E-learning: a nutrition and HIV/AIDS information tool

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Abstract

Purpose – This paper aims to examine how e-learning can add value to a postgraduate distance learning course using a combination of media for teaching and learning in the field of nutrition and HIV and AIDS.

Design/methodology/approach – Data were gathered through the survey method using questionnaires, group discussions and interviews. Descriptive quantitative statistics supported by qualitative techniques were used to gather data.

Findings – Findings from this research indicate that implementing e-learning as a mode of teaching and learning (provided that it is properly implemented and presented) can add value to an outcomes-based, distance learning course. E-learning provides: support for a paper-based, distance learning course in nutrition and HIV and AIDS; students with access to information and knowledge about the basic concepts of nutrition and HIV and AIDS; an alternative and interactive learning experience while encouraging self-directed explorative knowledge formation; and a means to develop critical thinking skills and methods of communication needed for independent, lifelong learning.

Practical implications – The selected instructional media can be applied successfully to adult and distance learning in the field of HIV and AIDS as well as nutrition.

Originality/value – The paper shares findings on the integration of e-learning into a HIV and AIDS nutrition course (for non-medical students), offered in an African context through open distance learning and demonstrates how the course addresses student profile and limited resources.

Keywords E-learning, Distance learning, Nutrition, HIV, Acquired immune deficiency syndrome, Mature students

Paper type Research paper

Introduction

The distance learning landscape in Africa is transforming at a rapid pace and it is driven by diverse economic, technological and social trends. In South Africa, as in other countries, there is an increasing demand for higher education institutions to provide accessible, quality distance learning that meets the needs of adult students, many of whom are from previously disadvantaged communities (Badat, 2005; Norman, 2004; Van Brakel and Chisenga, 2003). To address these needs, higher learning institutions are progressively incorporating ICTs (information communication...
technologies) and distance learning to provide flexible learning opportunities at a time and place that is convenient to students within a framework of lifelong learning (Badat, 2005; Chari and Haughey, 2006; Zentel et al., 2004). Student demands are shifting from just-in-case learning, where students are expected to complete degree programmes long before they actually need the knowledge, to just-in-time learning, where students seek customised certification when they need it and where the learning programmes are tailor-made to meet the particular and well-defined lifelong learning needs of students (Hochberg, 2006; Smart and Cappel, 2006).

The HIV and AIDS (human immunodeficiency virus infection and acquired immune deficiency syndrome) pandemic is having increasingly devastating socio-economic effects on South Africa and other African countries (Piwoz and Preble, 2000; Steenkamp, 2000). As the HIV and AIDS pandemic grows, so does the demand for training and health promotion strategies in this field (Mokwena et al., 2007). There is a growing need and appreciation among prospective students, especially working adults with families, who cannot attend residential universities or who live in rural areas, for the flexibility and fewer time constraints that distance learning offers (Carnevale and Olsen, 2003; Hochberg, 2006; Mokwena et al., 2007). Distance learning and technology has the potential to bridge the gap between educational disparities of race, income and region, and to deliver learning to adults on a scale hitherto undreamt of (Badat, 2005; Hopey, 1999). It can also “contribute to accountability by reinforcing learner-centred instruction and outcomes-based education while overall improving the relationship between teaching, learning, assessment, and effectiveness” (Hopey, 1999, p. 26). To gain more insight on how to implement and use e-learning, students’ perception of e-learning should be taken into account (Smart and Cappel, 2006). Although research has been conducted regarding e-learning (Tallent-Runnels et al., 2006) more information is needed on how and when e-learning can be implemented effectively as part of a blended mode of teaching and learning in open distance learning (ODL) in South Africa.

Background
The Sociology Department at Unisa, in consultation with other departments at Unisa, developed the Social Behavioural Studies in HIV and AIDS Honours Programme. The purpose of the degree programme is to provide the necessary skills in and knowledge of the social behaviour aspects of HIV and AIDS and to address the socio-economic impact of HIV and AIDS. It is an interdisciplinary programme offering outcomes-based courses where students are assessed through theoretical questions, authentic learning and skills development activities.

During the development phase of the programme a need for a course that would focus on the nutritional needs of PLWHA (people living with HIV and AIDS) was identified. For years the focus on the management of HIV and AIDS was on drugs – while the relationship between nutrition and HIV and AIDS was largely ignored. The World Health Organisation (WHO) has highlighted the importance of nutrition and diet in the management of HIV and AIDS (FAO Newsroom, 2003). In poverty stricken countries where malnutrition and its side effects are commonplace, and where resources, health care and drug therapy are expensive and not readily available, it is increasingly recognised that diet and nutrition can play an important role in the health management of PLWHA (FAO Newsroom, 2003; Huber et al., 2000). “Nutritional care
and support are essential components of health care management for people with HIV/AIDS” (Veldman, 2002).

