IST PROGRAMME

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End-User Development - Empowering people to flexibly employ advanced information and communication technology

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D2.2 Industrial Forum Report

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Summary

This document describes the EUD-Net industrial forum. Throughout the duration of the network, industrialists and researchers have met to foster collaboration on the development and diffusion of End-User Development technologies. The ultimate realisation has been that EUD is more than a technological issue and requires increased research input from commerce, regulatory authorities and the non-IT research community. The results of this forum led to the development of the industrial action plan, deliverable 2.1.

Industrial Forum Report

Contents

1. Aims and Objectives

The EUD-Net industrial forum brought together industrialists and academic researchers to pursue the goal of forwarding the adoption of end-user development. In combining the traditionally held "Blue Skies" approach of academic research with the pragmatic market-based view held by industrialists we can improve the understanding of the role EUD can play in society. It allows researchers to focus their view on demanded application domains while giving the eventual providers and major users of these technologies an early look at upstream developments. In order to exploit this synergy we have had a network composition that has included a high proportion of industrial members, adding new members as the network progressed, as well as consulting those not directly involved in the network through a questionnaire survey.

2. Forum Participation and Workshops

This section lists the companies and organisations involved in the industrial forum and describes the key findings from each workshop meeting.

2.1 Workshop Participants

The EUD-Net industrial forum was made up of both network members and associates of network members. The following is a list of organisations that participated in at least one EUD-Net event. Industrialists where drawn from a variety of industrial sectors.

Philips
Siemens Business Services
Think3
Telecom Italia
SAP
British Telecom
Fujitsu
RNIB

Xansa
NCC
Abbey National.

2.2 Pisa - CNR

The Pisa workshop served the important role of developing a common vocabulary for discussion across the network. It gave the industrialists the opportunity to present their organisations initial views on end-user development. This demonstrated that each firm had different connotations of what EUD was and its potential effect on their products and services. The discussions looked at current industrial practices and market needs in consumer electronics, telecommunication, computer-aided design and enterprise configuration.

There seemed to be no common use of the terms: end-user development, end-user programming, novice programming or end-user tailorability by the industrialists. Instead their concerns were expressed as three market needs:
- Increasing the usability of devices.
- Automation of repetitive yet complex tasks.
- Providing end-users with the ability to adapt systems to individual preferences.

It was agreed by the forum that state of the art EUD techniques demonstrated promising routes to fulfilling these needs.

2.3 Eindhoven - Philips Research

Philips Research hosted the second meeting of the network at HomeLab, their ambient intelligence research facility. The emphasis of industrial discussion moved towards the consumer and industrial appliance requirements for EUD. The tour of the HomeLab helped the network to grasp the implications for EUD from the vision of ambient intelligence at the home environment.

This reinforced the feeling that the requirements for EUD in the home domain will be different to industrial and organisational settings. In the work domain organisational processes and controls can be used to assure software quality, and educate the user to a certain level, in the domestic settings the self-motivation of the user becomes paramount. One idea to motivate the user in the domestic setting would be to make the learning experience for the user (and technology in high system initiative systems) fun, this could be done through the use of games. The following requirements for EUD for consumer devices were identified:

User Requirements for Consumer Device Market
- Make it fun to program.
- Keep the device simple.
- Provide appropriate level of feedback.

Functional Requirements for Consumer Device Market
- Provide comprehensible domain model.

- Allow user to define own classes of information [i.e. categories of TV programs] in PIM (Personal Information Management) systems.
- Provide means to simulate results.

After the Eindhoven workshop it was decided to hold an additional seminar in Manchester and that concentrating specifically on industrial requirements would be needed. A web site was created to publicise the event which was opened up to participants from outside of the network.

