WORLD WIDE FLOWERS: A MULTIMEDIA CASE ON WORLD WIDE WEB

Eric van Heck °, Ajit Kambil +, Benn Konsynski *
Kees de Groot ʼ, Gert Klein ʼ, Han Smolenaars ʼ

° Tilburg University, Department of Information Systems and Auditing
Tilburg, The Netherlands, Fax: +31-13-4663377
Email: evanheck@kub.nl
+ New York University, Department of Information Systems
44 West 4th Street, New York, NY 10012, USA
* Emory University, Goizueta Business School
Rich Building #302, Atlanta, GA 30322, USA
ʼ Wageningen Agricultural University, Department of Agricultural Education
Hollandseweg 1, 6706 KN Wageningen, the Netherlands

Abstract: World Wide Flowers is a prototype of a multimedia teaching case accessible via World Wide Web. It uses new Information and Communication Technologies (ICT) for effective learning - active, cooperative, and with group problem solving. In this article the content, the development process and the evaluation results are presented. World Wide Flowers was used and evaluated twice by students in Information Management courses at Wageningen Agricultural University and Tilburg University. In general, students in Wageningen and Tilburg received World Wide Flowers enthusiastic. The topic, structure and the easiness to use were mentioned positively. Students criticized the amount of textual information, the videoclips, and the sociodrama in the case. Students came up with numerous suggestions of improvements, which will be incorporated in the next version of World Wide Flowers.

Keywords: Learning, Teaching Case, Multimedia, World Wide Web, Flower Industry.

1. INTRODUCTION

World Wide Flowers is a prototype of a multimedia teaching case accessible via World Wide Web. It's objective is to facilitate access to information that support effective knowledge construction and learning by students in Information Management education with the help of new Information and Communication Technologies (ICT). This multimedia teaching case is developed in 1995 by Tilburg University, New York University, Emory University, and Wageningen Agricultural University. It will be used in MBA and MSc courses worldwide.

The ICT revolution has not really yet impacted the core processes of learning and teaching in universities. Computer-aided instruction will evolve from simple textual question-answer applications to complex simulations and virtual environments that rely on realistic, user manipulated graphics, video sequences, static images, high fidelity sound and textual information (Bergeron and Obeid, 1995).

Recently new applications are developed which use new ICT to enhance collaborative learning. For an overview of the current situation in Dutch universities, see Pilot et al. (1995). The *World Wide Flowers* case is an example of how to use new ICT to improve collaborative learning capabilities. It tries to use ICT for effective learning - active, cooperative, and with group problem solving. For a detailed description of collaborative learning examples, see Alavi et al. (1995). Multimedia cases go beyond the traditional paper cases, for example those presented in Bots et al. (1992) and Konsynski et al. (1989a and b), by providing a much richer content.

The central questions of this article are: What are the characteristics of *World Wide Flowers*?; How do students, as end-users, perceive and evaluate *World Wide Flowers*?; How can *World Wide Flowers* be improved?

This article is organized as follows. In section 2 the content of the multimedia case is presented. In section 3 the development process of *World Wide Flowers* is described. *World Wide Flowers* was used and evaluated by students in courses at Wageningen Agricultural University and Tilburg University. In section 4 the results of the evaluation are presented and discussed. In section 5 conclusions are formulated.

2. CONTENT OF WORLD WIDE FLOWERS

In *World Wide Flowers* students learn in groups to analyze and evaluate the position of the Dutch flower auctions in the international flower market. They have to take into account the advantages and disadvantages of the newest ICT (Internet, multimedia), global competition and market transformations. Students re-engineer a Dutch flower auction towards an electronic market. The content of the case is based on research by Kambil and Van Heck (1995).

A demo of *World Wide Flowers* can be seen at: (http://infolabwww.kub.nl:2080 /wwflowers/). *World Wide Flowers* consists of five modules: (1) introduction, (2) description of case, (3) background data, (4) case questions, and (5) user's guide. In the 'introduction' module the objectives and subject of the case are explained. The case deals with the im-

pact and usage of ICT on the Dutch flower auctions and industry. Students have to analyze and design an electronic flower market. In the 'case description' module a meeting of the staff of Flower Auction Holland is described. Different roles in a sort of sociodrama are distinguished. In the module 'background data' one can find data on the world supply and demand of flowers, on the use of ICT in the flower industry, and on theoretical knowledge dealing with trading institutions and auction theory. In the module 'case questions' one has to answer relevant questions. Student groups have to prepare a research report and some groups have to present their design and conclusions. In the 'user's guide' module one can find instructions on how to use the multimedia case.

World Wide Flowers has a simple and elegant architecture. Dynamic data of the case are presented at World Wide Web pages and are regular updated. Static and large pieces of data, like videoclips, will be put on a CD-Rom. The CD-Rom will be used as marketing and funding instrument. Users of the case can use the regular Internet facilities, like email (for student - teacher messages), World Wide Web, telnet and ftp. For a good description of the Whole Internet, see Krol (1994), and for doing business on the Internet, see Cronin (1994). Links to other interesting flower sites on World Wide Web are incorporated. To use *World Wide Flowers* one need a multimedia PC with Internet connection.

3. DEVELOPMENT OF WORLD WIDE FLOWERS

World Wide Flowers was developed in the period between November 1994 and April 1995. The methodology used was prototyping. Prototyping is considered to be useful in uncertain design situations, in which close collaboration between designers and end-users is worthwhile to improve functional specifications, see Bots et al. (1990:402). The projectteam was interdisciplinary and incorporated people with content, education, and ICT knowledge, see Van Heck et al. (1994). In total, the project team spend 200 days to develop the first version of the prototype.

