Scientific Report

ESF SCSS Exploratory Workshop on

Affective and Emotional Aspects of Human-Computer Interaction: Emphasis on Game-Based and Innovative Learning Approaches

23.-25. September 2004 in Pörtschach, Carinthia, Austria

Worksho Proposer

Maja Pivec, Ph.D.
FH JOANNEUM Gesellschaft mbH
(University of Applied Sciences JOANNEUM)
Alte Poststraße 152, A-8020 Graz
Tel.: +43 316 5453 8623
Fax. : +43 316 5453 8601
Email : maja.pivec@fh-joanneum.at
Homepage : http://www.fh-joanneum.at

Workshop co-organisers

Frank Thissen, Ph.D.
University of Applied Sciences
Stuttgart, Germany
thissen@hdm-stuttgart.de

Konrad Baumann, Ph.D.
University of Applied Sciences JOANNEUM,
Graz, Austria
konrad.baumann@fh-joanneum.at

1. Executive summary

The aim of the interdisciplinary workshop "Affective and Emotional Aspects of Human-Computer Interaction: Emphasis on Game-Based and Innovative Learning Approaches" is to define new research directions related to affective and emotional innovative ways of computer-supported learning and human computer interactions. The workshop is a unique opportunity to bring together on one hand scientists and research aspects from psychology, educational sciences, cognitive sciences, various aspects of communication and human computer interaction, interface design and computer science and on the other hand educators and game industry. The intensive exchange of research information from various research fields should open gates to evolutionary changes and new research directions in the technology supported learning.

Expected result of the intensive idea exchange co be carried out on the workshop is a list of characteristics of affective and learner centred adaptive learning environments and contents. Selected workshop contributions that reflect the state of the art and future research trends along with significant workshop results will be published in form of a book or special issue of a journal.

The workshop contributions are available from the workshop web site:
http://informations-design.fh-joanneum.at/images/esf_workshop_092004/index.htm

To provide opportunity to acquire new personal contacts workshop started with introduction of participants. Majority of the workshop work was carried out in a homogenous group. Workshop was based on very intensive information exchange and discussions. On one hand this was enabled due to limited number of participants, and on the other hand the schedule provided a necessary frame for it.
Only half a day work was done in a break out groups, which were previously defined by all participants. The workshop continued in three working groups focused on topics:
- ⇒ Design (of) emotions
- ⇒ Games and learning
- ⇒ Intercultural differences

The discussion of ***design of emotions*** concluded that design has always an emotional dimension (managing emotions). There are different applications and goals. The central question is What is the role of emotion?, with sub-questions in areas emotional demands, products, services, e.g. in education and art and performances where feeling of emotion stands in foreground.
When we talk of emotional design we have emotions of creators vs. emotions of users, meaning that the emotions of creators will be transformed in emotions of users. When we consider design of products vs. design of educational tools, we have to see what are the differences and requirements. Another issue is to look at emotions as additional channel of communication i.e. dynamics of emotions in communication.

Group that discussed ***games and learning*** focused on games as motivator to learn. The discussion was tackling questions as follows:
1)   *Does it?* Does games motivate learning; where the answer can be found in the market evolution.
2)   *How do games motivate?* Are there individual differences in acceptance of games? How does play experiences and emotional attachment contribute to motivation for learning? Can games be applied for problem-based learning? Can games be used for approach "pulling the knowledge" i.e. learning on demand versus pushing the knowledge to the learner? Can games contribute to innovation of learning in university and lifelong learning?

3)   *Could they de-motivate?* It is very difficult to achieve optimum challenge to have fun when playing game. In case that the game is too difficult, it can soon be a frustration of the player. Games could be motivator due to the emotional attachment of the player.

4)   *Who needs to be convinced?* Hence the acceptance of games for learning might vary in different cultures, one has to research that issue and produce guidelines that would be helpful for population, politics, teachers, pupils, game industry, customers, etc. to accepting game-based learning approach.

The group discussion on **intercultural differences** was focused on topics such as interface design from the viewpoint of different culture, interfaces that apologize and how are they evaluated in different cultures. Next research steps will be directed in trying out application of game environments for collaboration and empirical evaluation studies.

The ideas for further research and joint projects were tackling questions of intercultural diversity of web sites, in particular How do people from different cultures evaluate websites?, Are there culture specific qualities of web sites?, Can you find cultural dimensions in web sites?

Workshop results:
- ⇒ Unique opportunity to acquire new personal contacts by bringing together leading researchers and developers from different fields of science focusing on related research questions.
- ⇒ Exchange of the research ideas from the various scientific fields and outlining further research direction in the area of innovative human-computer interaction.
- ⇒ Workshop is a networking platform that initiated new joint research projects within Europe.
- ⇒ Workshop publication in a book form or special journal issue that gathers and presents the workshop papers and significant workshop results along with related interesting research reports (work in progress).
- ⇒ Workshop web page , that provides essential information about the workshop (background, aims and objectives of the workshop, workshop schedule, discussions, and reported results), offers possibility to download the presentation slides, list with full addresses of all participants.