Offering the distance learning course in nutrition and HIV and AIDS poses unique challenges. The majority of students enrolled for this programme have qualifications in the Social Sciences, Education, and Nursing from residential institutions. Although most students had no formal qualifications in nutrition, it was anticipated that they would have at least some degree of reliable knowledge about nutrition. To provide students with the basic points of reference in the science and practice of nutrition, the students were initially provided with a study guide comprising an overview of basic nutrition in the first section followed by basic nutritional care and support to PLWHA, and addressing some of the social implications of nutrition and HIV and AIDS.

However, when the course was offered for the first time it became apparent that the students had even less basic nutritional knowledge than had been anticipated and they (as individuals) had different levels of nutritional knowledge. They also entertained many misconceptions about nutrition in general and nutritional care for PLWHA. It also became apparent from the low marks that students achieved, as well as informal discussions with students, that they found the course content unfamiliar and difficult. They contributed these difficulties to the fact that they had no or very little prior knowledge about basic nutrition. Facilitators from some of the other modules in the programme reported the same problem. It thus became evident that the paper-based mode of presenting the nutrition and HIV and AIDS course did not meet the needs of these students and the outcomes of the course.

For years, distance learning institutions in South Africa relied mainly on paper-based study materials, the post, telephone calls and, in some cases, television. The quality of interaction between facilitators (lecturers) and students depended on (and was limited by) the capacity and format of study material and communication channels such as telephone, facsimile and later e-mail. The initial paper-based course on nutrition and HIV and AIDS comprised a printed study guide, three readings (a compilation of sections extracted from reliable textbooks, refereed publications and other sources that had a bearing on nutrition and HIV and AIDS in the African context), assessments and three one-week face-to-face sessions. Considering that most students are from previously disadvantaged communities and the high cost of overseas textbooks (there are limited local textbooks on nutrition), students cannot be expect to buy three to four textbooks to get the information they require. To obviate this textbook problem, students were provided with a selection of readings. Due to the high costs of the paper format, more information about nutrition could not be added to the existing readings. Therefore, it was necessary to investigate other modes of presenting the course and of providing easily accessible resources that did not depend on a paper format.

While providing relevant and reliable content, the degree programme (including the nutrition and HIV and AIDS course) also aimed at guiding students in developing skills and competencies to engage in independent lifelong learning. Such skills and competencies include (Ginsburg, 1999; Mutula, 2002):

- Information skills, i.e. acquiring and evaluating data, interpreting and communicating data.
- Systems skills, i.e. understanding social, organizational, and technological systems.
Thinking skills, i.e. critical thinking, thinking creatively, making decisions, solving problems, quantitative reasoning, knowing how to learn.

Interpersonal and communication skills, i.e. working with peers and teaching others.

These skills cannot be learned in isolation; they have to be learned in a context where the skills concerned are valued, modelled and assessed (Ginsburg, 1999; Smart and Cappel, 2006). Therefore the course and assignments were structured to support outcomes-based education and authentic learning while engaging students actively in their learning. Students had to submit four compulsory formative assessments during the year and a summative assessment at the end of the year. They had the option of two dates by which to complete and submit the formative assessments. When students submitted their assessment before the first due date, it was assessed with feedback and returned to them. They could then rework their assessment, resubmit it before the second due date and so improve their marks. They could also submit the assessments only on the second due date, but then the mark given was final.

However, due to staff constraints, facilitator workload, time limitations and the physical distance between facilitators and students, the facilitators need tools to assist them in the teaching and learning process. Technological applications (properly implemented and presented) can meet this need. E-learning minimises the educational role of the facilitators as the sole source of knowledge and rather allows them to become a collaborator, mediator and facilitator in the learning process; it supports students in developing process skills and building knowledge, rather than only gaining information (Beller and Or, 2003; Johnston et al., 2005).

In spite of the opportunities and challenges that the world wide web (www) provides for delivering nutritional education, it appears that ICT is still underutilized in this field (Kolasa, 2002). Limited research was available on the integration of basic nutrition and health education into non-medical disciplines at post-graduate level. No research could be found on e-learning, especially on the www, that had either investigated or described the offering of a distance learning course on public nutrition and HIV and AIDS, supported by e-learning. The available tertiary level e-learning courses are mostly designed for medical and dietetic students where it complements the face-to-face instruction.

Aims and objectives of this study
The aim of this study was to develop a course web site as part of a blended distance learning nutrition and HIV and AIDS course. The course site had to address the limited nutritional knowledge of the post graduate students and communicate knowledge about nutrition and HIV and AIDS while encouraging self-directed, explorative knowledge formation.

The objectives were to:

- Establish a student profile.
- Explore students’ access to computers and the internet and determine if they had the necessary facilities and computer skills.
- Explore students’ evaluation of the design and layout of the learning web site.
Explore whether the web site assisted students (or not) in familiarizing them with the content and whether the self-evaluation activities assisted them in understanding the subject principles better.

