Centre for SOFTWARE Engineering
http://www.cse.dcu.ie

Newsletter

Summer 1999 Number 31 ISSN 0791-5683

The Treadmill keeps Turning

About 20 years ago, Alvin Toffler coined the term "Future Shock" to describe the impact of an even increasing rate of change in technology and society. Within the software business, we know this phenomenon only too well.

And it's getting worse, not better. We now talk about "Internet years" to try and capture the much shorter time-scales involved in projects – and not only in web based development either. Coupled with this, we have the increasing pace of new technologies which we have to cope with and master.

All of this points to the ever increasing need for high quality training, since we all need to keep on top of our jobs by constantly improving our skills or learning new ones, or seeking ways of doing our job better and more efficiently. So in this issue, we are focussing on the expanding range of training courses being run by CSE as our contribution to help you do that. The initial focus which is gained by attendance at one of our courses can then be followed up by more detailed consultancy as and when required.

We in Ireland have gained an enviable reputation internationally for our software industry. Let's make sure we maintain that position, and avoid slipping back. That requires determination and effort, and also means that we must ensure that we all keep up to date, in our rapidly changing software world. Given this, attention to suitable strategically oriented training is a vital part of business planning.

Robert Cochran, Director

CONTENTS

Your Guide To Training At The CSE

Training of your people in the key skills needed by your organisation has many beneficial effects:

- The commitment to staff development increases the likely retention of staff
- Better trained staff generate improved quality and greater efficiency
- Attendance at training events creates a climate for fresh ideas
- Training on strategic topics is a necessary component in managing change in an organisation.

The Skills Addressed by the CSE

The CSE focus on training courses is twofold, on skills relating to the management of software as a technology-based enterprise (management skills), and on skills relating to strategic aspects of software engineering (engineering skills).

Management Skills

Management training is concerned with those capabilities required to effectively manage the organisation – an organisation that is subject to the demands of changing technologies, changing corporate policies on IT, and changing marketing models for software products and services.

Examples of training provided by the CSE are Winning Strategies for Young Software Companies, the Management of Research and Development in Software Product Organisations, and on the many aspects of the management of software projects.

Engineering Skills

Software Engineering training is concerned with those capabilities required to ensure that the appropriate processes, technologies, organisational environment, and skills are in place to bring about successful projects.

In order to fully address software engineering we have considered the many perspectives involved: the product view, the process view, the technology view, the organisational and people view. By considering these views it is possible to achieve a clear focus on software development and maintenance activity. The essence of this focus is to enable ongoing improvement in this activity by quantum change and/or incremental improvement.

Training as an aid to Organisational Improvement

Not all training is geared towards organisational change. Some training is aimed at ensuring that the existing skill set is maintained and enhanced. However training frequently achieves organisational improvement. In order to use training as an aid to organisational improvement, the CSE has applied a layered approach to its services.

The first layer is that of awareness and understanding. An awareness event is intended for decision-makers and influencers in determining a training programme or managing an improvement programme. It provides an understanding of the key features of a particular topic, an overview of recent advances in the area, its relevance to an organisation, and the benefits that can be achieved by its adoption. From attendance at an awareness event, you can determine whether it is appropriate, how extensively it might be used, what is the extent of change to the organisation, and what is a reasonable timeframe for its adoption.

The second layer is that of skill acquisition. This is intended for key management and technical personnel. It may be a detailed introduction, or a full practitioner course, or one or more workshops on a subject area.

The third layer is that of support in the adoption of a new process or technology. This frequently takes the form of coaching sessions, either in a cluster of companies or in-house in a company. It may be supported by a prior evaluation and by mentoring during the pilot implementation of the process or technology.

The fourth layer is that of implementation across the organisation following feedback and refinement after pilot experience. This represents the rollout phase in change management where further skills acquisition and supporting processes need to be addressed.

Software Engineering Perspectives

An evaluation of the current status of software engineering in your organisation will help in selecting the area requiring the most immediate attention for improvement. At any one time a particular view of software engineering in your organisation may dominate. The consideration of all views may give a more balanced approach to decisions on improvement.

