



## The Internet Journal of Allied Health Sciences and Practice

<http://ijahsp.nova.edu>

A Peer Reviewed Publication of the College of Allied Health & Nursing at Nova Southeastern University

*Dedicated to allied health professional practice and education*

<http://ijahsp.nova.edu> Vol. 3 No. 1 ISSN 1540-580X

---

### Online Learning in Nutrition and Dietetics: Student Performance and Attitudes

---

Dominic Upton, PhD

University of Wales Institute

Cardiff, School Of Health and Social Sciences

United Kingdom

---

**CITATION:** Upton, D. Online learning in nutrition and dietetics: Student performance and attitudes. *The Internet Journal of Allied Health Sciences and Practice*. January 2005. Volume 3 Number 1.

---

#### ABSTRACT

Context: Behavioural studies can form an essential component of the Nutrition and Dietetics undergraduate degree. Aims: This study aimed to firstly produce on-line teaching material in behavioural studies suitable for undergraduate Nutrition and Dietetic students. Secondly, to explore students' views on the online material, and record their performance when taught through this innovative method. Methods: Nutrition and Dietetics students completed an online health psychology/sociology module and their performance compared to students who completed a traditional lecture based course. Student evaluations of the online course were also recorded. Findings: Results suggested that students taught through on-line medium performed no differently to those taught through "traditional lectures". Students appeared to enjoy the material although there was some reluctance to develop an independent learning style. Conclusion: It was apparent that material has to be developed that can both engage and motivate learners, thereby further developing independent learning, and that this may have to be tailored dependent on a number of student factors.

#### INTRODUCTION

Degree level education is provided for nutritionists and dieticians at many specialized higher education institutions worldwide. Within Higher Education (HE) there is a move towards flexible, online learning for it has a number of benefits. For example, by increasing the access to flexible learning, access to these courses is extended to those geographically isolated, those whose disability prevents them accessing HE and those whose particular social and personal circumstances are not conducive to on campus learning.<sup>1</sup>

Furthermore, it has been reported that traditional lectures are not a good way to learn.<sup>2</sup> Today's students have grown up in a technological age of television, computers and videogames.<sup>3,4</sup> Some researchers argue that neither students nor teachers regard lectures as effective and students now expect technology to be use effectively as part of their learning experience.<sup>3,5-7</sup> The challenge for teachers is hold the attention of students from this high-tech generation. Many authors have suggested designing the learning and teaching environment to promote greater student participation and engagement thereby increasing deep learning in the students.<sup>2,8</sup> Some have suggested that web-based learning appeals to students both on and off campus.<sup>9</sup> Students find such learning appealing and engaging and may therefore be more involved and motivated as a consequence.

The benefits of on-line learning within the health and social care professional curriculum have been reported on- for example in nursing, medicine introductory biology and anatomy/physiology related to the subjects allied to medicine amongst others.<sup>10-14</sup>

The benefits of on-line learning within the nutrition and dietetic curriculum have yet to be explored extensively- although Shah et al (1999) do state that "...it will pay an essential role education in the 21<sup>st</sup> century".<sup>15</sup> Litchfield et al (2000) do present a picture of the future and how dietetic education can be improved through on-line distant education.<sup>16</sup> However, the small numbers (n=8)

and limited outcome variables employed in the pilot study reduce the conclusions that can be drawn although the benefits of the approach taken were apparent. We report here on the development of an on-line health psychology and health sociology module and the performance of students on the module compared to previous cohorts taught through a traditional lecture based method, along with the recorded evaluation by the students.

## **METHODS**

A pseudo-experimental design was undertaken; such that a cohort taught through a traditional lecture based medium was compared to those completing the course on-line. The dependent variables were performance on the end of module assessment, engagement with the online material and evaluation of the online course.

In terms of the evaluation, a survey of all students completing the on-line course was undertaken at the end of the final teaching session, but before the assessment had been completed and graded (as it was assumed that graded assessment could have affected the views of the students).

## **MATERIALS**

The on-line material included a range of behavioural science resources co-ordinated through the Blackboard Virtual Learning Environment (VLE). Blackboard (<http://www.blackboard.com>) is an online learning system which provides the functionality required to successfully manage distance, web-enhanced, or hybrid education programmes. It features a robust environment for content management and sharing, online assessments, student tracking, assignment and portfolio management, and virtual collaboration.<sup>17</sup> In essence, it provides a ready made online shell for tutors to populate with content, together with a set of commonly used online tools.