- Explore students’ experiences of learning at a distance.

**Data collection**

Questionnaires, group discussion and interviews were used to gather data from students. The target population consisted of all the voluntary students enrolled for the Social Behavioural Studies in HIV and AIDS Honours Programme over a period of two years.

The questionnaire items were structured as statements. The first section dealt with the student profile and the students had to indicate the applicable statement. The subsequent section dealt with the evaluation of the learning web site. Students had to rate the statements according to a five-point Likert style scale (range 1 = I totally agree with statement (TA) to 5 = I strongly disagree with the statement (SD)). The items from the questionnaire were further explored in the group discussions and interviews. At the end of the questionnaire students were given the option to add comments. The questionnaire was pre-tested for comprehensibility and clarity. From the feedback, some of the instructions were reformulated to improve clarity. Questionnaires were distributed to students during the face-to-face sessions held during each year. An overview of the questionnaire content is given in Table I.

Students had to return the completed questionnaire one month after receiving it. A covering letter explaining the objective of the study accompanied the questionnaire. The students had to sign a consent form acknowledging that their participation was voluntary and that the information they supplied would remain anonymous.

The degree programme offered three, compulsory one-week, face-to-face sessions per year where students interacted with their facilitators and peers. During the first two face-to-face sessions a training session on how to use the web site and internet as part of the nutrition and HIV and AIDS course was done in one-hour sessions over two days. Students had the opportunity to work with and evaluate the learning web site during these sessions and the rest of the week. Students also had to work with the site from home. Support was available if students needed it.

Group discussions and interviews were held with students after they used the learning web site and completed the questionnaire. The group discussions comprised nine and eleven students for each year group respectively. The discussions were facilitated by two evaluators. One evaluator facilitated the discussions while the other recorded the responses. Open ended questions were used to explore the following areas:

- Students’ access to computers/internet.
- Students’ computer/internet literacy.
- Students’ evaluation of the learning web site and whether the learning web site, questions and activities helped them to understand the subject principles better.
- Students’ experiences of learning at a distance.

The group discussions were held in a computer room and lasted approximately 45 minutes. The discussions were audio-taped with the consent of the students. The second evaluator handled the recordings and kept shorthand notes on the discussions.
## Scale Items

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Age, sex, first language, province where student resides, current profession, work location, competence in studying through the medium of English, assessment preference and number of hours per week, on average, spent working at their studies</th>
</tr>
</thead>
</table>
| Computer/internet access | Do you have access to a computer to use for your studies?  
Do you have access to the internet?  
- No  
- Yes, at work  
- Yes, at home  
- Yes, at home and at work  
- Internet café  
- Friend’s home |
| Computer/internet literacy | Indicate which statement applies to you:  
- I view myself as computer literate  
- I have enough computer skills to help myself  
- I feel my computer skills are not adequate  
- I cannot use a computer |
| Evaluation of learning web site | The screen layout was good and easy to read  
The organisation of the information was structured  
The positioning of information on the screen was consistent  
The navigation was clear and consistent  
I knew what each button, symbol and graphic on the screen meant  
The web site was easy to use  
The web site helped me to understand the subject content in my study guide better  
The various questions and activities in the learning web site assist me in understanding the subject principles better  
Working through the learning web site makes me more confident about answering my assessment questions better  
I enjoyed working with the web site. |

### Table I.

<table>
<thead>
<tr>
<th>Questionnaire items</th>
</tr>
</thead>
</table>

A facilitator who was not teaching the course addressed the students before the group discussions began. They were briefed about the purpose and methods of the study and the procedures followed to ensure confidentiality.

Interviews were held with three students from each year group. Since interviews are labour intensive and expensive tools—a small number of students were used (Laurillard, 1994; Van Vuuren and Maree, 2002). The interviews were open-ended and less structured to elicit a variety of detailed responses (Struwig and Stead, 2001, p. 98). The interviews covered the same question topics as listed under the group discussion.

**Data analysis**

Data from the questionnaires were presented as descriptive statistics and expressed as percentages. Questionnaire items were grouped under sub-headings and measured demographic data, computer/internet access, computer/internet literacy, evaluation of learning web site (see Table I). The internal consistency of these scales was confirmed using Cronbach Coefficient Alpha: 0.96 for computer/internet access, 0.95 for computer/internet literacy and 0.95 for evaluation of learning web site.
Data from the discussion groups and interviews were analysed by means of open coding (Strauss and Corbin, 1998). After coding the transcripts, categories with headings were extracted from the data. Comments were analysed until each comment from the transcriptions was grouped under a thematic heading (see Table II). The transcripts were analysed by the author and then checked independently by another member of the team to enhance the validity and reliability of the process. The few differences of opinion on the categorisation of the transcribed content were discussed until consensus was reached between the two researchers.