The Product View

As the primary objective in software development is quality in the software product, training gives attention to the product quality characteristics. Those characteristics, as documented in the quality model in the ISO/IEC 9126-1 standard, are functionality, reliability, usability, maintainability, portability, and efficiency. A user centred focus in software projects is encouraged through the CSE training courses. Courses applicable to the product view include those associated with the capture of requirements and the engineering of functionality and usability and other product characteristics into the software product.

The CSE also addresses the engineering activities in the productisation of software.

The Process View

The central plank in developing good software has been, for a number of years, the achievement of an appropriate software development process. The typical improvement programme focuses on software process improvement (SPI) and is based on an international model of the process. A range of courses is available on SPI and on various models such as the Capability Maturity Model® (CMM) and Software Process Improvement and Capability dEtermination (SPICE) and ISO9001/TickIT. Courses cover underlying software development life cycles, software paradigms and supporting methodologies such as object orientation and rapid application development. And courses address the ancillary activities used to successfully manage the process.

The Technology View

As many projects appear to be driven by use of advanced technologies it is important that training courses address the more important technologies and put them into perspective. Perhaps the current most important area of use of advanced technologies is in software components, both in the development and classification of components, and the access to and assembly of components into software products. These technologies are, largely, strongly influenced by the object orientation (O-O) paradigm.

CSE Online

http://www.cse.dcu.ie

Many of our publications, including this Newsletter are available in pdf format from our website, under Resources.

If you want to find out when new material is available then subscribe to csenews.

You will also be kept up to date with courses and other events at CSE.

To subscribe send an email to:

maiser@cse.dcu.ie

The contents should be as follows:

subscribe csenews
exit

A message will be emailed to you as confirmation of subscription.

We would encourage you to contact us to discuss issues arising from articles in this newsletter or with any other queries you might have, all CSE emails follow the same pattern,
<*firstname*>@cse.dcu.ie.

Further technologies are also considered in CSE courses, most notably advances in computer languages, analysis and design techniques, and underlying platforms such as databases.

The People View

CSE training courses endeavour to give attention to the critical importance of non-technical skills in software projects. Areas addressed include creative thinking, verbal and written communication, team working, and organisational skills. It is recognised that the direction that the software industry is now taking will require ever more capability in the soft or people skills.

Road Map

This article considers training from a number of perspectives:

- The need to acquire and further develop the skills of management and technical personnel
- Training as a key element in organisational improvement, and
- The different views of software activity as represented in training courses.

The CSE is developing road maps in which software organisations may approach training and improvement programmes. Through use of a road map approach you can see what options exist and what sequence of events you might follow. To determine how your organisation might best approach improvement, contact Michael O'Duffy or one of the consultants in the CSE.

Training is provided in-house as well as through the public events programme. You can use training from the CSE as part of an integrated CSE support service to improve your organisation's capabilities and achieve greater success.

How can you find out more

We will be producing a training catalogue later this year which will give information about our core training courses and which we hope you will find useful as a reference guide, however details of all our currently scheduled courses are available on the web at http://www.cse.dcu.ie/training.html.

To give you a flavour of the range of courses we run let's focus on two areas, one from a Process Viewpoint one from a Technology Viewpoint.

Quality and SPI: There are many process improvement models but on closer inspection the underling best practice they support is much the same. We have developed a new course "**Key Issues of SPI**" which deals with these common areas and compares and contrasts the different models. We aim to keep you up to date with international developments and with this is mind we have developed another new 2-day course "**ISO 9001:2000**" which will cover the changes to the 1994 Standard. This new standard has addressed current criticisms and is much more focused on the needs of organisations for the millennium. Another process improvement model growing in popularity in Ireland is the CMM®. This five-layer model promotes continuous improvement which many companies are finding attractive. Our 2-day "**Introduction to the CMM®** " will provide a detailed understanding of the structure and scope of the CMM Model and how it relates to other models for quality and process improvement. All of these courses address the cultural issues of implementing change.

We have a number of courses covering specific areas under the Quality umbrella. Our 1-day "**Internal Auditing**" course will show you how to set up an effective audit programme which will enable you to identify and prioritise process improvement and ensure that you do get the most out of your Quality System. Most organisations are aware of the importance of testing within their software development life cycle. We run two courses in this area. "**Software Inspections**" which takes a detailed look at the use of inspections as a means of capturing errors early in the life cycle and "**TMap**", this very popular 2-day course provides a detailed insight into the TMap approach, focusing on key issues of software testing, including structured testing, the development of a test plan and testing strategy, tools, test metrics and test maturity models.

