E-Learning in Green Sciences: The case study of Wageningen University

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Abstract

Nowadays, Information and Communication Technology (ICT) is playing a great role in all aspects of human life, and education is not an exception. Wageningen university and Research Centre (Wageningen UR for short) is a leading international knowledge institute in the fields of nutrition and health, sustainable agricultural systems, environmental quality and processes of social change. The research presented in this paper is about the use of e-learning at the university. In this paper the following questions are raised:

 In Wageningen university:

What is the teachers' attitude toward e-learning?
Which features of e-learning do teachers often use?
What added value do teachers perceive in teaching in e-learning environments?
What are the barriers for implementing e-learning environments in learning process?

Results have shown among features and capabilities of the e-learning environment "presenting course material and literature", "PowerPoint presentation" and "e-mail" were most used and "chatting", "voice conferencing" and "Shared whiteboard" were least used.. Also teachers' attitude toward constructivism, computer-assisted learning, and web-based education correlated significantly with their use of e-learning environment and their belief in its added value.

Introduction

Nowadays, Information and Communication Technology (ICT) is playing a great role in all aspects of human life, and education is not an exception. During the last decades a huge number of researches have been done in the field of computers in education, implementing forms of computer-assisted learning, e-learning, web-based learning and on-line learning. Several studies have shown that technology in general and Internet and World Wide Web in particular can have positive effects on learning processes and outcomes. Lehtinen, Sinko & Hakkarainen (2001) stated that thousands of experimental studies on the educational impact of ICT have been carried out since the first attempts to assess the educational use of information technology in the early 1970's. These results have been summarized in dozens of review articles and meta-analyses. They then mentioned that their overview of these reviews, covering more than 1000 original experiments, allowed some general conclusions to be drawn. In summary, reviews and meta-analyses of the experiments showed that in ICT-based learning methods, students learned better and faster than students in control groups, and that these students also showed improved motivation and social interaction.

Wageningen University and Research Centre (Wageningen UR for short) is a leading international knowledge institute in the fields of nutrition and health, sustainable agricultural systems, environmental quality and processes of social change. The research institutes and university work together closely in five areas of expertise: Agro technology & Food, Animal, Environmental, Plant and Social Sciences. Current important research themes include food safety and the green environment.

The research presented in this paper is about the use of e-learning at Wageningen University. In this research the current situation of e-leaning at Wageningen University will be studied. Also the study reflects the teachers' attitudes toward e-learning and its added value for learning processes.

Materials and Methods

In this study the course descriptions in the study guide of 754 courses in all master programs of about 80 education units and group of Wageningen University were investigated. Then a

questionnaire was used to assess the teachers' opinion toward e-learning. The questionnaire was piloted to measure its reliability and to see whether it is sufficiently understandable for the target group or not. Also, its validity has been improved by discussing and consulting with five experts in the field. The final version of the questionnaire has been sent to teachers in the university. For the courses presenting by more than one teacher, the questionnaire has been sent to the main teacher or contact person. It was distributed to 517 teachers across different chair groups and departments in Master of Science program in the university. Usable responses were received from 178 teachers over all the chair groups which represented a response rate of 34 per cent.

The questionnaire consists of seven basic sections. The first part focuses on teachers' experience with e-learning whilst in the second part, attention has been paid to the constructivism characteristics for learning process. The third part is devoted to computer-assisted learning followed by a division about web-based education. Next part (fifth) of the questionnaire is about teachers' attitude toward effectiveness of computer-assisted learning and web-based education. In the sixth part of questionnaire, the features of e-learning environment that are used by teachers are taken into account. And finally, the last section is related to the items and factors that prevent using e-learning.

The survey questionnaire was developed by researcher and validated by consulting with experts in the field. Teachers were asked to indicate the extent of their agreement or disagreement with the statements on the questionnaire on a five point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Also they were asked to specify to what extent they use different features of e-learning environments in their teaching tasks and learning process, and to what extent they believe in added value of each feature. Also the instrument consisted of three scales that measured a) Trend toward constructivism (8 items, Cronbach's alpha= .748), b) Trend toward computer-assisted learning (5 items, Cronbach's alpha=.805), c) Trend toward web-based education (13 items, Cronbach's alpha=.799). As it is mentioned Cronbach's alpha for all constructs is larger than 0.70, indicating good construct reliability (Nunnally, 1978).

Due to the exploratory nature of this research, in addition to descriptive statistics the collected data are further analyzed using the Bivariate Correlation test. The Bivariate correlation test computes Pearson's correlation coefficient, and measures how variables are related. Pearson's correlation coefficient is a measure of linear association. Only significant correlation is reported.