The interviews provided an opportunity to clarify concepts and interpretations and elaborate on the responses from the questionnaires and group discussions. Once the data had been analysed improvements in the elements of the design can be considered and implemented (Reigeluth and Frick, 2003, p. 10).

Findings
A total of 107 (95 per cent) completed questionnaires were returned and analysed.

Student profile
A selection of data significant for this study including sex, age, first language and province where the student resides is summarised in Table III.

<table>
<thead>
<tr>
<th>Category</th>
<th>Heading</th>
<th>Data example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer/internet access and skills</td>
<td>Computer access</td>
<td>“I did not know I can use the computers and internet in the library. I thought it was only for lecturers.”</td>
</tr>
<tr>
<td></td>
<td>Computer skills</td>
<td>“I know I must learn to work the computer better.”</td>
</tr>
<tr>
<td>The learning web site</td>
<td>Appropriateness</td>
<td>“The (web site) links can help me to get the information I need.”</td>
</tr>
<tr>
<td></td>
<td>Access</td>
<td>“I am prepared to spend my weekends in the library or any other place as long as I have access to information.”</td>
</tr>
<tr>
<td></td>
<td>Flexibility</td>
<td>“I only have time to study at night after I have put the kids to bed. It is then that I need the information.”</td>
</tr>
<tr>
<td></td>
<td>Assessment</td>
<td>“It is nice to do those questions on the web site. I like it when I can see my marks immediately.”</td>
</tr>
<tr>
<td>Learning at a distance</td>
<td>Time and study management skills</td>
<td>“This module is a lot of work. I do not have enough time to complete my assessments.”</td>
</tr>
<tr>
<td></td>
<td>Interaction with peers</td>
<td>“I like the face-to-face sessions. We (the students) become friends and we see our facilitators. We want more face-to-face sessions!”</td>
</tr>
<tr>
<td></td>
<td>and facilitators</td>
<td>“I am alone, I do not have someone to study with.”</td>
</tr>
</tbody>
</table>

Table II. Summary of group discussions and interviews
<table>
<thead>
<tr>
<th>Sex</th>
<th>%</th>
<th>n</th>
<th>Age</th>
<th>%</th>
<th>n</th>
<th>First language</th>
<th>%</th>
<th>n</th>
<th>Province where student resides</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>29</td>
<td>31</td>
<td>#24</td>
<td>9.3</td>
<td>10</td>
<td>English</td>
<td>2.9</td>
<td>3</td>
<td>Eastern Cape</td>
<td>9.3</td>
<td>10</td>
</tr>
<tr>
<td>Female</td>
<td>71</td>
<td>76</td>
<td>25-29</td>
<td>12.9</td>
<td>14</td>
<td>Northern Sotho</td>
<td>16.3</td>
<td>17</td>
<td>Western Cape</td>
<td>3.0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>30-34</td>
<td>14.7</td>
<td>16</td>
<td>South Sotho</td>
<td>8.7</td>
<td>9</td>
<td>Free State</td>
<td>8.8</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>35-39</td>
<td>24.4</td>
<td>26</td>
<td>Tswana</td>
<td>22.1</td>
<td>24</td>
<td>Gauteng</td>
<td>41.3</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>40-44</td>
<td>20.0</td>
<td>21</td>
<td>Xhosa</td>
<td>19.3</td>
<td>21</td>
<td>KwaZulu Natal</td>
<td>6.8</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45-49</td>
<td>14.0</td>
<td>15</td>
<td>Zulu</td>
<td>12.5</td>
<td>13</td>
<td>Limpopo</td>
<td>14.5</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤50</td>
<td>4.7</td>
<td>5</td>
<td>Other</td>
<td>18.3</td>
<td>20</td>
<td>Mpumalanga</td>
<td>6.8</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>North West</td>
<td>10.5</td>
<td>11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table III. Student profile
The following student information was also taken from the questionnaire: current profession and work location, competence in studying through the medium of English, assessment preference and number of hours per week on average spent working at their studies.

Most of the students were teachers 52.6 per cent (n = 56), 21.3 per cent (n = 23) were unemployed, 6.6 per cent (n = 7) were in the nursing profession, 3.1 per cent (n = 3) worked for the government, 3.1 per cent (n = 3) were self-employed and 13.3 per cent (n = 15) were employed elsewhere. Not all the students completed the question on the demographic area where they worked, but of those who did (n = 84), 59.5 per cent (n = 50) worked in cities/large towns and 20.3 per cent (n = 17) each in small towns or rural areas.