Future steps, visions:
- ⇒ Distribute the executive summary and the workshop web page to various European and international networks that are focused on related issues
- ⇒ Apply for joint research project in research fields technology enhanced learning, game-based learning, gender and culture, design methods (e.g. IST, NEST, Minerva, e-Learning)
- ⇒ Establish world-wide network of people working together (e.g. joint research, joint lectures, etc.)
- ⇒ Make joint web site for fostering further research endeavours
- ⇒ Exchange of research reports, articles, products, questionnaires
- ⇒ Publish joint articles in journals that report joint research results
- ⇒ Exchange of researchers and students (Marie Curie, Minerva, World Bank, Unesco)

2.   Scientific content of the event

Background, Goals and Topics

Digital information technologies develop rapidly and play an important part in everyday life. They are actively implemented in the learning process, and used in formal (school, colleges, universities), informal (people to people or collaboration) and non-formal (online, distance) education.

Emotions are essential for the success of the human learning processes. This well-established idea has been confirmed by modern cognitive science, but is neglected in most of the models and implementations of computer-based and web-based learning. Very often e-Learning means the presentation of information and material on a very rational base. Communication between learners and trainers takes place in a much reduced form that ignores the fact that communication is always meta-communication as well. If human emotions are essential for human thinking and learning processes, virtual platforms and learning environments have to intensively consider this fact if they are to be successful. In particular, the graphical computer interface may not address humans as information processing machines, but needs to consider human emotion, passion and affects. Learning environments have to be more than simply a program, they have to be a form of rich media and to pursue whole didactic concepts.

The field of computer games has become an important economic factor, comparable to the music and film industry. Analysis of the current situation in the field of the game industry shows that at the same time, new multiplayer environments give opportunities for interaction for thousands of simultaneous players. In January 2003 a record number of 120,000 users simultaneously played EverQuest, an online role-playing game. Its producer SONY "celebrated" a huge success when 430,000 subscribers joined the game last year ('Times online'). EverQuest has a Command Central at their San Diego office where their 150 full-time customer service staff wanders about the virtual game world assisting players, creating scenarios, conflicts, etc. It means that there is a huge interest of people in "collaborative" playing.

The aim of this workshop is to bring together related research from different research fields such as psychology, educational sciences, cognitive sciences, various aspects of communication and human-computer interaction, user interface design and computer science thus initialising interdisciplinary projects that will explore fields of emotional learning settings, innovative human-computer interaction and game research combined with application development. This can support the educational and game industry to focus on research topics as game-based learning, game dramaturgy or interactive storytelling and to introduce these approaches into their products. The field of new HCI (human computer interface) paradigms as well as micro-games (UMTS and interactive set-top boxes) can be considered. The reported research in the workshop, on the workshop web page and in the workshop publication shall have influence on future developments.

Goals of the Workshop

There is substantial effort and research within various disciplines that tackles communicational issues, emotional aspects of human-computer interaction, communication agents and improvement of computer based learning settings and environments. Recently there have been started several initiatives within the EU that focus on game development and facilitating and improving the learning process due to introduction of digital games into learning and fostering innovative learning paradigms like game-based learning. Because of the multicultural European space and present cultural differences, there is a need to introduce an interdisciplinary and trans-

European component into the research and future development of innovative learning approaches and novel ways of affective and emotional human-computer interaction.

Topics of the Workshop:
- affective computing,
- emotional agents
- emotional learning settings,
- game-based learning,
- human-computer interaction
- human perception emulation,
- innovative learning approaches.

3.   Assessment of the results

Benefits and outcomes of the workshop:

Providing opportunity to acquire new personal contacts.
Workshop started with introduction of participants. Each had to bring a wanted poster that describes her / his person and areas of interest. Socialisation was also fostered with an introductory game. The evening concluded with a buffet where the participants continued to socialise.
Workshop was based on very intensive information exchange and discussions. On one hand this was enabled due to limited number of participants, and on the other hand the schedule provided a necessary frame for it. Majority of the workshop work was carried out in a homogenous group. Only half a day work was done in a break out groups, which were previously defined by all participants.

Workshop web page
Workshop web page contains all the essential information about the workshop (background, aims and objectives of the workshop, possibility to download the presentation slides, list with full addresses of all participants, pictures taken at the workshop).
Web page is hosted and updated by FH JOANNEUM. Web page address:
http://informations-design.fh-joanneum.at/images/esf_workshop_092004/index.htm

There web page information is linked from the ESF web site. Executive summary and link to the workshop page will be send to various networks of excellence that have related focus (e.g. COGAIN, CONVIVO, SIG-GLUE).

