

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 we have 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 'fancy' ('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.

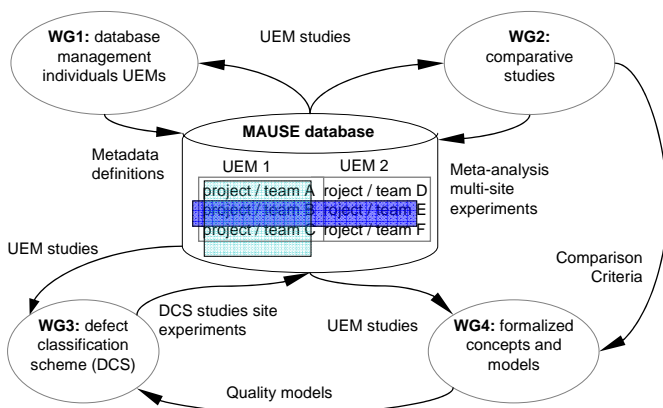


Fig. 1: The integration model of the 4 MAUSE WGs

Gilbert twisted the atmosphere to be more playful, though the seriousness of his messages remained intact. He started his story with his favourite creature – caterpillar, which was stuffed with too much food. It seemed that he analogized it to the infancy stage of the usability research when it tended to assimilate as well as accommodate theories, models and frameworks from a wide range of disciplines. The caterpillar emerged from being a gluttonous, slow and ugly pest to a fertile, agile and beautiful object, attracting a lot of people's attention.



Fig. 2: Caterpillar → Chrysalis → Butterfly

This description seems mapping quite well with the historical development of HCI and usability, from the influence of human factors engineering in 1970s through cognitive psychology in 1980s and participatory/contextual approaches in 1990s to today's socio-technical-economic eclectic approaches. Then came a provocative or tragic turn of the story – Gilbert declared the death of the butterfly after it lays eggs. This metaphor is, however, open to interpretation. But, there is an after-life! Gilbert then shared his vision about what lies beyond usability – the notion of worth-processing evaluation, from means to ends. It implies measuring impact against relevant and required thresholds using appropriate robust measures and instruments in the right place at the right time. It also entails progressive achievement from product attributes through usage consequences to achieved value. Gilbert advanced some radical claims that usability is not a value, only one of many human accelerants or retardants in socio-digital systems, and that it is wasteful, unhelpful and even impossible to just focus on ISO 9241-11. With the demise of the appealing object that we have pursued and even been proud of, are we then facing an identity crisis? Gilbert reassured us that we are experts of human measurement/instrumentation, of interaction, and of study planning, and advised us to communicate as well as exploit such expertise. Then what about the maturity? Gilbert's short answer is "pure usability is useless, and will mature out of existence" (it sounds a bit philosophical, doesn't it?), and his long answer can be found in his chapter in the forthcoming book "Maturing Usability: Quality in Software, Interaction and Value" (details see elsewhere in this Newsletter).

Mark, with his a bit more formal tone, shifted the atmosphere of the session to be a bit more serious as well. First, he identified three compelling issues in the current development of HCI: (i) A tale of two cultures – the interface between usability evaluation and design remains problematic, and the gap seems even widened with emerging technologies such as interactive TV; (ii) A black art – for many, method selection and deployment seem arbitrary, e.g., some evidence of naïve or uninformed selection in the new media industry; (iii) Impoverished model of evaluation research – this, unfortunately, is held by a surprising number of HCI academics, despite the fact that evaluation and requirements engineering are moving closer. To address his concerns →

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 back 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(verse)-engineering 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 show that certain types of research can (and should) be done in the field of usability, via structuring design space, performing long-term research gathering information and comparing approaches, and evaluating previous work (which is exactly what MAUSE objectives are about). He went on to claim that our future work would essentially be built on our favourite domains, namely standards GUIs and Web applications, and on our conventional strategy – tackling the relatively easier

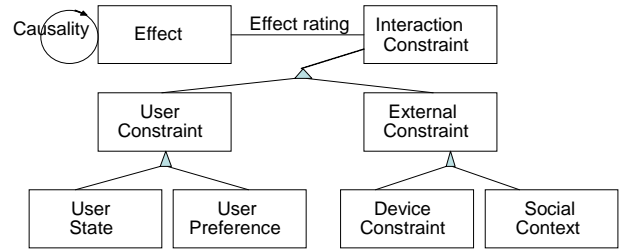


Fig. 3: A simplified model of interaction constraints (adapted from Obrenovic et al., CACM, May 2007).