Students were presented with the online behavioural sciences module material (on topics such as definition and measurement of health, social class and health, gender, stigma, stress, pain and pain management) throughout the academic year along with three traditional lectures throughout a twelve-week semester. One of the lectures was placed at the start of the semester to introduce the module, one in the middle to re-visit the students' learning and iron out any difficulties, and one at the end to review progress and provide a revision session.

Student outcome was assessed according to three variables: performance, engagement and evaluation. These were assessed through:

- a written assignment as per the validated course descriptor. All assessments were subject to both internal and external moderation, both internal and external examiners had no formal contact with the design or delivery of the module;
- the amount of contact the student had with the on-line module;
- the evaluation form that was completed at the end of the module.

At the final session, students were asked to complete an evaluation form which has been previously published.<sup>18</sup> It consisted of a series of statements asking the respondent's views on their learning experience and the materials with which they had engaged. There were sections on technical features (e.g. speed of response, accessing material), Blackboard features (e.g. announcements, information), academic support (e.g. e-mail response, marking of material), module design (e.g. organisation, usefulness), comparison of Blackboard to face-to-face teaching (e.g. convenience, learning) and overall comments (e.g. amount of material, views on learning by computer). Each of the statements was rated on a five point "strongly agree" to "strongly disagree" continuum. The questionnaire has been used in previous study and provides an indication of the students' views on the online learning environment. Limited comments on the reliability and validity are provided, but in the context of a small-scale evaluative pilot study this is not of key importance.

## **SAMPLE**

This report details the experiences of a cohort of students completing the online module. A total of 31 students progressed through the module during this time of which the majority (n=30) were female and under twenty-one (n=21). The module was compulsory for all students on the nutrition and dietetic undergraduate degree programme. The comparison was made with the previous cohort of students who had completed the module through the traditional lecture method. There were no discernable differences in sex, age or course entry requirements (see table 1) between the cohorts. In contrast to the first group (the online lecture group who just had three lecture sessions), the traditional lecture group had a series of ten two-hour lectures throughout one term. The latter group was used for comparison in order to determine if the presentation of material had an impact on performance. The sample consisted of all students recruited onto the Behavioural Sciences course of the Nutrition and Dietetics degree over two successive years.

**Table 1: Profile of student cohorts.**

	On-line group	Traditional lecture group
Male	8	4
Female	30	32
Under 21	21	21
Aged 21-25	7	8
Aged 25 years and above	10	7

## RESULTS

Students completed the module after one semester and were assessed via the usual procedure. In addition at this time, the students completed an evaluation questionnaire. On the basis of this information and data collated through the Blackboard VLE, analyses explored: student performance, student achievement and engagement and student evaluation of the online module.

### Student Performance

The performance of the traditional lecture method cohort compared with the performance of the cohort experiencing the on-line module is outlined in Table 2. As is apparent, there is no difference in performance between the teaching methods adopted- performance did not improve (nor deteriorate) with the introduction of the on-line learning module.

**Table 2: Student performance: On-line compared to traditional lectures.**

Year	Mean score on assessment (SD)
On-line	57.84 (8.54)
Traditional	57.37 (9.45)