In this paper the following questions are raised:In Wageningen University:

What is the teachers' attitude toward e-learning?
Which feature of e-learning do teachers often use?
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Results

Descriptive statistics for use of different features of e-learning environment are shown in table 1. The means range from 4.314 to 1.126 indicates that "Presenting of course material and literature", "PowerPoint presentation" and "e-mail" were most used and "chatting", "voice conferencing" and "Shared whiteboard" were least used .

Table1.

	Feature	SD	D	FA	A	SA	NOT	M	Sd
1	Presenting course material and literature	5.1	1.1	11.9	20.5	60.8	0.6	4.314	0.081
2	PowerPoint presentation	8.0	5.1	9.1	22.2	53.4	2.3	4.105	0.096

3	E-mail and mailing list	5.1	2.8	19.9	23.9	47.7	0.6	4.069	0.085
4	Course information	5.1	4.0	18.2	33.0	39.2	0.6	3.977	0.083
5	Course calendar and schedule	13.6	6.3	14.2	30.1	35.2	0.6	3.674	0.104
6	Course announcement and news	10.8	8.0	30.7	21.0	28.4	1.1	3.489	0.097
7	Course module	19.3	4.0	18.2	22.2	29.5	6.8	3.415	0.116
8	Non-interactive website	26.7	8.0	22.2	29.0	13.1	1.1	2.937	0.107
9	Specialized software	33.0	7.4	18.8	15.9	23.3	1.7	2.890	0.121
10	Off-line simulation programs	36.9	10.8	13.6	13.6	24.4	0.6	2.777	0.124
11	Link to other resources	29.0	13.6	27.8	14.2	13.6	1.7	2.694	0.106
12	Multi-media	38.1	17.0	30.1	6.8	4.5	3.4	2.200	0.090
13	Interactive website	48.3	19.9	17.0	6.3	7.4	1.1	2.035	0.096
14	Non-interactive CD	26.7	8.0	22.2	29.0	13.1	1.1	1.771	0.091
15	Online simulation programs	59.7	17.6	12.5	4.5	4.5	1.1	1.753	0.086
16	Computer-based test	74.4	9.1	6.3	5.7	3.4	1.1	1.529	0.081
17	Online collaboration	73.3	9.7	14.2	1.1	1.1	0.6	1.463	0.065
18	Interactive CD	76.1	9.1	9.1	1.1	1.7	2.8	1.386	0.064
19	Online discussion	75.0	13.6	10.2	0.6	0	0.6	1.360	0.052
20	Application sharing	79.5	5.1	5.7	2.8	1.1	5.7	1.313	0.063
21	Online test	85.8	4.5	4.5	1.1	2.8	1.1	1.287	0.064
22	Videoconferencing and net-meeting	80.7	9.7	7.4	1.1	0	1.1	1.282	0.049
23	Shared whiteboard	85.8	2.8	2.8	0.6	1.1	6.8	1.159	0.048
24	Voice conferencing	89.2	7.4	2.8	0	0	0.6	1.131	0.031
25	Chatting	89.8	7.4	1.7	0.6	0	0.6	1.126	0.032

Descriptive statistics for teachers' attitude toward "added value" of different features of e-learning environment are shown in table 2. The means range from 4.023 to 1.204.

Teachers believe that "presentation of course materials and literature", "course information" and "PowerPoint presentation" have most added value and "voice conferencing", "video conferencing" and "chatting" have least added value for their teaching tasks and students' learning processes.

Table 2.

