CHAPTER 1

INTRODUCTION

1.1 Background of the Study

The role that computers are playing in education has vastly increased in recent years and the trend appears to be towards additional involvement. Computers are at the heart of this information revolution because they are essentially very fast information processing machines. For the last two decades, there has been a tremendous growth and development in the use of computers in the various areas of education (Wainwright, 1989). Today, teachers and students utilise these machines in their teaching-learning activities. Studies have indicated that when computers are used for instructional purposes, learners showed positive learning outcomes (Robyler, Castine & King, 1988). The increasing options and challenges in the use of computers as instructional tools need no further emphasis and clarification. The school management uses it for administrative purposes, the computer laboratory for teaching computer literacy courses, the individual for storing information and a host of others. Nevertheless, however significant the proliferation of computer hardware is in the educational settings (Cohen, 1983; Varnhagen & Zumbo, 1990),
it alone cannot provide the answer to improve matters occurring in the
classroom. This is because a lot depends on how computers are managed
for instructional purposes. While acknowledging the potentials of the
computer as a teaching-learning tool, Soulier (1987) cautions that,

how useful it is depends on what people do with it. In
the hands of the master, a hammer and chisel create a
masterpiece; in the hands of a fool, they are tools of
destruction. So it is with the computer. If used properly,
it can change the way we teach in many positive ways;
but if it is to realize its full potential for computer based
instruction, it must have a creative instructional sound
design (p. ix).

It could, thus be assumed that those who design and develop
multimedia courseware for instructional purposes must bear responsibility
in managing instruction and more importantly, learning in the classroom.
Hence, if this factor is taken into consideration, it is then possible to
effectively change the way we learn and what we learn. An important point
to note in courseware development, more so, if it is an interactive
multimedia, is that the design should support the principle that learning is
a process of knowledge construction and knowledge dependent as
opposed to knowledge absorption. Reeves (1992) clarifies the above
principle further by stating that the content of the courseware should
enable learners to build new knowledge from the existing knowledge and
to retrieve knowledge for the purpose of problem-solving.
Computers for instructional purposes have been in use for the last 30 years. However, as Allessi & Trollip (1995) state, new ideas and approaches are constantly sought for to further improve the use of computers in instruction. Computer capabilities have advanced so rapidly that the most recent developments have become obsolete. This has led to teachers, educators and software designers to experiment various kinds of approaches to tap the potentials of the computer as an appropriate and meaningful instructional tool. As computers have the potential of being an effective and alternative tool to traditional instruction, it is crucial that consideration be given to appropriateness of its content for classroom needs.

Computers for instructional purposes are usually associated with terms like Computer Literacy; Computer-Assisted Instruction (CAI); Computer-Based Instruction (CBI); Computer-Aided Learning (CAL); Computer-Managed Learning (CML); Computer-Integrated Learning (CIL) and Computer-Based Learning (CBL). These terms are commonly used to specify the different approaches in which computers are used for instructional purposes.
1.2 Rationale

This study is undertaken with the following reasons. Firstly, it has been assumed that the prototype multimedia courseware for instruction would facilitate and enhance learning. Furthermore, a computer-based learning not only motivates but also further enhances student learning of different abilities. Therefore, it is imperative to investigate learners' interactions with the prototype multimedia courseware. Such an investigation will enable learners to provide sufficient responses on the effectiveness of the prototype multimedia courseware.

Secondly, good quality educational courseware should take into consideration individual differences and abilities. More importantly, they should be designed and developed based on current technologies and theories of learning. An investigation of this nature would help design a more practical and appropriate prototype multimedia courseware for classroom interaction.

1.3 Need for Evaluation

The significant proliferation of computer hardware has resulted in an equally significant demand for educational software. This, in turn, has compelled many courseware developers and teachers to create materials
for educational purposes. Consequently, instructional software of questionable educational value has flooded the market. Cohen (1983) feels that courseware packages are most often developed in a pragmatic or artistic fashion. It failed to take into consideration the objectives and the processes of the learning tasks. This has created fear and concern among teachers over the quality of both the design and presentation strategies employed by designers in the preparation of courseware.

There has always been the pertinent and pressing question of what really constitutes "good" instructional courseware and what is "inadequate". Studies have attempted to distinguish "good quality instructional and ideal" courseware from "inadequate and inappropriate" ones (Cohen, 1983; Steinberg, 1983). "Good quality and ideal" courseware are ones that are designed and developed by people who have sound knowledge of the design and learning theories of instructional design. However, Allen (1984, as cited in Marling & Owston 1987) noted that most courseware are written either by people who have the expertise in computers but not in education, or those who have the expertise in instructional theory but not in computers. It is rare to find a designer who is good at designing as well as knowledgeable on the subject matter. It is even more difficult to find teachers who are experts as courseware designers. Most teachers lack the skills and expertise of designing and developing courseware in accordance with the instructional design
principles. In Malaysia, much of the subject matter for courseware programming is left to commercially oriented courseware-publishing houses. Hence, there is a need for Malaysian courseware designers to prove themselves in creating sound courseware according to the principles of instructional design (Abtar, 1997).