### Relationship between student performance and engagement with the module.

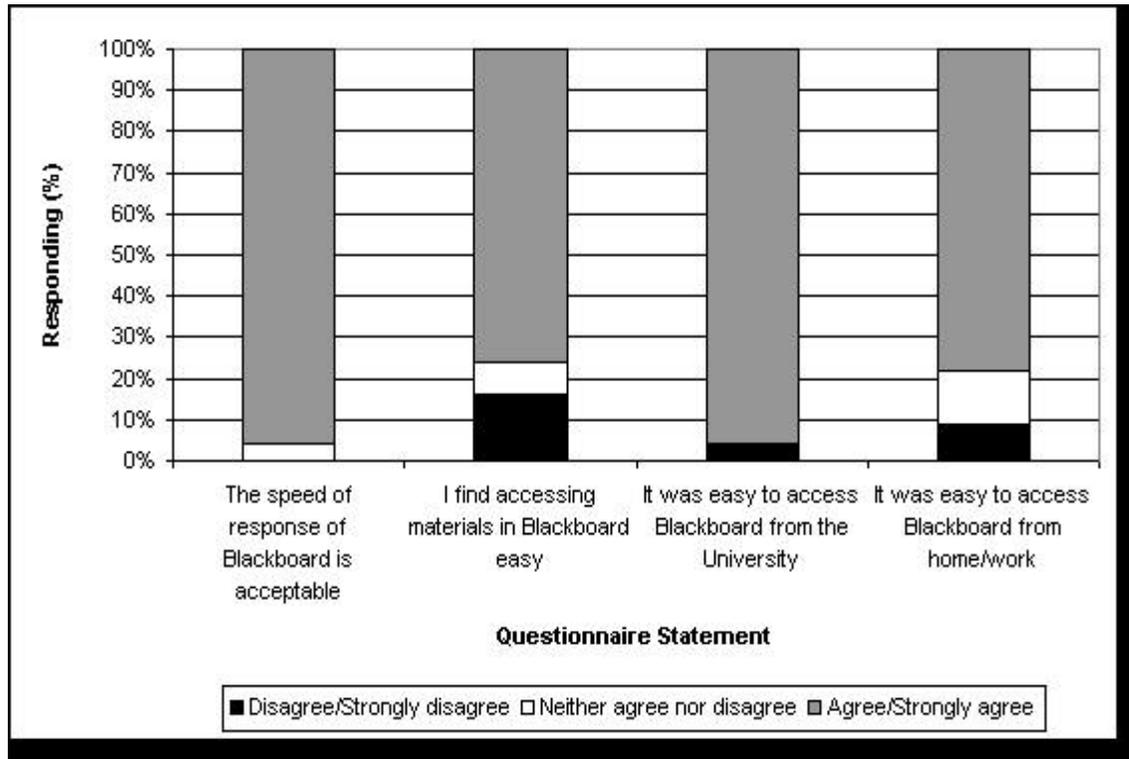
Blackboard allows for the recording and tracking of student use of the presented material. Using this data, a correlation was computed between the amount of times students used the on-line learning material and their final exam marks. No relationship between performance on the module assessment and usage for the students was revealed ( $r_s = -0.10$ , ns).

### Student Evaluation

A comprehensive evaluation was undertaken at the module end, and both qualitative and quantitative data collected. All 31 feedback forms (100% response rate) were received and each responded to a series of questions on: technical features, Blackboard features, academic support, module design and content and comparison of Blackboard to traditional teaching.

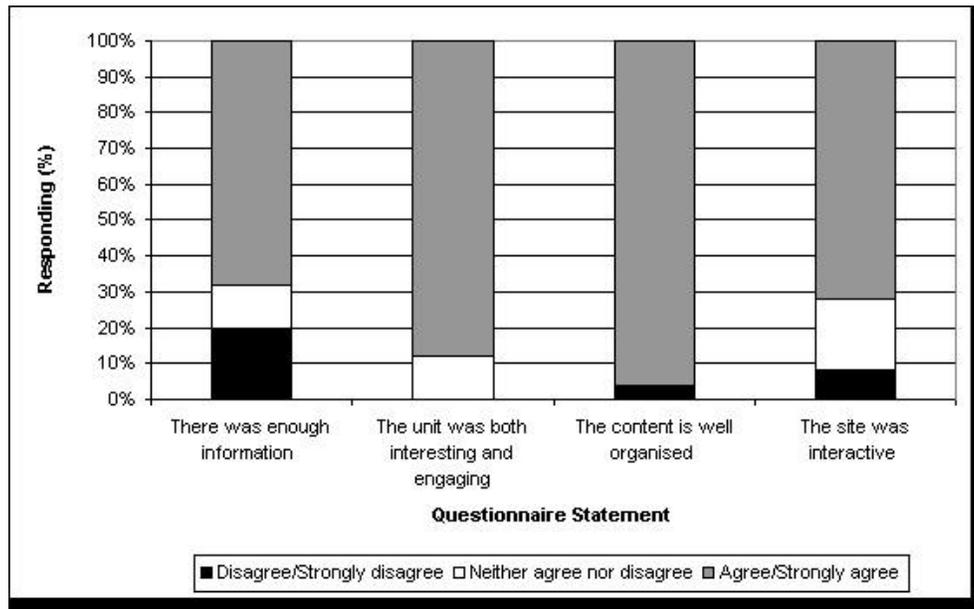
In terms of technical features, 96% agreed that the speed of response was acceptable, and a similar percentage found it easy to access the material from the University, although a slightly smaller number (approximately 78%) felt it was easy to access from home or work. The response to each of the statements on the questionnaire related to the technical features of Blackboard is presented in figure 1. This has been collapsed into either "Agree" (which includes both Strongly Agree and Agree), the mid-point, or "Disagree" (which includes both Strongly Disagree and Disagree)- a convention adopted throughout this report.