		SD	D	FA	A	SA	NOT	M	Sd
1	Presenting course material and literature	5.7	4.5	16.5	26.7	44.9	1.7	4.023	0.088
2	Course information	5.1	5.7	19.3	39.8	28.4	1.7	3.821	0.082
3	PowerPoint presentation	8.0	5.7	17.6	33.0	33.5	2.3	3.802	0.092
4	E-mail and mailing list	11.4	11.4	17.0	24.4	33.5	2.3	3.587	0.104
5	Course calendar and schedule	11.4	7.4	17.0	38.6	23.9	1.7	3.572	0.096
6	Announcement and news	9.7	10.2	19.9	30.7	27.3	2.3	3.570	0.097
7	Course module	22.7	5.1	10.8	31.3	22.7	7.4	3.282	0.118
8	Simulation programs and software	21.0	9.7	17.6	17.6	27.8	6.3	3.230	0.119
9	Specialized software	22.7	7.4	18.8	19.9	24.4	6.8	3.171	0.118
10	Non-interactive website	21.6	14.2	30.1	21.6	7.4	5.1	2.778	0.097
11	Link to other resources	22.7	17.0	25.6	17.0	11.4	6.3	2.758	0.104
12	Multi-media	31.3	15.9	21.6	17.0	6.8	7.4	2.485	0.103
13	Online simulation programs and software	38.6	12.5	16.5	13.1	11.4	8.0	2.414	0.114
14	Interactive website	35.8	15.9	21.0	14.2	7.4	5.7	2.380	0.103
15	Non-interactive CD	51.7	13.1	17.0	9.1	0	9.1	1.819	0.084
16	Computer-based test	53.4	18.8	10.2	8.5	1.7	7.4	1.773	0.085
17	Online collaboration	46.6	31.3	5.7	9.7	0	6.8	1.768	0.075
18	Online discussion	49.4	26.7	9.1	7.4	0.6	6.8	1.744	0.075
19	Online test	55.7	19.3	6.3	8.0	1.1	9.7	1.667	0.081
20	Application sharing	56.8	12.5	10.8	6.3	1.1	12.5	1.656	0.083
21	Interactive CD	62.5	8.0	11.9	8.0	0	9.7	1.616	0.081
22	Shared whiteboard	66.5	6.8	4.0	2.3	1.7	18.8	1.350	0.072
23	Chatting	72.2	16.5	7.4	0	0	4.0	1.325	0.047
24	Video conferencing and net-meeting	76.1	9.7	6.3	2.8	0	5.1	1.323	0.057

		80.7	9.1	5.1	0	0	5.1	1.204	0.040
25	Voice conferencing								

Descriptive statistics for preventing items are shown in table 3. The means range from 1.3276 to 3.3372 indicating that teachers believe that their concerns about students' capability to use the e-learning environment and difficulty of working with it have most negative effect on their using of the environment.

Table 3.

	Items	not at all	a little	Mode-rately	high	Very high	I do not know	Mean	Sd
1	Because I think students can not use it properly.	58.5	15.3	15.3	4.0	0.6	6.3	1.3276	0.073
2	Because working with e-learning environments is difficult.	50.6	19.3	11.9	8.0	2.8	7.4	1.6424	0.089
3	Because I think e-learning is just only useful for distance learning.	53.4	10.8	17.0	8.5	3.4	6.8	1.8466	0.094
4	Because of technical infrastructure.	44.9	18.8	15.9	4.0	6.3	10.2	1.9024	0.097
5	Because I could not find any effective and useful software or websites for my course.	47.2	13.1	15.3	13.1	5.7	5.7	1.9747	0.103
6	Because e-learning has no added value for my course.	40.9	13.6	18.2	15.3	7.4	4.5	2.1205	0.106
7	Because I think using normal e-mail and search engines like Google is enough for my course.	42.6	11.9	18.2	13.6	9.1	4.5	2.3155	0.109
8	Because I have no time.	19.9	22.2	19.9	23.9	11.4	2.8	2.3155	0.101
9	Because I prefer face- to-face teaching.	17.6	8.5	18.8	29.0	23.9	2.3	2.8421	0.107

Results (Table 4) have shown that teachers attitude toward constructivism, computer-assisted learning, and web-based education correlated significantly with their use of e-learning environment and their belief in its added value. In addition, attitude toward constructivism was associated with computer-assisted learning and attitude toward web-based education.

Table 4

		Use of e-learning environment	Believe in added value of e-learning environment
1 Attitude (trend) toward constructivism	Pearson Correlation	0.154	.241
	Sig.(2-tailed)	0.041	0.001
2 Attitude (trend) toward computer-assisted learning	Pearson Correlation	0.421	0.400
	Sig.(2-tailed)	0.000	0.000
3 Attitude (trend) toward web-based education	Pearson Correlation	.360	0.511
	Sig.(2-tailed)	0.000	0.000

Conclusion

This study focused on the teachers' use and attitude toward different features of e-learning environment in Wageningen university. From the technological point of view, the University is well equipped for computer-mediated communication and has a well-known platform for e-learning. Teachers and students have access to high speed internet connection and they are supported and persuaded by a group of professional experts in CIO (Coordination ICT in Education).

Most teachers use common and superficial features of e-learning environment, and not only there is not sufficient use of online discussion and collaboration and interactive capabilities of environment, but also there is not a strong belief in their added value.

It seems necessary that university must implement some measures about overcoming and moderating the barriers of implanting it, the most important of which are managing and working with e-learning environment for both teachers and students.

Obviously, more emphasis on introducing learning theories and familiarizing teachers with constructivism and its principles in education and knowledge construction approach can pave the road of using ICT in long term.
It is taken for granted from analyzing the qualitative data of the research that teachers must be trained and assisted to develop an interactive and well-designed webpage. Furthermore teachers are not confident about their ability to develop and maintain a web-site and web-page for their course.

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