Questions from the Forest

Interactive Multimedia Evaluation

An Interactive Qualifying Project Report

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Abstract

This report, prepared for the Zoological Parks and Gardens Board of Victoria, Australia, investigates the Questions from the Forest interactive multimedia. By using interviews, surveys, focus groups, observations of users, and by consulting with marketing experts, we determined that the software was an effective learning tool. Additionally, we determined that educational software is an attractive product for the Melbourne Zoo's target audience. Finally, we compiled recommendations for the zoo to follow when investing in similar ventures in the future.

Acknowledgements

Authorship Page

This document was produced through a collaborative and unified effort of all team members. Each member played an integral part in background research, methodology planning and implementation, data analysis, conclusions, and the creation of recommendations. Please regard all sections of this report as a single document produced by our team.

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Executive Summary

In March of 2003, the Zoological Parks and Gardens Board of Victoria (ZPGB) released the Questions from the Forest software bundle, a pilot multimedia venture designed to inform the public about the Asian Elephant and Elongated Tortoise, two species that are becoming increasingly endangered. There are four interactive programs which, in addition to being sold separately to zoo patrons in a CD-ROM version, are located on computer stations at informational kiosks in the Melbourne Zoo. The computer stations serve as a supplemental element of interpretation to the Trail of the Elephants exhibit. Having never experimented with this type of technology before, Zoos Victoria wanted to establish whether investing in similar projects in the future would be worthwhile.

The research goals of this project were the following:

- Evaluate the effectiveness of the Questions from the Forest CD-ROM as a learning tool

- Determine the expectations of potential buyers for educational multimedia.

To examine the software's effectiveness as a learning tool, we had to assess its ability to teach and engage both in the classroom and zoo environments. To evaluate the software in the classroom setting, we interviewed, tested, and observed children using the software and conducted a focus group with primary school teachers. Additionally, the teachers rated each program using an evaluative scale for developmental appropriateness. To determine whether the Questions from the Forest multimedia is an effective learning supplement in the zoo setting, we observed children who used the interactive kiosks located within the exhibit itself.

In addition to evaluating the educational effectiveness, we also examined the preferences of the CD-ROM's target market. To better understand the consumer expectations of parents, teachers, and children we conducted a focus group with teachers, surveyed adults exiting the exhibit, and interviewed marketing experts.

Upon compiling and analyzing our results, we found that the Questions from the Forest interactive software is an effective means of communicating the message of environmental conservation and awareness in the classroom environment. The results from our testing indicated that most students retained a majority of material when they used the software in the classroom. Also, in our observation work children displayed behaviors indicative of involvement in learning processes. Furthermore, teachers indicated that they were pleased with the programs and the software would make an effective computer-based supplement to their lesson plans and activities.

In the zoo environment, we discovered that there are several factors that hinder learning at the kiosks including: lack of initial engagement, impatience of parents, and children using software that is inappropriate for their age group. However, when the software was used for an adequate amount of time in the proper manner, we concluded that children were actively involved in the learning process.

Our focus group with primary school teachers helped us to further understand teacher expectations and considerations when choosing educational software for use in the classroom. The teachers valued a student's ability to use software independently very highly. Additionally they stressed the importance of educational software being entertaining and fun for the child to use. Other considerations teachers commented on were cost and ability to integrate the software into their curriculum.

From the 464 questionnaires we administered, we learned that parents were not as concerned with cost as long as the software was a quality product. Most parents also

identified content, ease of use, technical features, and age appropriateness as very important attributes of educational software.

Based upon these conclusions, we made several recommendations to Zoos Victoria, such as the following:

- promote learning in educational software by appealing to the desires of children;

- improve interactive kiosks in the zoo to encourage extended engagement;

- enhance advertising efforts and look into alternate methods including off-site advertisements and demo CD-ROMs.

These recommendations, along with our findings, were compiled into this report. Additionally, we developed an abridged version for the internal zoo staff that documented our conclusions and recommendations for this project. These documents are meant to assist Zoos Victoria when considering multimedia ventures in the future.

1 Introduction

Environmental conservation and wildlife preservation have become pressing issues in Australia. Species become increasingly endangered every day as a result of negative human interaction with the environment, such as pollution, deforestation, development, and poaching. Victoria's Zoological Parks and Gardens Board is committed to promoting programs to educate and inform the public about such matters. If people remain ignorant of the issues behind species extinction, such animals will continue to face an uncertain future. Ideally, everyone would understand the impact of the destruction of nature and its effect on the endangerment of plants and animals. With this knowledge they could take measures to reduce and remedy the crisis that is currently facing wildlife. While Zoos Victoria cannot

Figure 1.1: Make a Difference Sign
(Source: Grinstein, April 15, 2004)

expect to reach everyone, they hope to affect as diverse and widespread an audience as possible. Since the future of our world lies in the hands of children, it follows that Zoos Victoria would want to target, among other audiences, young minds of the next

generation. How to reach this audience effectively is one of the biggest challenges Zoos Victoria faces. Not only must the Zoo consider the most useful methods of communicating the message of conservation and animal preservation to adults and children, it must also consider the best way to market these methods.

One method identified by Zoos Victoria of educating youth is the use of computer-based learning tools. To investigate the feasibility and success of this approach they have launched a pilot venture featuring an interactive software bundle that parallels a new exhibit at the Melbourne Zoo, the Trail of the Elephants. This retail product consists of four interactive learning programs, which specifically target primary school children. The interactives[1] are designed for three different uses: to be an element of interpretation via informational kiosks that enhance the experience of patrons who visit the exhibit, to be sold as an educational supplement to a teacher resource package, and finally to be sold in the zoo's retail shops for visitors to purchase. While the venture seems promising, Zoos Victoria is unsure about whether the programs effectively educate children and what the market's expectations are for educational multimedia in general.

The first issue associated with this project concerns the efficacy of educational multimedia as a learning tool. In the zoo setting, the Questions from the Forest interactives provide an extension of the traditional zoo experience. Zoos Victoria wants to discover if these programs are an effective means of conveying information to zoo visitors. In a similar venture, Zoo Atlanta in Georgia, USA, has created a virtual reality program to supplement their gorilla exhibit. The virtual reality experience allows the user to become a gorilla, with the hope of teaching zoo visitors about the dangers that the

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[1]The term interactive is used often in the zoo to refer to the interactive programs from the Trail of the Elephants CD-ROM.

gorilla faces. Also in the United States, the Ecotarium of Worcester, Massachusetts, has also developed an educational CD-ROM designed to further their conservation programs aimed at school children. The programs designed by these two organizations share the same goals as the Questions from the Forest CD-ROM – to enhance the learning experience provided by a zoo exhibit and to reach different types of learners.

The second problem associated with this project involves understanding the expectations of the target market of the Questions from the Forest software. Even if the product accomplishes its educational objectives, it is still vital that it be attractive to potential buyers and meets their needs. To determine specifically what children and parents want in products, InZone Brands of Atlanta, GA USA uses a nationally selected board of children (Cioletti, 2003, p. 11). The board is comprised of 15 children from states across the United States from ages 8 to 12. These children brainstorm and offer input on desirable features, packaging ideas, and general marketing techniques. InZone uses these children to understand what is attractive to America's youth. The findings from these focus groups were used to create their Bellywashers line of drinks packaged in bottles shaped in the form of popular comic book characters. Thompson Learning of Australia also uses focus groups of children and parents to test and evaluate the market of their educational products. Nikki Unsworth, General Manager of Thompson's school division, explained that focus groups and observational work are the primary means of evaluating whether a product will be successful before taking the product to market (personal communication, March 30, 2004).

Because the Questions from the Forest interactive software was a pilot product venture, Zoos Victoria wanted to establish whether investing in similar projects in the future would be worthwhile. The learning programs on the kiosks were designed to complete the immersive experience of the Trail of the Elephants, explaining the

connection between humans and elephants. However, it remained to be determined whether the multimedia actually engaged visitors enough to deliver the message. It was also unclear as to what extent users learned and retained the information presented by the interactives. In addition to researching the educational value of these programs, Zoos Victoria sought to discover the qualities that might make them attractive to parents and teachers. To obtain the desired information regarding the CD-ROM, Zoos Victoria initiated this project.

The goals of this project stemmed from these needs; we had to determine whether or not the Questions from the Forest software bundle was an effective learning tool as well as determine the market expectations of this product. In order to achieve these goals we initially reviewed a wide variety of relevant literature and background materials to gain a deeper understanding of the problems and related topics. We performed observational studies and interviews with primary school students, surveyed visitors to the Trail of the Elephants, and observed those who had an opportunity to use the programs. Additionally, we interviewed marketing experts and used a focus group with teachers to further understand buyer expectations.

These methods yielded results from which we concluded that the interactive programs are effective learning aids and that teachers and parents want educational software that is engaging, entertaining, and informative. Based on our conclusions we prepared a set of recommendations for Zoos Victoria with suggestions for improvements to future ventures involving educational multimedia.

2 Background and Literature Review

In order to evaluate the Questions from the Forest CD-ROM from both educational and marketing perspectives and determine how similar ventures might be undertaken in the future, it is first necessary to understand the concepts and background material that this project is built upon. These topics include the Trail of the Elephants experience, types of electronic learning methods, and information regarding consumer expectations.

2.1 The Trail of the Elephants

"Melbourne Zoo will be a 'window on the world', where the diversity of the world's species, and its relationships with human cultures, will be explored. It will be a forum not only for discovery, but participation in shaping solutions to living sustainably with the natural world" (Zoos Victoria (c), 2003, p. 11). This philosophy is the cornerstone of exhibit design and educational programs at Melbourne Zoo.

The underlying motive behind the creation of Zoos Victoria's Trail of the Elephants exhibit and CD-ROM is to promote environmental awareness, more specifically, the conservation of nature and preservation of wildlife. This purpose directly relates to the mission of zoos – to ensure the survival of endangered species and to motivate and educate the public in the area of environmental conservation. (See Appendix B for more on environmental conservation.) The CD-ROM is one way that Zoos Victoria seeks to accomplish its mission in educating the public.

2.1.1 The Exhibit

Figure 2.1: Trail of the Elephants Entrance
(Source: Grinstein, April 17, 2004)

The Trail of the Elephants exhibit at the Melbourne Zoo is designed to be an immersive experience for zoo visitors. There are three types of visitors to the zoo, who can be classified based upon interest level in the learning experiences that supplement viewing the animals. The first classification of visitor is the informal spectator who comes only for the experience of watching animals in person. The second type of visitor is the person who becomes casually engaged in the educational information presented by the zoo, reading signs and listening to talks. The third type of visitor becomes engrossed in the learning experience; enthusiastically seeking out more detailed information by actively participating and asking questions (Aughterson, personal communication, March 16, 2004). The latter two visitor types with enhanced interest levels in environmental education are the target of the Melbourne Zoo's learning programs, such as the Questions from the Forest multimedia.

Through its learning programs, the Melbourne Zoo tries to convey to its visitors a message about the importance of wildlife conservation. The Trail of the Elephants

exhibit communicates this message through the information presented along the trail and

the interactive kiosks located at the end.

① OUTDOOR FACILITIES
- 2.3 hectares site
- Walking trails
- Scratching posts and logs
- Swimming and plunge pools

② THE BARN
- Serviced daily
- Heating and cooling systems
- Separate male/female facilities
- Provides for family living

③ SHOPS AND AMENITIES
- Gift shop
- Function Centre
- Hawker Stalls
- Outdoor dining watching the elephants

④ ACTIVITIES AVAILABLE (FOR ELEPHANTS)
- Supervised fitness program
- Painting
- Daily wash-down
- Music program

⑤ FIELD STATION
Use multi-media to:
- Track an elephant
- Rescue a turtle

⑥ MAKE A DIFFERENCE
- Help save elephants
- Discover the work of Zoos Victoria in S.E. Asia

⑦ ELEPHANTS AND HUMANS
Watch a video about:
- Training elephants
- Working elephants
- Elephants raiding crops

⑧ FULLY LANDSCAPED
- Over 40,000 plants
- Bamboo forest
- Fields of vegetables

Figure 2.2: Trail of the Elephants Exhibit Map
(Zoos Victoria (a), 2003, Overview of the Trail of the Elephants)

The trail itself simulates a typical Thai village with rice fields, rural Thai buildings, and bamboo forests. "It will transport visitors into the realm of an Asian village, where elephants have great significance in the lives of the inhabitants" (Zoos Victoria (c), 2003, p. 16). The virtual environment created attempts to capture the interactions that take place between humans and elephants in Thai culture. There is an emphasis on cultural representation not seen at other Melbourne Zoo exhibits (Zoos Victoria (a), 2003, Overview of Trail of the Elephants). The learning programs available at the computer kiosks within the exhibit offer an element of interpretation concerning human-elephant interactions, in an attempt to complete the message that visitors will hopefully take with them (Aughterson, personal communication, March 16, 2004). This electronic medium offers an in-depth supplement to the information presented throughout the exhibit. The atmosphere of the trail, the interactive kiosks, and the animals themselves all come together to provide an engrossing experience for the involved visitor about how humans interact with elephants and tortoises in Thailand. "The Trail of the Elephants will be a journey of discovery, a holistic, immersion experience" (Zoos Victoria (c), 2003, p. 16).

Figure 2.3: Thai Garden and Hut at Trail of the Elephants
(Source: Grinstein, April 15, 2004)

2.1.2 Evidence of Learning in the Zoo

The assessment of learning in a zoo setting is difficult for several reasons. A zoo environment is very different from a structured classroom experience, and often visitors learn material in zoos which is not revealed through formal testing (Birney, 1995, p.175). It has been found that zoo patrons have a hard time remembering specific facts or details from the exhibits that they have visited (Falk and Dierking, 1992, pp. 58-63). It is not that they do not learn anything about the animals, but rather that "formal, school-based instruments disregard the notion that learning is incremental and [zoos] form only a part of the consolidation and growth of ideas" (Griffin & Symington, 1998, p. 8).

Figure 2.4: Zoo Learning Experience
(Source: Grinstein, April 17, 2004)

Unlike a classroom setting, the learning that takes place in a zoo is more informal and intrinsically motivated (Ramsey-Gassert, Walberg & Walberg, 1994, pp. 347-350). The visitor learns about human relationships with animals in the world through curiosity, observation and activity. Instead of being fed information or reading from texts, the

learning is experiential. The visitor learns in a hands-on manner, becoming involved with the material with which they are engaged. One of the latest theories of learning and knowledge that is being embraced by zoos and museums is the idea of Constructivism (Hein, 1991, Constructivist Learning Theory).

The theory of Constructivism contends that knowledge is gained through learners constructing meaning for themselves (Hein, 1991, Constructivist Learning Theory). This theory differs from traditional theories of learning in that there are no set ideas or thoughts that the learner is expected to remember or understand. Instead, learners add their own meaning to the information that they receive from their own experiences and observations. One disadvantage of this theory is that, in practical settings, it is difficult to assess *what* has been learned. Alternatively, it is possible to assess whether in fact learning has taken place by looking for typified reactions and indicators.

Building upon the work of other educators and epistemologists, Janette Griffin and David Symington developed a set of indicators to identify whether or not learning has taken place in a museum or zoo setting (Griffin & Symington, 1998, p. 11). Based on seven key behaviors that are indicative of favorable conditions of learning, the following list can be used and analyzed to determine if learning has taken place.

Table 2.1: Indicators of Student Engagement in Learning Processes in a Museum Setting

a. showing responsibility for and initiating their own learning:
- know what they want to look for/ making choices;
- writing/ drawing/ taking photos by choice;
- talking to themselves;
- deciding where and when to move.

b. actively involved in learning:
- standing and looking/ reading
- exhibiting curiosity & interest by engaging with an exhibit;
- absorbed, close, concentrated examination;
- persevering with a task e.g. drawing.

c. purposefully manipulating and playing with objects and ideas:
- handling exhibits with care and interest;
- purposefully 'playing' with exhibit elements/ using hands on exhibits as intended.

d. making links and transferring ideas and skills:
- comparing exhibits;
- referring to their prepared questions;
- comparing/ referring to previous knowledge/ experiences.

e. sharing learning with peers and experts:
- talking and pointing;
- pulling others to show them something;
- willingness to be pulled to see others' interests;
- group members talking and listening;
- asking each other questions;
- talking to adults / experts (e.g. teacher or museum staff).

f. showing confidence in personal learning abilities:
- asking questions of displays;
- explaining to peers;
- reading to peers;
- comparing information with another source.

g. responding to new information or evidence:
- evidence of changing views;
- evidence of discovering new ideas.

(Source: Griffin & Symington, 2003, p. 11)

In an environment like the Melbourne Zoo, the presence of these given behaviors provides evidence of learning processes occurring. By focusing on whether the subject exhibits these indicators a researcher can conduct more efficient and effective observations. This method has been used in various museums to assess learning. (Griffin & Symington, 1998, p. 13) The Australian Museum in Sydney has employed this technique in their video-recorded observations of school children to analyze whether students appeared to be learning from various exhibits located throughout the museum.

We adapted this list of indicators for the observational work that we performed both at the zoo and in local primary schools. We noted the reactions and behaviors of children using the programs, and referred to Table 2.1 to determine whether learning took place.

Figure 2.5: Sharing Learning with Peers – Pointing
(Source: Grinstein, April 17, 2004)

2.2 Electronic Educational Aids

Compared to the traditional methods, Computer Based Instruction (CBI) and Intelligent Tutoring Systems (ITS) offer fundamentally different approaches to teaching. When used as an interactive learning tool, they help the user to become intellectually engaged to complete a lesson. The environment established by such an educational method alters the instructional context, "opening the door to levels of effectiveness not obtainable through didactic presentation alone" (Arons, 1984, p. 1051). Using software to deliver information is also beneficial because it can be delivered to a virtually unlimited audience without a significant increase in cost. In the following section, benefits, implementation methodologies and design/evaluation strategies of such systems are examined.

2.2.1 Benefits and Trade-offs of CBI and ITS

There are several benefits associated with CBI and ITS that cannot be obtained through more traditional instructional media. The computer display can be employed in a variety of ways that other devices cannot be, with integrated multimedia and selective change. This is especially effective with children because sounds, images, and activities can be integrated in fun and exciting ways to engage them (Fairweather & Gibbons, 1998, chap.1). A computer can also accept input from multiple students in a variety of ways, allowing the student to employ a mouse, light pen, joystick, keyboard, or other device. The computer is also able to process things very quickly and allows the student the ability to select between multiple courses of action or alternatives. Games and tutorials can be created in such a way that users feel like they have exploratory freedom.

Yet another benefit associated with CBI and ITS is their ability to remember past information about the student's input and apply it in future decisions (Fairweather & Gibbons, 1998, chap.1). CBI can keep a constantly changing profile about the student's

progress and performance and use it to plot the future path of instruction. The computer can accurately remember responses and scores, examine data accumulated for several students, and remember personal student information.

While there are many benefits of computer based instructional methods, there are also drawbacks associated with the approach (Fairweather & Gibbons, 1998, chap. 1). CBI and ITS methods can be expensive to implement and sometimes are not intuitive. As computer hardware can also be expensive, access to these educational methods is sometimes unavailable. Also, while CBI and ITS can mimic one-on-one attention, they are unable to provide feedback to questions or respond with further explanation when needed.

2.2.2 Learning Models of Educational Media

There are several methods of delivering educational material through electronic means. The Questions from the Forest CD-ROM draws upon several learning models that are used differently in each of the programs. There are four programs that are part of the Questions from the Forest package: Ellie's Journey, Meet my Family, Turtle Investigation, and Field Mission. These programs can be purchased separately by zoo patrons or be purchased as a bundle by teachers. The following sections discuss which model each program follows and briefly describe each program in further detail.

2.2.2a Ellie's Journey: The Drill and Practice Model

The drill and practice method is among the most common and least sophisticated models of educational software. The drill and practice method is not very effective in teaching the learner new information, but rather helps to reinforce or perfect performance (Geisert & Futrell, 1995, p. 138). Usually the drill and practice method is helpful in increasing the speed or accuracy in a given skill, but the model can also be used

to test knowledge after the learner receives information. The typical drill and practice pattern is shown in Figure 2.6.
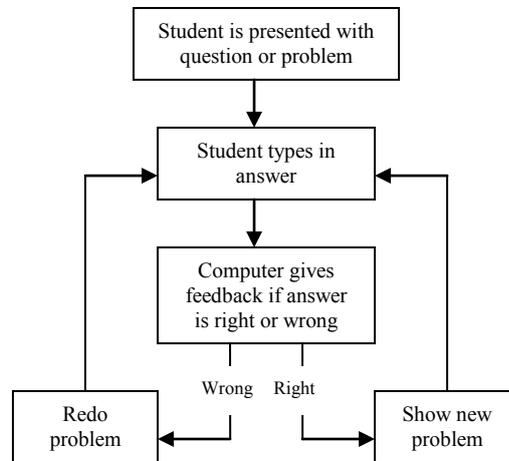
Figure 2.6: Drill and Practice Model
(Source: Geisert &Futrell, 1995, p. 138)

Ellie's Journey on the Questions from the Forest interactive CD-ROM follows an Elongated Tortoise through its lifecycle. Throughout the game the drill method is used by prompting the user to answer questions as shown in Figure 2.7.
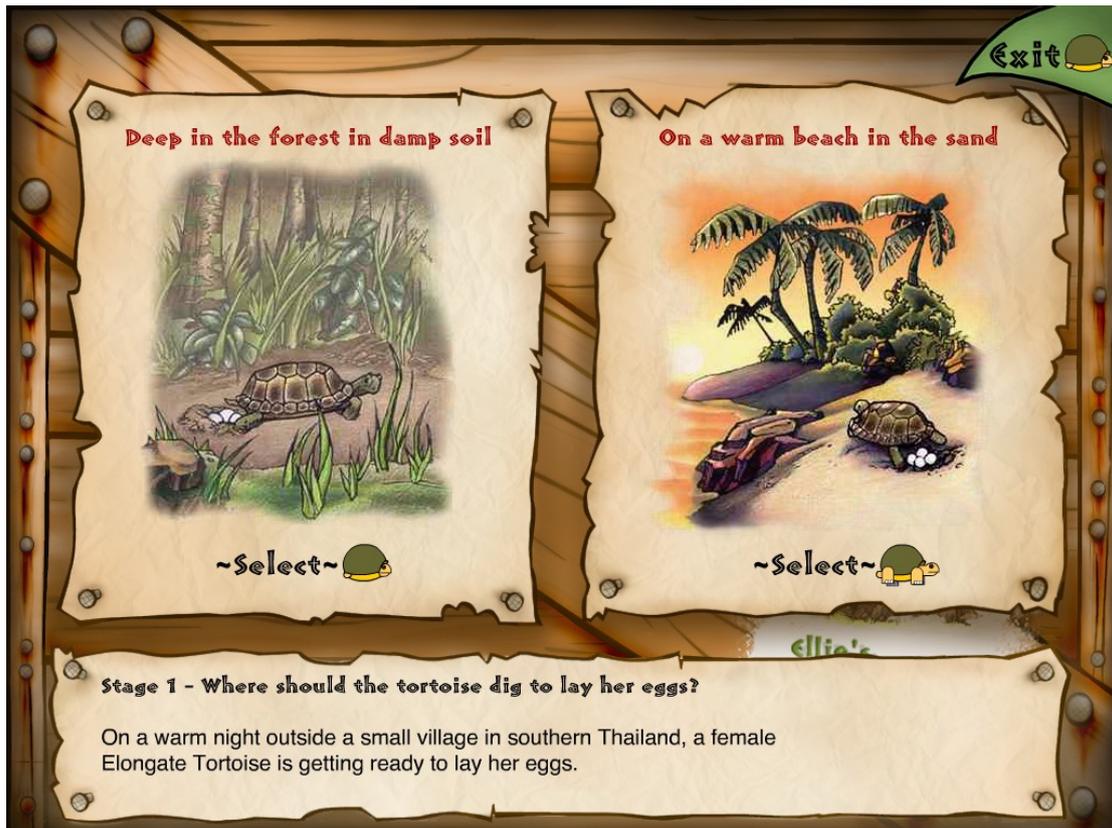
Figure 2.7: Ellie's Journey Screenshot
(Source: Zoos Victoria (d), 2003, Ellie's Journey)

The user is motivated by a desire to follow the life of the tortoise and progress through subsequent questions. If the user answers the question correctly, they step forward through the life of the tortoise. If they are incorrect, they are prompted to re-answer the question with a hint or additional information provided (Zoos Victoria (d), 2002, Ellie's Journey). The drill and practice method is particularly effective when attempting to educate younger audiences (Geisert & Futrell, 1995, p. 138). As Ellie's Journey is a program designed for ages 5-8, the drill and practice model is very appropriate.