Figure 1: Views on technical features of module.



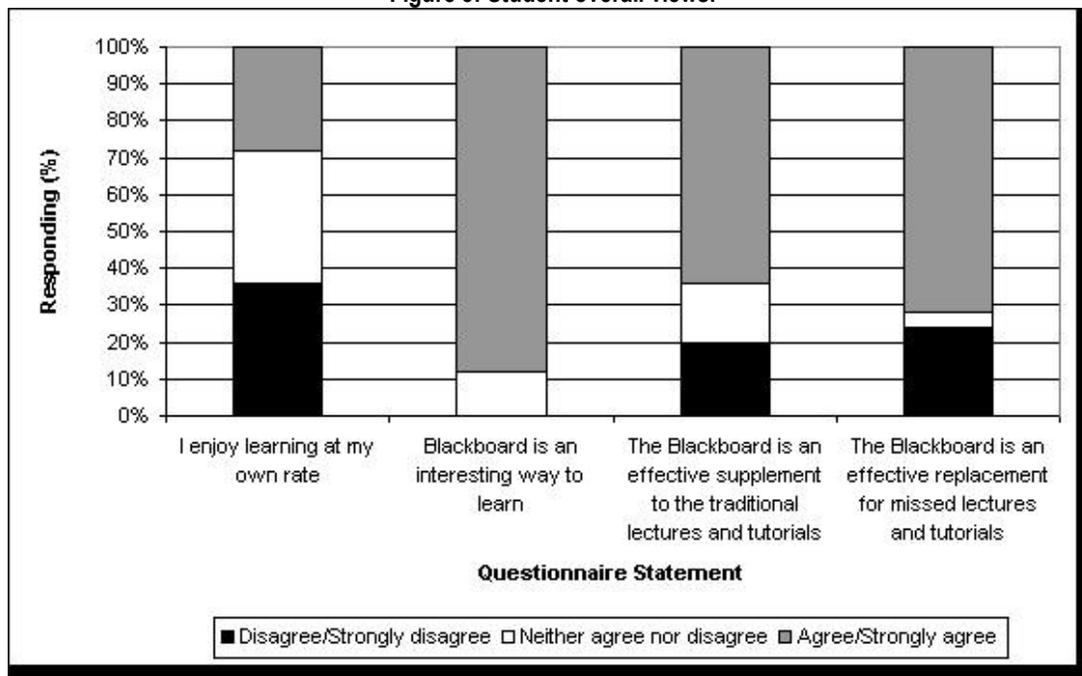
In terms of the module design and content evaluation, the students' viewed the material positively- with no student reporting it to be badly organised or lacking in interactivity (see figure 2). It was noticeable that this group rated the content as interesting and engaging (88% reporting), along with being well organised (96% reporting positive) and found the material interactive in nature. On the basis of the results presented here it is evident that the group was satisfied with the design and content of the module.

**Figure 2: Student perspective on module design and content**



When students' overall views were recorded it was notable that they found Blackboard an interesting way to learn (88%- see figure 3). They also found it an interesting way to learn and felt that Blackboard was an effective supplement and replacement for missed lectures. However, 36% did not enjoy learning at their own rate.