2.4 Manchester - UMIST

The theme of the Manchester workshop was to investigate barriers to the uptake of EUD methods and technologies in large enterprises. It looked particularly at the current and future impact of EUD on organisations processes, policies and structures. The workshop was organised jointly with ISEN (Interdisciplinary Software Engineering) an EPSRC (Engineering and Physical Sciences Research Council) Network of Excellence which helped the discussion to be opened up to a larger number of industrialists. Participants were given an overview of the state of the art in EUD by invited academics and two separate groups were used to explore the issues through structured discussions. The Manchester workshop yielded four areas of concern for EUD within large organisations:

1. Managerial acceptance of end-user development, looking to concerns of strategic risk, operational accountability and the cost benefit to the organisation.

  - There is a need for enterprise risk models, in order that areas suitable for EUD can be identified within organisations. Without the existence of a "Play Pen" approach it was felt that end-users could underestimate the complexity of what they are trying to achieve and possibly do harm to the organisation.

  - EUD could create a power shift and effect ownership in the workplace by creating unnecessary barriers to information access. Those who previously had informal access via conventional means may lose this if they were not designated as an end-user developer.

2. Quality of end-user developed artefacts

  - Greater effort is required on both technical and social aspects of testing. From the transferring of existing cultures of testing of the domain experts into their EUD work. Thorough to the use of novel auditing and interactive testing technologies. The borrowing and adoption of development methodologies from professional software engineering was also proposed as way of introducing ruggedness to EUD.

3. The worker as an end-user developer. The human resource implications of EUD and the cost benefit to the individual.

- Processes and polices are needed to ensure developers are both accountable for the artefacts they produce as well as being recognised for the extra work done. It was felt this duality of accountability and recognition for end-user development was vital for acceptance by both management and worker.

4. Perceptions of current and future markets for EUD

- There is a need to learn the lesson of related and complementary technologies. Large sums of research money have been spent on component research but it has only been accepted by niche markets. In the same vane fourth generation languages were proposed for the use of end-users but instead they are now marketed to and used predominantly by software professionals as productivity aids.

2.5 Bonn - FIT

The final meeting of the forum provided an opportunity to confirm the ideas generated over the lifetime of the network and to plan future industrial collaboration. SAP presented their view of end-user development giving an insight into how ERP vendors are beginning to embrace EUD as an enhancement to their products.

A panel was convened of representatives from think3, SAP, Philips and Telecom Italia. During the panel the following points were made.

- Telecom Italia considers their most important market to be the mass market. Therefore the average end-user must be able to configure the telephone terminal and does not have time to continuously learn new interaction styles. This requires stability of the mental model between versions of EUD tools. EUD on phone terminals must also not become like a modern car where we appear to have moved backwards with regards to ease of interaction. Once you could change the clock buy physically turning the dial but now you need the instruction manual and complex software. Telecom Italia felt that this was because of the use of poor metaphors; the inappropriate metaphor of the Personal Computer had become the metaphor for programming a car systems.

- In the consumer electronics marketplace Philips relayed that they had problems with context aware devices interfering with the rituals of users. The systems were inferring users' intentions. It is believed wrongly. Philips therefore believes that tasks that are essentially part of ritual should not be automated.

- Philips also raised the issue that even with user centric design approach, designers should not be worried about providing the

underlying metaphor themselves. If it is a good metaphor does it matter if it came from the user or the designer?

- Think3's interest in EUD lies in automating complex but highly repetitive tasks, such as modifying curves to be pleasing to the eye. They feel that the solution to this problem probably lies in the programming by example/demonstration arena of EUD tools.

The following risks of EUD raised by SAP were discussed:
- Simplification is the goal. EUD may actually make things more complicated.
- Be aware it is hard to motivate people to change work practices.
- Collaboration is always going to be complicated.
- EUD could create redundant efforts.
- Quality may be bad and good.
- End-users do not recognise that their problem is everyone's problem.
- Recognise the tension between standardisation and improvisation

3. Industrial Perceptions Questionnaire

In order to gain the input from outside the network and those not able to attend seminars and workshops a questionnaire was developed to measure the perception of industry towards a number of EUD themes.

