Butterfly Metamorphosis: A Metaphor for the Maturation of Usability?

by Effie Law on behalf of Dominique Scapin, Gilbert Cockton, Mark Springett, Chris Stary, Philippe Palanque, and Ebba Hvannberg

In the warm afternoon of 8th June 2007 in ICT&S Centre (Salzburg, Austria), a group of HCI researchers kept their mind cool to discuss the past, present and future of usability. It was actually one of the sessions of our usually packed consortium meeting program. This so-called Reflection Session was our first, but surely would not be the last, attempt to review what we have (not yet) achieved to attain usability maturation. The review was not restricted to the ongoing scientific activities of the MAUSE project, but, taken it to a broader level, the work of the HCI community in general (i.e., we took not only an ant’s view on the ground but also a butterfly’s view in the air). A panel consisting of the four working group (WG) leaders, the dissemination leader, and the project vice-chair was formed with the project chair (yes, it’s me) sitting in the corner to moderate the proceeding. The six panelists had been given two questions to explore: “How far have we progressed?” and “How far do we still have to go?”, and each of them took turn to present their arguments. Unfortunately, the vice-chair (the only female in the panel, is gender mainstreaming a pressing issue in HCI?) did not make it because the time was running out (my fault of not putting her first in the line). Anyway, it is also my job, and pleasure, of course, to report what the panelists have expressed. The talks were stimulating and amusing (these two quality attributes are not correlated, are they?) Hope that I am able to recapitulate correctly the panelists’ views.

While still being puzzled by the ‘fan cy’ (‘sophisticated’ perhaps is the better term) diagram (Fig. 1) illustrating the integration of the four WGs of MAUSE, Dominique looked beyond this local view to address the usability maturity from a more global perspective by proposing three probes. Accordingly, we need (i) Better links between research centres, which provide knowledge and other resources, and industry/consulting partners, which provide case studies, feedback as well as follow-up; (ii) Appropriate tool supports for selecting methods, preparing evaluation studies, analyzing problem situations, usability reporting, and maintenance in the case of long-term studies; (iii) Better integration of practices and concepts from ergonomics and HCI in the real world, with special efforts for the involvement of standards and the certification of expertise.

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for methods, Mark suggested that expert craft skills, ranging from method comparisons to choice criteria, be documented in academic literature, that "method hashing" without the required knowledge of theoretical underpinnings be discouraged, and that method fragmentation be harmonized. Mark also addressed the expanded role of evaluation in requirements gathering as well as refinement, and in design-space exploration. Returning to the tale of two cultures, how usability, as one of design goals, can better fit with design culture remains unclear – a challenge not only for the audience of this plenum but for the HCI community as a whole.

Next in the line was Chris, who always speaks in a gentle tone and thus made a contrast to the hard methodological and definitional issues that he was addressing. He epitomized the past HCI as being reactive with respect to technological advances and as being active in generating a range of usability design and evaluation methods, which mostly are not (yet) standardized. The present HCI, as Chris described, is characterized by our struggles with the past to define the future, for instance, the definition of quality models and even usability maturity per se (or will there be xXML?), and by the shift to accept diversity. The future HCI, as Chris predicted, will focus on ontology building and method (re)engineer in terms of usability engineering, accessibility engineering, and user experience (UX). Further, Chris argued for shifting from explanatory to descriptive definitions, rendering quality as inherent property. He illustrated his idea with a simplified model of interaction constraints (Fig. 3). While the diagram itself is basically self-explanatory, a few words on "Effect" may be a bit helpful. Effects are classified as sensory, perceptual, motor, linguistic and cognitive; they are interconnected with certain causal relations, and manifested in various interaction modalities to different extents (i.e. effect rating). In a nutshell, this kind of unified framework typifies the recurrent attempt to integrate the fragmented work in the ever-expanding field of HCI. Perhaps Chris agrees on it.

It was then Philippe's turn. My past experiences alerted me that I would probably laugh (too loud) during his presentation, which is often humorous as well as nutritious. In the beginning of his talk, Philippe, however, used quite a serious tone to address the two questions concerning the progress we have made and still have to make. He remarked that the main point for MAUSE is to tackle the relatively easier challenges first, which has made the success of HCI and will continue to do so (I'd rather call those challenges salient rather than easier; they are easier to identify because of their saliency).