2.2.2b Meet my Family: The Tutorial Model

The simple tutorial model is another method that is widely used in educational software. Tutorials are programs that take the role of the instructor by presenting information and guiding the learner interactively throughout the lesson (Fairweather & Gibbons, 1998, p. 413). Tutorials are generally used to teach a student new information, as opposed to testing retention or accuracy like the drill method. A good tutorial "...will engage the student with [an] interesting stimulus while providing outlets to explore and learn by interacting with the computer interface" (Fairweather & Gibbons, 1998, p. 415). Tutorials guide the user through a sequence of events in order to explain and elaborate upon material. Combining visual and aural data as well as requiring the user to actively engage with the learning environment, tutorials are among the most effective means of teaching.

Figure 2.8: Meet My Family Screenshot
(Source: Zoos Victoria (d), 2003, Meet My Family)

Meet my Family, the program designed for ages 8-10, uses the tutorial model to deliver information on how elephants and humans interact in daily life in Thailand. The story follows Susa (a young girl) and Chetsu (a baby elephant) who work together to learn ways in which humans and elephants can coexist peacefully. The user navigates through different places in Thailand and interacts with various elements of the surroundings, including people, animals, and the environment.

2.2.2c Turtle Investigation and Field Mission: The Instructional Game Model

The instructional game is another model that is typically used as an educational tool. Computer-based instructional games are designed to engage a learner in a purposeful activity to fulfill a goal, prize, or winning score (Shneiderman, 1997, pp. 125-128). Graphics, sound, and hand-eye coordination are often involved and help to enhance user satisfaction and further entice the learner (Shneiderman, 1997, pp. 121-123). Computer drill and practice models are often couched in the format of a game. For example, words may fly across the screen as spaceships, and the user must fire at the misspelled words. The most significant feature of instructional games is the involvement of action and a win/lose element. The motivational force of competition and the ease by which the games stimulate interest in children are key aspects of their effectiveness.

Two critical dimensions that must be held in balance when designing an effective game are user engagement and an emphasis on learning (Prensky, 2001, p. 151). There are three distinct features of educational games that make them engaging according to Prensky: the elements of challenge, fantasy, and curiosity. If the activity has a meaningful and clear goal and challenges the user to fulfill it, the user's motivation can increase significantly. It is important to use audio and visual effects to stimulate sensory curiosity

and to provide feedback and "surprises" to make the user more engaged. Turtle Investigation and Field Mission do this remarkably well, combining music, animation, and a challenge to teach the user about animal conservation while keeping him or her engaged.
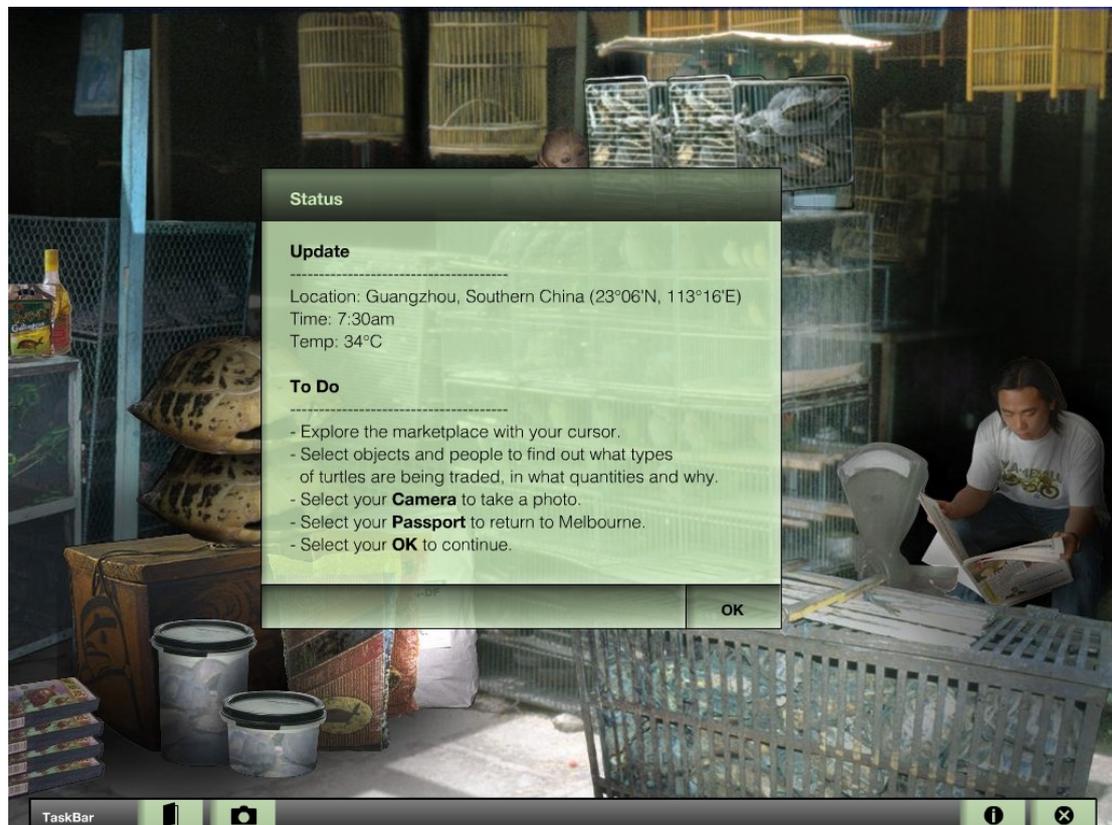
Figure 2.9: Turtle Investigation Screenshot
(Source: Zoos Victoria (d), 2003, Turtle Investigation)

Turtle Investigation is designed for older children, aged 10-12. The user takes on the role of an international newspaper reporter who is assigned to follow a story on the endangered turtle crisis in Thailand and Vietnam. Throughout the game, the user must interview villagers and scientists, take pictures, and travel to different countries. At the end of the program, the user must compile a news report by answering a series of questions that are based upon the information presented throughout the game.
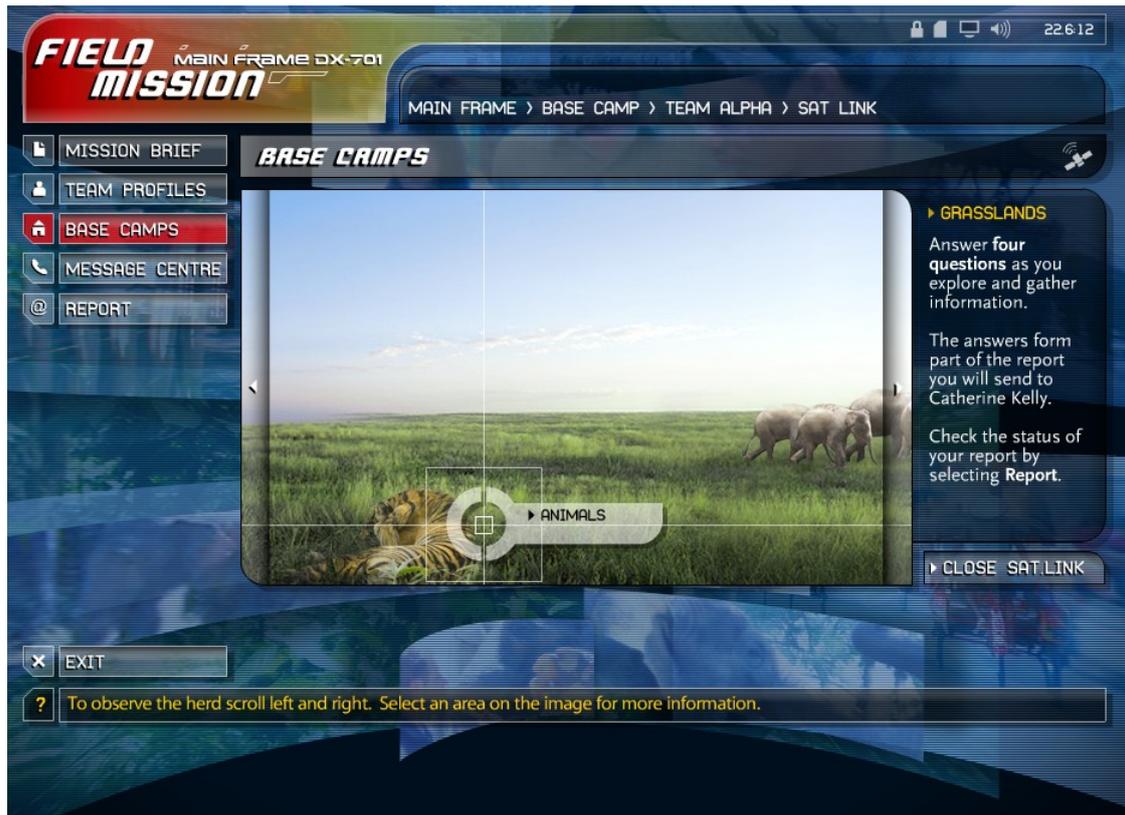
Figure 2.10: Field Mission Screenshot
(Source: Zoos Victoria (d), 2003, Field Mission)

Field Mission is the final game on the Questions from the Forest software bundle
and is also designed for children 10-12. In this game, the user is projected into the role
of a scientist whose charge is to investigate the reasons that elephants are endangered
and have difficulty co-existing with humans in Thailand. Throughout the game, the user
must explore a grassland and forest environment, learning about the local plants and
animals as well as the culture of the inhabitants in the region. The game follows a
format similar to Turtle Investigation, as the user must answer questions about what they
learned to compile a report to find ways in which humans and elephants can live
peacefully together.

2.2.3 Design and Evaluation Considerations

There are several elements that should be considered when designing or evaluating an electronic instructional aid. The metrics to gauge effective instructional processes that are agreed upon by many researchers are described well by Geisert and Futrell (1995, p. 143) and can be summarized by the following list of characteristics:

- Get the student's attention and provide motivation
- Present the lesson objective (in a form that takes into consideration the student's age and learning maturity)
- Remind the student of relevant background information that must be remembered to be successful in the forthcoming lesson
- Present instruction in the form of narrative, explanations, simulations, graphics, and so forth, to implement the elements of an instructional strategy
- Provide examples of expected student performance (the same type of problems that the student is then called upon to do in the objective).
- Present practice items on the lesson objective
- Provide feedback on the student's performance on practice items, including right and wrong, and if wrong, offer hints for improved performance and the possibility of redoing the item
- Assess the student's performance using a test to measure whether or not the student has reached the objective

The Northwest Educational Technology Consortium (NETC) (2003, Software Selection) suggests similar criteria, but places special emphasis on the following guidelines for educational software:

- Encourage exploration, imagination and problem solving
- Reflect and build on what children already know
- Involve many senses and include sound, music, and voice
- Be open-ended with the child in control of the pace and path

These characteristics fit the way that young children learn, and their need to interact with their environment.

The Haugland Developmental Scale for evaluating software is one of the most widely used methodologies to gauge the educational value of software. Many researchers and experts seem to agree that the scale is an effective measure available to evaluate the

merit of educational software (Wardle, 2002, p.81). The scale assesses how developmentally and educationally appropriate a software title is based on a zero to one ranking in each of ten categories. If the software rates a seven or above after summing the rankings, it can be considered educationally appropriate for children. Another key feature of the software evaluation scale is its ability to account for various types of biases inherent in educational tools. The final scaled score will have points subtracted if it seems ethnic- or gender-biased (Haugland, 1997, p. 4). The scale is a valuable method of providing tangible numerical feedback about how well a software title achieves certain educational and developmental outcomes. (For additional information on the Haugland Scale, refer to Appendices C and D.)

2.3 Marketing and Consumer Expectations

A major objective of our project was to understand and evaluate the desires of the target audience of the Questions from the Forest CD-ROM: children aged 4 to 12 years old and the parents and teachers of these children. In order to better understand the general market and buyer tendencies of these groups, we reviewed relevant research and recent marketing studies that have been conducted involving this target market.

2.3.1 Children's Buyer Expectations

Marketing to children is strategy that manufacturers of many types of goods focus on (McNeal, 1998, p. 38). Children represent a large part of the market for many different products. The percentage of major retailers that make an effort to target the younger audience has risen from roughly 1/3 in the 1980's to approximately 2/3 today. That number is still rising as more and more companies are starting to recognize the importance of marketing to children.

In order to compete in the youth market of today, one must appeal to children's ever-changing desires, as well as their busy schedules and interest in computers and technology (Bartram, 2001, p. 65). When marketing towards children, it is necessary to design a product that fulfills the needs and wants of today's youth. Children change their minds about products more than any other market audience, but one cannot deny the buying power that they possess.

To understand what children want and how they influence purchasing decisions we focused on the perspective of the children themselves. According to Darren Walls (Corporate Marketing Manager of Zoos Victoria), by perceiving the commercial world as a child one can better understand the consumer psychology of children (personal communication, March 28th, 2004). We also reviewed the various sub-groups that exist within the market of children themselves, including divisions between different types and age groups of buyers.

2.3.1a Division of Markets

According to McNeal (1998, pp. 37-38), marketing to children can be divided into three separate categories, the primary market, the influence market, and the future market. The first of those three, the primary market, involves the children directly and the purchases they make with money out of their own pockets (McNeal, 1998, p. 38). The influence market deals with the purchases made for children by adults due to the wants of the children and their influence on their parents, something Bartram calls "Pester Power" (Bartram, 2001, p. 65). The third market deals with marketing to children today to secure a purchase from them in the future (McNeal, 1998, p. 40).

One focus of our marketing investigation in terms of retailing to zoo patrons involved understanding the needs and desires of the influence market. It was important

to determine what strategies would attract this group of children and influence them to want the CD-ROM and thereby ask their parents to purchase it.

2.3.1b Age Group Differences and Their Effect on Purchasing

According to Bartram (2001, pp. 65-66), children pass through three distinct stages as they grow from infants to adults. These stages are kids, 'tweens, and teens. Children in each stage have different interests and go about making purchasing decisions in different ways. The Questions from the Forest CD-ROM is marketed toward children in the kids and 'tweens stages.

Kids (3 to 9 year olds) do not consider as many factors as older people do when making purchasing decisions. Most of their purchases are based on wants and urges instead of needs. They are highly influenced by trends and television and have little brand loyalty (Bartram, 2001, p. 67).

'Tweens, children 10 to 13 years old, are more influenced by those around them than kids. At this age, children are feeling pressure from their peers and are becoming more aware of their image. The need to fit in can influence the products that they purchase. Children at this age begin to spend more of their own money on products "not traditionally considered 'children's products'" (Stipp, 1993, p. 51).

2.3.2 Market for Educational Multimedia

When asked about marketing educational CD-ROMs in general, Nikki Unsworth of Thompson Learning of Australia was quick to remark on her reluctance in taking on such ventures: "stand-alone interactive CD-ROMs are associated with a high-investment, low-return market" (personal communication, March 30, 2004). She then remarked on

the lack of success she had seen in this field in general and stated that CD-ROMs typically accompany a textbook as a supplement to the material presented in print form.

Wyatt Wade, President of Davis Art, an educational publishing company based in Worcester, MA (USA), had a similar view regarding educational CD-ROMs (personal communication, February 27, 2004). He had experienced difficulties when attempting to gain entry into the educational CD-ROM market due to the abundance of software titles out there as well as the typical lack of interest of buyers in such products.

Also since it is not possible to actually look at the contents of a CD-ROM in the store, including something with the CD-ROM is a good strategy. It is important to create something that is tangible – something that a customer can look at and examine in the store. Most consumers are wary of CD-ROMs because there is an uncertainty involved with buying one (Wade, personal communication, February 27, 2004). When purchasing a CD-ROM, there is a risk that the software might not work after installation.

Other disadvantages of a CD-ROM include prohibitive cost, limitations of storage space on the CD-ROM (approximately 750 MB), and possibility of becoming scratched. However, CD-ROMs do have redeeming qualities that make them a popular format to use for educational purposes. They facilitate the organization of a relatively large amount of information and they can be easily packaged and distributed due to their compact size.

2.3.3 Interactive Websites

There are other forms of multimedia that can be used for educational purposes aside from CD-ROMs. One form that is increasing in popularity is interactive websites. While our project focuses on a CD-ROM, there are various benefits and tradeoffs to this

method of presenting educational material. There may be other types of media that can be more cost-efficient in accomplishing Zoos Victoria's educational objectives.

An interactive website is useful in the sense that it can be utilized by a large number of people. However, required access to the internet can limit the diversity of its audience. Nonetheless, this method can be easier to develop than a CD-ROM and it is relatively inexpensive to implement in comparison. There are several Australian companies that design websites appropriate for educational use[2].

One company that designs interactive educational websites is Web Genius Development (www.webgenius.com.au) (Adams et al., 2004, Contacting Vendors of Technology). Based in Melbourne, this company creates websites for local businesses at a price of approximately $3,500-$4,500 (AUD). This is a base price and includes such features as allowing certain teachers to log into the site and administrators to change or update the site. Certain additions can be made to the website at an added cost of production. These include online tests that could be sent to the teachers or organized in a database, Flash technologies and streaming media.

A second company that creates interactive websites is Create-it Technologies (www.createit.com.au) (Adams et al., 2004, Contacting Vendors of Technology). This company employs a system designed by Ektron, an American company. This is a content-management system that makes the website easily upgradeable. Little technical knowledge is required to upload files and post documents or other forms of media. However, the cost of this system is $12,000 (AUD). Additionally there is a charge of $8,000 (AUD) by Create-it Technologies to set up, upgrade, and maintain the site for a year, making the total cost for this website $20,000 (AUD). A cost-benefit analysis of a

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[2] We referenced the 2004 Commonwealth Scientific and Industrial Research Organization IQP in order to find information regarding the pricing of certain types of interactive websites.

CD-ROM compared to that of an interactive website could provide feedback that indicates a more beneficial strategy for Zoos Victoria.

2.3.4 Buyer Expectations of Parents and Teachers

When purchasing educational software, parents and teachers are concerned with whether or not this software will teach their children/students anything (Wade, personal communication, February 27, 2004). Wade explained that teachers want software containing material that will help them teach relevant lessons in the classroom. There needs to be a connection between the content of the CD-ROM and the material they want their students to learn. Regarding parents, Wade stated that they are concerned with the quality of the CD-ROM and how much their children will learn from it. They are also concerned with the improvement, or lack thereof, that the CD-ROM will bring in their children's performance in school. With the prevalence of standardized testing, both parents and teachers are looking to see if the CD-ROM will help to improve scores on any of the multitude of tests used today.

2.3.5 Computer Use

In a world that is advancing technologically, many households possess a wealth of electronic devices, and children are turning to electronic forms of entertainment. The results of a study performed by the Kaiser Family Foundation in the United States show that American children from 8 to 18 use the computer an average of 30 minutes a day. Of this 30 minutes, children 8 to 13, spend an average of 16 minutes playing video games (Raymond, 2000, p. 60). In the words of Paul Kurnit, president of Grifin Bacal, a youth marketing agency, "The computer is a powerful form of kids' entertainment that makes parents happy from the educational aspect, makes kids happy because it's fun, and makes

marketers happy because it's a whole new channel" (Raymond, 2000, p. 61). The computer is a large part of the lives of children in the United States, Australia, and the rest of the world. Computer products for children are being marketed at an increasing rate.

One example of educational products designed for use on computers by children can be found in the Australian organization, CSIRO (CSIRO, 2003, Club Shop). CSIRO, or the Commonwealth Scientific and Research Industrial Organization, produces several CD-ROMs aimed at educating the youth of Australia in schools and in their homes. These programs offer a variety of activities targeted at children as young as four years of age and covering a wide range of topics including dinosaurs, the Great Barrier Reef, and the Solar System.

2.4 Summary

In summary, zoos are committed to preserving wildlife and promoting awareness about animals and their habitats through exhibition, captive breeding, and educational programs. Melbourne Zoo is one of the world's premier zoological parks and is on the forefront of such programs by exploring and experimenting with innovative forms of learning. The Trail of the Elephants experience is a recent addition to the Melbourne Zoo that features a new form of educating visitors – electronic multimedia. The Questions from the Forest CD-ROM is retailed to zoo visitors, and the software can also be found on interactive kiosks in the Trail of the Elephants exhibit. The kiosks serve as a supplemental educational experience to children who seek additional information.

The interactive CD-ROM developed for this exhibit is an experimental pilot product, of which the educational and market success have yet to be determined.

Evaluating learning in a zoo setting can be difficult, but a method exists to determine whether patrons demonstrate behaviors indicative of learning processes. The method developed by Griffin and Symington was used in our observational work to determine the educational effectiveness of the software. The Haugland Developmental Scale is another evaluative tool that was used in our research methodology to assess educational value.