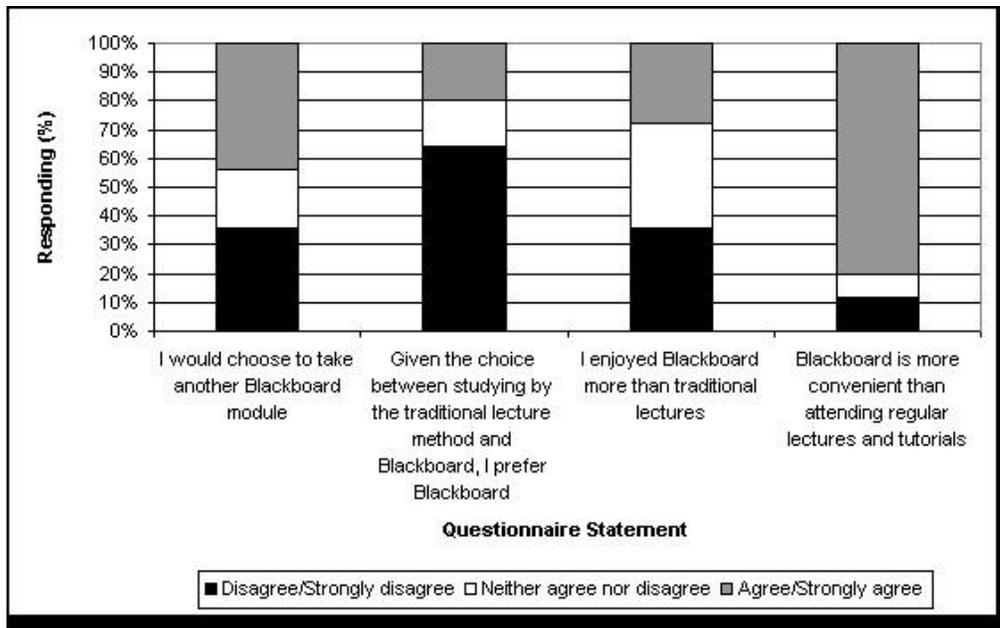
**Figure 3: Student overall views.**



When comparisons between the use of on-line teaching and face-to-face teaching there was more of a mixed picture (see figure 4). On the one hand, the majority (80%) considered Blackboard to be more convenient than attending regular lectures and

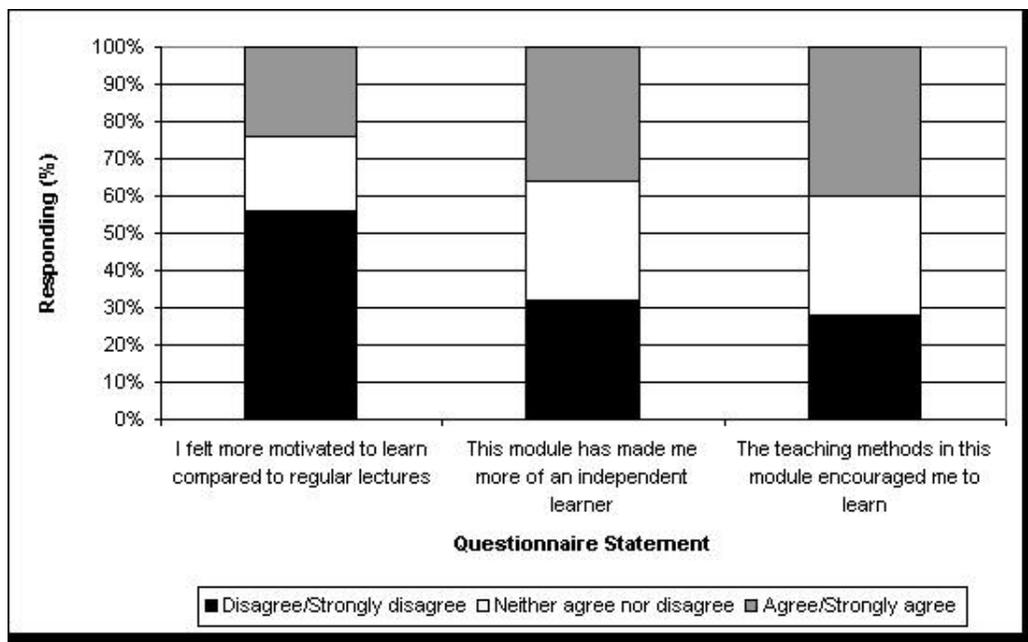
tutorials but given the choice between studying through Blackboard and through the traditional method, students would select the traditional method (64%). Similarly, they appeared to enjoy the traditional method slightly more than the Blackboard method.

