 is an investigation into how learners create an entry for the *ThinkQuest* web design competition *at a distance* in a digital environment. The chapter commenced by describing the diversity of participants in the study looking at:

- Numbers of learners who completed the entry and questionnaire
- Distribution of learners by race and gender
- Numbers of learners who submitted their entries
- Ownership and use of digital devices

The data collection methods were described looking at observation, the event log, the questionnaire, document analysis and interviews. The process of making the entry was described from setting the Background, to the Start, In progress and Submission stages. The completed entries and the questionnaire were analysed with respect to how the learners created the entry from cognitive, affective and physical perspectives. A detailed profile indicating how they interacted with information *in a distance* digital environment was developed. The chapter concluded by describing the measures taken to ensure validity and reliability.

Case Study 2 will be examined in a similar way, looking at how learners interacted with information from cognitive, affective and physical perspectives while creating a web-based CV in a *contact* digital environment.