Understanding the underlying educational models associated with computer-based instruction provides context to analyze the benefits and tradeoffs of each format. Research into computer-based instruction also helped us to determine which educational model each Questions from the Forest program follows.

In order to further understand the issues involved with our project, we researched the market of educational interactive multimedia. Because our methodology did not investigate the consumer expectations and preferences of children, we researched this topic to gain a better understanding of this potential market for the zoo.

The background material of this project helped to guide our project throughout completion. Researching these ideas influenced the design and implementation of our methodology. These concepts also helped to shape our analysis and formulate conclusions.

3 Methodology

The goals of this project were (1) to determine whether the Questions from the Forest CD-ROM achieved its educational goals, and (2) to determine the market expectations of potential buyers. During our preliminary research, we identified specific research questions to focus on throughout the course of the project. These research questions led to the development of various methodologies, including interviewing, observational studies, surveying, focus groups, and use of an evaluative scale. This chapter discusses the chosen methods in detail and provides our rationale behind their use.

3.1 Assessment of Educational Value of CD-ROM

The most important goal of our project was to determine whether or not the Questions from the Forest multimedia is an effective means of conveying information to its target audience. This aspect of the project can be subdivided into two parts: assessment of educational outcomes in the zoo setting and assessment of effectiveness outside the zoo.

As outlined in the literature review, it is very difficult to assess learning in environments that involve self-directed education, such as a zoo setting. By focusing our evaluation more on determining whether patrons appeared to be learning at all rather than determining what specific information they had retained, we were able to gain a more general understanding of the CD's effectiveness as a learning tool. When evaluating the CD-ROM in the classroom setting, however, we also investigated the amount of information students retained from using the software.

3.1.1 Assessment in Classroom Setting

In order to discern if the programs are effective learning tools in an off-site environment, we visited Brunswick Southwest and St. Monica's Primary Schools to interview and observe children using the software. We also led a focus group with teachers to determine if learning had taken place when the programs were used in their classrooms. To get the most out of each visit, we devised two methods of evaluation and learning assessment: one that focused on immediate assimilation of knowledge and one that focused on more extended retention of the information.

Observing Learning Behaviors & Information Retention

To gather information concerning immediate retention we met with three different age groups from Prep to grade 6. In one-hour meetings we let groups of 2-3 students use the software title that was appropriate for their particular age group, Prep-2, grades 3-4, or grades 5-6.

Figure 3.1: Children Using Interactive Software
(Source: Grinstein, April 22, 2004)

In total, we observed 71 students using the interactives, 2-4 groups of 2 students in each one-hour session. To obtain accurate results, it was important that we gather data from as broad an audience as possible. The group of students that we observed consisted of an approximately even distribution of male and female students as well as an even distribution of ages and intelligence levels within each grade level, as determined by the students' teachers.

To ensure that all school regulations were followed, we were required to be under supervision of a registered teacher at all times. Additionally, we needed to submit all research material and data collection forms to the school's administrator for approval one week prior to arriving. We collected indemnity waivers from all students whom we photographed for use in this report. This allowed us to publish photographs of the children that we worked with in our report.

We recorded demographic information and administered a pre-test that would measure what the children already knew before they used the software. (Copies of the pre- and post-tests for each program are included in Appendix E). The demographic information that we collected included questions about the child's age and gender as well as questions about any previous zoo visits. We assigned a pre-test that was a short, open-ended prompt that required the student to describe and/or list everything that he or she knew on the subject matter. After taking 5 minutes to complete the pre-test, each group of students was then allowed to use the program for 20 to 30 minutes. While they were using the software we took detailed notes of their behavior, their interactions with team members, and their comments to ensure that we had a thorough record of each session for subsequent analysis. (A copy of our observation sheet is included in Appendix F). We performed our analysis using the "Indicators of Student Engagement in Learning Processes" (Griffin & Symington, 2003, p. 11) detailed in Section 2.2.3. These

observational criteria were used to help us determine whether users appeared to be actively engaged in learning as well as to get each student's opinions of the CD-ROM.

After the students finished using the program, they were given a post-test to determine whether they understood and remembered the information from the software. The post-test asked the same open-ended question from the pre-test and also contained more specific questions about the subject matter from each program. These questions were based on the educational objectives set forth by the zoo. After finishing the post-test, each student was asked a series of questions regarding overall satisfaction with the program as well as comments and suggestions for improvement. (See Appendix G for the feedback questionnaires used with each program.)

The information from these observation and interview sessions was very valuable as it allowed us to evaluate the Questions from the Forest CD-ROM in an off-site setting and make judgments on how effective the software is when used as a stand-alone learning tool. The suggestions and feedback the students provided about improving the interactives were very helpful. The information we recorded from our initial visit to the primary schools was based on post-tests given only moments after the software was used for the first time. To evaluate more realistic use of the programs, we performed a second post-test that would indicate whether students learned more through extended use of the software.

Extended Use of Software

The Questions from the Forest learning programs are designed to be used multiple times in an off-site environment. Also the CD-ROM is intended to be used in the classroom as a supplemental exercise to a lesson plan on relevant subject matter. In order to gauge the effectiveness of the interactives over a longer time period, we had the

teachers at Brunswick Southwest Primary use the software in their classrooms for one week. We could not personally check that the programs were used during this period, so we had to take the word of the teachers involved that the software was used correctly. We also asked that the students who completed the initial post-test complete the extended post-test. At the end of the week the teachers administered a questionnaire to their students that was similar to the post-test given to students during our initial observational sessions, with additional feedback questions that had previously been issued orally. Four of the teachers administered the questionnaire to students who used the programs, yielding 45 responses. A majority of the students who completed the extended study had also participated in our immediate retention study, but in each case, there were several students who had not. We compared these data to the results obtained in our observational and immediate post-test learning studies. (A copy of the letter that was attached to the extended use post-tests is included in Appendix H).

Teacher Feedback

To further evaluate the educational effectiveness of the CD-ROM, we led a focus group to find out what primary school teachers thought about the programs. The focus group included each of the five teachers at Brunswick Southwest Primary who had an opportunity to use the software in her classroom. We explained that we were an objective third-party looking for a critical evaluation of the CD-ROM to ensure that participants felt comfortable voicing their true opinions. In the interest of maintaining confidentiality to allow for honest discussion in this focus group, we made sure that they understood that data would not be traceable to any particular individual. We also ensured that each participant consented to the possibility of their feedback being published anonymously.

For one hour, we asked the teachers about their opinions of electronic learning aids, the Questions from the Forest CD-ROM, how they could use the software as part of their lesson plans, and how the students reacted to the learning programs. They gave us very informative feedback about electronic multimedia in general, student interaction with the Questions from the Forest interactives, the entertainment value of the CD-ROM, and possible suggestions for improvement. (Refer to Appendix I for the focus group protocol.)

Haugland Developmental Scale for Software

The Haugland Developmental Scale (HDS) is a very widely used methodology to gauge the educational value of software (Haugland, 1997, p. 198). Through the use of this scale, we obtained tangible numerical feedback about how well the CD achieved certain educational and developmental outcomes. These outcomes have already been agreed upon by researchers as necessary components of effective educational software. We asked the teachers involved in our focus group and observational studies to analyze the programs using the HDS. Each interactive was evaluated by two teachers of the appropriate grade levels. As the teachers were more professionally qualified to judge educational qualities, we used their evaluations of the software in our analysis. As opposed to the first three methods, this scale was a means of quantitatively assessing the CD-ROM independent of the study of user interaction. Using the criterion established for each category, the teachers ranked each program from zero to one in each subsection, summed the rankings, and computed an overall score. To be considered developmentally and educationally appropriate for a child, a program must receive a sum greater than seven. (See Appendices D and E and section 2.2.3 for specific details about how to use the Haugland Scale.)

3.1.2 Assessment of Learning in the Zoo Setting

It was important to evaluate the effectiveness of the interactive multimedia when used in the context of the exhibit and the other learning stimuli associated with the Trail of the Elephants experience. Similar to interacting with students using the Questions from the Forest CD-ROM in the classroom, we observed children using the interactive kiosks located at the exhibit itself.

Figure 3.2: Zoo Patrons using the Trail of the Elephants Kiosks
(Source: Grinstein, April 17, 2004)

In this study we relied on the passive deception approach by performing a disguised observation of users' behavior and reactions. In the passive deception approach, the researcher makes observations in a public place and records data in such a way that the recorded information cannot be traced to any particular individual (Bernard, 2002, p. 419). This method eliminated the possibility of any bias that might be associated with the presence of a third-party evaluator. Direct observation was the most practical technique to gauge users' feelings about the kiosks. This technique also helped us to determine whether patrons using the programs appeared to be learning anything. As in

the classroom study, we used the learning indicators developed by Griffin and Symington, described in section 2.1.3.

We are aware that we were not professionally qualified to interpret the actions and behaviors of an individual and determine exactly what he or she was thinking or feeling. However, we felt that we were able to get an approximate understanding of their opinion of the kiosks with our observational study.

In order to ensure that our methods ran as smoothly as possible, we tested our observational methods a day earlier than planned. This allowed us make adjustments for any logistical problems that we discovered. After trying our observational approach for a day, we realized that it would be impossible to monitor all of the exhibit traffic fields that we had originally intended. In our trial run we intended to monitor how many patrons passed the kiosks by, how many visitors went into the research hut that the kiosks were located in, and how many visitors actually used the software at the interactive kiosks. It was too difficult to monitor all of these elements while observing children at the kiosks. We instead focused on taking detailed observation notes at the kiosks; monitoring length of use, number of children at the kiosk, and whether a parent helped the child use the software.

By studying users' reactions and noting their behaviors, we discovered whether or not they appeared captivated and engaged in the learning process. After taking detailed notes on each individual, we were later able to compile a summary of all cases and discover trends and consistencies. This information helped to provide us with further insight into user satisfaction and engagement as well as whether the CD-ROM effectively adds to the overall visitor experience at the Trail of the Elephants.

3.2 Determining Consumer Expectations

Zoos Victoria wanted to discover the best means of presenting an attractive product to their target audience, which has been identified as parents of children 4-12 years old, schoolteachers, and the children themselves. This section details the methods that we used to examine the needs and interests of the target market for the Questions from the Forest CD-ROM.

3.2.1 Teacher Focus Group

In addition to asking the Brunswick Southwest teachers about their experience using the software, as discussed in section 3.1, we questioned them about their expectations of educational multimedia. The focus group questions helped us gain insight into buyer interests associated with our target market. The topics for discussion included: key factors in choosing software to use during class, expectations in childhood learning programs, opinions of the Questions from the Forest CD-ROM in particular, etc. The teachers were very helpful in identifying the important features of computer-based leaning programs and the key elements involved in selecting such programs for the classroom setting. (See Appendix I for the focus group protocol.)

3.2.2 Surveying Zoo Visitors

In order to understand the purchasing preferences of potential buyers, we conducted an oral survey of zoo patrons at the exit of the Trail of the Elephants exhibit. The survey was in the form of a written questionnaire, which utilized open-ended and multiple-choice questions as well as a Likert scale (see Appendix J for the survey form). Topics addressed in the questionnaire included demographic information, general feelings about interactive multimedia, and desired attributes of learning software.

Surveying took place for 4 consecutive days from 14 April to 17 April 2004 for 3-5 hours per day. This time period was chosen due to increased visitation during the Easter school holiday.

Figure 3.3: Surveying Zoo Patrons
(Source: Grinstein, April 17, 2004)

We decided to sample at least 400 visitors because several past marketing studies conducted in the Melbourne Zoo used the same sample size (Aughterson, personal communication, April 13, 2004). The sample consisted of 464 adults who were at the zoo accompanied by children in an age range that was judged to be 6 to 12 years old. A poster was given to patrons who participated to motivate visitors to complete the questionnaire.
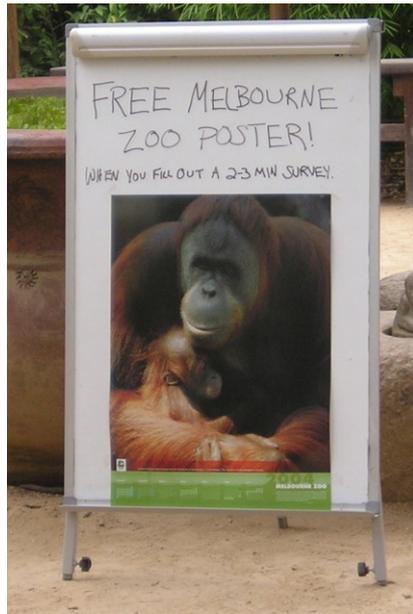
Figure 3.4: Free Poster Sign
(Source: Grinstein, April 15, 2004)

With an annual zoo visitation count of over 900,000 people, to achieve a confidence level of 95%, and a confidence interval of 1, we would need to survey 9,503 respondents to get data that would be statistically representative of the zoo's entire visitor pool (Creative Research Systems, 2004, Sample Size Calculator). With the limitations of a seven-week time frame and scarce resources, it would be impossible to survey even a tenth of this number. Also, because this was a voluntary-response, purposive sample, no overall statistical analysis could be made about the total visiting population regardless of the number surveyed.

The limitations involved with our survey methodology must be noted. By providing a poster as an incentive to parents to increase response rate, we had to accept a voluntary response bias. Because the surveys were administered orally, we had to accept a bias associated with respondents being too positive with their feedback. Also because of the number of respondents selected and the method of choosing them, we had to accept a non-probability bias. While these biases were unavoidably present, we were still

able to draw valuable inferences about the needs and purchasing preferences of our target market.

3.2.3 Marketing Expert Interviews

In order to help formulate our methodology for researching buyer expectations and to further understand the process of marketing in general, we consulted with three experts in the field of marketing and sales. These individuals included employees of the Zoological Parks and Gardens Board as well as representatives from publishing companies and software development firms. These semi-structured interviews were conducted via face-to-face and telephone correspondence and followed a formal interview protocol created specifically for each person. (The protocols and summaries for each interview are included in Appendices L through P).

The interviewees explained the general approach to understanding the needs of our target market and gave us practical advice concerning the methods involved with surveying and how to conduct focus groups. They also provided sources for relevant background research into the following:

- The general outlook of the market for educational CD-ROMs

- An analysis of the purchasing process

- The factors and buyer decisions that hinder sales

- The consumer psychology of children and how parents respond

3.3 Analyzing the Data

After collecting data from the observational work and teacher feedback, we were able to analyze the overall effectiveness of the Questions from the Forest CD-ROM as a

learning tool. By comparing the frequency of positive versus negative comments about the interactives from both students and teachers, we established the general user opinion of the programs. This revealed how engaging the programs are as well as their entertainment value. Through the results obtained by the pre- and post-tests, we found out whether the CD accomplishes the educational objectives established by the zoo. (Refer to Appendix P for the learning objectives of the interactives.) Also, after evaluating the product with the Haugland Scale, we numerically defined how effective the programs are as learning aids.

After recording results from the 464 completed on-site marketing questionnaires, we analyzed the frequency of similar responses. By determining the most common responses, we were able to formulate the general opinion of our target audience for certain questions. We discovered the most suitable price range for parents, what they see attractive in educational multimedia, and their opinions of the Questions from the Forest CD-ROM. After analyzing the teachers' replies to our focus group questions, we determined which aspects of computer-based learning tools appeal to that particular audience. Through the assessment of this information we compiled a summary of the desires and needs of the target market to present to Zoos Victoria. In the following chapters we discuss and analyze our results and then present the conclusions and recommendations that we made based on these results.

4 Results and Analysis

Upon completing our various research methodologies, we compiled and sorted our results to describe how these data have fulfilled the research objectives associated this project. In this section, we discuss the CD-ROM's effectiveness as a learning tool followed by the information we obtained regarding consumer expectations for educational multimedia.

4.1 Effectiveness of CD-ROM as a Learning Tool

As the Melbourne Zoo's multimedia was designed for use at the Trail of the Elephants exhibit and in the home or classroom, we evaluated the programs in settings both on-site and off-site. We performed observational studies of children in the classroom and at the exhibit's kiosks, administered a focus group with local teachers, conducted a survey of adults with children at the zoo exhibit, and used the Haugland Developmental Scale to evaluate the Questions from the Forest software bundle.

4.1.1 Evaluation in Classroom Setting

To determine if the software was an effective educational tool, we had to discover whether or not knowledge was retained and whether students appeared to be learning. In order to fully evaluate use in a classroom, we also investigated whether or not students and teachers would be conducive to actually using the programs, regardless of its effectiveness as a learning tool.

4.1.1a Knowledge Retention Study

During our visits to Brunswick Southwest and St. Monica's Primary Schools we tested and observed a total of 71 children ranging from grades Prep through 6th. We observed 36 students at Brunswick Southwest and 35 at St. Monica's. The children ranged in age from 5 to 13 years old. The results from our retention study are described below.

We used the educational objectives that are outlined in Questions from the Forest Teacher Resource Pack to determine whether or not the child displayed knowledge of the appropriate material. (See Appendix P for a list of the objectives for each program.) After reviewing the post-tests for each program we sorted the student responses into three categories: little or no retention, some retention, and full retention of the material. Sorting was based upon how well the child displayed knowledge of the subject matter by answering the post-test questions. Little or no retention was defined as the student only being able to answer 50% or less of the questions on the post-test and displaying little knowledge of the subject matter. Some retention was defined as the student being able to answer from 51%-75% of the questions on the post-test and displaying partial knowledge of the information. Full retention was defined as the student answering more than 75% of the questions on the post-test and displaying a thorough knowledge of the material.
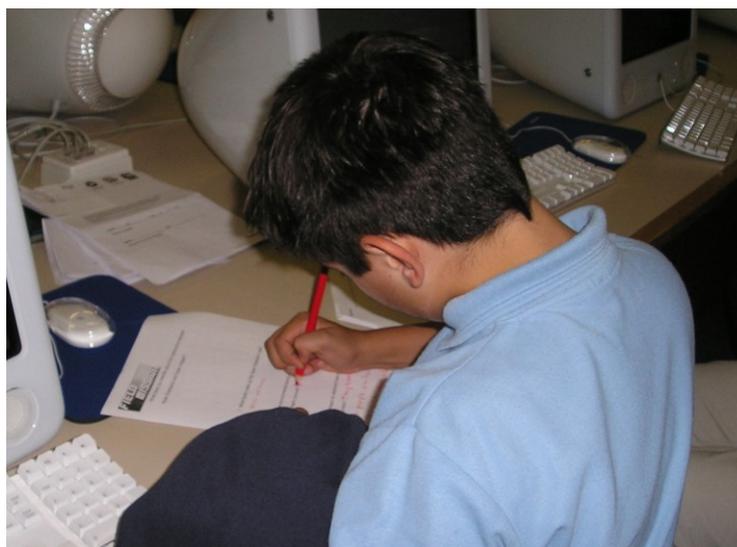
Figure 4.1: Child Taking Post-Test
(Source: Grinstein, April 22, 2004)

Overall Retention

Table 4.1: Overall Retention Levels

Retention Level	Ellie's Journey	Meet My Family	Turtle Investigation	Field Mission	Total
Little or No Retention	10%	7%	13%	22%	**13%**
Some Retention	32%	47%	31%	39%	**37%**
Full Retention	58%	47%	56%	39%	**50%**
# of Respondents:	31	30	32	36	**129**

Table 4.1 shows the combined results for all four programs. These results were compiled by summing the immediate and extended results for each of the four programs. Ellie's Journey shows the highest level of full retention with 58%, followed closely by Turtle Investigation at 56%. At 39%, Field Mission shows the lowest percentage of full retention compared to the other three programs. The reasons behind these differences could be the difficulties that some children had navigating through Field Mission. Ellie's Journey was a much simpler program, and students had less trouble working through it.

Looking at the percentage of students who retained a majority of information, all four programs showed promising numbers. We determined the percentage of students

that retained a majority[3] of information by summing the numbers of students who showed "full" and "some" retention.

- 87% of all students who used the programs at both primary schools retained a majority of the information presented.

- 50% of all students who used the programs at both primary schools showed full retention of the information presented.

Based on the results shown above and in Table 4.1, we believe that the software programs are successful in educating children on the subject matter they present.

Immediate vs. Extended Retention

Table 4.2: Overall Immediate vs. Extended

Retention Level	Immediate Retention			Extended Retention		
	Male	Female	Total	Male	Female	Total
Little or No Retention	9%	23%	15%	13%	5%	9%
Some Retention	43%	41%	42%	26%	30%	28%
Full Retention	49%	36%	43%	61%	65%	63%
# of Respondents:	47	39	86	23	20	43

Table 4.2 shows the difference between the levels of retention for the immediate study compared to the extended study. As the result show, there was an improvement in retention after the students had used the programs for an extended period of time. 43% of all students who participated in our immediate retention study showed full retention. This improved to 63% for the extended retention study. Students who were exposed to the programs for a longer amount of time retained a greater amount of information. (For more results from our retention studies see Appendix Q.)

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[3] A majority is defined as more than 50% of the information presented.

4.1.1b Evidence of Learning Behaviors in the Classroom Environment

Based upon the indicators of learning behaviors described in Section 2.1.3 and the observational notes obtained from our classroom visits, we found evidence of various learning behaviors when the Questions from the Forest CD-ROM was used in a classroom environment. The most common types of learning behaviors and student interactions with the software are:

Showing responsibility for and initiating their own learning

When using the program, students seemed eager to proceed through the software and make their own choices. By reasoning through problems and navigating through the programs without assistance, students displayed responsibility for initiating their own learning. This was the most frequently occurring behavior for each program.

Sharing learning with peers

Because we placed students in groups as part of our observational study, sharing learning with peers was another behavior that was commonly displayed among students using all four of the programs. The children seemed eager to help each other work through the software and to stop to think through and discuss questions and possible answers. When something interesting or exciting happened on screen, the children stopped to point and converse. Also, students asked each other questions about the software to better understand how to use it.

Actively involved in learning

Figure 4.2: Children Engaged In Learning Process
(Source: Grinstein, April 22, 2004)

While using the programs, the children seemed actively engaged in the learning process. Older students (ages 9-12) were in general very absorbed and interested while using the Turtle Investigation and Field Mission programs. Younger children (ages 5-8) did not display as much active involvement with Ellie's Journey and Meet My Family, especially when the immediate classroom environment contained distractions. This disparity in engagement could be explained by several factors, including the age difference between groups, distractions present in the room, and the different learning model associated with each game.

Showing confidence in personal learning abilities

After exploring the programs, children were very eager to explain to their peers how to use them. Drawing on this excitement, we explained to the children that they were our official "experts" in showing the rest of the students in the class how to use the

programs. The teachers later commented on how enthusiastic our "experts" were in helping other children to use the software. The older groups (ages 9-12) were especially excited, as they had mastered basic computer skills and the more complex aspects of the games. Upon gaining confidence in their ability, they were eager to share their knowledge and to respond to their peers and teacher.