And what are they? (1) Interaction techniques as exemplified by direct manipulation and by multimodal interfaces for synergetic input/output; (2) Providing support to address competing factors, including safety, usability, reliability and certifi-ability (yes, we still have to do a lot with all these -flies); (3) Cost-benefits approach, especially for takeup-ability (watch out: a new -ity!). Philippe elaborated each of these areas with an example: (1) a formal model for clicking a button (the complexity grows rapidly when time, movement and threshold are taken into account), (2) the orthogonality of usability and reliability (these two attributes at their high level can enhance people's safety in the case of command & control systems, but lessen people’s safety in the case of destructive weapons), and (3) some bar charts illustrating that additional costs incurred by illy-centred development processes (such as user-centred, reliability-centred or safety-centred) will presumably be justified by the elimination of the additional costs due to poor usability, reliability or safety. Then was the climax - Philippe's extension of Gilbert's metaphor is open to interpretation as well. One thing I have not yet mentioned - the laughter. Apparently, the audiences were amused by the metamorphosis metaphor, but they are still musing over it: Will the caterpillar turn into a beautiful maturing butterflies are supposed to multiply and spread all over Europe (Don't ask where the origin is, it does not matter, does it?). Unlike Gilbert’s, Philippe's projection seems more optimistic and focuses on the chrysalis phase corresponding to the maturation of the field. Like Gilbert’s, Philippe's metaphor is open to interpretation as well. One thing I have not yet mentioned - the laughter. Apparently, the audiences were amused by the metamorphosis metaphor, but they are still musing over it: Will the caterpillar turn into a butterfly or a moth? What do you think?

**Fig. 3:** A simplified model of interaction constraints (adapted from Obrenovic et al., CACM, May 2007).

**Fig. 4.** Roadmap on maturing usability evaluation

| 2008 | Secure |
| 2015 | Usable |
| 2030 | Reliable |
| Today | Evolvable |
This was the question that leads me to BCHI at Université catholique de Louvain in Louvain-la-Neuve, Belgium. Model-Driven Architecture (MDA) has recently attracted interests of both research community and industry corporations. It specifies an automated process of developing interactive applications from high-level models to code generation. The goal of my STSM was assessing the level of usability covered by a set of USIXML model transformations to develop Multimodal Web UIs. According to USIXML, a platform-independent Task and Domain Model is transformed into one Abstract User Interface (AUI) model that is, in turn, transformed into one or more Concrete User Interface (CUI) models. The CUI are then transformed into code. This STSM can clarify the following questions: what usability criteria are covered in each step of the transformation process? What is the level of usability covered by modality? What is the level of usability covered by design option? What criteria are preserved in all the transformation process levels?

We evaluated each USIXML transformation rule according to its ability to preserve each one of the Bastien & Scapin’s ergonomic criteria. A set of 98 transformation rules have been evaluated by three evaluators using a linear model (all criteria have the same weight). The individual assessments of this first evaluation were consolidated into an agreed criteria assessment. During this STSM, we also launched an experiment to evaluate the level of usability covered by a set of selected USIXML transformation rules. Twenty-six external evaluators were recruited to assess the stability of the results obtained with the first evaluation. This is an ongoing work, and if you are interested in participating in this experiment please contact me at (sabrahao@dsic.upv.es). Your participation will be greatly appreciated!

Finally, I would like to give big thanks to Jean Vanderdonckt and Adrian Stanciulescu for the very interesting and productive working sessions! Also thanks to all the BCHI team. Our cooperation continues beyond my stay in Louvain-la-Neuve - we are currently organizing a workshop at the British HCI 2007 conference about Usability Evaluation of Multimodal User Interfaces. Thanks to MAUSE for making all this possible!

**COST294-MAUSE Book Project**

The COST294-MAUSE book project was stimulated by the event International COST294 Workshop on User Interface Quality Models, 12th -13th September 2005, in Rome, Italy. Enthusiastic and enlightening discussions in the Workshop have led to the conceptualization of the overarching theme as well as the title of the book “Maturing Usability: Quality in Software, Interaction and Value”, Effie Lai-Chong Law, Ebba Thora Hvannberg & Gilbert Cockton (Eds.), Springer.

The main objective is to bring together, in one book, contributions on the topic of usability in connection to quality in software, interaction and value. A balance between theoretical and empirical work is to be thrived for. Foreword and sixteen chapters are authored by 30 contributors of diverse backgrounds coming from 14 countries in Europe and North America. The book will be of great value to usability researchers and practitioners and to the Human-Computer Interaction (HCI) community at large. The target audience is everyone who is interested in exploring issues in usability and HCI. They are graduate and postgraduate students, faculty members, industrial partners, and members of standardization bodies and other similar initiatives.

The book consists of three major parts, each of which is underpinned by some specific ideas and concerns. For software to be of high quality, it needs to meet specified requirements or to show emerging qualities that satisfy different stakeholders with different backgrounds, needs and goals. Consequently, complex factors and measures are involved in evaluating qualities of software systems. Contributions for this book have been screen by a scientific committee which provided expert consultations and opinions on the quality of individual chapters, thereby ensuring the topics being tackled in a scientific and professional manner. All 27 members of the Scientific Committee are leading HCI researchers, specializing in usability evaluation, software quality engineering and software design and contributing substantially to the advancement of the field of HCI.
New Directions in the Usability Research in Romania

Horia Pitaru & Daniela Onaca, Babes-Bolyai University, Romania

During the last decades Romanian researchers in Human Computer Interaction (RoCHI – ACM SIGCHI) have showed a constant interest in the usability field. One of the main focus points of the Psychology Department research group at the Babes-Bolyai University, Cluj-Napoca has been the usability of interactive systems and their implementation within organization. As the usability assessment during the design process is still an issue in Romania, the main tools used are usability questionnaires. Our efforts are directed both into the building of assessment questionnaires and into the adaptation of existing tools to our Romanian context.