3.1 Questionnaire Participants

The questionnaire survey had over 40 respondents, drawn from a wider selection of organisations than the workshops. They include:

> Microsoft
> PWC
> KPMG
> UK Financial Services Authority
> Procter & Gamble
> Bank of Ireland
> De Nederlandsche Bank
> BDO Stoy Hayward
> HM Customs and Excise
> Lloyds TSB
> Merrill Lynch
> Operis and a number of smaller SME's

3.2 Questionnaire Design

Questionnaire participants were required to rate their agreement to a set of statements using a scale of *Agree Strongly*, *Agree*, *Indifferent*, *Disagree, Disagree Strongly* aiming to illicit their perception and attitudes towards *EUD.* The responses were then mapped to a scale from 2 for agree strongly, 0 for indifferent and -2 for disagree strongly.

3.3 Questionnaire Results

Theme	Statement	Score
Development by specialists	Software development is the responsibility of software specialists	-0.26
Improves efficiency	Using EUD tools will make me more efficient in my main job task	0.84
Waste of time	Using EUD tools will consume time which I should be spending on my main job task	0.08
Job enrichment	Using EUD tools could make my work more interesting.	0.89
Faster development	EUD could speed up software development.	0.97
Quality risks	EUD creates a software quality issue.	1.24
Domain Expertise improves product	The domain expertise of end-users can create more effective software to support their activities	1.34
Need for perceived net benefit	EUD success in the organisation depends primarily on the perceived benefits out-weighing the perceived costs	0.79
Programming too hard for end users	Programming will always be too hard for the non-specialist.	-0.50
Control risk	EUD can undermine managerial authority	0.11
Operational Risks	EUD can be dangerous (e.g. Data security)	1.05
Cost barriers	EUD is too expensive for organisations to implement	-0.53
Cognitive priority	EUD work should focus on solving the cognitive issues first	0.21
Socio-technical priority	EUD work should focus on socio-technical issues first	0.21
Organisational priority	EUD work should focus on organisational issues first	0.24

4. Conclusion

The results of the questionnaire survey and forum discussions led to the industrial action plan, EUD Deliverable D2.1. The ultimate realisation of the forum is that EUD is far more than a technological issue and requires increased research input from commerce, regulatory authorities and the non-IT research community.

Appendix - Perceptions Questionnaire V2.0

Perception V2.0

End User Development Perceptions Questionnaire

|PART A|

(Q1) Name: _____

(Q2) Organisation Size: _____

(Q3) How does your job relate to Information Technology? _____

_____

(E.g. are you an IS developer, Researcher, End-User....)

(Q4) Have you used End User Development technologies? Yes/No (please circle)

(Q5) If yes which? _____

_____

(e.g. spreadsheets, macro programming....):

|PART B|

Please complete this section by rating your sentiments towards the statements. Place a mark in the box of the option which best describes opinion.

Statement	Agree strongly	Agree	Indifferent	Disagree	Disagree Strongly
(S1) Software development is the responsibility of software specialists					
(S2) Using EUD tools will make me more efficient in my main job task.					
(S3) Using EUD tools will consume time which I should be spending on my main job task					
(S4) Using EUD tools could make my work more interesting.					
(S5) EUD could speed up software development.					
(S6) EUD creates a software quality issue.					
(S7) The domain expertise of end-users can create more effective software to support their activities					
(S8) EUD success in the organisation depends primarily on the perceived benefits out-weighing the perceived costs					
(S9) Programming will always be too hard for the non-specialist.					
(S10) EUD can undermine managerial authority					
(S11) EUD can be dangerous (e.g. Data security)					
(S12) EUD is too expensive for organisations to implement					
(S13) EUD work should focus on solving the cognitive issues first					
(S14) EUD work should focus on socio-technical issues first					
(S15) EUD work should focus on organisational issues first					

Perception V2.0

End User Development Perceptions Questionnaire

|PART C|

Please use this space for comments about either this questionnaire or on End-User Development in general.

(QX)