4.1.1c Student Comments and Feedback

Figure 4.3: Kyle Interviewing St. Monica's Primary Student
(Source: Grinstein, April 24, 2004)

We performed observations during our visit to Brunswick Southwest Primary and St. Monica's Primary which allowed us to draw some generalizations about the students' opinions and thoughts about the programs. (Feedback and observations we collected are included in Appendix R.) The following are some of the more common remarks and observations.

Ellie's Journey

The students who had the opportunity to explore Ellie's Journey were very interested and excited by the game. They enjoyed the music and sounds of the game as

well as the animations of the turning pages. The majority of the students using the program were excited when they answered the questions correctly. However, they seemed to guess some of the answers without reading the information presented before the question sections.

There were some noise distractions present in the classroom, and the sound on some of the computers used was not consistently working. These conditions could have accounted for the students skipping some of the informational screens. However, even when the sound was working well enough for the students to hear, they sometimes lost their concentration on the longer text screens. They seemed more interested in getting the answers right than they were in the actual information presented.

Overall, the students stated that they would like to play the game again in class, and many would recommend the game to their friends as well as use it on their computer at home. Some suggestions that they made for improvements included seeing more of the turtle's life cycle, such as tortoises older than 7 years, and more levels of difficulty to the questions.

Meet My Family

As with the Ellie's Journey game, the majority of students who used this program enjoyed answering the questions. A favorite aspect of this program was being able to walk around with the elephant, and many students admitted that they would like more area to explore and more tasks to perform. The students enjoyed listening to the stories during the treehouse section but wished that there were questions involved with this aspect of the game.

Many of the students using the program did not know how to properly interact with objects in the village and forest sections. Instead, they progressed immediately to

the questions and guessed the answers, having varied success with this trial and error method. This was consistent with the inquiry-based, leaner-centered approach the software was designed to encourage. Some appeared bored listening to the longer text sessions. Most of the students said that they would like more questions in the game as well as questions that were more difficult.

Overall, the students who used this program liked answering the questions more than they enjoyed reading the information on the screen. It appeared that their favorite aspect was choosing where to go on the map and interacting with objects on screen.

Turtle Investigation

The students who used the Turtle Investigation program were very interested at first. They enjoyed traveling to different countries and using the camera to take pictures of different objects.   The students had fun learning about tortoises and recognized that wildlife endangerment affects the entire world.

Initially some of the students were confused about where to go in the program. After using the program for a brief amount of time, they figured out how to progress and enjoyed the program more. Several of the students skipped over information screens or read through them quickly before trying to answer the questions. Again, when reaching the question sections, the students would attempt to use a trial and error, inquiry-based method. However, they were happy and excited when they answered a question correctly.

Many students stated that they would enjoy using the program in the context of a classroom, but felt that they would be unlikely to play the game at home. Another comment made by the children was that there should be more areas to explore. There

was some confusion downloading the pictures to the laptop from the digital camera. Students also requested that the game show pictures of the turtles' habitat.

Field Mission

The students who used the Field Mission program enjoyed several features of this game. They enjoyed watching the videos, analyzing the various objects in each part of the game, and taking on the role of a scientist. Many students became excited when they correctly answered the questions and completed the report.

While many of the students appeared pleased with Field Mission, some of the children had difficulty navigating through the program and needed some outside direction on how to proceed. There was some confusion in the first menu on what the students should click on. After being instructed how to play the game, they proceeded with ease.

A majority of the students skipped through several of the instructional screens, proceeding directly to the questions, which hindered their ability to navigate the program. Since they had not read the information, they simply guessed the answers to the questions until they got the right answer. Once they reached the end of the program, they could not figure out that they had finished creating the report and were somewhat confused.

Again, students said that they would use the programs in the classroom but would prefer to play other games on their own time. Others said that they would play the games at home if the instructions were clearer. Their suggestions for improvement included being able to assume the role of an elephant and interact with the forest and villages. They also would have liked it to be more obvious when the mission was

completed, and they wanted to change the first two movies of the game because they were difficult to understand.

4.1.1d Teacher Comments and Feedback

Based upon our notes from personal communications with teachers who used the program at both schools and the focus group conducted at Brunswick Southwest Primary School, we summarized and reviewed their professional opinion of the educational effectiveness of the CD-ROM. Overall the teachers' feedback was very positive; they expressed satisfaction with the programs, as the students maintained a very high interest level. According to the teachers, all of the children were actively engaged in the learning programs, enjoyed using them, and wanted to use them again. The information contained in the software was very interesting for this particular age level, as animals are a popular subject.

The children were also entertained by the visually appealing nature of the graphics. When the audio features of the software were working, they added another element to the entertainment value, which the children enjoyed. The older students liked the freedom and control they had over the course of the program in Field Mission and Turtle Investigation; they could play until they became bored or tired of the game. The teachers also mentioned that the subject matter of endangered species conservation would be appropriate for the curriculum at several different times during the year. They were also pleased to see the integration of social and cultural themes into the software.

Figure 4.4: Focus Group at Brunswick Southwest Primary
(**Source: Hamman, March 31, 2004)**

In summary, we received exceedingly positive feedback from the teachers regarding the effectiveness of the CD-ROM. From their use of the software in the classroom, they felt that it was a successful learning aid and stated that they would use it frequently in the future. They wanted to look into additional resources to support the programs in order to better incorporate them into the curriculum and were excited when they learned about the Questions from the Forest Teacher Resource Kit. Although budget constraints affect their decisions, the teachers stated that the CD-ROM was a product they would purchase and use regularly in their classrooms. (For the focus group summary see Appendix S.)

4.1.1e Haugland Scale Results

After conducting the focus group with the Teachers at Brunswick Southwest, we distributed the Haugland Scale evaluation form along with instructions and category explanations. The teachers agreed to perform a walkthrough of the program and complete the evaluation forms. Because the teachers have worked with the Discovery and Learning Center closely in various educational programs in the past, we refer to the teachers who used the software as "Teacher 1" and "Teacher 2" in order to preserve their anonymity.

Each teacher rated the software from zero to one depending on how well she thought the program fulfilled the criteria in each of 10 categories. These ratings were summed and an anti-bias deduction was made if the software ignored cultural differences, was gender biased, or promoted messages inappropriate for the child. (For more information refer to Section 3.11 and Appendices D and E.) If the software received a score of seven or greater, it was considered to be educationally and developmentally appropriate. We received two responses for each program and averaged the scores in Tables 4.5-4.9. We also summarized some of the main points that teachers had in justifying their evaluations.

Ellie's Journey

Ellie's Journey	Age Appropriate	Child In Control	Clear Instructions	Expanding Complexity	Independence	Non Violence	Process Orientation	Real World Model	Technical Features	Transformations	Sub-Score	Anti-Bias Deductions	Final Score
Teacher 1	1	1	1	0.7	1	1	0.6	1	1	0.7	9	1	8
Teacher 2	1	0.7	1	0.6	1	1	0.8	0.9	0.7	0.6	8.3	1	7.3
Average:	1	0.9	1	0.7	1	1	0.7	1	0.9	0.7	8.7	1	7.7

Figure 4.5: Haugland Scale Evaluation for Ellie's Journey

Ellie's Journey received an average score of a 7.7, which means that the program can be considered appropriate for children 5-8 years old. The software had very high rankings overall before the anti-bias deduction was made by both teachers. The teachers felt that the program failed to promote diverse cultures, languages, or mixed gender messages, so they deducted a point from the sub-score. Both teachers were very positive about the age appropriateness of the software as well as the fact that it allowed the child to use the program independently.

Meet My Family

Meet My Family	Age Appropriate	Child In Control	Clear Instructions	Expanding Complexity	Independence	Non Violence	Process Orientation	Real World Model	Technical Features	Transformations	Sub-Score	Anti-Bias Deductions	Final Score
Teacher 1	1	1	1	0.7	1	1	0.9	1	1	0.5	9.1	0	9.1
Teacher 2	1	0.8	1	0.9	1	1	0.9	1	0.9	0.8	9.3	0	9.3
Average:	1	0.9	1	0.8	1	1	0.9	1	1	0.7	9.2	0	9.2

Figure 4.6: Haugland Scale Evaluation for Meet My Family

Meet My Family received the best rating overall for effectively communicating information to children aged 8-10. The teachers who evaluated this program had

positive reactions across the board. Teacher 1 praised the integration of societal and cultural issues in Thailand with the conservation of the Asian Elephant and thought that the program would be very useful in her classroom. Teacher 2 appreciated the independence associated with the program; the intuitive interface made it unnecessary for the teacher to explain how to use the program to the children.

Turtle Investigation

Turtle Investigation	Age Appropriate	Child in Control	Clear Instructions	Expanding Complexity	Independence	Non Violence	Process Orientation	Real World Model	Technical Features	Transformations	Sub-Score	Anti-Bias Deductions	Final Score
Teacher 1	1	0.8	0.8	0.7	1	1	1	1	0.8	0.8	8.9	1	7.9
Teacher 2	0.8	1	0.7	0.6	0.9	1	0.8	1	0.8	0.9	8.5	1	7.5
Average:	0.9	0.9	0.8	0.7	1	1	0.9	1	0.8	0.9	8.7	1	7.7

Figure 4.7: Haugland Scale Evaluation for Turtle Investigation

Turtle Investigation also received a high score from the teachers who evaluated the program. Teacher 1 found that the instructions were somewhat complicated and that the program did not display expanding complexity. The teacher explained that although the program taught powerful ideas and was challenging for the students, it failed to have a low-entry point. The low-entry point is the initial point of engagement to motivate the child to progress through completion. Initially using the program should be easy and engaging, only later expanding in complexity and difficulty for the children (Haugland, 1997, p.199).

Teacher 1's opinion was consistent with our observational findings in that we noticed that most children had difficulty initially understanding how to use the program. Despite this one drawback, Teachers 1 and 2 praised the real-world model associated with Turtle Investigation. Teacher 2 commented that taking on the role of an

international reporter and being able to use a digital camera and laptop helped to make the program interesting and realistic for the children.

Field Mission

Field Mission	Age-Appropriate	Child In Control	Clear Instructions	Expanding Complexity	Independence	Non Violence	Process Orientation	Real World Model	Technical Features	Transformations	Sub-Score	Anti-Bias Deductions	Final Score
Teacher 1	1	0.8	0.9	1	1	1	1	1	1	1	9.7	1	8.7
Teacher 2	0.8	0.7	1	0.9	1	1	0.9	1	0.9	0.8	9	0	9
Average:	0.9	0.8	1	1	1	1	1	1	1	0.9	9.4	0.5	8.9

Figure 4.8: Haugland Scale Evaluation for Field Mission

Field Mission also received a high score from both teachers. Teacher 1 was most pleased with the technical features of the game. She praised the music, video clips, and sound effects as being very interesting. Teacher 2 felt that the real-world model the game follows was the most positive aspect of the game. She felt that students found it interesting to play the game as a scientist and to analyze and explore the animals and environment. Despite the presence of mixed-gender roles in the program, Teacher 1 added an anti-bias deduction because she felt it was more oriented to a male audience for this particular age group.

Overall, the interactives scored well with the Haugland Scale. Consistent with our focus group feedback, the teachers seemed overwhelmingly pleased with the software and the ability to use the program in the classroom. All programs received average scores well above the cut-off to be considered developmentally and educationally appropriate and for the most part only positive comments were made.

4.1.2 Evaluation in Zoo Setting

To determine whether or not the CD-ROM was an effective learning tool in the zoo setting, we performed disguised observation of children as they used the kiosks. In three days of observational work, we observed 53 individual uses of the interactive kiosks. Each time a user began a session at the kiosk the length of use, program used, the number of children, and the number of adults present was recorded. Detailed notes of behaviors, reactions, and comments were recorded for each session.

In the zoo context, the software is meant to serve as a means of adding to the Trail of the Elephants experience and, therefore, cannot be evaluated as a stand-alone learning tool as was done in the classroom. The interactive kiosks serve as one single element of an immersive set of sensory, cultural, and learning experiences. Also, the kiosks were not intended to educate every zoo patron, but rather those who chose to take time to use them. While the kiosks might educate users of any age group, they were aimed at children under the age of 13, the target audience of the interactive learning programs.

There were several difficulties that arose when evaluating learning in the zoo atmosphere. For the most part, parents only seemed willing to wait for 3-5 minutes before moving on. This made it difficult to measure whether or not learning had taken place because children did not have a full opportunity to use the software. It was also difficult to assess learning when children used programs that were not designed for their particular age group because the program would be either too easy or too complicated.

Figure 4.9: Exhibit Kiosk
(Source: Grinstein, April 17, 2004)

One major barrier affecting children's understanding of how to initially use the software was the keyboard interface. Children struggled to begin using the software by pushing keys on the keyboard while the kiosk only accepted input from the touch pad located to the right of the keyboard. Were a touchpad the only peripheral between the computer and the user, children would be more likely to have success in using the program. Children who fell into this category were difficult to assess because they had limited use of the software.

Of the 53 sessions of use that we observed, 24 did not last longer than 5 minutes because of one or more of the reasons noted above. Separating these 24 sessions from the initial 53, we were left with 29 sessions that lasted more than five minutes. We performed a further analysis on these results to evaluate whether or not learning took place during these 29 sessions. We found that children displayed behaviors similar to those observed in the classroom environment. Children showed responsibility for their own learning, were actively involved in the learning process, shared learning with their

peers and parents, and displayed confidence in their learning abilities while using the interactive kiosks.

A particular learning behavior witnessed at the zoo that was not observed in the classroom setting was purposefully manipulating and playing with objects and ideas. In the classroom, children were not given the choice or opportunity to initiate using the software on their own. At the zoo, children consciously decided that they wanted to sit down and use the kiosk. By voluntarily taking time to interact with the virtual environment, making decisions and answering questions, children seemed interested in the programs. Often children would argue with parents who wanted to keep moving through the zoo because they wanted to continue playing the game.

Children clearly displayed several behaviors that are indicative of learning in the zoo environment. In addition to detecting learning behaviors, we noted several other interesting observations. These were made by analyzing the notes from the original pool of 53 observation sessions. Listed below are some general observations and trends:

- The average session length was 3.6 minutes, the longest was 18 minutes and the shortest was 1 minute.

- Meet My Family was used more frequently than other programs and also showed longer individual session lengths.

- Children seemed more interested when parents stopped to help them use the program. When an adult took the time to sit down and use the kiosk with the child, there was generally a significant increase in the session length.

- Few children actually completed a full walkthrough of a game. Of the 53 sessions recorded, only 7 children fully completed the game they were playing.

- There were an average number of 3 children at a kiosk per session, with most sessions having groups of two.

- Many children struggled to understand Turtle Investigation and Field Mission. Some of these children were too young for the programs, while others had difficulty understanding how to play the game altogether.

- In almost every case, if a child could not figure out how to use the computer or play the game within the first 2-4 minutes, they gave up and either left the kiosk or tried another game.

4.2 Buyer Expectations and Needs of the Market

To determine what makes educational software attractive to buyers, we first interviewed experts in the field of marketing to better understand the target market and the proper methods for researching market demand. Next, we conducted a focus group with teachers to look at their expectations of educational multimedia. Finally, we surveyed parents at the exhibit to discover their interest level and preferences regarding educational software for their children.

4.2.1 Understanding the Market: Purchasing Process

Before conducting an analysis of what might make the CD-ROM attractive to buyers, we needed to understand the market for educational CD-ROMs in general as well as our target audience in greater depth. From interviews with various marketing experts in both Australia and the United States, we gained insight into researching the appropriate background material to analyze our target market (see section 2.3).

Additionally, we were able to analyze the purchasing process and create a decision tree to describe it.

After our interview with Darren Walls, the Corporate Marketing Manager for the Zoological Parks and Gardens Board of Victoria, we created a purchasing process decision tree. The information that we received from Walls allowed us to organize a chart that outlines the process that a potential buyer might go through before deciding to purchase the CD-ROM at the zoo. The chart that we produced is shown in Figure 4.10.

This decision tree (Figure 4.10) shows the process that a potential consumer goes through, starting from entering the exhibit to finishing the day at the gift shop and deciding whether or not to buy the software. Both the parents and the children pass through a series of decisions while visiting the exhibit. Based upon their responses, they decide if they like the programs, which influences their ultimate purchasing decision.

Some of the factors that affect parents' and children's decisions include: whether the children find the program interesting, whether the program is too complicated, and whether the program is too expensive. In order to maximize the sales of the program, it is necessary to minimize these factors in as many ways as possible.
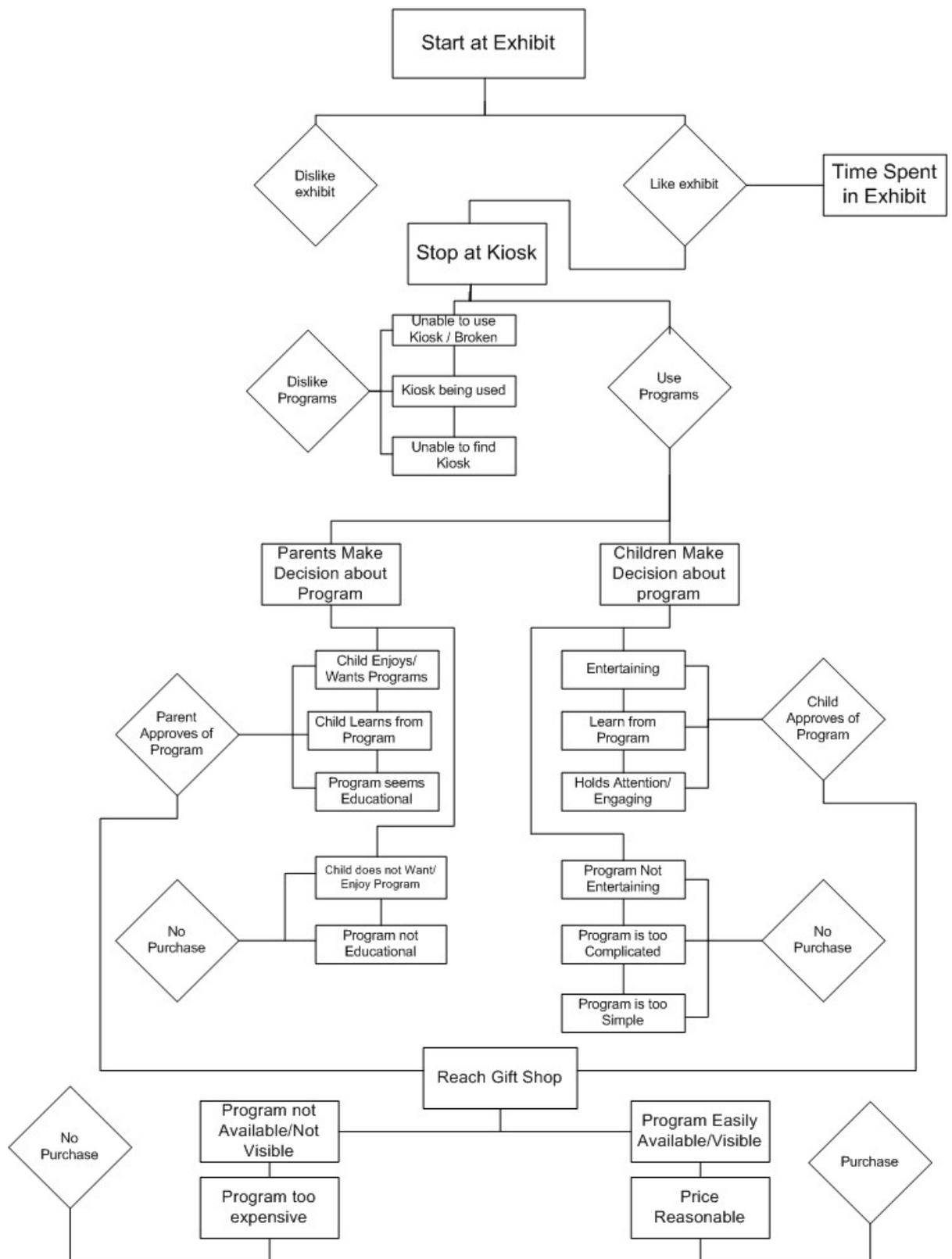
Figure 4.10: Purchasing Process diagram

To further understand these decisions and reactions that might negatively affect

sales of the Questions from the Forest CD-ROM, we designed a survey to be

64

administered to zoo patrons. The information we gathered from the interview with Darren Walls and the subsequent analysis of the purchasing process helped us to formulate the most effective questions to ask visitors to obtain relevant marketing information. In creating this decision tree, we gained insight into the thought process that a potential consumer might go through before making the decision to purchase software from the zoo, which was later helpful in creating our on-site survey.

4.2.2 Teachers' Expectations of Educational Multimedia

In order to further understand the consumer expectations of teachers, we conducted a focus group with five teachers at Brunswick Southwest Primary School. According to the teachers, computer-based educational tools greatly benefit classroom learning. They promote independent learning, as students explore the programs unaided, and also help students gain important computer skills. The teachers discussed the importance of introducing computer skills at a young age, especially in Australia's technologically advancing society. They explained that electronic multimedia sometimes extend children into a new area of interest by exposing them to the subject in a captivating and engaging manner. These entertaining qualities of educational software also facilitate the teaching of students who struggle with traditional methods of learning. The teachers stated that they use computers as often as possible in their classrooms and expressed interest in further integrating software into their curriculum.

When selecting computer-based learning tools to utilize in the classroom, teachers focus on their educational value as well as their ability to entertain and engage learners. Teachers strive for a balance between education and entertainment because while it is important that students learn something from the software, students simply will not use programs that fail to engage them. The teachers also explained that even

purely entertaining software can be effective, as students still become familiar with computer use, a skill that is essential for children today. Another key factor that affects a teacher's decision in choosing educational multimedia is receiving a recommendation from another teacher. In addition, pricing influences their choices greatly, especially in government schools due to limited budgets. (The average yearly software budget of government schools is $500AUD) Expensive programs are often immediately overlooked due to scarce funding for computers and technology. (For the focus group summary see Appendix S.)

4.2.3 Parents' Expectations of Educational Multimedia

In order to better understand the interests and expectations of parents regarding educational software, we conducted an oral survey of parents and adults, as described in Section 3.2.2, at the Trail of the Elephants exhibit. The survey questionnaire contained various questions concerning demographics, the Trail of the Elephants computer stations, and educational software in general. (See Appendix J for the survey questions.)

4.2.3a Trail of the Elephants Multimedia

User Opinion

- Only 16% of adults who were surveyed were with children who had actually used the interactive kiosks.

