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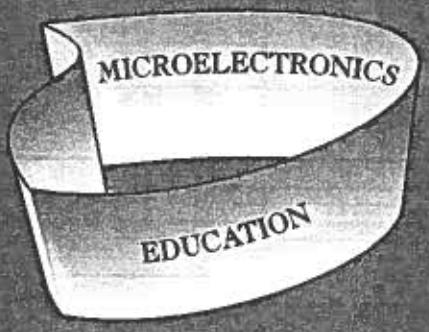

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THE ASTEP EDUCATIONAL MULTIMEDIA FRAMEWORK

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1 Abstract

This paper addresses the use of multimedia frameworks for the delivery, support and assessment of trainees for process-based high-technology companies. This framework is the basis of an European telematics network that is being developed in the ASTEP project for semiconductor fabrication, microsystem manufacturing and high-level design and test activities. ASTEP (*Advanced Software for Teaching and Evaluation of Processes*, project reference number MM1001) is a project being carried out in the framework of the Commission of the European Community Action on Educational Multimedia and will deliver a set of multimedia course modules designed for the semiconductor industry. The ASTEP consortium combines companies from this industry area and universities, with the final objective of improving the qualification of the skilled workforce required for a competitive semiconductor industry in Europe. The ASTEP strategies to achieve success, namely in what concerns the exploitation of results, the technical and pedagogical approaches and the mechanisms set up to assure constant update of course contents, are presented as well.

2 Background and rationale of the ASTEP project

Distance learning technology is now a powerful alternative to traditional classroom education, in spite of the identified disadvantages of current technologies for this purpose [1,2]. The major benefits assuring a successful future for remote course delivery are the following:

- Any number of trainees can be accommodated, allowing the organisation of training programmes with little dependence on the expected size of the target audience
- Training schedules can be easily adapted to each trainee's occupations and to their diverse needs to improve professional skills
- Access to information and interaction with lecturers / other trainees is much simpler

The range of tools available for online course development and delivery is however a complex task, requiring a detailed comparison among the alternatives available [3,4].
As a combined effort between industry and academia, the ASTEP project rationale derives from the potential of interactive multimedia telematics networks to effectively provide solutions for this and other similar needs.

E.J. Mouthaan and C. Salm (eds.), Microelectronics Education, 213-216.

3 The ASTEP project

The ASTEP project will be described in this section, starting with the project objectives and proceeding to the development model underlying the R&D work.

3.1 ASTEP OBJECTIVES AND CONSORTIUM

The purpose of the ASTEP project is to create a multimedia educational platform and a European telematics network for the delivery, tutoring and assessment of trainees employed in process-based high-technology companies. To prove the capabilities and benefits of this platform and network, the following sets of courses are being designed:

- Motorola and SensoNor semiconductor processes
- Generic semiconductor process
- Test and High Level Design

At the end of the project, the trainees will be able:

- To learn the manufacturing process and characterisation techniques at each step of the process
- To diagnose and evaluate any deviations of the process from the nominal one
- To share peers' experience and the latest technological breakthroughs through the telematics network
- To be able to acquire a Nationally recognised diploma through tutor support and assessment modules of the learned material

The objectives given above emphasise the immediate requirements of high-technology companies and the acute needs for Europe-wide accreditation procedures within a short timescale. In order to fully meet these objectives, the ASTEP consortium comprises the following members:

- The companies Motorola UK and Motorola France (MOT) for the development, testing and exploitation of the proprietary process package
- The company SensoNor Norway for the development, testing and exploitation of the proprietary process package
- The European Teaching Organisation of the company Applied Materials (AMAT) Germany for the development and testing of the generic process package
- The Colleges Buskerud Norway (HIBU) and West Lothian College (WLC) Scotland for the development, testing and exploitation of the generic process package
- The University of Porto (FEUP) combined with other Portuguese Universities, for the development, validation and exploitation of the Test and High Level Design package
- Heriot-Watt University (HWU) expertise in computer-based learning, project co-ordination and management

3.2 THE ASTEP DEVELOPMENT MODEL

The consortium encompasses enough diversity in terms of countries (France, Germany, UK, Portugal), type of partners (Industry, College, University, National Organisation) and educational abilities of the trainees (operator, technician, engineer, researcher) to demonstrate fully the pedagogical and technical capabilities of the project outcomes.
Fundamental to the nature of this project is the intention to produce a generic ASTEP framework which could be used to support training of staff for any process-based industry. As such, this means that the actual development of an instantiation of ASTEP for the semiconductor manufacturing industry, for example, provides a demonstration of

the capability of the general framework to be customised to a specific industrial domain. Within this context, the Industrial, and to some extent the Learning Institution, partners within the consortium, will evaluate the effectiveness of this customisation process, as their focus throughout the project will be to consider ASTEP in terms of the semiconductor industry. Therefore, each individual component of the framework will be developed and tested as a general component by the multimedia and telematic expert partners within the consortium, and will then be customised for the semiconductor industry and evaluated and assessed by those partners whose focus is on that particular domain.

