

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions and implications

This study showed that instructional computer designing and computer teaching is complex and goes way beyond merely putting teachers in front of computers to teach human population dynamics. The implications of these findings are that a number of improvements need to be made to the package if it is to meet its objectives. However, the positive responses from the teachers (participants) are indicative of the fact that the use of computers in teaching can be implemented in the actual classrooms. This could be achieved if some teachers are able to establish familiarity with the use of computers in teaching.

Knowing how to operate a computer was one concern raised. Some teachers believed that computer literacy amongst teachers was very vital if teachers were to use the package. The concern of computer literacy of teachers did not form part of this research and it was made clear to the teachers during the modification stage of the package.

Despite the concern of computer literacy, many teachers in the sample were able to move around the package because of the simple navigation system that was used. Each screen had well labelled buttons which could easily be seen and when clicked could take the users to the previous screen or the next screen.

It was also found in this study that some teachers seemed to have been concerned about the adequacy of the coverage of the topics, which left out some sections. These teachers felt that the package needed to cover all the topics under human population dynamics which was not the intention at all. The content and coverage of the package was well explained during the modification stage (i.e. after getting responses from questionnaires) to indicate that the package only covered certain sections under population dynamics.

The expert review also revealed a number of issues that were carefully addressed in the modification stage when designing this instructional package for teachers. Some of these concerns involve;

- the instructions which had to be made very clear so that teachers are able to understand what is required of them to do.
- the directions which are necessary for teachers to work through the lessons and other information were modified. This was important so that teachers could easily follow the STS approach to teaching population dynamics without getting confused or lost.
- the layout of the text had to be changed so that it did not look like a textbook full of written text, rather it should be short and direct to the point.

However, a number of aims were achieved in this package, for example, the package;

- introduced the teachers to the idea of teaching human population dynamics using an STS approach and to a learner-centred approach.
 - ▶ This package was able to provide teachers with useful ideas for teaching human population dynamics using relevant and real-life issues which is one of the outcomes for *Curriculum 2005*. The content of human population dynamics used different problems in real-world situations to make a link between real life issues and the content learned at school.
 - ▶ It also uses a learner-cantered approach and could be an effective resource for teachers to engage in innovative teaching methods.
- There were several advantages of using computers that teachers gained by using this package.
 - ▶ By using computers teachers gained computer skills and overcame possible fears of working with computers.
 - ▶ Rather than teachers attending workshops for a specified time, they worked at their own pace and time on the computers.
 - ▶ Teachers studied the package in a less threatening environment when they used the computers than if they were placed in a workshop environment in which groups of teachers are taught. In workshops, teachers may be scared to talk or participate for fear of their contributions being judged negatively.
 - ▶ Teachers were able to attain experiences otherwise not possible. The package had multimedia facilities that gave teachers access to activities and experiences they might not otherwise have access to in an ordinary classroom.
 - ▶ The package was used for different medium to cater for different learning styles of learners like graphics for spatial interpretation and animation for processes.
 - ▶ The package showed visual processes as they occur e.g. by using a spreadsheet containing tables of data and associated graphs, it was possible for teachers to see changing trends in the graph when figures were changed in the table. This is a big benefit when teaching population dynamics because the effect of some factor (e.g. illness or death) can be simulated by changing data in the tables, which is immediately shown on the associated graph. The trends are easy to illustrate.
- The use of this approach also linked so well with the outcomes advocated for in *Curriculum 2005*. For instance, using these problems to teach provides learners the opportunity to develop various skills such as critically evaluating of information, identifying, collecting, analysing, organising information on the problem and finding ways to solve it. This also offered the teachers opportunities to make learners work in groups. Furthermore, the content used in this package contained relevant issues linked to the textbooks used at matriculation level in teaching human population dynamics. This was important so that the syllabus was considered.

- Importantly, the reaction and attitude of most teachers who were involved in this study was very positive. If the package can be improved, it is most likely that most of these teachers would be able to use it in their teaching.