The majority of students viewed their competence in studying through the medium of English as excellent (25.7 per cent; n = 27) and good 47.6 per cent (n = 51), while 25.8 per cent (n = 28) rated their competence as satisfactory and 1.0 per cent (n = 1) as poor. Nearly 80 per cent (n = 85) of students indicated that they preferred completing assessments during the course and a summative assessment at the end of the course to writing tests and examinations. Students were also asked to indicate how many hours per week on average they spent working at their studies in total. A large number of students (46.1 per cent; n = 49) spent five hours or less per week at their studies. Of the remainder of students, 17.6 per cent (n = 19) spent between six and ten hours per week at their studies, 12.1 per cent (n = 13) between 11 and 15 hours, 8.8 per cent (n = 9) between 16 and 20 hours and 15.5 per cent (n = 17) more than 20 hours per week.

Computer/internet access and literacy
The students were assessed on their access to computers, the internet and their computer literacy. Only 37.7 per cent (n = 40) had access to computers, while 62.3 per cent (n = 67) did not. The majority of students (54.6 per cent; n = 85) did not have internet access, while the remainder (45.4 per cent; n = 49) had access from work, home, a friend’s home, internet cafes or used university facilities. More students than expected viewed themselves as computer literate (27.1 per cent; n = 29), or felt that they had enough computer skills to help themselves (21.5 per cent; n = 23). A large number of students indicated that their computer skills were not adequate (33.5 per cent; n = 36), while 17.6 per cent (n = 19) indicated that they could not use a computer.

Student evaluation of learning web site
Students were required to evaluate the learning web site on its design and layout. They also had to indicate the extent to which they felt the web site assisted them (or not) in understanding the content and whether the questions and activities assisted them in understanding the subject principles better. Students rated statements on a five-point Likert scale and the results are shown in Table IV.

Group discussions and interviews
The data of the group discussion and interviews were grouped under three major categories while a number of headings, grouped under each category, emerged from the data. The categories included access to computers/internet and computer skills, the learning web site and learning at a distance. The same issues were raised in the interviews as in the discussion forums. Data from the interviews supported what was
<table>
<thead>
<tr>
<th>Statement</th>
<th>Totally agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The screen layout was good and easy to read</td>
<td>57.1%</td>
<td>35.2%</td>
<td>2.9%</td>
<td>3.8%</td>
<td>1.0%</td>
</tr>
<tr>
<td>The organisation of the information was structured</td>
<td>42.9%</td>
<td>42.9%</td>
<td>9.5%</td>
<td>3.8%</td>
<td>1.0%</td>
</tr>
<tr>
<td>The positioning of information on the screen was consistent</td>
<td>33.0%</td>
<td>43.4%</td>
<td>13.2%</td>
<td>5.7%</td>
<td>4.7%</td>
</tr>
<tr>
<td>The navigation was clear and consistent</td>
<td>31.8%</td>
<td>47.7%</td>
<td>14.0%</td>
<td>4.7%</td>
<td>1.9%</td>
</tr>
<tr>
<td>I knew what each button, symbol and graphic on the screen meant</td>
<td>26.2%</td>
<td>30.1%</td>
<td>22.3%</td>
<td>17.5%</td>
<td>3.9%</td>
</tr>
<tr>
<td>The web site was easy to use</td>
<td>28.0%</td>
<td>43.3%</td>
<td>17.3%</td>
<td>6.6%</td>
<td>4.7%</td>
</tr>
<tr>
<td>The web site helped me to understand the content in my study guide better</td>
<td>58.9%</td>
<td>29.9%</td>
<td>7.5%</td>
<td>2.8%</td>
<td>0.9%</td>
</tr>
<tr>
<td>The various questions and activities in the learning web site assist me in understanding the subject principles better</td>
<td>56.6%</td>
<td>29.3%</td>
<td>12.3%</td>
<td>1.9%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Working through the web site makes me more confident about answering my assessment questions better</td>
<td>56.6%</td>
<td>28.3%</td>
<td>13.2%</td>
<td>0.9%</td>
<td>0.9%</td>
</tr>
<tr>
<td>I enjoyed working with the web site</td>
<td>62.3%</td>
<td>30.2%</td>
<td>4.7%</td>
<td>0.9%</td>
<td>1.9%</td>
</tr>
</tbody>
</table>
stated in the group discussions. During the interviews more personal issues relating to access to the internet, cost, time and managing family and studies were raised.

Access to computers/internet and computer skills:

- **Computer/internet access.** Many students commented that they were not aware of the student computer facilities and internet access on campus and at the student support centres. They indicated that they would make use of these facilities in future. A small number indicated that they had computer access from work or from home. Not all the students had internet access but some made use of internet cafés. They usually went there once a week to check their e-mails and access the website for information, links or content updates. Two of the interviewees indicated that they were using the library facilities and that it was quite convenient.

- **Computer skills.** Most students stated that they realised that they have to be computer literate. A number of them indicated that they needed the skills and were planning to go for training. One of the interviewees indicated that he was busy teaching himself computer skills from a text book. Some students indicated that before the training session, they had not been aware of how easy it was to surf the internet and how to use the internet search facilities. The majority of students were of the view that using the website would help them to improve their computer skills.