**Figure 4: Student views on Comparison between Face-to-Face and online learning**



Finally, students were asked their views on the development of independent learning through the online material. It was evident (see figure 5) that students felt less motivated to learn through online learning, but felt that the module had made them more of an independent learner.

**Figure 5: Student views on development of independent learning**



## DISCUSSION

The results of this investigation reveal some interesting findings at a number of different levels that may be of interest in nutrition and dietetic education. Firstly, students performed no worse with on-line learning material compared to the previous cohort who did not access this material and had a traditional lecture based course. This finding is in line with other studies that generally suggest either improvement or limited difference between on-line and traditional courses.<sup>9, 19</sup> However, the analyses completed here was at a rather superficial level- it may be that different elements of performance are affected by mode of learning. For example, it has been found that there is no difference in factual knowledge between those taught through the traditional method and those taught through a Problem Based Learning (PBL) method. However, the PBL students performed significantly better in terms of deeper understanding.<sup>20</sup> The same may be true of online learning, and needs to be assessed in any future studies.

Second, students reported that they had a positive experience in terms of the technical capabilities, the features inherent in Blackboard, the academic support provided by the tutor and the module design and content. Additionally, students felt that Blackboard was more convenient than attending regular lectures, enjoyed learning at their own rate, found e-learning an interesting way to study and using a VLE made them more independent in their learning.

Despite this, few reported that they would choose this method over traditional lectures and most felt they learned more in a traditional lecture setting. Hence, there appears to be a contradiction: students valued e-learning, yet still retain an urge for traditional lectures. Why should there be this paradox? Some explanations can be uncovered from the qualitative comments also recorded. A recurring theme was that the students felt that Blackboard required commitment and active learning that lectures did not. For example, students found it "hard to motivate themselves" or "difficult to prioritise" and that it was "tempting to leave until the last minute" (a perspective supported by the questionnaire results). In the current climate, with a number of competing demands on students they may be happier to have a structured time around which other activities can be accommodated. Students may obviously need assistance so they can motivate themselves to complete such online activities. This has previously been highlighted as a potential drawback for on-line learning but one that is key to learning and together with intelligence, influences the success of a programme.<sup>9, 21, 22</sup> Therefore, the challenge is to provide students with an environment that enhances motivation, engages them but which also directs and rewards.

The use of on-line learning is certainly increasing, but there is a need for a greater examination of the material, and how this is presented to best engage with the learner.<sup>21</sup> Students are becoming more conversant with the experience of on-line learning and with this experience come expectations. Tutors and on-line developers are going to have to increase their skills in the development of interactive material in order to encourage students to use it, interact with it, and engage with it.

Obviously the individual methods described in this report have been employed within other settings and for other groups, although not extensively for dietetic and nutrition students. Clearly there is still some way to go in terms of enhancing motivation of students- although we believe that we have reported on a method that helps. However, there may be individual differences, which may be influential in online performance. For example, it may be related to student's learning style, or their expectations of teaching. Both of these variables may be linked to the way students, or groups of students, approach learning through an on-line medium.<sup>23</sup> There is no doubt that on-line teaching is going to become ever more prevalent throughout higher education in the UK and it is therefore important that the material is appropriately written and delivered. It may also be possible to identify student factors (e.g. attitudes and expectations) at the outset that could be modified, or accommodated through the on-line resource. Indeed, this could lead to a more tailored and appropriate pedagogy.

A final comment has to be made on the tutor's experience. Despite the enthusiasm and encouragement for the use of on-line learning, often mediated through a virtual learning environment, the potentially overwhelming preparation time should not be underestimated.<sup>24</sup> The development time associated with this material ran into several hundred hours and certainly in excess of the time required for the development of a traditional lecture based course. The time involved in learning new skills was also considerable and this has to be taken into account with the development time.

In conclusion, online education can offer a great deal to nutrition and dietetic education. However, there needs to be an appreciation of the amount of time taken to prepare the learning material that has to be tailored to student characteristics. Although we have reported here a first step, there still remains a quest for online material that can engage the student and move them towards successful independent learning.