- 97% of these adults felt that the children enjoyed using the programs on the kiosks.

While a large number of patrons did not use the interactive kiosks, the software had a high satisfaction rate among those who did.
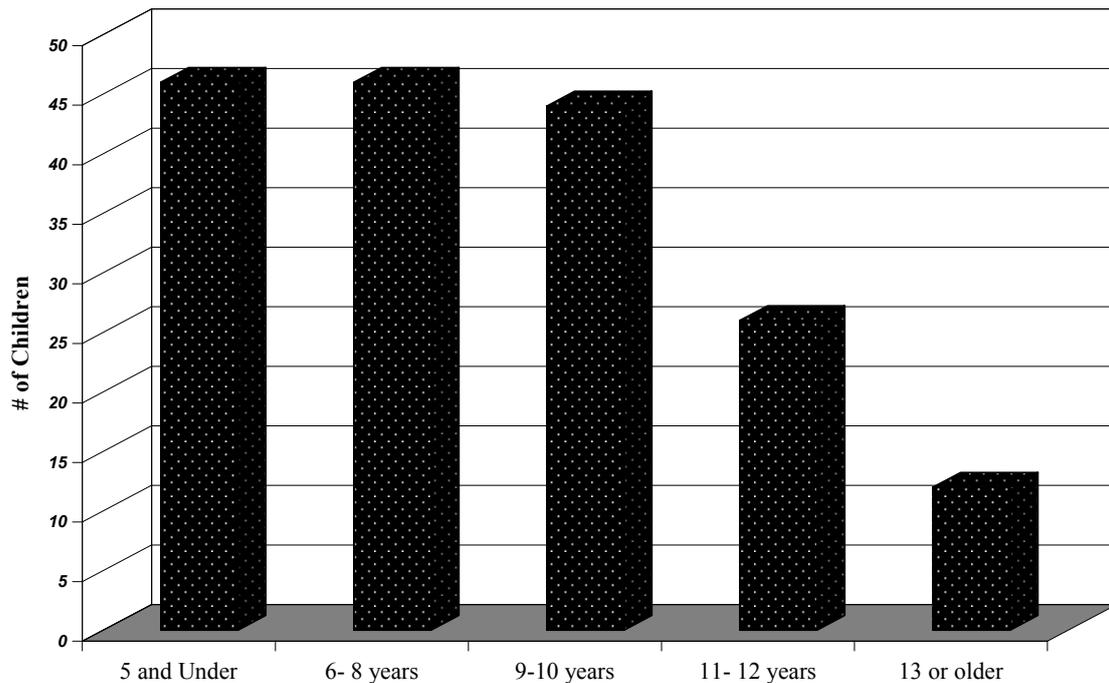
Figure 4.11: Age of Kiosk Users

Figure 4.11 includes the ages only of children accompanying adults we surveyed who used the multimedia on-site. The 13 and older age group does not include adults who might have used the kiosks. 78% of children who used the kiosk were aged 10 and under. This shows that the multimedia kiosk was not as successful in reaching its older target audience.

Length of Use

Children generally did not spend much time using the kiosks. Of all the children who used the interactives, 84% used them for less than 10 minutes. This corresponds to our observational work, showing very short amounts of time spent by children at the kiosks. The lack of extended involvement could be due to the impatience of parents or the lack of engagement in the interactives. This could also be due to the user accessing a

program designed for a different age group or not being able to operate the kiosk interface.

Learning
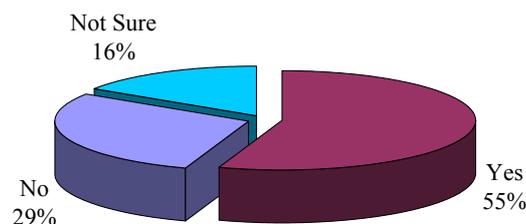
Figure 4.12: Did the User Learn from The Kiosks?

According to the parents and adults whose children used the programs, 55% felt that their children had learned something from the interactives. Educational value is one factor involved in the purchasing process of the Questions from the Forest CD-ROM. If the parents feel that their child/children learned from the programs, as a majority did according to our survey results, then they are more likely to purchase the product.

Home Use

More than 80% of those who used the software felt their child/children would enjoy using the programs at home. This desire to use the programs at home is another factor that affects the purchasing process and supports the likelihood of parents buying the product. However, this information may not correctly represent the feelings of children, as it is based upon the opinion of the parents. Many students involved in our

studies at the local schools stated that they would not like to use the programs at home. (For more information on this please refer to section 4.1.1c.)

4.2.3b Educational Software Feedback

Previous Purchases

Sixty percent of survey respondents had purchased educational software in the past, and therefore were already familiar with the market of this type of product.

Important Considerations When Choosing Educational Software

To determine what considerations are important to parents and adults when choosing educational software, we asked respondents to rank the importance of each of the following attributes using a Likert Scale. Because so few responses were received in the "Not Important" and "Less Important" categories, we combined the two when analyzing the data.

|	1: Not Important	2: Indifferent	3: Somewhat Important	4: Very Important
□ Total	5	18	120	321
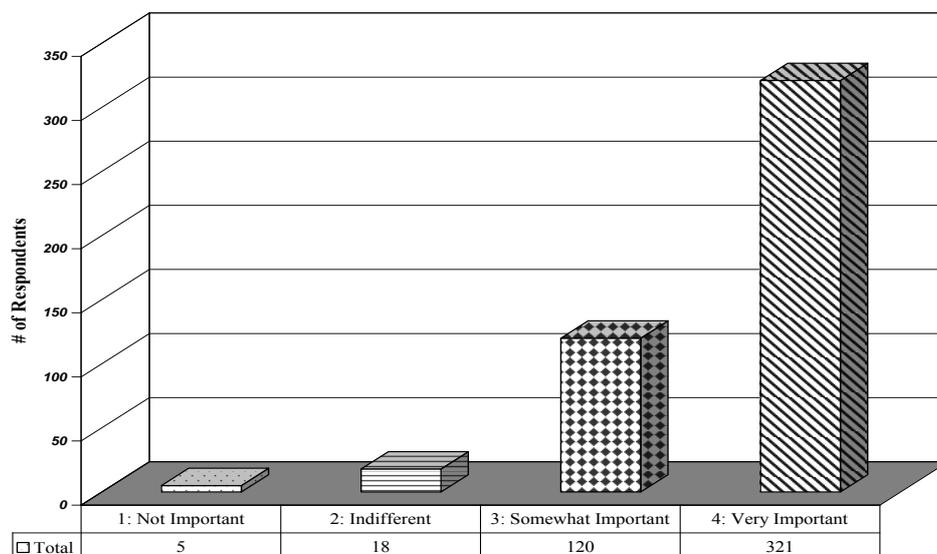
Figure 4.13: Importance of Content/Quality of Material Covered

When asked about content and quality of material covered, an overwhelming majority of parents ranked this as being a very important consideration when choosing educational software. When we designed our survey, we assumed that this characteristic would be very important to parents. The purpose of our survey was to determine if our assumption was correct. In this case, our results show that this was true.

|	1: Not Important	2: Indifferent	3: Somewhat Important	4: Very Important
☐ Total	12	26	146	280
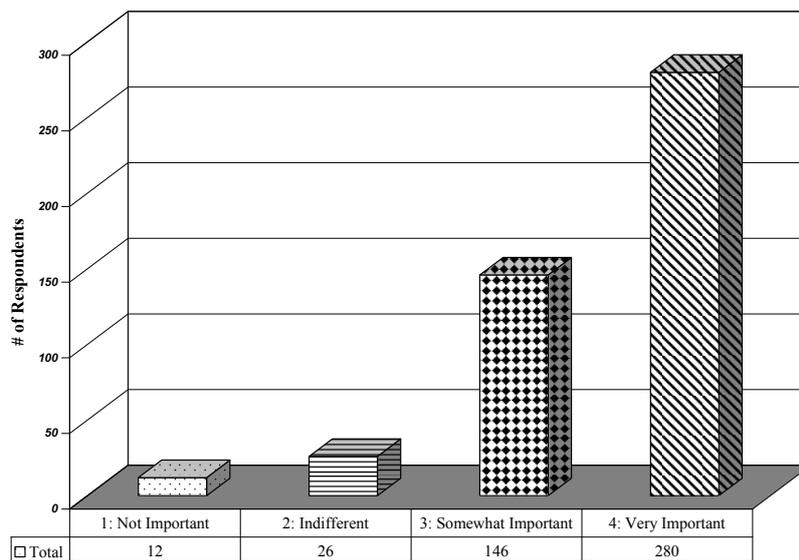
Figure 4.14: Importance of Ease of Use / Ability of Child to Use Alone

As before, we assumed that this ease of use and ability of a child to use alone would be very important to parents. While the results of Figure 4.14 are not as overwhelming as Figure 4.13, they still show that this characteristic is very important to parents.

☐ Total	1: Not Important	2: Indifferent	3: Somewhat Important	4: Very Important
	44	117	163	140
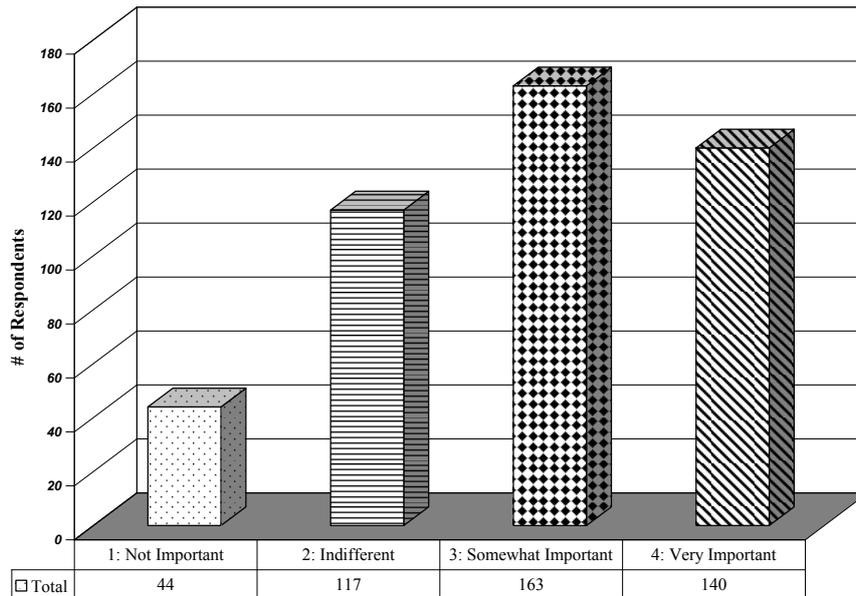
Figure 4.15: Feedback and Assessment

When asked about the importance of feedback and assessment, respondents were more spread across the spectrum. It was explained to respondents as the survey was issued that this characteristic dealt with the presence of questions or quizzes within the programs. Most respondents gauged this characteristic with slight importance. This shows that parents were not as concerned with the amount of feedback that the program would provided their children as they were with the quality of the content or the ease of use of the program.

Desired Characteristics

The open-ended questions at the end of our survey gave the respondents a chance to express the characteristics that they looked for in educational software. We categorized the most frequent responses into the following categories. Within each category we have listed the most frequent comments.

Age Related

- Age Appropriate
- Non-Violent
- Suitable for All Ages / Abilities
- Appealing to Children

Content – General
- Australian Content / Culture / Voices
- Interesting / Entertaining
- Fun to Use
- Interactive / Stimulating

Content – Educational
- Help Achieve Educational Goals
- Open-ended Challenges
- Related to Curriculum
- Covers Accurate Information
- Relevant to Subject

User Interface
- Easy to Use / User Friendly
- Ability of User to Relate to Content of Program
- Program Gets to the Point

Technology / Multimedia Aspects
- Colorful Graphics / Visuals
- Music / Audio / Sound Effects
- Compatible with Computer (Apple and PC)

Longevity / Shelf Life
- Current Material / Technology
- Upgrades Available
- Known Brand / Company Name

Desired Subjects

Along with gathering information on the characteristics adults' desire, we also collected data on the subjects that they would like educational software to cover. As before, we categorized the most frequent responses into the following categories. Within each category we have listed the most frequent comments.

School Subjects

- Science
- Nature
- Biology
- Environment
- Conservation
- Math / Basic Math
- History
- Geography
- English
- Basic Learning
- Literacy
- General Knowledge

Animal Subjects

- Animals' Natural Habitats – How to Protect Them
- Animals' Lifecycles
- Where Animals Live / Eat
- Australian Wildlife
- Abuse of Animals
- Preservation of Animals
- Endangered Species
- Wild Animals

Cost of Software

The parents surveyed ranked the importance of price when purchasing educational software using a Likert scale. Only 29% felt that the cost is a very important attribute for educational programs. 59% ranked this attribute as being at least somewhat important. Many explained that if the product is effective, then the price is insignificant. For the actual dollar amounts parents were willing to spend on a single piece of educational software, see Figure 4.17.
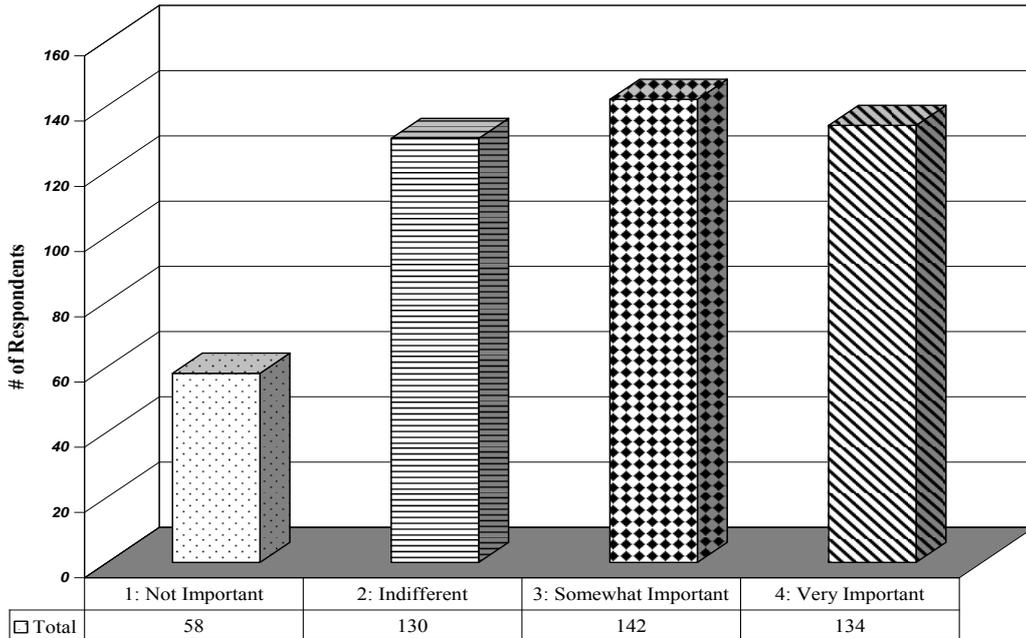
Figure 4.16: Importance of Cost of Software
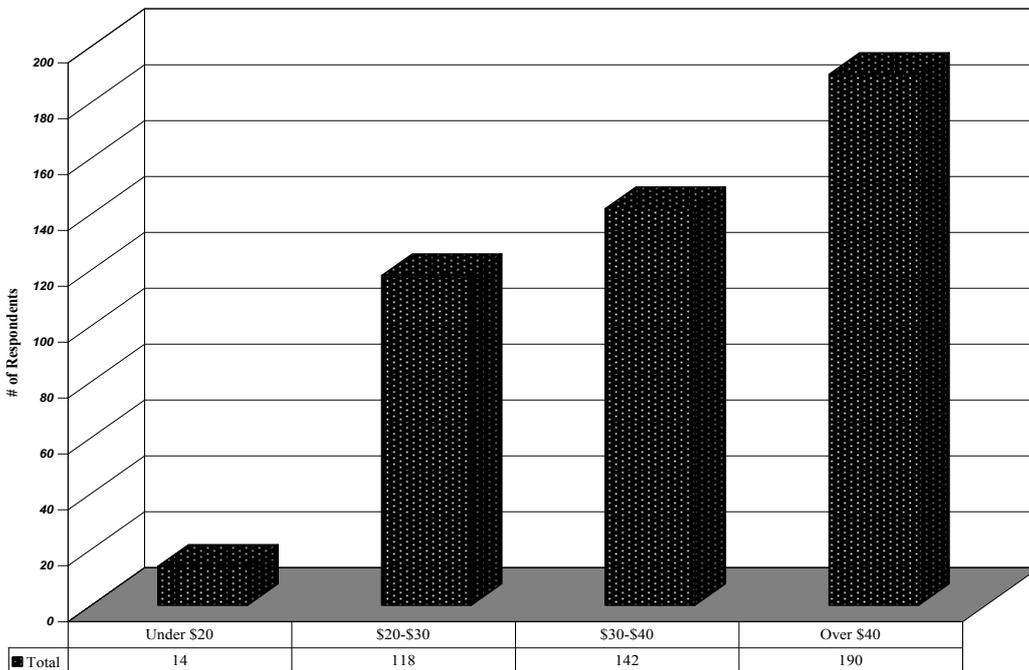
Figure 4.17: Amount Willing To Spend on Educational Software (AUD)

When asked how much they would be willing to spend on educational software, 41% of respondents indicated that they would be willing to spend $40 (AUD) or more and 30% stated that they would be willing to spend between $30 and $40. Most parents

who answered in the former category actually volunteered a figure that was between $50 and $100 (AUD). These results are very encouraging as individual titles from the Questions from the Forest software bundle retail for $29.95; meaning that if they considered the CD-ROM a quality product, 71% would be willing to spend the money to purchase it. Asking how much one would be willing to spend on educational software is a very subjective question. It is hard to judge how much one would spend on a product without actually viewing it, and most parents answered that they would only be willing to spend the money on a quality product.

4.3 Summary

The research we conducted allowed us to collect data on knowledge retention, the opinions of children, and valuable information about the expectations of parents and teachers for electronic learning tools. Through analysis of these results we evaluated the educational effectiveness of the CD-ROM and the needs of its target market. The next two chapters detail the conclusions of our findings from this analysis and outline our recommendations for Zoos Victoria.

5 Conclusions

Our project consisted of two main research goals – to determine the educational effectiveness of the Questions from the Forest CD-ROM and to discover the expectations of the CD-ROM's target market. To understand the concepts behind these goals we initially conducted background research into the Trail of the Elephants exhibit, interactive multimedia in general, and attributes of the CD-ROM market. Following this research, we established the most effective methods for collecting the information needed to fulfill our project goals.

We investigated the educational value of the CD in the classroom setting by observing students at local primary schools, collecting teacher feedback in a focus group, and evaluating the programs with a developmental scale. We focused on its effectiveness in the zoo setting by observing children using the interactive kiosks at the exhibit. To determine the desires and interests of the CD's target market, we initially interviewed experts in the marketing field. We also conducted a focus group with teachers and administered a survey to parents at the exhibit. Upon analyzing the results obtained from our methods, we arrived at the conclusions explained in this chapter.

5.1 Educational Effectiveness of Multimedia

Overall, the Questions from the Forest programs are effective learning aids for children. The programs are entertaining for students and support retention of the presented information, achieving the educational objectives set forth by Zoos Victoria. The interactive kiosks at the exhibit actively engage visitors and promote learning when patrons complete this interactive element of the exhibit. Even when children do not use the computer stations for an extended amount of time, they may still be learning from

the experience. "When people are having fun, they can also be learning" (Aughterson, personal communication, April 28, 2004).

5.1.1 Effectiveness in Classroom Setting

Figure 5.1: Children Enjoying Program
(Source: Grinstein, April 22, 2004)

Based upon the results from our observational work and focus group dealing with evaluation in the classroom environment, we concluded that the Questions from the Forest CD-ROM is a very effective educational tool. Students maintained a high interest level in the subject matter and were deeply engaged in the programs. The interactives appear to be entertaining for the target age groups, as many students wanted to use them multiple times. From student feedback, we determined the programs' most entertaining qualities:

- Exciting visual graphics and animations

- The ability to explore different areas of the program

- Questions to answer in order to proceed through the program

Many students particularly enjoyed the challenging aspect of answering the questions in order to advance within the programs. The students did not enjoy every aspect of the interactives, however. They desired more areas to explore and more opportunities to interact with the virtual environment. The programs may be too short or simple, as many of the children finished the program and wanted to play more. Many students were bored by long sections of text, especially those not accompanied by audio. Although text is an element of educational software's effectiveness as a literacy tool, it may lessen its success by disengaging users. Sections of text could be read aloud in programs targeting this young age group, as students in our study paid more attention to portions of reading with audio voice-overs. Some of the students who were particularly disinterested in the reading explained that they would not use the programs at home. This demonstrates the importance of entertainment value in educational software. Despite these considerations, our observational studies showed that overall the multimedia effectively engages users.

87% of all students learned and retained a majority of the information presented by the interactives, according to our retention studies. The percentage of students showing full retention increased from 43% to 63% from the immediate retention study to the extended retention study. The responses on a majority of the post-tests we collected indicated that students had become more aware of endangered species and related conservation efforts. Many students also displayed common behaviors and reactions that are indicative of learning processes. The Haugland Scale evaluation conducted by the Brunswick Southwest teachers showed that the programs are developmentally and educationally appropriate for primary school students. From these results we concluded that the Questions from the Forest CD-ROM effectively accomplishes its educational objectives in the classroom setting

5.1.2 Effectiveness in Zoo Setting

The observational work we conducted at the Trail of the Elephants interactive kiosks yielded both positive and negative results in terms of the effectiveness of the multimedia in educating children and completing the Trail of the Elephants experience. We found that many children (24 of the 53 we observed) used the interactives for less than five minutes. This lack of initial engagement may be caused by several different factors. The impatience of children may be the issue, or the inability of the multimedia to keep them interested. However, often the impatience of the parents stopped children from completing the programs; many parents we witnessed were unwilling to spend more than five minutes at the kiosks. Another influence on the shortened use of the kiosks may be the user interface. The keyboard frequently confused children, as the touchpad is the only component necessary to use the program. Children's inability to select the program designed for their age level also affected their level of engagement in the multimedia. When children struggled with the programs not aimed at their age group or found them too simple, they often lost interest and left the kiosk. Although the interactives did not capture the attention of some of the children, 29 of the 53 that we observed did use the programs for longer than five minutes.

When used in the zoo, the software seems to be fun and an effective means of educating children as long as they use the programs as intended. From our observations, when children stayed more than a few minutes, they appeared entertained and engaged – actively participating and interacting with the multimedia. Upon initially figuring out how to play the game, the children displayed various behavioral indicators that suggested that they were engaged in learning. Based on these observations, in its context as an element of interpretation, the software is an effective educational supplement to the Trail of the Elephants experience.