The learning website:

- ** Appropriateness of the website.** Students felt the website suited its purpose. They remarked that the additional links and resources assisted them in acquiring a better understanding and background knowledge about the subject matter (nutrition) and clarify misconceptions and misunderstanding. The website served as a resource they can refer to and find information as they need it. Students found the website easy to use and navigate and the majority of students enjoyed working with the website. Students viewed the website as a supplement to the paper-based materials and not as a replacement.

- **Access and flexibility.** Access to current information was important to students. A number of students stated that the information in the University Library was not relevant to what they needed to complete their assessments. The resources on the website and the internet links were more appropriate. The students also pointed out that they had limited resources and that the few community libraries that they had access to did not provide the information they needed. The website and web links provided them with access to relevant information. A number of female students noted that the website made it possible to access resources after hours and late at night when they had time to complete their assessments. This allowed for more flexibility.

- **Assessment.** Students commented that they enjoyed the interactive self-assessment activities on the website. They also felt that the automated immediate feedback on these activities was helpful in assessing their own progress. They would have liked more of these activities. Some students remarked that they found the assessment criteria given at the end of each assessment activity very useful and used them as a guide when completing their
assessments. Students were very appreciative of not having to write examinations; everyone preferred submitting summative assessments to writing examinations. Students also were appreciative of the two submission dates that allowed them more time for submission and/or to rework their assessment and improve their marks. There was a clear preference among students for a more outcomes-based approach to assessment. They felt this approach provided more flexibility and they found it much less stressful to complete an assessment than going through the preparation and writing for an examination.

Learning at a distance:

- **Time and study management skills.** Many students had problems managing their time around work, home and studies. They also underestimated the implications of studying at a distance as some of the students previously studied full time at residential institutions. Students commented that they did not realise how much input and time the degree required of them. They said it took some time before they realised that they had to pace and plan their studies, since they had difficulty in submitting assessments on time. Many said they still had difficulty in doing this. They often found they underestimated the time the assessment took to complete and had to work late into the night one or two weeks before the assessments were due. They also remarked that they knew they did not spend enough time on their studies mainly due to work and family commitments. During the discussion a number of students stated that they found it very difficult to manage time between studies, work and family.

- **Interaction with peers and facilitators.** Many students indicated that they felt isolated and lonely and did not have someone to study with. The face-to-face sessions helped to reduce the isolation and loneliness. The sessions also helped them to get to know each other and a strong sense of community developed with time. However, students indicated that they wanted more face-to-face sessions and needed to see the facilitators in person even if they did not have content-specific queries.

Table II summarises the categories with relevant headings and examples from the data.

Discussion
The findings will be discussed under the question topics as stated under the aim and objectives of the study.

**Student profile**
The results indicated that most of the students conform to a distinctive profile with specific teaching and learning needs. The adult student profile, as reported in this research, coincides well with that derived from the analysis of the literature (Blustain *et al.*, 1999; Hijazi, 2003; Sakamoto, 2003). Therefore, when the nutrition and HIV and AIDS course was developed, the student profile was used to guide the design and presentation. The course and web site had to be student-centred and flexible, and had
to accommodate the cultural, language and literacy levels and circumstances of the adult student.

The majority of students were female and aged between 35 and 44 years, in the teaching or nursing profession. Although the majority of students resided in Gauteng and Limpopo provinces, there were students from all over the country. Just over 20 per cent of students worked in small towns and rural areas. These students play an important role in the fight against HIV and AIDS since many will take their newly acquired knowledge and skills back to their communities and schools.

The questionnaire data show that students had limited time to spend on their studies since most of them were females, working full time and who had to attend to the responsibilities of a home and family. During the discussion forums and interviews students confirmed that work and home responsibilities limit their study time and that many were only able to study late at night. There was a clear preference among students as indicated in the questionnaires, discussion groups and interviews for a more outcomes-based approach to assessment. The students also found the two due dates for submitting assignments helpful in pacing their assignment submissions. It also provided them with the opportunity to improve their marks. This approach provided more flexibility to make time available for studies and completion of assessments. Students also do not need to go through the stress of preparing for and writing examinations.

Often students underestimate the implications of studying at a distance as many of them studied full time at residential institutions previously. All the students were enrolled for at least two or three courses per year. From the discussion groups it became clear that students had difficulty in managing their time and studies and that they underestimated the volume of work. They then have difficulty with submitting their assignments on time and have to work late just before the submission dates. It is important that students realise that studying at a distance at postgraduate level requires them to demonstrate their ability to manage their time and studies independently. These factors play a major role in the successful completion (or not) of the qualification. During the design of assessment activities and teaching of the course, time management skills and how to pace studies should be planned in.

Although more than 70 per cent of the students viewed their English competency as excellent or good only three students indicated that they were English first-language speakers. The diversity in language and geographical distribution are indicators that students come from different cultural backgrounds and that English, for the majority of students, is not their mother tongue. Considering the student diversity the course content should therefore be written in a format that is clear and understandable to second and third English language speakers. When compiling content for study materials the crossing of customs and belief systems should also be taken into account.