Recently, we have started the adaptation of the Intranet Satisfaction Questionnaire (ISQ) developed by Javier Bargas-Avila and Lotscher (2006). Preliminary data collected from two Romanian organizations show that the adaptation was successfully - the internal consistency coefficient is similar to the ones obtained by the authors (Alpha = .90, N=130) and also the factorial structure. Moreover, we were interested in seeing how the intranet implementation relates to other important job-related processes like job satisfaction, organizational emotions or organizational culture. Our results show that the organizational culture and values can influence the activation of certain use needs (market-type culture enhances the manipulation needs in the detriment of identification, stimulation or evocation needs and functionality can explain most of the satisfaction). Intranet efficiency correlates with general job satisfaction (r=.32) and satisfaction is related to positive affectivity as a state and trait (r=.43; r=.36) suggesting that the intranet can represent a job satisfaction facet and that positive affectivity is related to the way we internally evaluate the interactive system. For the future, we intend to extend our research in the field of interactive systems in organizations, their usability and relation to other important organizational processes in order to increase the advantages of a proper implementation.

About COST294-MAUSE

COST294-MAUSE is a usability research community run under the auspices of COST (http://cost.cordis.lu/). MAUSE is the acronym for “Towards the MAturation of Information Technology Usability Evaluation”. The ultimate goal of COST294-MAUSE is to bring more science to bear on Usability Evaluation Methods (UEMs) development, evaluation, and comparison. The results will be of benefit to industry and educators, thus leading to increased competitiveness of European industry and better products for the public. The major rationale for our collaboration is that we share the vision to improve the research as well as practical work on usability. Existing problems in usability research, from basic to intricate, need to be resolved through extensive cooperation within a community of usability professionals and researchers with diversified backgrounds. In fact, usability research has been rather fragmented and scattered in a variety of industrial and academic institutions. We want to coordinate these distributed efforts to best utilize the resources available, and to mutually stimulate and enrich ongoing research activities. COST294-MAUSE is a community committed to address this challenge.

Screenshot of COST294-MAUSE Videoconferences with Flashmeeting (http://flashmeeting.open.ac.uk/)

Upcoming COST294-MAUSE Events

4th Open COST294-MAUSE workshop: Downstream Utility: The Good, the Bad, and the Utterly Useless Usability Evaluation Feedback
Location: Toulouse, France
Contact: Effie Law (law@tik.ee.ethz.ch)
Date: November 6, 2007

7th Management Committee + WG meeting
Location: Toulouse, France
Organizers: Philippe Palanque & Marco Winckler
Contact: Marco Winckler (winckler@irit.fr)
Date: November 7, 2007

Related Events

Location: Rio de Janeiro, Brazil
Date: September 10-11, 2007
Web: http://cost294.org/uess2007/

UIST 2007: ACM Symposium on User Interface Software and Technology
Location: Newport, USA
Date: October 7-10, 2007
Web: http://www.acm.org/uir/uir2007/

TAMODIA 2007: 6th International Workshop on Task Models and Diagrams
Location: Toulouse, France
Date: November 7-9, 2007
Web: http://lihs.irit.fr/tamodia2007/

IWWUA: 1st International Workshop on Web Usability and Accessibility (WISE 2007 workshop)
Location: Nancy, France
Date: December 3, 2007
Web: http://gplsi.dlsi.ua.es/congresos/iwwua07/

CHI 2008
Location: Florence, Italy
Date: April 5-10, 2008
Web: http://www.chi2008.org/

Evaluating User Experiences in Games
(CHI 2008 workshop)
Web: http://workshops.ics.sbq.ac.at/chi2008/

BELIV 2008: Beyond time and errors: novel evaluation methods for Information Visualization (CHI 2008 workshop)
Web: http://www.dis.uniroma1.it/~beliv08/

AVI 2008: Advanced Visual Interfaces (ACM SIG-CHI)
Location: Napoli, Italy
Date: May 28-30, 2008
Web: http://hci.uniroma1.it/avi2008/

DSVIS 2008: Design, Specification and Verification of Interactive Systems
Location: Kingston, Canada
Date: June 2008
Web: http://www.cs.queensu.ca/dsvi2008/

CADUI 2008: Computer-Aided Design of User Interfaces
Location: Albacete, Spain
Web: http://cadui2008.albacete.org/

HCSE 2008: Working Conference on Human-Centred Software Engineering (IFIP WG 13.2)
Location: Pisa, Italy
Date: September 25-26, 2008

COST294-MAUSE Management Committee

Effie Lai-Chong Law & Ebba T. Hvannberg
law@tik.ee.ethz.ch, ebbath@iri.fr
ETH Zürich, Institute TIK
Gloriastrasse 35
8092 Zürich, Switzerland

COST294-MAUSE Dissemination Activity

Marco Winckler & Philippe Palanque
[ winckler, palanque ]@irit.fr
LIIS-IRIT, Université Toulouse 3
118 Route de Narbonne
31062 Toulouse Cedex 9, France