5.2 Consumer Interest and Expectations

The Questions from the Forest CD-ROM targets two distinct markets, parents and teachers. Teachers purchase educational software for use in a classroom, and therefore focus on the product's educational objectives and its ability to be integrated into the curriculum. Parents, on the other hand, purchase educational programs for use at home. They look for programs that entertain and engage their children, while still presenting informative educational material.

5.2.1 Teachers

Based upon the feedback from the focus group at Brunswick Southwest Primary School, we determined the characteristics that teachers desire in educational multimedia products. Teachers will purchase software that:

- promotes independent learning;

- captivates and engages students;

- both educates and entertains users, and

- is priced within schools' limited budgets.

As explained in section 5.1.1, the Questions from the Forest CD-ROM exhibits these qualities. According to the teachers involved in our focus group, the teacher resource package is also priced appropriately at $195.00(AUD) and is a product that they would purchase for use in the classroom.

5.2.2 Parents

From the comments and feedback obtained by our survey, we determined which aspects parents focus on when purchasing educational software. More than 90% of parents surveyed said that content and ease of use were important qualities for educational multimedia products, while only slightly more than 50% stressed the importance of feedback/assessment and cost of the software. Parents want educational programs that are:

- informative with accurate and age-appropriate information;

- easy for children to use alone;

- entertaining and fun to use;

- interactive and stimulating for children;

- aesthetically appealing with exciting graphics and audio, and

- relevant to the target age level and children's work in schools.

Many of the parents surveyed felt that the cost of the software is less important, as long as it is a quality product in terms of the features listed above. Sixty percent of respondents had purchased educational software in the past.

The conclusions developed through our research helped us to prepare recommendations for Zoos Victoria to consider in the future. These recommendations concern the following: future multimedia ventures, methods of appealing to their target audiences, and the general use of interactive multimedia in the zoo. We discuss these topics in the following chapter.

6 Recommendations

With the pilot venture of the Questions from the Forest interactive software Zoos Victoria has proven itself successful in integrating technology into its educational programs and learning experiences. Based upon the background research and conclusions derived from our project, we advise that Zoos Victoria consider the following recommendations about developing interactive multimedia in the future and making such multimedia attractive to their target markets.

6.1 Promoting Learning in Future Ventures

While the Questions from the Forest CD-ROM was successful in many of the following respects, we advise that Zoos Victoria consider these guidelines when developing future multimedia experiences. If the following recommendations are considered in the development and design process, more effective learning tools can be produced.

6.1.1 Use Educational Game Format

To promote learning, it is important that the software hold the child's interest long enough to encourage learning. The most effective model of electronic instruction is the educational game. The Tutorial and Drill and Practice models of computer-based instruction can be effective with younger children, but they typically do not hold a child's interest very long – especially when used at home. When competing in the extensive market of entertainment games, the educational aspects must be disguised (and in some cases almost hidden) in the format of a game.

6.1.2 Allow Open Ended Decision Making

Children like to answer questions and make conscious, active decisions. When they are in control of the software, children are engaged and entertained. When developing educational software, Zoos Victoria should strive to make them as child-oriented as possible and allow the child a multitude of options and paths in which to progress through the software. Many students commented that they wanted more avenues in which to explore the virtual environment in the programs.

6.1.3 Allow Expanding Complexity

To fully ensure the child learns and retains information from software it is important that they are highly engaged while using the program. Initially, the program must be easy to understand and follow. The rules, object of the game, and how to play should be as intuitive as possible for the child in the beginning. Our observational work indicated that some of the programs had limited success in initially engaging children, because they were too complicated for a child to understand and proceed without difficulty. As the game progresses, it should then expand in difficulty and complexity.

6.1.4 Make Software Age Appropriate

Parents identified age appropriateness among the most important characteristics when choosing software for their children. By ensuring that presentation of the information and the content of the software are age appropriate, the program will be far more engaging. If the software is aimed at children of a certain age group, those children must be able to understand and enjoy the material delivered. Older children are not as interested in purely educational software due to the abundance of other software titles. Many would rather play a purely entertaining video game over an educational game. This

is an important factor to consider when designing educational software aimed at an older audience.

Additionally, adults whom we surveyed explained that they will not buy educational software that contains adult themes. Therefore it is important to ensure that the subject matter and content be free of violence, sexual overtones, and prejudicial material. Children of different age groups also have different abilities and knowledge with computers; it is important to design software with this in mind.

6.1.5 Consider Aesthetic Appeal

It is essential that the software appeal to a child's aural, visual, and emotional senses. By effectively integrating video, pictures, sound effects, music and animation, the program will be more engaging and entertaining to both younger and older audiences. Visual presentation and feedback are the most direct means in which children interact with the computerized environment and thus should be as sharp and intuitive as possible. Sound is also an important characteristic because it conveys information in tandem with the sight experience by providing feedback with sound effects or conveying instructions.

6.1.6 Improve Interactive Kiosks

The interactive kiosks at the Trail of the Elephants are meant to serve as an element of interpretation for the entire immersive experience. To enhance the effectiveness of future multimedia ventures in this regard children must become actively engaged in the learning programs. We found three areas that can be improved to promote children's involvement in the interactives, including the following:

- Keeping parents occupied long enough for children to complete the programs

- Removing unnecessary components of the user interface

- Clarifying the target age level of each program

Our observational studies showed that children exhibit more prominent behaviors indicative of learning when using the kiosks for longer periods of time, and also when assisted by parents. The multimedia will reach children more effectively if parents are kept occupied or enticed to use the programs with their children. This could be accomplished by presenting other forms of media nearby that interest adults or a pamphlet/brochure that details information about the multimedia programs. Making the kiosk interface more user-friendly would also help children get more from the multimedia. Removing the keyboard or simply indicating that the touchpad is required to navigate the program will make the kiosks easier for children to use. Finally, specifying the age level each interactive targets will enable children to select the program of the appropriate difficulty level.

6.2 Appealing to Target Audiences

Based upon our background research and the conclusions we reached from our data regarding buyer expectations, we formulated various ways in which Zoos Victoria might attract a larger consumer group. There are essentially three groups that need to be considered: children who come to the zoo, the parents and adults that accompany these children, and primary school teachers.

6.2.1 Children

The best way to appeal to children from a marketing perspective would be to ensure that after using software in the zoo, they are excited and satisfied with the

program. As described in section 6.1, there are many attributes that must be present to encourage engagement. In addition to designing an effective educational tool that children enjoy, there are other considerations the zoo might focus on to market to children, including the following:

- allow children to play the interactive in the retail shop;

- offer demo CDs to Zoo visitors;

- utilize Zoos Victoria website to advertise, sell, and promote the product;

- advertise that the software used on the kiosks is available for purchase;

- use bright, colorful packaging that makes children notice the software in the retail shop, or

- add incentive to purchase software, e.g. a free stuffed animal or toy.

Based upon our background research (see section 2.3.1) and interviews, marketing to children seems to be the most effective strategy when trying to influence a purchase. Once a child wants the product, much of the work of selling the product is done; if an appeal to the expectations and desires of the adult is successful, likelihood of purchase is greatly increased. However, as we learned in our marketing interviews, educational CD-ROMs are difficult to sell by themselves. Adding incentive to purchase the software or selling the CD-ROM as a supplement to another product is an effective way of marketing educational software.

6.2.2 Parents and Adults

Only 16% of adults who were surveyed had children who used the interactive kiosks in the Trail of the Elephants exhibit. In order to effectively market to parents and adults, it is important that they:

- are aware that the interactive kiosks exist;

- realize the software is available for purchase;

- be convinced that the software is a quality product and appeals to the characteristics that they find important.

Further study into increasing visitor awareness of both the kiosks and the CD-ROM would be beneficial to the market success of both the Questions from the Forest product as well as other similar ventures in the future. Also, future marketing studies regarding expectations of software when used at home would be beneficial. This topic was very relevant, but was neglected within the scope of our project.

6.2.3 Teachers

The consumer expectations of teachers have also been investigated throughout the course of this project. Appealing to these expectations is one important part of formulating an effective marketing strategy. Before this appeal can be made, though, Zoos Victoria must first explore additional outlets through which they can communicate to teachers. Some ways in which the zoo might accomplish this include the following:

- advertising the Questions from the Forest Teacher Pack at local, state, and national teacher conferences;

- advertising on educational television channels;

- advertising software and kiosks to teachers that visit the zoo with students and encourage them to explore the kiosks, and

- advertising in journals, newsletters, and other publications that are intended for primary school teachers.

6.3 General Recommendations Regarding Educational Multimedia

The success of the Questions from the Forest software as a pilot venture warrants that Zoos Victoria should continue to utilize electronic learning aids in the future. There are several considerations that Zoos Victoria might take into account in the future with regards to electronic multimedia in general.

While the CD-ROM proved to be an effective means of delivering electronic learning aids, several other technologies exist as well. As discussed in the background chapter (see section 2.3.3), there are various benefits and tradeoffs associated with different forms of electronic multimedia. One format that is becoming increasingly popular is the interactive website. The Woodland Park Zoo uses their interactive website (www.zoo.org/multimedia/interactive) to educate the public about various animals and promote exhibits online. Interactive websites are fairly inexpensive to create and are easily maintained. Linking the Questions from the Forest software to a website as well as other learning programs to the web would likely prove successful in helping Zoos Victoria to reach a larger audience.

Zoos Victoria should also increase use of interactive multimedia in the Zoo. Integrating technology in the learning process appeals to children in ways other methods cannot and adds user satisfaction to the zoo experience. Technology can be an effective and entertaining means of appealing to a child's curiosity and sense of wonder. Moving into the 21st century, Zoos Victoria should continue to be innovative and forward looking when designing its learning programs.

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Appendices

Appendix A: Zoological Parks and Gardens Board of Victoria

Please note: Some of this appendix was adapted and expanded from "A Zoo Without Boundaries," the 2002 Zoos Victoria IQP.

The Melbourne Zoo was founded in 1862, under the direction of the Zoological Society of Victoria. Originally designed as a domestic animal acclimatization area, the zoo began collecting unique species from around the world beginning in the 1880's. These animals included species such as the elephant, zebra, and giraffe. Over the next century, the Melbourne Zoo acquired many unique animals, constructed permanent enclosures, and developed programs for captive breeding of endangered species. In the 1980's, the Zoo developed and implemented a master plan to divide the grounds into three bioclimatic zones, and furthered the Zoo's regional conservation and education efforts through additional activity programming.

Several agencies have overseen the Zoo since its inception. Zoo leadership was transferred to the Zoological Board of Victoria in 1937. Created in 1936, the Zoological Board was responsible for the creation of Victoria's Open Range Zoo at Werribee in 1975 and the Healesville Sanctuary in 1978. Together, these three conservation areas are known as Victoria's Three Great Zoos and their purpose is (Zoos Victoria (c), 2003, Zoological Parks and Gardens Board),

- "The exhibition of zoological specimens to the public."
- "The scientific study of zoological specimens."
- "The instruction and entertainment of the public."
- "The protection, preservation, management and care of wildlife."
- "The protection or preservation of wildlife habitat including native plants and trees."

Currently, the Zoos are led by the Zoological Parks and Gardens Board, established in 1996.

Table A1 shows the financial summary for the ZPGB for the fiscal year of 2002-2003. As the table shows, there is an increase in both inflow and outflow of funds indicating a growth in the organization. There is also an increase in government grants over the past year. However, there is a loss in the amount of revenue due to Sales of Goods and Services. The sales of the CD-ROM would be included in this category. This might have nothing to do with the Questions from the Forest CD-ROM, but will be something to look into.

Table A.1: ZPGB Financial Summary - 2003

Statement of financial performance for the year ended 30 June 2003	Notes	2003 $'000	2002 $'000
Revenue from Ordinary Activities			
Admission Income		14,081	12,567
State Government Grants	2	15,209	9,986
Sales of Goods and Services	3	4,195	4,990
Other Revenue from Ordinary Activities	4	5,195	4,267
Total Revenue		38,680	31,810
Expenses from Ordinary Activities			
Employee Benefits	5	(20,258)	(17,495)
Depreciation	1(h),6	(2,657)	(2,601)
Borrowing Costs		(218)	(230)
Supplies and Services	7	(11,576)	(10,646)
Other Expenses from Ordinary Activities		(147)	(156)
Total Expenses		(34,856)	(31,128)
Total changes in Equity other than those resulting from transactions with the Victorian State Government in its capacity as owner	15	3,824	682

The above statement of financial performance should be read in conjunction with the accompanying notes.

Source: Zoos Victoria . (2003). Annual Report. Victoria, Australia: Braemar Graphic Reproductions.

Figure A1 shows the organizational chart for the executive management of Zoos Victoria. Our liaison, Jen Aughterson, is the Learning Technologies Coordinator in the Department of Discovery and Learning, under Karen Fifield's direction.
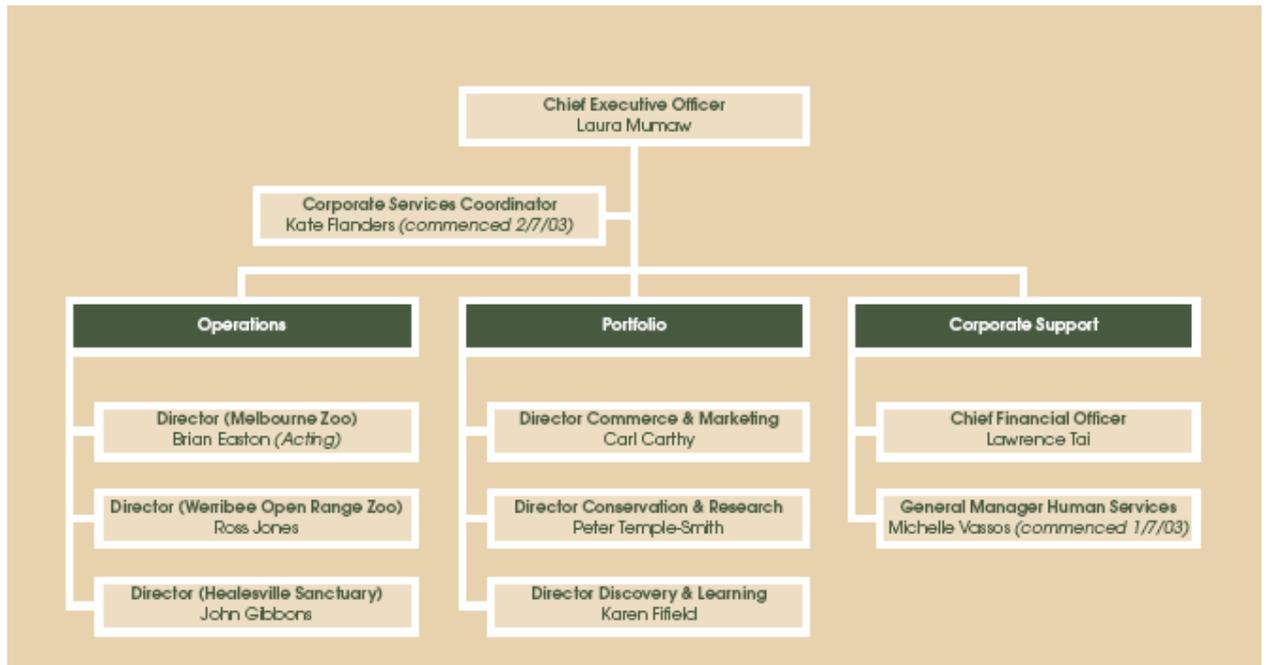
Figure A.1: Executive Management Organizational Chart
(Source: Zoos Victoria (c), 2003)

Figure A2 is a list of the employees of the Discovery and Learning branch and their positions.

Figure A.2: List of Discovery and Learning Employees
(Source: Zoos Victoria (c), 2003)

The Discovery and Learning Home Page has a variety of educational resources online in addition to the Questions from the Forest software package. (Zoos Victoria (a), 2003, Education) The website features information about the three zoos, online learning resources, fact sheets, and contact information for the Discovery and Learning Center Staff.   For more information go to: http://www.zoo.org.au/Education/.

Discovery & Learning Home Page

Discovery & Learning delivers 'Wild Education' programs at Melbourne Zoo, Healesville Sanctuary and Victoria's Open Range Zoo at Werribee.

Learning Resources

NEWWe now offer our Learning Resources ONLINE - click here!

Multimedia

NEWQuestions from the Forest - CD Rom Series Click here to view the brochure! or Click here to register your purchase!

Links

Click here for links to other educational organisations and partners.

News

Click here to see the latest in Discovery & Learning News

Are you a teacher who would like to have our program information and schedule of events emailed to you? Click here to fill in our online form

You can find out about all the Zoo Education programs on offer for early childhood, primary, secondary and tertiary students in this website.

Figure A.3: Discovery and Learning Home Page
(Source: Zoos Victoria (a), 2003, Discovery and Learning)

In tandem with the Questions from the Forest CD-ROM software package, Zoos Victoria offers additional resources for use with teachers in a classroom setting. The resources include additional activities that utilize the CD, suggested questions, and how involve students with the software before visiting the zoo. The resource package also

ties in lessons concerning Asian Culture. The marketing flyer that is given to teachers to advertise is shown below:

Figure A.4: Questions from the Forest Information
(Source: Zoos Victoria (a), 2003, Discovery and Learning)

Appendix B: Environmental Conservation

Destruction of the Environment

"Concern for environmental degradation is that rare political phenomenon, a genuinely new issue in civil life" (Rosenbaum, 1985, p. 7). Corruption of the environment has become a serious problem in Australia, along with the rest of the world, as industries contribute to every form of pollution. Goudie (2000) studied the human impact on all aspects of the environment, and came up with some discouraging results. The earth's population is growing amazingly fast, and the condition of nature's valuable habitats will continue to deteriorate as humans' needs for resources and space grow. "Estimates for current species extinction rates hover close to 1,000 times pre-human levels (0.1 per cent per year), with the rate projected to rise, and very likely sharply" (Broswimmer, 2002, p. 3). While we strip the earth of its resources and create enough pollution to spoil habitats we disrupt the balance of life. The equilibrium is altered to such an extent that species are driven to extinction. "Energy resources are being developed at an ever-increasing rate, giving humans enormous power to transform the environment" (Goudie, 2000, p. 33). This power will continue to grow as long as the population does, and unless it is countered by means of protecting the environment, the planet may not survive very long.

Public Policy

The extinction of endangered species can and must be reduced through public policies, as described by Broswimmer (2002). However, the desire for such policies is sometimes nonexistent. Rosenbaum (1985) explained the dilemma, "the benefits are often intangible, long-range, and distributed among a very large public, while the costs are often tangible, immediate, and imposed on a specific set of organized interests" (p.104). More simply, corporations are affected by obligatory laws immediately while the

benefactors are humans with a healthier world decades later. Rosenbaum (1985) illuminated the fact that many people of today's world cannot see the rising problems facing the environment, nor can they see the benefits of programs to stop them. They are so occupied and excited about our rapidly expanding technological advances and growing population that concern to protect this social progress overwhelms them. Caldwell (1973) explains it well, stating, "Practical politicians find it difficult to persuade themselves or their publics of the necessity of dealing with tomorrow's uncertain problems when the self-evident issues of today press for attention" (p. 29).

Conservation Efforts

Combating pollution and wildlife extinction is not impossible. "It is evident that while humans have imposed many undesirable and often unexpected changes on the environment, they often have the capacity to modify the rate of such changes or to reverse them" (Goudie, 2000, p. 425). Although there is still the problem of contesting negative public opinion, steps are being taken to protect the environment. Goudie (2000) reports some of the successes of environmental programs: "In some countries, conservation and protection have had a long and sometimes successful impact" (p. 426). It is clear that endeavors of ecological preservation have inspiring effects on the world and are obviously worthwhile. According to Rosenbaum (1985), increased awareness of environmental conservation in recent decades has led to the protection of land and animals all over the world. "One hallmark of this era is the increasing involvement of government at all levels in environmental protection" (p. 7). Hence, the world is finally taking steps to remedy the current situation. As more land is destroyed each year and more species become extinct, conservation efforts become ever more crucial.

Zoos

Jamieson (2002) justifies one of the core motives behind the implementation of zoos as the preservation of species. "As the destruction of habitat accelerates and as breeding programmes become increasingly successful, this rationale for zoos gains in popularity" (p. 171). When a species is in danger of extinction, a practical solution seems to be transferring the animal to a zoo and initiating breeding in captivity. However, moral issues stem from this frequently practiced method of preserving endangered species. Is it ethical to take animals from the wild and deprive them of their freedom in order to attempt to save the few remaining individuals of a dying species? It is likely that the zoo is merely the last stop of this species on its way to extinction. Besides, the chances of survival of animals reintroduced into their natural habitats are small, as most attempts have failed (Jamieson, 2002, pp. 176-184). On the other hand, environmentalists argue that these animals must be taken into captivity before they are destroyed along with their habitats. The harmful influences of humans are a major cause of the extinction of endangered species; as long as conservation attempts fail to stop our destruction of the natural world and habitats continue to disappear, the only way to preserve wildlife will be to place the threatened species in zoos (Joyce, 1970, p. 107).

Taking in wild animals is not the only way that zoos help to protect the valuable wildlife of our planet. "Zoos and aquariums (sic) are working to scientifically manage conservation and breeding efforts throughout the world. They have supported or participated in thousands of conservation or related scientific projects in over 60 countries worldwide" (Nashville Zoo, 2004, Why is Conservation Important?).

As one of their many methods protecting endangered species across the globe, zoos also sponsor a plethora of educational programs. One example is the Questions from the Forest CD-ROM. The interactive product attempts to teach users about the

problems facing two distinct endangered species and how the situation can be remedied. Multimedia educational programs can greatly impact people's awareness of nature, especially when utilized in a zoo setting. Cassandra Andersen, Youth Coordinator of the Ecotarium (Worcester, MA, USA), explains: "electronic educational tools are a very effective means of education, but only if used in tandem with another learning experience." Interactive learning programs are sometimes not very engaging and therefore ineffective when used as separate teaching instruments. However, when they are part of a larger experience, like watching the animal behave at a zoo exhibit, detailed learning can take place (Andersen, personal communication, February 11, 2004). Melbourne Zoo is on the forefront of zoological parks worldwide in terms of its educational programs and support of conservation efforts.

Questions from the Forest Endangered Species

Animal endangerment is one aspect of environmental concern that closely relates to the Trail of the Elephants exhibit – in particular, the two species featured at the exhibit and in the CD-ROM itself: the Elongated Tortoise and the Asian Elephant. The Elongated Tortoise has a large range in Asia from Nepal to Malaysia. Because it is a common feature in Asian food markets, it is under stress in its entire range and thus considered an endangered species. International trade of the animal has been regulated but without much effect, as it is still the most common tortoise shipped to Chinese food markets from Vietnam (Senneke, 2003, Status in the Wild).