Computer/internet access and literacy

The findings point to a number of factors that have to be taken into account when planning a distance learning course supported by e-learning. These factors include access to computers and the internet, computer literacy and access to the resource.

Although only 37.4 per cent (n = 40) and 45.8 per cent (n = 49) of students had access to computers and the internet respectively, these numbers will increase as students become more aware and make use of the University facilities available in the
library and the student support centres situated around the country. From the discussions it became apparent that many students were not aware of these facilities, but in future will make use of these facilities.

Students also made use of internet cafés to access the internet. They usually went there once a week to check their e-mails and access the website for information, links or content updates. In the South African context access to computers and the internet to all students will be a limitation for some time yet. Students who access the internet via a standard telephone line are challenged with telecommunication limitations. Most home dial-up connections are via a telephone line with a limited bandwidth (57 kB). During peak hours (7 a.m. to 10 p.m.) dial-up connections are slow and between 7 a.m. to 7 p.m. they are more expensive. Internet costs become high if students have to access the internet via a telephone line for long periods. All these factors limit internet access. However, there are students who have access to broadband from work or University facilities. These kinds of constraints can be limited by issuing students with CD-Rom copies of, for instance, the learning website. They then only need to go online when they need information from internet sources and do so during non-peak hours. Although the CD-Rom cannot be updated immediately it can be done yearly, a major improvement on the printed materials that are only updated every third year. Students can be informed by e-mail or text message of updates or adjustments made to the site.

Not to disadvantage students who do not have access to computers the printed format will form the foundation of the course. The learning website will provide an alternative format of access and provide support and additional sources and information. In this way the course can accommodate students who are only able to study after hours and those in the more rural areas that have difficulty in accessing the University library and other sources of information due to distance or work commitments.

The computer proficiency of students needs to be improved. Nearly half the students (48.9 per cent; \( n = 31 \)) indicated that they had enough computer skills to help themselves or viewed themselves as computer literate, while 17.6 per cent (\( n = 19 \)) indicated that they could not use a computer. From the group discussion and interviews it became apparent that students were aware of their limited computer skills and many of them indicated that they were busy improving or planning to improve their skills.

The majority of students had no difficulty in using the internet. This was also confirmed in the discussion groups and interviews. Only a few students needed some time to find their way around the internet and to access the learning website. However, a small number of students indicated that they did not find the website easy to use and also did not enjoy working with the website. This suggests that there are students who are not comfortable with using the internet. This lack of ease can be attributed to the fact that these were probably the students who also indicated that they could not use a computer and that the prospect of using an unfamiliar technology would make them feel uncomfortable. Those who did not like working with the website most probably also felt that they were not able to master this “new” technology and found it difficult to do so or that they simply did not like working with computers. The relatively high percentage of negative and neutral responses to the statement, “The website was easy to use”, support the findings that the students who could not use a computer also had difficulty in using the website. The discussions and interviews confirmed that some students had limited computer skills and that they need to improve their skills. None of
the students attending the discussion forums or who were interviewed had problems using the web site.

In the case of students’ limited computer competencies, it is the view of the programme management committee that students at postgraduate level should be computer literate. In the degree guidelines, it is also stated that students must be computer literate to enrol for this degree. The University library provides computer literacy training as well as training in using the internet and other electronic sources, such as electronic databases free of charge. Since one of the programme and critical cross-field outcomes is the appropriate use of technology, the learning web site provides students with the opportunity to develop this skill and achieve the outcome. Without computer skills it is even more difficult to compete for the limited number of jobs available in South Africa and students are fully aware of this.

The learning web site
In general the learning web site was rated positively. The students rated the statement, “I knew what each button, symbol and graphic on the screen meant”, less positively than the other statements. A large percentage (22.3 per cent; \( n=24 \)) rated the statement as neutral, and 21.4 per cent of the students disagreed with the statement (17.5 per cent; \( n=19 \) disagreed and 3.9 per cent; \( n=4 \) strongly disagreed). These findings can be ascribed to the fact that more than half of the students (54.6 per cent; \( n=85 \)) did not have internet access and were therefore unfamiliar with the meaning of terms such as buttons as well as the purpose of buttons, symbols and graphics utilised by Internet Explorer and other internet functionalities. Although the buttons displayed on the Internet Explorer browser screen were explained to the students during the training sessions, the large volume of new information and the unfamiliarity of working with a computer and the internet could have influenced the students’ ability to interpret and operate the system. The responses of the large percentage of students who gave a neutral rating to the statement could be explained by the fact that the students did not know the meaning of the terms used, especially in the context of the internet and the web site, and therefore were unable to evaluate the statement.