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 synergistic input/output; (2) Providing support to address competing factors, including safety, usability, reliability and certify-ability (yes, we still have to do a lot with all these -ities); (3) Cost-benefits approach, especially for take-up-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 usability-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 metamorphosis. SURE it is exciting. Philippe portrayed with a fascinating diagram (Fig. 4) how the eggs of the four "-ity beasts" - Security, Usability, Reliability and Evolvability – metamorphose over time from now till 2030! Can you believe that there won't be any usability problem in less than 25 years? (Don't forget that we've already researched on usability for more than 25 years). This story does not end at this point. Those 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? ■

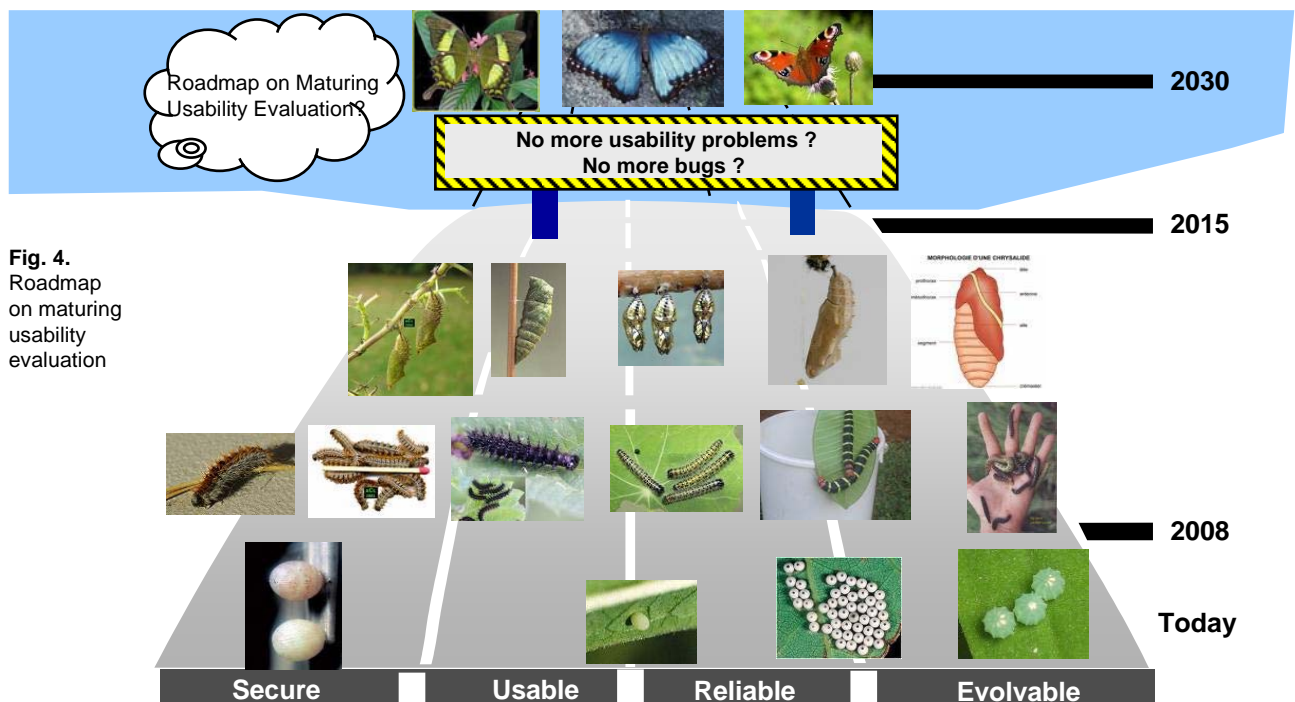


Fig. 4. Roadmap on maturing usability evaluation

Silvia Abrahão

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Can MDA-based methods ensure a guaranteed level of usability through model transformations?