An important point to note is that not all courseware designed and developed along instructional design principles will guarantee good instruction (Steinberg, 1983). What is even more important is that incorporating the design elements could undoubtedly become a potential checklist for evaluators of courseware and also "enhance interactivity in the design of computer-based instruction" (Cohen, 1983, p. 14). In evaluating the effectiveness of a courseware, Robyler (1981), Cohen (1983) and Jay (1983) provide guidelines or criteria on formative evaluation of courseware. Cohen suggests seventeen characteristics which are generic to instructional design and eighteen qualities necessary for computer courseware design. Jay, on the other hand, highlights the cognitive approach to computer courseware design and evaluation where he focuses on "five human information abilities which cognitive psychologists would anticipate must be accounted for in order to develop good courseware" (p.23). These abilities include memory and attention, language and text characteristics, graphics and visual processing, cognitive characteristics of a user and feedback to users. Cafarella (1987)
is also of the opinion that CBI courseware can be formatively evaluated based on certain guidelines which include, the programme goals of the courseware, programme content, programme design, audience for computer-based programme, instructional strategies, appropriateness of using CBI, programme techniques and cost/benefit analysis. This evaluation guide is important because it guides the instructional designer during the evaluation process.

In view of the ‘pragmatic or artistic fashion’ employed by designers in the development of the courseware, it is necessary to safeguard a “sloppy instructional design” material for computer-based instruction (CBI) (Braden, 1987). Ideally, all instructional materials have to be tested and tried with students for whom they are intended because their knowledge, skills, learning characteristics and social attributes are essential prerequisites in the lesson (Steinberg, 1983).

Although the need and awareness is obvious for quality courseware, little attention is paid to formative evaluation (Dick, 1987). Formative evaluation is a process employed by instructional designers to obtain feedback on the effectiveness of their instructional materials. Since formative evaluation is a process, instructional designers usually develop and implement loosely structured products in prototypes because they can test and revise their prototypes (Martin, 1984). When designing a prototype, it is important that design elements of instructions are built into
it in order to facilitate learning. Abtar (1996) claims that to create a sound and effective instructional courseware, instructional designers should adopt the basic principles of instructional design and then conduct a prototype testing. Since instructional design and development process is crucial for effective usage, every phase in this process should be subjected to some form of formative evaluation (Patterson and Bloch, 1977). In multimedia courseware, formative evaluation should be on-going from the onset of a prototype to field-testing (Northrup, 1995; Savanye, 1992) and according to Braden (1987) "prototype testing is a form of formative evaluation" (p. 34). Basically, having diagnosed faults or weaknesses in the product, instructional designers will be able to revise and further improve the quality of the product. Consequently, learning is not only greatly facilitated but also becomes meaningful and effective.

In Malaysia, as reported by Puvendran (1992), the Ministry of Education spends a substantial amount of funds on purchasing computer software for its Computer-in-Education project. However, the limited time span in its implementation implies that most of the courseware is not subjected to the formative evaluation process. Although the formative evaluation process may be time consuming and expensive to any instructional designer, the results are certainly worth both in terms of its quality and effectiveness. Again, as Braden states, "formative evaluation
is the engine that drives efficient design and development and provides quality control for the project under development" (p.34).

1.4 Statement of the Problem

Using the multimedia courseware as a teaching aid is a relatively new concept in the Malaysian education setting. Nevertheless, the computer and its usefulness is gaining considerable prominence. In the researcher's school, Sekolah Menengah Kebangsaan Agama Sheikh Hj. Mohd Said, Seremban, teachers do not resort to using multimedia courseware in their teaching-learning process. Similarly, students are not given the opportunity to use multimedia courseware for individualised learning. Traditional approaches remain the main method of classroom instruction despite the fact that the school prides itself of having a computer laboratory, equipped with twenty computers with multimedia capabilities. It is even more surprising to learn that most teachers are well aware that computer-based instruction can enhance learning and that it can also provide personalized assistance to students. It could, thus be assumed that in this school, the use of computers as an alternative instructional strategy is at its embryonic stage.

Nevertheless, a fact to contend with is that there are teachers who are still in awe of the computer and more importantly, what is of greater
concern here is that there is a lack of quality educational courseware which teachers can rely on and be confident of using it. A point to highlight, at this juncture, is that even if teachers are willing to use the computer as their media of instruction, they will still face difficulties in distinguishing between good quality courseware from the ineffective ones, solely because they lack the expertise.

Like any other business enterprise, commercial companies have cashed in on this demand by producing commercially produced courseware for the educational market. One striking weakness is that these prepackaged courseware do not cater for individual differences in student learning. Such poor quality courseware simply reflects lack of programming skills, insufficient support materials and field testing.