The student-centred design approach followed in this study recognises that the students’ needs, preferences and constraints (Padilla, 2003) are inseparable from the success (or otherwise) of learning a web site’s application. However, most students indicated that the web site assisted them in understanding the subject content better. During the discussion forums and interviews the students confirmed that they viewed the web site as a means to master the subject matter and provide access to more background information as the subject was unfamiliar to most of them. Students also indicated that the self assessment with automated feedback was very helpful, as it served as a guide on how well they mastered the content.

The learning web site also met most of the students’ needs of access and flexibility. During the discussion and interviews the importance of flexibility and access was highlighted as students had limited time to spend on their studies. Many of them also lived in more rural areas, which made access to resources more difficult. During the discussions the students pointed out that the community libraries did not provide the information they needed for their studies and that the course web site provided them with access to the relevant information. After their training they were more confident
to use the internet to find relevant information. During the interviews, female students pointed out that they felt empowered as they now know how to access the internet.

The internet and the learning web site demonstrated to students the vast access they have to information. However, the issue of judging what is reliable information and what is not is a concern. Students need guidance and experience on how to make this judgement. It is therefore advisable to provide students with examples of reputable web sites, as was done in this study, and state clearly what is expected from the students in the assessments concerning content and scope.

Learning at a distance
This study highlighted some issues regarding the students’ experience of distance learning. Although the students were on a postgraduate level and the degree is offered in a distance learning mode only, they still had a strong preference for face-to-face contact. During the group discussions and interviews students indicated they had difficulty adapting to the distance learning mode of limited face-to-face contact and personal support. Students indicated that they wanted more face-to-face contact to interact with their facilitators and peers and personal assistance from the facilitator. From the discussion groups it became clear that students had difficulty in managing their time and studies and that they underestimated the volume of work. Students should be made aware that they cannot depend on meeting daily with their facilitators and peers to be successful with their studies. Students must develop skills to manage their time and studies and use other modes of communication for interaction and support, such as e-mail and online discussion forums and social technologies.

The needs and requirements of students, as identified from an analysis of the literature and the research itself, and how and to what extent such needs and requirements were met by the course is summarised briefly below.

- **Delivery options.** The course incorporated a variety of delivery options, including the paper format, learning web site, face-to-face sessions and communication channels such as telephone and e-mail.

- **Delivery.** Delivery did not proceed as seamlessly and reliably as was expected. Technical matters such as servers being down, limited bandwidth, accessibility and the vagaries of the postal service were major problems that need to be addressed.

- **Course design.** The course was designed according to course design principles. It provides engaging and intellectually challenging activities, quizzes and assignments.

- **Teaching approach.** Because the course is outcomes-based, a learner-centred approach was followed.

- **Presentation.** Interactive activities were incorporated where possible, and content was integrated with problem-based real-life situations.

- **Course format.** The course is offered in a modularised format. This offers students some flexibility.

- **Interaction.** Assignments are formulated in such a manner that students have to interact with the community affected by HIV and AIDS as well as their learning community.
Support. Although academic advisory and student support services are available, the degree management committee also provided as much support as possible.

Conclusion

Some researchers are of the view that distance learning and e-learning may be a more appropriate way of delivering education to students who come from different ethnic backgrounds, and whose needs and expectations, prior education and life experience, personal learning styles and abilities vary significantly (Mutula, 2002; Beller and Or, 2003). The results of this study on the student profile indicate that the students enrolled for the Social Behavioural Studies in HIV and AIDS Honours Programme fit this profile and that delivering their educational needs by means of distance learning and e-learning will be more appropriate.

Utilising e-learning as a means of instruction offers students access to appropriate web sites and other documentation that provide them with immediate and relevant knowledge and whatever other information they may need. From these links they can venture out to other sites and resources. Second, there are students located in more rural areas with very limited resources of the kind that we associate with an urban society. The learning web site provides students with the means of finding at least some of the relevant information and knowledge that they need. The availability of the web site as a component of the distance learning course means that students at least have a choice of travelling (for many a long distance) either to a library in the hope of finding some information on the subject, or a much shorter distance to the nearest internet café or University student centre to access the internet and learning web site there.

New teaching and learning possibilities need to be explored in spite of the many constraints associated with e-learning and the internet as modes of instruction. E-learning in this study provided:

- Valuable support for a printed mode of distance learning in nutrition and HIV and AIDS.
- Students with access to immediate information and resources about the basic concepts of nutrition and HIV and AIDS.
- An interactive alternative and more pleasant learning experience while encouraging self-directed explorative knowledge formation.
- A means to develop skills, methods and modes of communication that are needed for independent, lifelong learning.

For an e-learning project to succeed, a balance should be established between the target group student needs and expectations, and the requirements, strategic objectives and values of the organisation and its brand. E-learning developers should also consider the constraints placed on a particular project such as time, resources (including the available budget) and the technologies accessible to the target user base (Preston, 2003).