Exchange of the research ideas from the various scientific fields and outlining further research direction in the area of innovative human-computer interaction

Workshop offered a unique opportunity for leading researchers and developers from different fields of science to meet and report about their work. This workshop focused on topics such as affective computing, emotional agents, emotional learning settings, game-based learning, human-computer interaction, human perception emulation, innovative learning approaches.

The aim of the workshop was to define guidelines for innovative learning settings and promotion and development innovative approaches to learning and innovative learning environments. The workshop participants worked in three working groups focused on topics:
- ⇒ Design (of) emotions
- ⇒ Games and learning
- ⇒ Intercultural differences

Future steps, visions:
- ⇒ Exchange of research reports, articles, products, questionnaires
- ⇒ Distribute the executive summary and the workshop web page to various networks
- ⇒ Apply for joint research project (e.g. IST, NEST, Minerva, e-Learning)
- ⇒ Make joint web site for fostering further research endeavours
- ⇒ World-wide network of people working together (e.g. joint lectures, joint research)
- ⇒ Joint projects with funding: gender & culture, design methods
- ⇒ Publish joint articles in journals, e.g. JILID.org Journal of Intercultural Learning and Information Design, ect.

$\Rightarrow$ Exchange of students and researchers (Marie Curie, Minerva, World Bank, Unesco)

Publishing a book or a publication that gathers and presents the workshop papers and significant workshop results.

One of the workshop goals was to issue a workshop publication, either a special issue of a Journal or a book.
We contacted several publishers e.g. Springer Verlag, Elsevier, Pabst Verlag and IOS Press. Pabst Verlag and IOS Press showed interest in publishing the research. Hence IOS Press is well known we negotiate further with them. At the present we have 110 pages of research report. According to the IOS Press this is not enough for a book. Therefore we made another call for papers, to enlarge the contributions and extend the research information flow. Also this will enable other researchers, who showed interested in the workshop and were not able to attend, to send their contributions, so the publication will have broader range. The work is still in progress.
Among journals it was planned to contact J.UCS (Journal of Universal Computer Science, Springer Verlag) or International Journal of interactive Learning Research (AACE).

Workshop can be seen as networking platform that will enable new joint projects within Europe.
Based on the contacts and exchange of information about current research interests, several joint projects (D, A, TR), related workshops (D, A – workshop proposal to the network CONVIVO), bilateral (A – TR) or European (UK, A, NL, TR) project applications were carried out.

4.   Final programme

ESF Workshop

**Affective and Emotional Aspects of Human-Computer Interaction:
Emphasis on Game-Based and Innovative Learning Approaches**

Pörtschach am Wörthersee, Austria, 23rd – 25th of September

Workshop Schedule

Thursday, 23. 9. 2004
17:00 - Official opening (Introductory word by organisers; ESF representative)
17:30 - Who is who
19:00 – *Workshop Dinner (establishing new contacts and informal discussion)*

Friday, 24. 9. 2004
09:00 –10:30 impulse talks - innovative ways of learning, emotional communication
agents, emotional learning settings
10:30 – 11:00 *Coffee Break*
11:00 – 12:30 impulse talks
12:30 – 14:00 *Lunch*
14:00 – 15:30 impulse talks
15:30 – 16:00 *Coffee Break*
16:00 – 17:00 impulse talks
17:00 – 18:00 Discussion (Moderated discussion – definition of 3 questions or statements, to be
discussed on Saturday in smaller groups)

Saturday, 25. 9. 2004
9:00 – 12:30 Open workshop - Braking into interest groups, group work
12:30 – 14:00 *Lunch*
14:00 – 16:00 Presentation of the group work, Discussion
16:00 – 17:00 Conclusions, Publication, Joint Projects
17:00 End of the workshop

5. Final list of participants

Dietrich ALBERT
Cognitive Science Section
Department of Psychology
Karl-Franzens Universität - Graz
Universitaetsplatz 2
8010 Graz
Austria
Tel: +43 316 380 5118
Fax: +43 316 380 9806
Email: dietrich.albert@uni-graz.at

Elizabeth ANDRÉ
Institut für Informatik
Lehrstuhl fur Multimedia-Konzepte und ihre Anwendungen Universitat Augsburg
Eichleitnerstr. 30
86135 Augsburg
Germany
Tel: +49 821 598 2341
Fax: +49 821 598 2349
Email: andre@informatik.uni-augsburg.de

Konrad BAUMANN
Department of Information Design
University of Applied Sciences JOANNEUM
Alte Poststraße 152
8020 Graz
Austria
Tel: +43 316 5453 8615
Fax: +43 316 5453 8601
Email: konrad.baumann@fh-joanneum.at