## REFERENCES

1. Wade, W. (1994) Flexible learning and flexibility in course provision. In Martin, J. and Darby, J. (Eds) *The CTISS File. Flexible and Distance Learning, Vol. 17*. CTISS Publications, University of Oxford.
2. Biggs, J. (1999) *Teaching for Quality Learning at University*. Buckingham: Society for Research into Higher Education and Open University Press.
3. Frey, B.A. & Birnbaum, D.J. (2002) *Learners' Perceptions on the Value of PowerPoint in Lectures*. Pennsylvania USA: EDRS
4. Looms, P.O. (2002) Sailing into uncharted waters - the impact of new media use on education. In Williamson, A., Gunn, C., Young, A. & Clear, T. (Eds) *Winds of change in a sea of learning: Proceedings from the 19<sup>th</sup> annual conference of the Australasian Society for Computers in Learning in Tertiary Education (ASCILITE)*. 1, 5-16.
5. Butler, J.A. (1992) Use of teaching methods within the lecture format. *Medical Teacher*, 14, 11-25.
6. Husbands, C.T. (1996) Variations in students' evaluations of teachers' lecturing and small-group teaching: a study at the London School of Economics and Political Science. *Studies in Higher Education*, 22, 187-206.
7. Willcoxson, L. (1998) The impact of academics' learning and teaching preferences on their teaching practices: a pilot study. *Studies in Higher Education*, 23, 59-70.
8. Hartley, J. (1998) *Learning and Studying: A Research Perspective*. London: Routledge.
9. Waschull, S.B. (2001) The online delivery of psychology courses: Attrition, performance, and evaluation. *Teaching of Psychology*, 28, 143-147
10. Lewis, M.J., Davies, R., Jenkins, D. & Tait, M. (2001) A review of evaluative studies of computer-based learning in nursing education. *Nurse Education Today*, 21, 26-37
11. Buckley, K.M. (2003) Evaluation of classroom-based, web-enhanced, and web-based distance learning nutrition course for undergraduate nursing. *Nursing Education*, 42, 367-370
12. Steele, D.J., Palensky, J.E.J., Lynch, T.G., Lacy, N.L., Duffy, S.W. (2002) Learning preferences, computer attitudes, and student evaluation of computerised instruction. *Medical Education*, 36, 225-232
13. Sanders, D.W. and Morrison-Shelkar, A.I. (2001) Student attitudes towards web-enhanced instruction in an introductory biology course. *Journal of Computing in Education*, 33, 251-262
14. Lewis, M.J. (2003) Computer-assisted learning for teaching anatomy and physiology in subjects allied to medicine. *Medical Teacher*, 25, 204-206
15. Shah, Z., George, V.A., and Himburg, S.P. (1999) Computer-assisted education for dietetics students: A review of literature and selected software. *Journal of Nutrition Education*, 31, 255-261
16. Litchfield, R.E., Oakland, M.J., and Anderson, J.A. (2000) Improving dietetics education with interactive communication technology. *Journal of the American Dietetic Association*, 100, 1191-1194
17. Blackboard (2003) Blackboard e-Education Suite. <http://www.blackboard.com/products/index.htm> (accessed 29 May 2003)
18. Jolliffe A., Ritter J., and Stevens D. (2001) *The On-Line Learning Handbook*. London: Kogan Page
19. Dewhurst, D., MacLeoad, H., and Norris, T. (2000) Independent student learning aided by computers: an acceptable alternative to lectures? *Computers and Education*, 35, 223-241
20. Finch, P.M. (1999) The effect of problem-based learning on the academic performance of students studying podiatric medicine in Ontario. *Medical Education*, 33, 411-417
21. Stanton, N.A., Porter, L.J., Stroud, R. (2001) Bored with Point and Click? Theoretical perspectives on designing learning environments. *Innovations in Education and Teaching International*, 38, 175-182
22. Pintrich, P.R., Cross, D.R., Kozma, R.B., and McKeachie, W.J. (1986) Instructional Psychology. *Annual Review of Psychology*, 37, 611-651
23. Entwistle, N., McCune, V., and Housell, J. (2002) *Approaches to studying and perceptions of University Teaching-Learning Environments: Concepts, Measures and Preliminary Findings*. ETL Project: University of Edinburgh

Acknowledgement: The author wishes to thank UWIC's Learning and Teaching Support Unit, LTSN-psychology, and LTSN-Health Science and Practice for financial assistance in developing the on-line learning material.