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 Vanderdonck and Adrian Stanculescu 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!

Lenja Sorokin

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Integrating Usability Evaluation into the Development Process of Flex RIAs

Lately there is a growing market for Rich Internet Applications (RIA) with a strong focus on usability. Adobe® Flex™, which enables the creation of files for the Flash Player, is one of the most promising environments for this purpose. However existing tools, especially academic proposals, for usability evaluation of Web applications focus on HTML websites and do not allow to evaluate Flash sites. Another restriction is that most of the proposals are product-oriented and therefore do not support the integration of usability at an early stage of the development process.

To approach these challenges, Lenja Sorokin, from the Automation in Usability Engineering (AUE) group at Augsburg University of Applied Sciences, spent one month at the Universidad de Castilla-La Mancha (Albacete, Spain). Lenja Sorokin, like other interactive system developers, frequently employs Flash applications in her projects thus realizing the lack of appropriate evaluation tools. In Albacete she was working together with Francisco Montero from the LoUISE Research Group, whose main focus is on model driven development of user interfaces.

The result of this collaboration is a framework, which integrates usability evaluation in the development process of Flex RIAs using task models and standardized task-based metrics (ISO 9126-4 and ISO 9241-11). The details of the framework were elaborated and some major parts were implemented, so that finally a case study could be conducted to show its applicability.

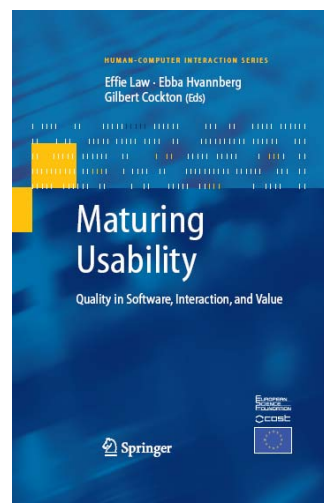
Currently a publication of the results is under way and, as the project contains promising areas for future research, the establishment of a permanent cooperation is planned. The contributors of the project are much obliged to COST and the Universidad de Castilla-La Mancha, as this STSM was a great starting point, which brought together two different perspectives and enabled a prolific collaboration. Special thanks to Francisco Montero, who made this a very pleasant and enlightening stay!

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 books have been screened 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.



Maturing Usability: Quality in Software, Interaction and Value

Law, E., Hvannberg, E., Cockton, G. (Eds.)
Springer - Human-Computer Interaction
Series. 2007. ISBN: 978-1-84628-940-8

New Directions in the Usability Research in Romania

Horia Pitariu & 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

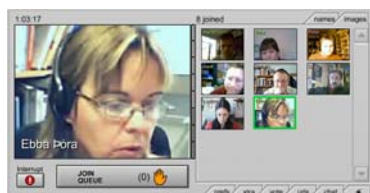
COST294-MAUSE is a usability research community run under the auspices of COST (<http://cost.cordis.lu/>). MAUSE is the acronym for "*Towards the MAturation of Information Technology USability Evaluation*". The ultimate goal of COST294-MAUSE is to bring more science to bear on Usability Evaluation Methods (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 co-operation 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/>)

Ebba Hvannberg, February 6th 2007 ▶



Effie Law, July 3rd 2007 ▶



◀ Mark Springett, April 16th 2007



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

UESS 2007: Usability Evaluation of Social Software: Challenges and Solutions (INTERACT 2007 workshop)

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/uist/uist2007/>

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 in

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.icts.sbg.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/dsvvis2008/>

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

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