6.2 Recommendations

In this research, there are two major recommendations that could be made for future research. In order for the package to achieve its' aims, the package should be improved upon and teachers should use it in their teaching to see what kind of effects it will have on learning.

6.2.1 Improvement of the package

The package developed revealed a lot of faults that have to be worked upon. Therefore, one of the things that needs to be done to the package should be to improve it considering the responses obtained from the teachers and expert reviewers discussed in the results chapter and the development of the package (Chapter Three and Chapter Five). The package developed was only evaluated twice due to time constraints, resulting in inadequate information to improve on it.

In order to effectively evaluate an instructional material, a lot of time and input is required on the part of the researcher. Even though talking about textbooks, Doidge (1991) points out some of the problems that are also expected in designing instructional materials “ *the production of excellent textbooks requires time, research and expertise. It also requires the piloting of textbooks in schools, evaluating and revision before they are published*”. The lack of such important consideration and advice results in poor quality computer materials that would not be in any way better than other teaching materials. Therefore, it would be highly suggested that the developed package be further administered to teachers and expert reviewers to obtain more information to improve the package.

6.2.2 Implementation of the package by the teachers

Secondly, it is the view of the researcher that administering the package by teachers in the actual classroom situation will be a more effective method to find out how effective the package is in teaching. Gauguly cited by Tsvigu and Maswera (2001) argues that for successful implementation of computer enriched teaching, more attention is needed in the area of educating the teachers who will use this technology so that learners interest and participation in the subject can be improved. This can be done if teachers actually used the package in the classrooms.

6.3 Limitation of the study

A major limitation of this study was the time frame given for the completion of the research. In evaluating instructional materials, a lot of time is needed because the researcher needs to go through several phases administering and collecting information in order to improve the material. However, there was only one year to complete this research, giving the researcher only two phases of data collecting from the teachers and the two expert reviewers. If there was more time, the researcher would have collected more feedback from different groups of teachers to improve on the package further.

The other aspect that was affected by the time frame is the planning of the development model in developing package. In order to properly and effectively develop a good quality package, there is need to consult with the experts and other people whilst going through the stages. This is important because the development of instructional materials requires careful planning and a significant amount of experimentation before software designers can come up with models that are effective. According to Phillips (1997: 36) *“Interactive Multimedia programs require considerable time and resources to create and, therefore, the development process needs to be as efficient as possible”*. Phillips claims that it is important to complete the planning stages and do all the checks before the designer could start the production of the package. But this was not possible in this research because the time was not enough.

Secondly, the sample size of teachers was small which did not give enough responses on the design of the package. This could not be avoided because it was only this group of teachers who were suitable to give their views on the STS approach as they had done the course on it.

Thirdly, there was also little time (one hour) for the teachers to go through the package before they could answer the questionnaire. This did not offer them enough time to critically evaluate the package and give detailed responses. This limitation could not be avoided because it was the last session of their lectures.

The fourth limitation involved the pilot study where two teachers checked the questionnaire ie questions, wording, language etc. These teachers did not adequately and critically evaluate the questionnaire which obtained poor results in the main study.

6.4 Delimitation of the sample

Even though having a small sample proved to be a limitation to this study, it was chosen to limit the scope of the study. This was important to enable the researcher complete the research in the specified time frame for completion of the degree.

6.5 Concluding remarks

This evaluation research involved two stages and two methods of data collection. The researcher first used a questionnaire to collect information from teachers who worked through the package in its earliest stage of development. The second stage involved two expert reviewers doing a walk through the package and verbally giving their criticisms and appreciations of the package.

The responses obtained from both instruments (questionnaire and expert review) was used to modify the package. A number of appreciations were expressed about the package as well as criticisms which the researcher considered in order to improve the package. These appreciations and criticisms have been discussed in Chapter Three and Chapter Five. Based on the responses obtained from teachers and experts, some recommendations have been suggested on how the researcher may address them so that the package could further be improved upon.

This research has revealed that teachers are willing and appreciate to learn different teaching methods that could meet the new curriculum in South Africa. On the other hand, the research has also highlighted some of the problems that one may experience in designing instructional materials.

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