Finally in this area with a growing number of companies internationally now achieving success using PSP℠, the CSE is offering training to enable Irish companies to evaluate how the PSP could be used in their workplaces, through a 1-day "**Introduction to the PSP℠**".

We also provide a series of "cluster based" programmes, providing training and mentoring to assist organisations in the implementation of a successful SPI programme, whichever model they choose.

The "clusters" are workshop based, where participants are encouraged to learn from the experiences of other similar organisations. Throughout the programme, support is provided in the actual implementation of the concepts learned in the classroom.

Check out our website under **Services** for details of the ISCP, SKATE and SPIRE cluster programmes.

Object Orientation and Component Based Development: Object Orientation has somewhat evolved and the term 'Component Based Development' is becoming more established. Our portfolio in this area has been honed and improved to provide what you the customer want.

More emphasis is being placed on UML and so we run a 1-day "**Overview of the UML Notation**". The purpose of the course is to give a taste of what visual modelling is all about and also to highlight the main aspects of the UML notation.

A further 2-day workshop on "**Object Oriented Analysis and Design Using UML**", gives participants a more thorough understanding of what UML is and allows them to apply it to the analysis and design of software systems. Participants are taken from initial concepts through to application of the language via a number of practical case studies.

The CSE **Object Technology Cluster** initiative is still available to eligible companies who wish to participate. It involves the establishment of a small 'cluster' of organisations whose aim is to carry out the adoption of a significant aspect of object technology within their company across a period of months. At the end of the operation of the cluster each organisation achieves a significant advance in this area. Goals are reached through structured coaching sessions held at the CSE. The companies involved in the most recent clusters have chosen to primarily consider OO analysis and design methods, with particular emphasis on using the UML notation. Each company selected their own pilot project to work on throughout the duration of the cluster. We have taken companies from requirements through analysis, design and implementation.

With the advent of Enterprise Java Bean (EJB) based Application Servers component technology now underpins all aspects of mainstream application development. With the confusing amount of standards and jargon that surround components it is very important as a first step to leveraging the technology that we understand the key concepts and standards that underpin components. The **Component Technology: An Introduction to key concepts and standards**, half-day awareness event will provide the following:

- Component development: The key principles and concepts
- Component Architectures: CORBA, ActiveX, and EJBs.
- Managing Component Development

The **Fundamentals of Component Development** 1-day course will explore more deeply the key concepts underpinning component development. In particular it will look closely at the key principles of abstraction, precision, and pluggable parts. Illustrative UML models will back up all of the points made in the course.

If you are thinking of starting a new project that may partly or fully embrace Object Technology, one of the critical initial decisions you will need to make prior to embarking on the project, will be the choice of implementation language. There are a number of both technical and non-technical influencing factors, but these do not always lead to choosing the most appropriate implementation language for a given project. Our 1-day course "**Java, C++, VB or C? - Making the Right Choice for Projects!**", will help you, through discussion, to decide what might be the best choice for your project and/or organisation.

ESPINODE-Ireland: The First Year

ESPINODE-Ireland was launched in May 1998, with the aim of encouraging and continuing best practice in the area of Software Process Improvement, in both the North and South of Ireland. The node is part of a network of throughout Europe. Since ESPINODE is now at the halfway stage, it seems an appropriate time to review the achievements of the first year, and to look forward to what's planned for the remainder of the project.

What's Been Done So Far…

Workshops on SPI, Project Management, Requirements Management and Software Methods have taken place. Awareness events run for local industry included a presentation on the PSP and GUI Architectures and a presentation on achieving CMM Level 5. Workshops have proved highly popular, so early booking for future events is advised!

A web site has been established, http://www.cse.dcu.ie/espinode which includes resource material from events.

The Next Year: ESPINODE Goes North

Seven events are planned for the next twelve months. These will be a mix of awareness events and workshops.

In Belfast in September/October of this year there will be a workshop on the DSDM method and an awareness event on SPI/CMM. The remaining events are planned for early year 2000 in Belfast and in Limerick.

In Dublin there will be a workshop on Software Testing in September at CSE. Two further events will take place early next year. Check the CSE web site for details.