Once a generic model of ASTEP has been developed, a standard commercial alpha-beta test model will be adopted. Alpha testing will be carried out at Industrial and Academic partner sites with test data, related but not necessarily specific to the domain, instantiated into the framework.

The framework will be evaluated for usability, consistency, speed, and the efficiency of the delivery of material, specifically multimedia assets across telematic links. As part of this process, research staff from the multimedia and telematics expert partners will be based in the companies and learning institutions, to support the establishment of the infrastructure for ASTEP, to provide a basis for technology transfer and to aid in the capture and collation of evaluation results.

Without pre-empting on the dynamic links to be established for a full demonstration of the product capabilities, one could envisage the following scenario in order to demonstrate a typical course delivery illustrated in figure 1.

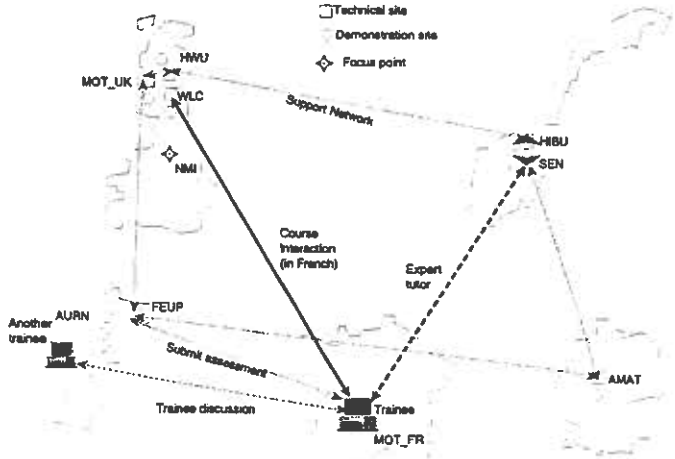

Figure 1: A typical course delivery scenario.

A trainee in Toulouse wishes to learn the package devoted to the generic process manufacturing at WLC. SensoNor happens to deliver a colloquium on microsystems which is being videoconferenced to the partners of the network. The trainee follows this conference and interacts with the expert tutor from Norway. This conference is also followed by employees in AMAT. After the conference, the trainee comes back to his module which is being supervised at the moment by some tutors at WLC. A course interaction takes place with the tutor on specific points of the module. The trainee has the freedom to consult also others trainees (such as those in Portugal) who happen to study the same course. At the end of the module, an assessment is completed by the trainee and

sent to FEUP which is assessing the modules. HWU ensures that the management of the network is adequate with its partners HIBU and MOT_UK for example.
Beta-test results will be incorporated into a final, product release of ASTEP as a generic framework, and an industry-specific release of ASTEP for the semiconductor manufacturing industry. User group newsgroup, mailing-list, or other appropriate telematic structures will be developed to provide ongoing support and feedback structures relative to the further development, maintenance and exploitation of ASTEP. This structure will be distinct from the support framework provided within ASTEP itself, for users in a particular domain. As part of the exploitation plan for the project, appropriate feedback response times, formats and actions will be identified and responsibilities assigned to partners within the consortium.

4 Conclusion

The ASTEP project was set up in response to the difficulties experienced by traditional engineering education in the area of semiconductor manufacturing. The need to cope with the exceptionally fast pace at which the technology evolves in this area was another reason behind ASTEP, since a permanent update of the technical skills of employees in process-based high-technology companies is vital in terms of market competitiveness.
By delivering flexible training programmes through an educational multimedia telematics network, the project helps to improve and maintain European competitiveness in the global semiconductor industry and allows the creation of a pool of trainees geographically dispersed, which can be identified easily and employed by potential new companies. It enables the rapid propagation, by experts, of technical breakthroughs and state of the art reviews, while at the same time creating a critical mass of trainees, which is particularly effective for the dissemination of solutions on internal technical issues. For SMEs and international companies alike, this type of course delivery is also very effective for the training of rapidly expanding activities critical to the SMEs future. Another important issue is that the proposal aims at developing qualifications of trainees which are officially recognised, enhancing the mobility of labour within Europe and facilitating the quality audit process of trans-national companies. Finally, and in economically deprived areas which are often attractive to multi-national companies for financial reasons, the delivery of courses by telematics facilitates the retraining of unemployed workers in suitable high technology skills.

5 References

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