Figure B.1: Asian Elephant (Taken at the Trail of the Elephants)
(Source: Grinstein, April 17, 2004)

The Asian Elephant is also considered an endangered species. Over the last decade approximately half of the population has vanished, reducing its range from all of Asia to the inaccessible forests of south and Southeast Asia. As more forests are cleared for farming and lumber, the Asian Elephant's habitat is destroyed. Poachers still hunt the elephants for their ivory tusks, used to make expensive jewelry and sculptures (Zoos Victoria (b), 2003, p. 2).

Appendix C: Haugland Developmental Scale for Software

HAUGLAND DEVELOPMENTAL SOFTWARE SCALE

Title _____ Ages _____
Publisher _____ Cost _____

Date Evaluated _____ Hardware Eval. On _____ Updated on _____
Evaluated by _____ Multiple Platforms _____ Copyright _____

Description
_____

Comments
_____

Category		Items
Age Appropriate		☐ Realistic Concepts ☐ Appropriate Methods
Child in Control		☐ Actors not Reactors ☐ Can Escape ☐ Children Set Pace ☐ Trial & Error
Clear Instructions		☐ Picture Choices ☐ Simple, Precise Directions ☐ Verbal Instructions
Expanding Complexity		☐ Low Entry, High Ceiling ☐ Learning Sequence is Clear ☐ Teaches Powerful Ideas
Independence		☐ Adult Supervision Not Needed After Initial Exposure
Non Violence		☐ Software is free of violent characters and actions ☐ Software models positive social values
Process Orientation		☐ Discovery Learning, Not Skill Drilling ☐ Intrinsic Motivation ☐ Process Engages, Product Secondary
Real World Model		☐ Concrete Representations ☐ Objects Function ☐ Simple, Reliable Model
Technical Features		☐ Animation ☐ Colorful ☐ Installs Easily ☐ Operates Consistently ☐ Prints ☐ Realistic Corresponding Sound Effects or Music ☐ Runs Quickly ☐ Saves Children's Work ☐ Uncluttered Realistic Graphics
Transformations		☐ Objects and Situations Change ☐ Process Highlighter
Multiple Languages		☐ Multiple Languages
Universal Focus		☐ Universal Focus
Mixed Gender and Role Equity		☐ Mixed Gender and Role Equity ☐ Exempt
People of Diverse Cultures		☐ People of Diverse Cultures ☐ Exempt
Differing Ages and Abilities		☐ Differing Ability or Age ☐ Exempt
Diverse Family Styles		☐ Diverse Family Styles ☐ Exempt

Subscore _____
Anti Bias _____
TOTAL _____

1997 Haugland, Susan W. Based upon the Haugland/ Shade Developmental Scale. All rights reserved.

Figure C.1: Haugland Scale
(Source: Haugland, 1997)

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Appendix D: Haugland Scale Category Explanations

Age Appropriate

The concepts taught by the software or web site reflect realistic expectations for the age children for which it was designed. The focus is one or more sound leaning objectives. These objectives are valuable skills and or knowledge for children to acquire. The teaching method meets children's developmental needs rather than children adapting to meet the demands of the software of web site. Children with different developmental levels utilize the product successfully. This is important because children in the classroom have a wide range of abilities and skills.

Child Control

When using both software and web sites children decide the flow and direction for the experience, not the computer. They are navigators, determining where the computer experience will lead and through trial and error learn the consequences of their choices.

Children set the pace, taking as long as they desire to respond and have ample time to reflect or discuss what they are exploring. It is important software allows children to escape, returning to the main menu whenever they desire. When exploring web sites children navigate easily throughout the site. Visuals and/or verbal prompts assist children as they move throughout the web site.

Clear Instructions

Verbal instructions are essential, since even children who are reading navigate with greater success if verbal instructions are provided. Simple and precise directions are

equally important. Children need short simple phrases which provide them their choices or the next step for achieving their goal.

Directions are accompanied with visual prompts and/or a help option. Software includes picture choices which make options clear to children. Web sites have icons which children can easily recognize and that guide children in how to explore the site.

Expanding Complexity

Software and web sites need to be an exciting world that is easy for children to enter. To have this critical low entry point, they must reflect children's current cognitive, physical and language skills. When children use software and web sites a logical learning sequence emerges.

Ultimately all software and web sites should have the potential to teach them powerful ideas. Powerful ideas are concepts and or knowledge that children internalize and then apply to new situations and or problems.

Independence

While adults may need to assist children in loading software or finding web sites after this initial guidance and support, children operate the software or web site with minimal adult supervision. Thus, computers become an asset to teachers, not a liability. When children have questions or problems emerge, teachers provide minimal assistance, encouragement and utilize a problem solving approach. This does not mean that adult supervision is not important for enriching and expanding children's learning.

Suggestions can often enhance learning and expand children's computer experiences. But this assistance enhances and expands, it is not required to operate the software or use the web site. In addition to the support from adults, peer tutoring

promotes successful computer experiences and also facilitates language and social development.

Non-Violence

Children learn a great deal through media. Media communicates to children what the world is like and how things happen. To insure children are not exposed to violence, software and web sites should contain no violent objects, characters or activities. Too often violence is used in software and on web sites to attract children's attention and because children may express that it is fun. Violence in software and web sites are of particular concern because children often initiate and control the violence. They are not passive observers; they are making it happen!

What do we communicate to children when bombs are used to destroy pictures rather than a eraser? In one classroom, children quickly placed objects on the screen using a drawing program for the sole purpose of watching a bomb explode the objects on the screen. Children bombed the screen over and over. In software and web sites it is critical to recognize that children never experience the consequences of their violent behavior. They just quit and start over again as if they had never done the violent act. These communicates to children that violence is harmless. Yet in reality when something is bombed, it is destroyed. It is not possible to click a button and have objects and or people restored. It is important that we as adults prevent children from being exposed to violence and if they are exposed to violence that adults emphasize the destructive nature of violent acts.

In addition, software and web sites demonstrate positive social values: the importance of caring, cooperation, communication, sharing, expressing feelings,

friendship and family. Software and web sites can be a value tool for enhancing children's social and emotional development.

Process Orientation

Intrinsic motivation, the desire to explore, experiment and discover about the world motivates children as they use software and web sites, not rewards.
The joy of learning is the reward in developmental software.

Real World Model

Developmental software and web sites provide children with concrete representations of objects found in meaningful situations or settings. The scale and color of the objects are realistic, not stereotypical. They reflect the richness of the world. The software and web sites go beyond modeling objects; children control the function of these objects.

Thus, children learn how the world works. It is critical that the information portrayed is accurate. Children believe without much questioning that what they see and hear is true.

In web sites it is equally important that advertising is minimal. Television has surely taught us that children are susceptible to advertising. Web sites need to be a learning environment, where children are free from the negative impact of commercialism.

Technical Features

Developmental software and web sites are colorful with realistic uncluttered graphics, which enable children to focus on the learning objectives. Graphics are

animated to help children attend and take advantage of the unique learning opportunities computers provide children. Whenever possible children control the animation, learning through "hands-on" experiences how the world works. These graphics are enhanced with realistic corresponding sound effects or music.

It is critical that software and web sites operate consistently. Children should be assured that they can explore for extended periods and that their actions will produce a reasonable result.

Printing is important for several reasons. Printing provides children a tangible product from their computer experiences. It helps children share their experiences and reflect on their computer activities. Also, printing facilitates curriculum integration. It allows children and teacher alike to take activities from the computer and use them with off computer activities. Lastly, printing enables teachers to utilize children's computer activities in portfolio development. By keeping a sampling of children's work over time, teachers have concrete vehicles for assessing children's mastering of learning objectives.

Developmental web sites operate quickly after loading and software runs quickly. Long pauses are confusing to children and since learning time is valuable it is important for children to be actively involved, not waiting and watching for something to happen. In addition developmental software installs easily. If installation is complex, a trouble shooting guide is available for solving problems both during installation and operation. Directions for installation are easy to follow, specific and concise.

Software provides children the option to save their work. It is important children can stop and interrupt their work and then start where they left off. Just imagine all the situations when we interrupt children: lunch, helping a friend, going to the bathroom, etc.

Transformations

Developmental web sites and software has the unique potential to give children opportunities to change objects and situations over and over and discover how different components impact their world.

There is tremendous capacity to teach children about hidden processes. The type of processes children explore is limited only by the vision of software and web sites.

Calculating the Anti-Bias Deduction

To insure that software reflects the diversity of the global society in which children live an anti-bias deduction is then accessed. The vision software and web sites provide children influence their thoughts, ideas and even their dreams for the future. Children begin to notice differences at an early age. Exposing children to the richness in our society helps to prevent the development of prejudice.

Developmental software and web sites is in multiple languages and has a universal focus. Software or web sites with people or humanized animals must contain mixed gender and role equity.

Software including people reflects diverse cultures and differing ages and abilities. If families are included, diverse family styles are portrayed. The anti-bias deduction ranges from 0 to 1, depending on the inherent diversity of the software or web site.

Appendix E: Questions from Observation/ Interview Work in Schools

(Note: These tests have been modified for the appendix in order to conserve space.)

Ellie's Journey

Interviewer_____Group #___

Learning L___ S___ F___

Pre-Test:

What do you know about tortoises and their life cycle?

Post-Test

What have you learned about tortoises and their life cycle?

1. Where do Elongate Tortoises live?

2. Where do they lay their eggs?

3. What do Elongate Tortoises eat?

4. When do they look for food?

5. When do Elongate Tortoises mate?

Why is the Elongate Tortoise in danger? What can you do to help?

Interviewer_____Group #___

(5 Minutes)   Learning L___ S___ F___

Pre-Test

What do you know about people and elephants living in

Asian villages?

Post-Test

What have you learned about people and elephants living

in Asian villages?

   1. Where do Asian Elephants live?

   2. What do Asian Elephants eat?

   3. What is a group of elephants called?

   4. Which elephant is in charge?

   5. What is the main crop people grow and eat in

      Thailand?

   6. Why do some Thai people dislike the Asian

      Elephant?

Why are Asian Elephants endangered?

Interviewer_____Group #___

(5 Minutes)   Learning L___ S___ F___

Pre-Test

What do you know about the relationship between Asian

Elephants and Asian villages?

Post-Test

What have you learned about the relationship between

Asian Elephants and Asian villages?

1. What foods make up the Asian Elephant's diet?

2. What environmental factors influence the Asian

   Elephant's survival?

3. What impact do elephants have on the environment?

   On humans?

4. What impact do humans have on the elephants?

What solutions are there to the conflict between humans

and elephants?

Turtle Investigation
the Asian Turtle Crisis

Interviewer_____Group #___

(5 Minutes)   Learning L___ S___ F___

Pre-Test

What do you know about turtles in Asia?

Post-Test

What have you learned about the endangerment of turtles in Asia?

1. Why are turtles sold in Asian markets?

2. Are there laws against the trade of turtles in Asia?

3. Where do turtles sold on the black market come from?

4. What is being done to stop the turtle trade?

Appendix F: Student Observation Sheet for Classroom Use
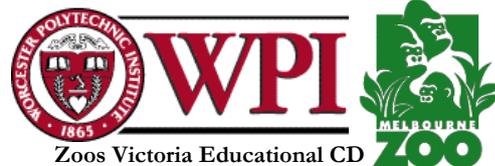
Demographics/Introduction

Age #1:___#2____   Gender #1:___#2:___   School: _____   Program:_____

Length of Use_____   Interviewer_____   Group #_____

1.   Ever visited a zoo? #1:Yes _____   No_____   #2: Yes_____   No_____

2.   Which One(s)? Melbourne____   Healesville____   Werribee____

Other_____

3.   How long ago? #1:_____   #2: _____

4.   How long were you there? #1:_____   #2:_____

5.   Did you visit the Trail of the Elephants exhibit? Yes_____   No_____

6.   Did you use any of the programs at the exhibit?

Family_____   Ellie's _____   Field Mission_____   Turtle

Investigation_____

Observations

Appendix G: Student Feedback Form

1. Did you get to all parts of the program? Were there parts you couldn't figure out how to use?

2. Did you have enough time to use the program?

3. Did you enjoy using the program? Yes/No Why? Why Not?

4. Was the program easy to use? Yes/No

5. Would you tell your friends about this program?

6. Are there any parts of the program you would change?

7. Do you have any other comments?

Appendix H: Extended Use Instruction Sheet

<u>Instruction Sheet: Questions from the Forest CD-ROM</u>

Please use _____ from the Questions from the Forest CD-ROM with your students as much as possible over the next week. Also, please feel free to use the Questions from the Forest supplemental Resource Packet. Once the students have had an ample amount of time to explore the program please have them complete the included post test worksheets. The results from these worksheets will be very valuable in determining the quality of the program. Please guide students through the questions, providing oral prompts if necessary. We will return on 31 March 2004 to collect the worksheets. Thank you very much for all of your assistance in evaluating this product.

Sincerely,

The Zoos Victoria / WPI IQP Project Group
24 March 2004

Appendix I: Teacher Focus Group Protocol

Aaron Grinstein   arg@wpi.edu
Chris Hamman   cnhamman@wpi.edu
Kyle Vander Poel   kvan@wpi.edu
Group E-mail   zoo@wpi.edu

Zoos Victoria Educational CD
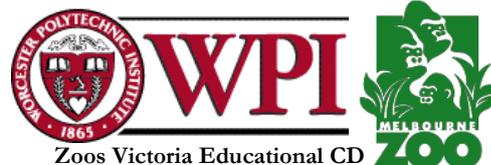
Focus Group Protocol for Teachers

Objective
To learn more about how educational programs and tools can be advertised and sold, and what makes these programs appeal to parents and teachers.

Introduction/Warm-Up
Thank you for taking the time to participate in this focus group today. We would like to introduce a series of topics and questions for discussion. Please feel free to discuss any aspect of the topic introduced. In the interest of time, we may need to stop the discussion and introduce a new topic so that we can keep the discussion focused on relevant matters. Your responses to these questions will be recorded anonymously, please be as honest and critical as possible. Please let me know if you have any problems with any of this discussion being published as part of the report for this project.

Background on Project
We are currently working on a project for the Melbourne Zoos concerning the Questions from the Forest CD-ROM that was released last year. We have been asked by the Zoo to perform an evaluation of the educational effectiveness of the CD-ROM. It contains four interactive learning programs, geared toward children ages 4 to 12. Visitors to the zoo can use these programs on kiosks located at the exhibit, or they can be purchased at the Zoos gift shop.

Questions
1. What are your feelings about using computers / educational software in the classroom?
2. How often / How much do you use computers in your classroom?
3. If you were choosing software for your classroom, would you choose a title that was more educational or more entertaining?
4. What are some of the key factors that you look for when choosing software to use during class?
5. Do you think that your class enjoyed working with the Questions from the Forest CD-ROM?
6. Were there any specific points in the software that seemed to be a problem for multiple users? Any parts that were enjoyed by multiple users?
7. What are your opinions of the Questions from the Forest CD-ROM?
8. Were there any problems/difficulties that you had with the software?
9. Were there any specifics points of the program that you really liked?
10. Is the TOTE CD-ROM something you would have purchased? How much would you have been willing to spend?
11. Would you consider continuing using the TOTE CD-ROM?
12. Are there any other comments/questions you might like to add about the CD-ROM or our project in general?

Appendix J: Questions from the Forest Multimedia Survey

Introduction

Please take 3-5 minutes to complete the following questionnaire. Please be as honest as possible.

1. Have you been to the Trail of the Elephants before?
   - ❑ Yes   ❑ No

If Yes, when was the last time you visited the Trail of the Elephants?
   - ❑ Less than a week ago   ❑ Within a month   ❑ Within a year   ❑ Over a year ago

2. How many children are you visiting the Zoo with today?
   - ❑ One   ❑ Two   ❑ Three   ❑ More than Three   ❑ None

3. What are the ages of the children you are with? (Check all that apply)
   - ❑ 5 or under   ❑ 6-8   ❑ 9-10   ❑ 11-12   ❑ 13 or older

If you have not used the multimedia in the Research Station please skip to question #9

4. What was your impression of the multimedia?
   - ❑ Enjoyed using it   ❑ Didn't enjoy using it   ❑ Wanted to use it   ❑ No opinion   ❑ Didn't use it

5. Who initiated using the multimedia?
   - ❑ I did   ❑ The children did   ❑ Both did

6. How long did you/they use the multimedia for?
   - ❑ 5-10 minutes ❑ 11-20 minutes   ❑ Over 20 minutes   ❑ Not Sure

7. Do you think you or the children in your group learnt something from the multimedia?
   - ❑ Yes   ❑ No   ❑ Not Sure

8. Do you think you/they would enjoy using the multimedia at home?
   - ❑ Yes   ❑ No   ❑ Not Sure

Multimedia is available for purchase in the form of CD-ROM software.

9. Have you purchased educational software in the past?
   - ❑ Yes   ❑ No

10. If you were to purchase educational software, rate the importance of the following attributes
    on a Scale of 1 to 5, (1 being not important at all, 5 being very important)

	Not Important		Indifferent		Very Important
♦ Content / Quality of material covered	1	2	3	4	5
♦ Ease of use / Ability to use alone	1	2	3	4	5
♦ Provides feedback and assessment	1	2	3	4	5
♦ Cost of the software	1	2	3	4	5

11. What other characteristics do you look for when purchasing educational software?
    _____
    _____

12. What topics/subjects would you like to see covered by educational software?_____
    _____

13. How much would you be willing to spend on educational software?
    - ❑ Over $40   ❑ $30-$40   ❑ $20-$30   ❑ Under $20

14. What is your country of residence? _____ Postal Code?_____

Office Use Only : M____ F____

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Appendix K: Wyatt Wade Interview Protocol

Objective

To gain information on marketing strategies and methods to appeal to children and parents. To learn more about how educational programs and tools can be advertised and sold. Also, to find any other sources of information that might be relevant to our project.

Introduction/Warm-Up

Thank you for taking the time to speak with me today. I would like to ask you a series of questions that will be a valuable part of the background research for the Interactive Qualifying Project I am working on at Worcester Polytechnic Institute. Please let me know if you have any problems with any of your answers being published as part of the report for this project.

Background on Project

I am currently working on a project for Worcester Polytechnic Institute that deals with the Melbourne Zoos in Australia and an educational CD-Rom that they released last year. We have been asked by the Melbourne Zoo to perform a review of the CD to determine its educational value. This CD contains four educational interactive programs. Two of these programs are aimed at children aged 4-8 years old, the other two are aimed at children aged 8-12 years old. Visitors to the zoo can use these programs on kiosks located at the exhibit, or they can be purchased at the Zoos gift shop.

Questions

13. Have you ever been to Australia?
14. How long have you been working with Davis Art?
15. What types of projects does your company work on?
16. Can you describe some of the products that you have published? Successes? Failures?
17. What factors do you take into consideration when analyzing the market for a particular product?
18. What kind of strategies do you recommend when marketing a product to a younger audience? Packaging? Advertising?
19. What kind of strategies would you recommend marketing this same product to adults? Parents? Teachers?
20. Are there any methods you use to analyze or discover buyer behavior?
21. Do you know of any contacts that might be helpful to our project?

Appendix L: Wyatt Wade Interview Summary

Interview with Wyatt Wade, President of Davis-Art
February 27th, 2004

- We gave him a background about CD, age groups, kiosk set-up etc
- Focus Groups are key to gather marketing information!
- CD-ROMs don't sell very well, by themselves don't sell very well, only a few of the thousands sell well
- The term "CD-ROM" has a negative marketing connotation, use alternate language if possible- ex. interactive
- CD-ROM should be "ancillary to a more tangible product" i.e. book, pamphlet etc. something tangible you can look at in the store…people are weary of CDs; needs to have some hook to draw people to buy it?
- Show Screen Shots, not CD itself
- Focus Groups gives best marketing research, Surveys are good for providing quantitative data
- What you want to ask focus group
  - Hard to ask for creative feedback
  - Coach respondents
  - Guided Interview- no debating
  - Ask for Opinions, Start Broadly and move into more detailed
    - How do you respond to a CD-ROM?
    - Have you ever bought an interactive CD?
      - Why did you buy it? Why Not?
    - Have you used them before?
      - What drew you to them?
    - What do you think about this CD-ROM?
    - How do you feel about it in comparison to others?
- What is the budget/time constraints associated with collection of data? It is important to consider these as they will direct what you can feasibly do
- If possible, have a run-through of a focus group with an expert.
- Stated he might be able to provide us with a set of sample focus questions.
- Factors to consider when looking at the market for a product?
  - How do you market product
  - How do they respond to CD?
  - Ask why questions
  - Competitive Products already in market
  - Uniqueness of Product in Market
  - What are the benefits or distinguishing characteristic of it in relation to other products
  - What triggers the act of purchase?
  - Where should you place the CD for sale?
  - Create List of Potential Methods of Advertising
    - Direct Mail (cheap) 3% return-rate considered successful
    - TV, Radio, etc

- - Magazines – advertisement in learning-oriented science magazines bought by parents for children, magazines about education
- Questions for Director
  - Are students coming to the zoo?
  - Are you interested in marketing to people out of the park?
  - Need a way to show people outside of zoo what the product can do/ what makes it effective
- Will the content help teachers teach relevant lessons in class
- What will students learn? Will improve their scores?
- Need something to make leap from exhibit to CD…need a middle ground
- Difficult to use in classrooms, 30 kids and 1 CD isn't very effective
- Schools/Parents must feel it has:
  - Quality
  - Content
  - Helpful with School, will it improve performance in a subject?
- Show benefits of product, what will they gain? Benefits, benefits, benefits
- Buyer Behavior
  - Analyze target audience within teachers- what kind of teachers, what area of focus

Appendix M: Interview Protocol Marketing Experts

(Nicki Unsworth and Darren Walls)

Objective

To learn more about how educational programs and tools can be advertised and sold, and what makes these programs appeal to parents and teachers.

Introduction/Warm-Up

Thank you for taking the time to speak with us today. We would like to ask you a series of questions that will be a valuable part of the background research for the project we are working on at the Melbourne Zoo. Please let me know if you have any problems with any of your answers being published as part of the report for this project.

Background on Project

We are currently working on a project for the Melbourne Zoos concerning the Questions from the Forest CD-ROM that they released last year. We have been asked by the Zoo to perform an evaluation of the educational effectiveness of the CD-ROM. It contains four interactive learning programs, geared toward children ages 4 to 12. Visitors to the zoo can use these programs on kiosks located at the exhibit, or they can be purchased at the Zoos gift shop.