Geertje BEKEBREDE
Faculty of Technology, Policy and Management
Delft University of Technology
P.O. Box 5015
Jaffalaan 5
2628 BX Delft
Netherlands
Email: g.bekebrede@tbm.tudelft.nl

Paul BRNA
Computer Based Learning Unit School of Informatics
Northumbria University
Room 118, Pandon Building
Camden Street
Newcastle upon Tyne NE2 1XE
United Kingdom
Tel: +44 113 233 4637
Email: Paul.Brna@unn.ac.uk

Michael BURMESTER
Ergonomics and Usability
Hochschule der Medien
University of Applied Sciences
Wolframstraße 32
70191 Stuttgart
Germany
Tel: +49 711 25706 101
Fax: +49 711 25706 300
Email: burmester@hdm-stuttgart.de

Kürsat ÇAGILTAY
Department of Computer Education and Instructional Technology
Middle East Technical University
06531 Ankara - Turkey
kursat@metu.edu.tr
http://www.metu.edu.tr/~kursat

Lizbeth GOODMAN
The SMARTlab Centre - connecting SMARTsystems, spaces & people
Central Saint Martins College of Art and Design
The University of the Arts
Southampton Row
London WC1B 4AP
United Kingdom
Tel: +44 207 514 8378
Fax: +44 207 514 8379
Email: lizbeth@smartlabcentre.com

Marc HASSENZAHL
AG Sozialpsychologie & Entscheidungsforschung
Institut für Psychologie
Technische Universität Darmstadt
Steubenplatz 12
64293 Darmstadt
Germany
Tel : +49 (0)6151 - 16-5214
Fax : +49 (0)6151 - 16-4614
Email: hassenzahl@psychologie.tu-darmstadt.de

Douglas LEITH
BusinessLab
Campus 3
Aberdeen Science and Technology Park
Aberdeen AB22 8GW
United Kingdom
Tel: +44 1224 332 227
Email: dleith@businesslab.co.uk

Manuela PAECHTER
Department of Psychology
University of Graz
Universitätsplatz 2

8010 Graz
Austria
Tel: +43 316 380 8542
Fax: +43 316 380 9808
Email: manuela.paechter@uni-graz.at

Ana PAIVA
INESC-ID and IST
Grupo de Agentes Inteligentes e Personagens SintÉticas
Tagus Park Av. Prof. Cavaco Silva
2780-990 Porto Salvo
Portugal
Tel: +351 21 310 02 19
Email: ana.paiva@gaips.inesc-id.pt

Thomas PFALLER
Illustree
Agentur für Neue Medien
Hofgasse 7/1
1050 Wien
Austria
Tel: +43 158 526 010
Fax: +43 158 526 011
Email: pfaller@illustree.at

Maja PIVEC
Department of Information Design
University of Applied Sciences JOANNEUM
Alte Poststraße 152
8020 Graz
Austria
Tel: +43 316 5453 8623
Fax: +43 316 5453 8601
Email: maja.pivec@fh-joanneum.at

Peter PURGATHOFER
Institut fur Gestaltungs- und Wirkungsforschung
Technische Universität Wien
Favoritenstrasse 9-11
1040 Wien
Austria
Tel: +431 588 011 8723
Fax: +43 588 011 8793
Email: purg@igw.tuwien.ac.at

Thomas RIST
Fachbereich Informatik
Fachhochschule Augsburg
Friedberger Straße 2a
Raum J 412
86161 Augsburg
Germany
Tel: +49 821 5586 249
Email: tr@rz.fh-augsburg.de

Jon SYKES
Glasgow Caledonian University
Cowcaddens Road
Scotland
Glasgow G4 0BA
United Kingdom
Email: jon.sykes@gcal.ac.uk

Frank THISSEN
Studiengang Informationsdesign
Hochschule der Medien
FH Stuttgart
Wolframstrasse 32
7019 Stuttgart
Germany
Tel: +49 711 25706 189
Email: thissen@hdmstuttgart.de

6.   Statistical information on participants

Age of the workshop participants can be approximately broken down as follows:

⇒   1/6 of participants was 30 – 35,
⇒   2/6 of participants was 35 - 40,
⇒   2/6 of participants was between 40 – 50 and the rest,
⇒   1/6 of participants was over 50 years

Details about occupation of the participants. Out of 16 participants:
⇒ 1 participant was a PhD student
⇒ 2 participants were game and educational game providers
⇒ 13 participants were researchers in various fields as follows:
o   games and emotions
o   game-based learning
o   e-learning, adaptation and personalisation
o   emotional agents
o   emotional (product) design
o   usability

Enclosed it the table that show countries of origin and number of participants from each of the countries.

Country	Number
Austria	6
Germany	5
UK	4
Portugal	1
Nederland	1
Turkey	1
Sum	18