

# The Humanware Process Improvement Framework: Interfacing User Centred Design and the Product Creation Process at Philips<sup>1</sup>

Ashok Gupta  
Principal Scientist

Software Engineering & Applications Group  
Philips Research Laboratories,  
Cross Oak Lane, Redhill, RH1 5HA, U.K.  
Voice: +44 1 293 815647 Fax: +44 1 293 815500  
gupta@prl.research.philips.com

## Introduction

The software community is increasingly looking to the Software Capability Maturity Model (SW-CMM) for solutions to the problems of controlling software quality, cost and schedule. The SW-CMM has shown a way toward defect-free software, toward project control, indeed toward a more efficient organisation that is also more pleasant to work in.

Independent surveys hold that in general, the user interface (UI) content of software is greater than 50%. From the On Screen Display of menus on TVs to the LCD based displays on mobile phones, the UI is, in part, contained in embedded software. We need therefore, to go beyond the customer (who signs the contract or purchase order), to the actual *end-user* (who uses the software or product). End-user concerns - whether professional or consumer - centre on usability. This requires looking at the different types of users, at their tasks and goals, the environment and cultures they work (and play) in, and at the systems they interact with. The SW-CMM does not address the 'how' aspects of any software development activity - which is its strength. However, as far as UI development is concerned it does not address the 'what' and 'when'.

At Philips, we have developed a set of Key Process Areas (KPAs) which identify UI design practices and suggest how these can be incorporated in the product creation process. Our work has been inspired, in part, by the SW-CMM. Our work *complements* the SPI programme and together they allow organisations to address both supplier (i.e. developer) concerns, as well as end-user concerns.

## Humanware Process Improvement

**Humanware:** Products which satisfy users in all the ways important to them. Humanware goes beyond

traditional product design by focusing on the total experience of usage, from first encounter to disposal.

Humanware Process Improvement (HPI) is based on the 'Plan-Do-Check-Act' cycle. A Humanware process (briefly described below) and an assessment tool (questionnaire) provide the guiding framework for raising awareness, and for self- and full-assessments.

### Engineering Related KPAs

The Humanware Process consists of the following activities (these may be thought of as 'tools of the trade' and are comparable to the 'Software Product Engineering' KPA as defined in the SW-CMM):

#### *Understanding Use*

Design teams develop a shared understanding of how the product is expected to be used in practice, based on information from user studies. The emphasis is on learning from the user group by direct contact with users in their environment.

#### *Creation and Simulation*

Mock-ups and prototypes are produced and evaluated to ensure that they achieve the best match between available technology and the requirements of end-users and customers.

#### *Humanware Evaluation*

Design solutions are evaluated against usability criteria to ensure that these are met.

These three activities form an iterative cycle. Their output is documented in a User-Centred User Requirements Specification (UC-URS) and a User Interaction Specification:

The UC-URS records information about the users, their tasks and the context of use, upon which design decisions are based, in such a form that a design team

---

<sup>1</sup> The work described here was undertaken in a joint project with Philips Corporate Design, Eindhoven, The Netherlands, in close co-operation with Tedde van Gelderen, Ian McClelland and Bronwen Taylor, whose contribution is gratefully acknowledged.

can use to guide their work, and to check that the Requirements are met by candidate solutions.

The UI Specification describes the UI in a form suitable for communication with the implementation teams and at an appropriate level of detail to enable software developers to implement the design.

#### *Humanware Quality Acceptance*

Before market release, products are evaluated with end users or the customer, against usability goals set out in the UC-URS.

#### **Management Related KPAs**

In addition to the above, supporting management activities are defined (these apply at the project and the organisational level and have equivalents in certain KPAs in Levels 2 and 3 of the SW-CMM):

#### *Humanware in Market Intelligence*

End user and customer information relating, for example, to social, economic and demographic trends is gathered to guide decisions on future product ranges and new products.

#### *Humanware in Market Feedback*

End-user and customer feedback relating to products in use, is gathered to identify strengths and weaknesses of current designs and to guide future product design.

#### *Humanware Responsibility*

Responsibility for Humanware is allocated at three levels: A co-ordinator drives the policy on Humanware quality and harmonisation throughout an organisation; Humanware quality is managed and monitored for each product development programme; a team of individuals is responsible for carrying out Humanware activities.

#### *Humanware Project Management*

The organisation's Humanware policy is supported by ensuring the Humanware activities are resourced and scheduled in a dedicated Humanware project plan, which is in turn integrated with the overall project plan.

#### *Humanware Communications*

Communications are promoted within project teams, between teams across the organisation and between the UI team and other relevant parts of the organisation to ensure that the Humanware policy in the organisation is implemented effectively.

#### *Integration of Humanware into the PCP*

Existing procedures are extended to include Humanware activities to ensure they are carried out as an integral part of the Product Creation Process.

## **What are the benefits?**

The practical value of HPI is the identification of:

- which key activities are important for meeting your business objectives
- why they are important and
- where they should be incorporated in the product creation process.

In practice, this may take different forms. For example, it may lead to the early definition of usability criteria to guide product development, the definition of a URS template, or the broadening of Acceptance Test plans to include usability tests.

## **... and costs?**

The activities do not necessarily require that either major new investments in resources need to be made or that development costs or time to market will rise. There are a host of relatively small changes which can have a profound impact on the business: on greater customer satisfaction with the products we make or on reduced iterations in development, for example.

The suggested activities are *not* prescriptive; the Humanware Process is a flexible tool which one can *adopt and adapt* to the needs of the project, business or organisation.

## **Discussion**

The SPI community is well aware of the *core issues* in process improvement, namely, management awareness and commitment, culture, and change management. Process improvement is, for many people, an abstract issue. We are up against these very same, and very difficult, challenges.

In contrast to the SW-CMM, ours is not a maturity model. Creating humanware touches most parts of the organisation: senior product management, Marketing, Development, Service etc. We cannot focus on a team in the same way as the SW-CMM can. Furthermore, Humanware is applicable to software as much to hardware - and for both consumer and professional products, and services. Our aim is to heighten awareness of the process aspects of user-centred design, and to enable the diverse Philips business groups themselves to adapt the model in the light of their business objectives.

A brief overview of our work - still ongoing - has been given in this position statement. These will be elaborated on at the panel session.