It is my concern that multimedia courseware for educational purpose be designed and developed according to the principles of instructional design. Good courseware should be systematically designed by incorporating the design and learning theories that would both motivate and facilitate student learning. Commercially produced courseware that is simple, unimaginative and unchallenging will result in ineffective learning. It is equally unprofessional to purchase courseware that have been designed and developed based on out-dated technology and theories of learning.
1.5 Purpose of the Study

The purpose of this study is to conduct a one-to-one formative evaluation of a prototype multimedia courseware for English language proficiency in order to determine the extent of inclusion of Gagne's Nine Events of Instruction in the design. The feedback obtained from the three try-out students who represent the target population will help the researcher make revisions for further improvements to the courseware.

1.6 Research Questions

This study seeks to answer the following research questions:

Question One:

Has the Nine Events of Instruction been effectively incorporated in the design of the prototype multimedia computer-based instructional courseware?

Question Two:

Has this prototype multimedia computer-based instructional courseware influenced students' attitudes towards computer-based instruction?
1.7 Focus of the Study

A prototype multimedia courseware on a poem, entitled *Throwing Down A Tree* will be used in this study and the focus is on the one-to-one phase of formative evaluation.

The evaluation of this courseware will be on three try-out students with different English language abilities: above average, average and below average.

The researcher will gather information about this courseware from students' responses to the questionnaire and their verbal and non-verbal responses during the interview.

1.8 Significance of the Study

The study hopes to throw some insight into the strengths and weaknesses of the courseware. This would help the researcher make qualitative improvements to the courseware so that learning is further facilitated and enhanced. Furthermore, the findings hope to confirm the researcher's contention that computer-based learning not only motivates but also further enhances student learning of different language abilities.
1.9 Limitations of the Study

The findings of this study are based on the responses of the sample population that is, three try-out students. Since the sample size is relatively small, generalisations of the findings may be inappropriate. Furthermore, population representativeness may not be possible, too.

The text used in the lesson is a poem and according to Meyer and Freedle (1984) as cited in Gurdarshan Kaur (1994) different texts have different kinds of impact. Therefore, the narrow range of the poem in this study limits the generalizability of the findings. The contention is that it is difficult to extend the findings to other textual content.

The development of this prototype courseware is entirely the effort of the researcher who is a self-taught courseware developer with limited programming skills. The development of a high standard quality courseware and which has utility outside one's own classroom requires expertise in the different disciplines including instructional design, screen design, content, editing and programming. Hence, a multidisciplinary approach with division of labour should be used to ensure an effective and efficient courseware (Carrier & Sales, 1987; Chen & Shen, 1989; Reece, 1990; Smith & Boyce, 1984; Yau et al., 1985).

This study is subjected to a one-to-one evaluation of the formative evaluation. Furthermore, there was no summative evaluation to validate
the effectiveness of the prototype package. Hence, the effectiveness of the final product of the courseware could not be assessed.

As the sample comprised only three try-out learners, a full-scale classroom evaluation on the prototype is not feasible. Furthermore, it is not possible to detect management problems, which could be beneficial for making revisions to the prototype. Dalton, Hanaffin & Hooper (1989) claim that extensive research has been focused on one-to-one evaluation because of the benefits CAI has on individual learners. On the other hand, research also suggests that separating learners from their peers during instruction may be less effective than small group instruction. However, it cannot be denied that interaction among peers is beneficial not only to the academic performance but also to social and affective outcomes.

Another limitation is the physical distance between the researcher and the production house, Accumedia Sdn. Bhd., which undertook the authoring of the prototype. There were only five interactions with the production house. Hence, the authoring of this prototype was done within this limited interaction period.

Finally, as this lesson was part of a sub-module of a bigger package, revision had to be made so that the sub-module could be run independently without it being hyper-linked to the main package. As the
links were removed, the reader might not be able to detect the effectiveness in terms of navigation.

1.10 Definitions of Terms

The following terms were used in this study and the definitions are listed below:

1. **Attitudes** refer to how learners’ feel, think or behave when they use a courseware. It includes their enjoyment, anxiety, interest and preference.

2. **Computer-Based Instruction (CBI)** is an instructional computer programme.

3. **Formative evaluation** is a systematic collection of information for the purpose of making decisions to design and improve the instructional product.

4. **Instruction** is a set of events that affects learners in such a way that learning is facilitated.

5. **Instructional designer** is a person who is asked to work on a content area.

6. **Learning** is a process that brings about a change in the behaviour of human beings in an identified situation.
7. **Learning Module** is a self-contained package that deals with one specific subject matter.

8. **Multimedia** is a collection of two or more technologies which have the capability to access and manipulate text, graphics, animation, video and sound.

9. **Nine Events of Instruction** are referred to elements that support the internal cognitive processes necessary for learning and they (events) are used in the delivery of a CBI lesson. These Nine Events were forwarded by Robert M. Gagne (1992).

10. **One-to-one evaluation** is the formative phase in the evaluation process whereby the researcher sits with individual learners as they work through their instructional materials.

11. **Prototype** is the executable version of a product, which incorporates key elements of the final version but is incomplete in many ways.

12. **Try-out students** are those students who are available to the researcher while the instruction is being developed. It is assumed that these try-out students are members of the target population. They serve as representatives of the target population.

13. **Target population** refers to the intended users of the courseware.

14. **Proficiency** is the ability to use the language competently and accurately.