Questions

22. How long have you been working with Thomson Learning/Melbourne Zoo?
23. What types of projects do you work on?
24. (Unsworth) Can you describe some of the products that you have published? Successes? Failures?
25. What factors do you take into consideration when analyzing the market for a particular product?
26. What kind of strategies do you recommend when marketing a product to a younger audience? Packaging? Advertising?
27. What kind of strategies would you recommend marketing this same product to adults? Parents? Teachers?
28. Are there any methods you use to analyze or discover buyer behavior? To determine what parents/teachers want in a multimedia learning program?
29. What aspects of the market did you analyze when creating the Questions from the Forest CD-ROM?
30. Do you have any other comments/questions about our project?

Thank you/Wrap-Up

Thank you very much for your time. Your answers have been a great help for our project.

Appendix N: Interview Summary Darren Walls

Darren Walls
Zoos Victoria Corporate Marketing Director
28 March 2004
2:40 PM
Interview at Discovery and Learning Center Office

- We need to find out what is attractive in market
- Recommendations:
    - Look more at visitation than at revenue
    - Look at response rate of visitors on-site
        - What did they learn?
        - How much fun was it?
- Trail would have to be interesting
    - How many people can access kiosk?
    - How long would they spend at it?
- Review similar products
    - How they are marketed
    - Other retail products
    - Difference in marketing channels
    - Differences in product / aims of product
    - How they are distributing software
    - Judge limiting factors – product – process – etc.
- S.W.O.T. Analysis
    - Strength
    - Weakness
    - Opportunities
    - Threats
- Physical factors – location – only two screens
- Do parents and kids see game as entertainment or educational,
    - If parents see it as educational they will want their kids to have it
    - Kids will want to have it as entertainment
- Divide buyer behavior to both parents and kids
- Surveying kids will be really hard
- Add questions to parents survey
    - Would your kids like this game?
- Do more market research on other children, any research in children buying, parents buying for children
- Consumer psychology
    - Start to think as a child – how they would think and respond

Appendix O: Interview Summary Nicki Unsworth

Nicki Unsworth
Thomson Learning Publishing
30 March 2004
10:00 AM
Phone Interview from Discovery and Learning Center Office

Marketing Distribution K-12
- Predominantly Print Material some e-learning material as supplements
- CD-ROM Stand-alones Primary K-6, acquired small company earlier in year, get most of their stand-alone CD-ROMs from them
- CD-ROM alone market hard to tap-"High Investment, Low Return"
- Publishing focus is on literary product
- H.S. Math Science Language
- Primary Literature Math
- Identify products needed with changing curriculum, work with teachers to market products specific to their needs
- Focus groups and surveys of teachers : find out what they want/need and market a product to that specifically
- Don't really look at children in focus groups or surveys, don't find out what children want and market it to them
- Teachers main focus of marketing,
- Children only involved with testing of product
  - Make sure product is user friendly,
  - Make sure content offers best learning outcome opportunities
  - Specific learning objectives
  - Assurances that children will learn from product
- Packaging very important,
  - Find out if packaging will hold up on transport
  - If packaging is necessary
  - If packaging is user friendly
  - Appearance very important, package must stand out from competition
  - Must be something different
- Work with major distributors
- Interested in looking at CD-ROM willing to work with Melbourne zoo in the future

Appendix P: Educational Objectives

(The following list of aims, objectives and suggested activities is an excerpt from "Questions from the Forest! CD Rom Series Teacher Resource Pack".)

Ellie's Journey
(CSF II, Level 2 and 3)

Aims
• To investigate the life cycle and survival requirements of an Elongate Tortoise.
• To investigate human impact on the life cycle and overall survival of the Elongate Tortoise and other animals.

Objectives
• Identify the different stages of a tortoise's life cycle.
• Identify environmental factors (living and non-living) that affect survival of wildlife.
• Suggest reasons why species become endangered or extinct and strategies for conservation of these species.

Suggested Activities
• Students log Ellie's journey – including dates and significant events using a journal format.
• Using the log, students create a timeline of Ellie's journey. The timeline could also be represented as a cartoon strip, a play or an alternative format as decided.
• Students investigate and then prepare a PowerPoint presentation about the life cycle of another animal (individually, pairs, small group).
• Students compare human impact on Ellie's life cycle to that of other endangered animals (local area).
• Students design and create a poster, short non-fiction text, PowerPoint presentation, audiotape or diorama highlighting ways the local community could have a positive impact on
the life cycle of the endangered animals they have researched. These formats should depict a before and after scenario in some way. Display these in local community shopping centers, libraries and at school.

Questions from the Forest - Teacher Resource
• In groups or pairs students conduct a radio or TV 'interview' of the endangered animals they have researched. The interviewer is to find out about their life and what has influenced them so far. Alternatively students could create a 'This is Your Life' program where the endangered animal's life is celebrated and 'significant' visitors come to talk about the part they have played in their 'friend's' life.
• Students e-mail Melbourne Zoo's Conservation and Research Department conservation@zoo.org.au to receive the 'Make a Difference' newsletter to keep up to date with what is happening regarding the Turtle Crisis in Asia and other significant conservation projects or go to: http://www.zoo.org.au/conservation/newsletter.htm
• Students can become involved in a local project such as developing a wildlife friendly garden in the school grounds or other revegetation work in the local area. Contact the local

Council or 'Friends of....' group or refer to the wildlife friendly gardening fact sheets on the Learning Resources CD.

Meet My Family
(CSF II, Level 2-3)

Aims:
• To investigate life of an Asian family living in a small 'Elephant Village' to gain greater insight into their history and traditions and compare them to our own.
• To investigate how humans have an impact on the natural world and how this can cause conflict with wildlife sharing the same habitat.
• To investigate solutions to human/wildlife conflicts.

Objectives
• Identify needs of elephants living near 'Elephant Village'.
• Describe the way of life for human families living in 'Elephant Village' including the elements of that culture that they might contribute to life in Australia.
• Identify changes that have been made by humans to the habitat surrounding 'Elephant Village' and the different types of elephant/human conflict that occur as a result.
• Suggest solutions to this conflict so both elephants and humans will benefit.
• Apply what is learned by creating an action plan for sustainable living for humans and wildlife.

Suggested Activities
• Groups of students create a family tree for Susa's family while others create a family tree for Chetsu's family, including the roles that each family member plays. Students then create their own family trees. Display and compare the Indonesian/Australian human families, and then compare human/elephant families. Family trees can be represented in either 2D or 3D format.

Field Mission
(CSF Levels 3 and 4)

Aims
By taking on the role of field researcher and collecting data students will be able to:
• gain a greater understanding of the needs of elephants living in different habitats;
• gain a greater understanding of why conflict occurs when humans share this habitat;
• investigate solutions to human/elephant conflict;
• investigate other situations where human/wildlife conflict occurs and possible solutions to those.

Objectives
• Identify needs of elephants living in both savanna and forest habitats.
• Identify changes that have been made by humans to these habitats and the different types of elephant/human conflict that occur as a result.
• Suggest solutions to this conflict that is beneficial to both elephants and humans.
• Apply what is learned to creating an action plan for sustainable living for humans and wildlife.

Turtle Investigation

CSF Level 4 and 5

Aims

By taking on the role of journalist and conducting an investigation of two locations in eastern Asia students will be able to:
• gain a greater understanding of why turtle populations are in crisis in Asia;
• gain a greater understanding of the relationship between the trade in turtle and other animal products and the economic situation of the countries concerned;
• investigate solutions to the illegal trade in live animals and animal products;
• investigate other situations where human/wildlife conflict occurs and possible solutions to those.

Objectives

• Identify different elements of the illegal trade in animals/animal products in Asia, particularly in relation to the turtle crisis.
• Identify reasons why this trade exists.
• Suggest solutions to the turtle crisis and the greater problem of the illegal trade in animal product.
• Apply what is learned to creating an action plan for sustainable living for humans and wildlife.

Suggested Activities

• Students log their travel on a map of South-East Asia. Record distances traveled and information about locations visited on the map. Students can do further research about these
destinations.
• Students keep a journalist's log using the Turtle Investigation Journalists Travel Diary. Students will need to research the costs associated with their trip and record these in their log or create an excel spreadsheet to record and total all costs. Students could then use this to prepare a mock tax return.
• Students create a newspaper article or editorial, television (video) or radio interview (tape) or Web Page about the Turtle crisis in Asia. The article, webpage or interview should reflect
the points of view of different 'players' in this situation such as the conservation biologist at Cuc Phuong and the market stall holder in Southern China. Encourage students to send
electronic versions of their work for inclusion on the Zoo's website or send us a link to your website displaying students' work.
• Students could choose an endangered animal species to research using the websites suggested overleaf and create web quests for each other.
• Students create an Endangered Species puzzle or board game about the Asian Turtle Crisis or a game about the endangered species they have researched. Game cards
should reflect the issues that are causing the endangerment as well as the positive actions being taken or other solutions to the problem.

Appendix Q: Additional Retention Study Results

Brunswick Southwest Primary March 24, 2004
St. Monica's Primary March 21, 2004

Ellie's Journey

Table Q.1: Knowledge Retention Study for Ellie's Journey

Retention Level	Immediate Retention				Extended Retention		
	Male	Female	Total		Male	Female	Total
Little or No Retention	23%	36%	29%		0%	17%	8%
Some Retention	54%	27%	42%		33%	33%	33%
Full Retention	23%	36%	29%		67%	50%	58%
# of Respondents:	13	11	24		6	6	12
* Percentages are rounded to the nearest whole number							

Table Q.1 displays the results of our knowledge retention study performed with Ellie's Journey from which we noticed several interesting trends between the levels of retention for the immediate and extended studies. There was an obvious improvement in the level of retention in both male and female students in the extended retention study as compared to the immediate retention study. The total retention for both male and female students doubled from 29% for immediate retention to 58% for extended retention. This shows that after a longer exposure to the program, the students remembered a greater amount of information. Even though we did not test the exact same students in both the immediate and extended knowledge retentions studies, as mentioned in section 3.1.1, we felt our results were still valid because they were a comparison of an extended period of use against a 30-minute session with the program.

When we looked to see what percentage of students retained at least some knowledge, we found that 71% of the students in the immediate retention study and 91% of the students in the extended retention study retained a majority of the information presented.

The results presented in this table were affected by the conditions that existed during the immediate retention study at Brunswick Southwest. The facilities used to access the programs were not conducive to allowing the children to have a fully immersive experience. The sound quality on each of the computers was poor, and it was hard to hear over the musical activities that the teacher was leading at the time with the other students in the classroom. The lower levels of retention that we recorded that day could have been due to these distractions.

Meet My Family

Table Q.2: Knowledge Retention Study for Meet My Family

Retention Level	Immediate Retention				Extended Retention		
	Male	Female	Total		Male	Female	Total
Little or No Retention	0%	30%	14%		17%	0%	10%
Some Retention	33%	30%	32%		17%	50%	30%
Full Retention	67%	40%	55%		67%	50%	60%
# of Respondents:	12	10	22		6	4	10
* Percentages are rounded to the nearest whole number							

The results that we obtained from the retention studies regarding Meet My Family also revealed some noticeable trends:

- The percentage of full retention for males remained constant at 67% between the immediate and extended retention studies.

- The percentage of full retention for females increased from 40% for immediate retention to 50% for extended retention.

- 87% of students in the immediate retention study retained a majority of the information presented.

- 90% of students in the extended retention study retained a majority of the information presented.

Turtle Investigation

Table Q.3: Knowledge Retention Study for Turtle Investigation

Retention Level	Immediate Retention				Extended Retention		
	Male	Female	Total		Male	Female	Total
Little or No Retention	0%	8%	6%		14%	0%	8%
Some Retention	67%	58%	61%		29%	20%	25%
Full Retention	33%	33%	33%		57%	80%	67%
# of Respondents:	6	12	18		7	5	12
* Percentages are rounded to the nearest whole number							

The results from the data that we collected from the retention studies show trends that are similar to those found in the Ellie's Journey results.

- Percentage of full retention was the same, 33%, for both male and female students for the immediate retention study.

- The percentage of full retention for male students increased from 33% in the immediate study to 57% in the extended study.

- The percentage of full retention for female students increased from 33% in the immediate study to 80% in the extended study.

- 94% of students in the immediate study retained a majority of the information presented.

- 92% of students in the extended study retained a majority of the information presented.

Field Mission

Table Q.4: Knowledge Retention Study for Field Mission

Retention Level	Immediate Retention				Extended Retention		
	Male	Female	Total		Male	Female	Total
Little or No Retention	6%	17%	9%		25%	0%	11%
Some Retention	31%	50%	36%		25%	20%	22%
Full Retention	63%	33%	55%		50%	80%	67%
# of Respondents:	16	6	22		4	5	9

The trends shown by the data collected from students using Field Mission are comparable to Ellie's Journey and Turtle Investigation.

- The percentage of full retention for females rose from 33% for the immediate study to 80% for the extended study.

- The percentage of full retention for males decreased from 63% for the immediate study to 50% for the extended study.

- 91% of students in the immediate study retained a majority of the information presented.

- 89% of students in the extended study retained a majority of the information presented.

Appendix R: Primary School Observation/Interview Notes

<u>Ellie's Journey</u>

24 Students used program, 13 Male, 11 Female
Ages 5-7
Average Usage Time =15 minutes
All visited Melbourne Zoo
All visited within a year
All visited the Exhibit
None Used Kiosks

- The random Start-overs that occur throughout the game confuse students and make them think that they have answered incorrectly
- Distractions during class, loud instruments and activity
- Excited when they got the answer right
- Involved in program, read every screen
- "Cool! This is fun!"
- Learned from mistakes and continued well
- Children seem to remember Sea Turtles before other turtles, remembered where they lay their egg
- Once they began, they seemed more engaged despite classroom distractions
- Seemed to just guess the answer instead of reading info and trying to understand, might be due to distractions
- Liked sounds, voices, liked the song
- When one child had no sound, less interested in game than other who had sound
- Liked the turning of the pages of the game
- "What does mate mean?"
- Remembered wrong answer when answering question for second time
- Easy to use
- Would Tell Friends and Play at home

<u>Meet My Family</u>

22 Students, 12 males, 10 females Ages 8-10
Average Usage Time = 20 minutes
All Visited Melbourne Zoo
All but one visited within last year
All but one visited Exhibit
3 Had Seen Programs before

- Liked elephant walking around the map
- Went to treehouse and left, ignoring it
- Skipped parts of Chetsu's picture but answered all questions correctly
- Curious about Chetsu's family
- "I like the questions"
- "Look at the elephant move"

- Amused by bird in the tree house
- Wanted to go back to the tree house, liked the story, "Next! Next!"
- Very focused on questions
- Sad that time was up
- Liked selecting areas on the map
- "I'm just guessing" "Try all of them"
- Liked picking pictures in forest
- Didn't pick any pictures in the village
- Got bored going through same types of screens over and over
- Said they learned more about elephants
- Would add more questions make program longer
- Boy said some questions were to hard, girl said they were easy
- Disappointed no questions in tree house section
- Bored with writing part, liked questions
- "Cool Compass"
- Didn't know to click on pictures to get info, got questions wrong
- Thought scientist would be a boy (From a Male)
- Some of the words were difficult to read without sound
- Laughed quite a bit, found program very amusing
- Used trial and error method at first, then began to think about questions
- Enjoyed tree house and listened to stories
- Wanted more things to do…asked if there was more to the game
- At end of game thought about questions and discussed answers
- Thought it would be helpful if needed to research elephants
- More games, more places to look at more freedom
- Better with sound
- wanted :
    - More areas to go to
    - Carried by a herd of elephants
    - More nature, tigers and birds
    - Choose an animal to be
    - Talk to people about elephants
- Would use it at home

Turtle Investigation

18 Students used program, 12 Female, 6 Male
Ages 10-12
Average Use Time 25 minutes
All visited Melbourne Zoo
All but one visited exhibit
None Used Kiosk
One within last year, 3 within last 2 years
- Enjoyed photos, different countries

- Wanted more countries, another area to go to
- Went through 3 messages first
- Confused about where to go at first
- "I want to go to China again"
- Read nothing about turtle shells
- Read through info quickly
- Tough to figure out how to download pictures
- Didn't read info for answers
- Answers to similar
- Very interested initially
- Enjoyed photography
- Were engaged by asking more questions
- Laughed and were very explorative
- Struggled to figure out exactly what to do on desktop
- Questions : very effective, happy when they got answers correct
- Cooperated well together, interested in finding answers
- Had to ask what to do : not very easy to understand, hard to move forward, moving forward for trivial reasons, going further to Vietnam is difficult
- Once in Vietnam became more exploratory before taking pictures
- Conversed regularly, read aloud and thought about what was going on
- Again, spent more time on questions to learn more
- As time wore on began to lose interest
- Game became much easier once they got gist of the game
- Found mother's message amusing
- Didn't much like the questions
- Trial and error method throughout the questions
- Enjoyed it but thought it was hard, tricky to use
- Recognized that endangerment is beyond turtles
- Fun learning about turtles and learning more

Field Mission

22 students, Ages 10-13, 16 males, 6 female,
Average usage time = 20 minutes
All visited Melbourne Zoo
All visited Trail of the Elephants Exhibit, none used computers
All but one visited within the last year
- Watched intro intently
- Couldn't find where to click for a while
- Had trouble navigating, confused about where to go
- Dung is hard to find
- Didn't notice final message
- After watching final message, watched all the messages that they missed before
- Fun and interesting but hard at first

- Read first screen to see where to go
- Question on where to go in base camp, what to do collecting when collecting samples
- Skipped through info to answer questions for Beta Team
- Read through info for Alpha Team
- Used game in quiet room, more focused on the game
- Didn't read info before questions to often
- Enjoyed game alright
- Liked how you got to analyze data, like questions
- Should have been more to the game
- Program was easy to use
- Would tell friends and use in class
- Use at home sometimes, 3x a week
- Change: different tasks besides analyzing- see what elephants see- elephant vision-do things elephant does- game
- More questions
- Keep difficulty level ages 10-12
- Some initial confusion on where to go
- Exited program by accident
- Used external controls to navigate
- Child using mouse more focused on game
- Some trouble navigating program, needed some prompting on where to go
- Liked videos
- Didn't read briefs, just skipped straight to questions – guessed at answers
- Once told what to do, read briefs before questions
- Became more focused farther into the game
- Went back to check for the answer only a few times
- Excited when report completed-read through report at end
- Would tell classmates about program and play again in class
- Wouldn't play at home
- Bit at the beginning was very confusing
- Didn't learn what makes elephants sick / dead
- Didn't seem interested in explanation of program
- Message center was a problem
- Clicked exit by accident, to easy to exit program
- Wasn't easily understandable right away, had trouble understanding what to do
- Explored several aspects of game before we helped them proceed
- Skipped directly to questions w/o reading first time, used trial and error to answer question
- After explaining how to play game, they were much more engaged and more apt to answer questions
- Didn't read why the answers were incorrect, rather immediately tried the other questions
- Interface seemed a bit difficult to understand right away

- Seemed to understand basics
- Excited they got answers correct and finished task to create report
- Read aloud

Overall Notes/ Observations

- Despite Distractions in classroom, the observations were still valid b/c in the classroom environment, there will likely be distractions present also
- Most students initially excited and engaged at start of program
- Many students felt program should be longer more in depth, more questions more things to do
- Became disinterested faster without sound
- Sounds of program kept viewers interested especially younger grades who had a harder time reading
- Even 3-4 graders had some difficulty reading meet my family
- Generally students said they enjoyed the program and liked the questions and that they learned information
- Most of the time, older students 3-6 grade skipped through information screens and went right to the questions and tried to figure out questions on own, guessing most of the time till they got the right answer
- Had few problems with several students using one machine
- Liked getting answers right, got excited

Appendix S: Focus Group Summary

Brunswick Southwest Primary School
31 March 2004 4:00 PM

Received post tests back from a few teachers

Focus Groups members
1: 5-6th grade teacher
3: 3-4th grade teacher
4: 5-6th grade teacher
6: Prep-2nd grade teacher
7: Prep-2nd Grade Teacher

Introduction and Thank You

Question #1 - What are your feelings on using computers / educational software in the classroom?

7: They are good if they can be used independently, if they can be used on own.

6: Extends certain kids into areas of interest.

4: Some kids who struggle with traditional learning methods do better on computers.

Question # 2 - How often / How much do you use computers in your classroom?

7: Daily, when computers are working

1: Sometimes not working, 2-3 computers in each room

6: Use computers 2-3 hours per week

3+4: Don't' use nearly as much as they would like

Choose software, educational or entertainment?

6: educational

7: Both – Need to get something out of the program

1: Kids won't use purely educational stuff

6: Kids love Math blaster

1: Some math programs kids don't like

4: After certain age novelty of a computer wears off

Question #4 What are some of the key factors that you look for when choosing software to use during class?

1: Usually go with what is recommended by other teachers

3: Think about site licenses and money

Question #5 Do you think that your class enjoyed working with the Questions from the Forest CD-ROM?

6: Thought kids enjoyed program but sound was terrible, kids couldn't hear

3: All kids wanted to use program- wanted to teach other kids

7: All about animals – kids like animals

4: Liked Turtle Investigation – liked having control over program – could keep playing until tired or bored

Question How does Trail of Elephants fit into curriculum?

7: Doesn't exactly fit into current curriculum but they are flexible

4: Would fit into lots of different aspects

6: If they were doing turtles as a lesson, they would have looked into more resources. Game kind of short – only took 15-20 minutes

Question: Who sets curriculum?

4: Government – kind of loose

3: Must cover certain topics, Government sets guidelines to follow

7: School decides where things go – State government website www.sofweb.edu

4: In curriculum – have computer learning requirements

4: Different schools approach topics differently

Question #7: What are your opinions of the Questions from the Forest CD-ROM?

6+7 : Liked graphics

4: Liked telephone in Turtle Investigation

7: Visually appealing

4: Interesting bits of information

Question: Kids get anything out of it

7: Some more than others

4; If doing unit on it, would go more in depth

7: Only small part of it, if had more time would be better

Question # 10: Is the TOTE CD-ROM something you would have purchased? How much would you have been willing to spend?

7: If it would fit into the budget

Question #8+9 : Were there any problems/difficulties that you had with the software?
          Were there any specifics points of the program that you really liked?

3: Set kids off to use it, had no problems

1: Kids wanted to do it again, wanted to teach it to others

- Put Resource Packet info onto the CD-ROM
- CD-ROM would be easer if all programs would be easier all on one CD

6: For smarter students Ellie's Journey was to simple; gave them Meet My Family

Gave Teachers Haugland scale so they can send it back to the Zoo