4. EVALUATION OF WORLD WIDE FLOWERS

World Wide Flowers was used and evaluated twice. The first time was in March 1995 at Wageningen Agricultural University. The second time was in November 1995 at Tilburg University. Students could fill in evaluation forms after they used *World Wide Flowers*. The main purpose of the evaluation was to investigate how students perceive and evaluate *World Wide Flowers* and how they think it can be improved. There was no evaluation of the effectiveness of the learning process itself, as for example was done for a collaborative telelearning technology by Alavi et al. (1995). Due to the first evaluation in Wageningen the prototype was improved by incorporating better questions, and by taking out report facilities by email. The second version of the prototype was used in Tilburg. In Tilburg also a paper version of the case description was given to the students. In Wageningen and Tilburg no adequate multimedia infrastructure was available in the practical rooms. The results of the questions 1 to 13 and 16 are presented in table 1.

Table 1: Evaluation results World Wide Flowers.

Q.	Evaluation aspect	Evaluation results First row: average results Wageningen Univ. (W) Second row: average results Tilburg University (T)	N
1.	The structure of WWF is clear.	fully disagree 1 2 3 4 5 fully agree	28 35
2.	The structure of the module 'description of the WWF case' is clear.	fully disagree fully agree	28 35
3.	The structure of the module 'background data' is clear.	fully disagree fully agree	28 35
4.	The graphics and slides in this multimedia case are useful.	fully disagree fully agree	28 35
5.	The videoclips in this multimedia case are useful.	fully disagree fully agree	16 21
6.	The multimedia case is easy to work with and to use.	fully disagree fully agree	28 35
7.	Sending answers by email to the teacher is easy.	fully disagree fully agree	28 --
8.	The sociodrama in the multimedia case is easy to play.	fully disagree fully agree	21 33
9.	The multimedia case is more instructive than a 'paper case'.	fully disagree fully agree	28 35
10.	In a multimedia case one can imagine oneself better and faster in a practical situation compared with a 'paper case'.	fully disagree fully agree	28 35
11.	The accompaniment of the multimedia case by the student-assistant and teacher was sufficient.	very insufficient very sufficient	28 34
12.	The lecture is useful to execute the multimedia case.	fully disagree fully agree	28 35
13.	The multimedia case costs more, less or the same amount of time than it is planned for.	much less much more	28 35
16.	What is the final mark you give to the multimedia case World Wide Flowers?	1 2 3 4 5 6 7 8 9 10	28 35

The results in table 1 indicate that:
. the respondents agree on the clearness of the case structure (Q1, Q2, and Q3);
. the respondents don't fully agree on the usefulness of the graphics and slides (Q4);
. the respondents don't fully agree on the usefulness of the videoclips (Q5). The low number of respondents were due to the fact that in Wageningen not all students could see the videoclips and in Tilburg there was no possibility to get the videoclips on the PC-screens;
. the respondents agree that this multimedia case is easy to work with and easy to use (Q6);
. in Wageningen there was the possibility to send the answers by email. Respondents find that easy to use (Q7);
. the respondents disagree about the easiness of playing the sociodrama in the case (Q8);
. the respondents of Wageningen disagree about the instructiveness of the case, the Tilburg respondents agree on it (Q9);
. the respondents don't fully agree with the statement that one can imagine oneself better and faster in a multimedia case (Q10);
.the respondents agree on the sufficientness of the student-assistant and teacher (Q11);
. the respondents were neutral about the usefulness of the lecture to execute the multimedia case (Q12);
. the respondents think that the multimedia case costs more time than planned for (Q13);
. the Wageningen respondents give *World Wide Flowers* an average final mark of 6.6 and the Tilburg respondents 7.0 (Q16).

Question 14 dealt with problems related to *World Wide Flowers*. Students could

specify these problems. Question 15 dealt with the question how to improve this multimedia case. Students in Wageningen had problems with the editing functions of the email facility, with the amount of textual information, and with the size of the groups. They came up with very useful improvements like to provide a paper version, to incorporate better questions dealing with the impact of Internet, and to improve editing facilities. These suggestions were built in the prototype used in Tilburg. Students in Tilburg complained about the amount of textual information, and the lack of multimedia and computer facilities. Students came up with very useful improvements like to incorporate intelligent retrieval and update systems, electronic World Wide Web based auctions, help functions, and collaborative telelearning technology.

5. CONCLUSIONS

The central questions of this article are:

What are the characteristics of *World Wide Flowers*?

World Wide Flowers is a prototype of a multimedia teaching case accessible via World Wide Web. It's objective is to facilitate access to information that support effective knowledge construction and learning.

How do students, as end-users, perceive and evaluate *World Wide Flowers*?

In general, students in Wageningen and Tilburg received *World Wide Flowers* enthusiastic. The topic, structure and the easiness to use were mentioned positively. Students were critical about the vi-

deoclips due to the fact that no adequate multimedia infrastructure in practical rooms in Wageningen and Tilburg was available. Students were also critical about the sociodrama built in the case. It seems to be not an effective mechanism.

How can *World Wide Flowers* be improved?

Students came up with numerous suggestions of improvements (incorporate intelligent retrieval and update systems, electronic World Wide Web based auctions, help functions, and collaborative telelearning technology). These suggested improvements will be incorporated in the next version of *World Wide Flowers*.

ACKNOWLEDGEMENTS

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