



## THE eLiTA PROJECT: WEB-BASED EDUCATION PLATFORM FOR TEXTILE STUDIES

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### **Abstract:**

*Distance learning, e-learning and web-based education have become common terms in modern studies. Technology-driven learning has many advantages when compared to conventional education. Using modern internet-based concepts, information and communication technologies and services, this type of education, generally represented as e-learning or e-education, represents great potential also for textile studies. The fundamental objective is to provide effective and efficient learning on demand and to assure a good learning experience. Modern concepts for design and production of e-materials can be effectively used for e-learning and web-based education and training for textile studies. Specific textile courses and subjects' contents will eventually require a so-called blended learning as a combination of conventional and distance learning techniques.*

*The paper presents the international project eLiTA (e-learning in Textiles and Apparel) the aim of which is to establish European-wide, web-based, distance education in textiles. The project is being undertaken by a consortium of seven partners from the UK, Greece, Latvia, Portugal, Romania and Slovenia and is supported with funding from the EU Leonardo da Vinci programme. Four modules have been produced in the respective languages of the partners covering different aspects of textile and apparel manufacture and technology. These e-materials are intended for use by employees within textile and clothing companies, as well as in secondary and higher education. The modules are designed for on-line internet use and will be delivered through the learning portal [www.e-learning-textiles.co.uk](http://www.e-learning-textiles.co.uk).*

### **Keywords:**

*e-learning, web-based education systems, textile studies, eLiTA project*

## **1 INTRODUCTION**

Distance learning has already has a long tradition in certain regions [1, 2]. However, one should keep in mind that modern concepts of distance learning include more than simple mediation of study materials. Numerous strong points of distance learning, above all time and place independency of teachers and students can be effectively used also for textile studies. New technologies and their use in textile design and production processes require continuous learning and freshening of knowledge.

Distance learning and e-learning will play an important role in the future for improving the educational level of those textile professionals who have completed further or higher education, but would like to retrain and/or obtain new knowledge, necessary for their work [3, 4, 5, 6, 7]. E- learning



represents also great potential for education of disabled people who could be educated for creative jobs, particularly in textile and clothing design.

## 2 WEB-BASED EDUCATION PLATFORM FOR TEXTILE STUDIES

The textile sector is important to the European Union. This is underlined by the report European Technology Platform for the future of textiles and clothing - A vision for 2020 p.4 states “the European Textiles and Clothing industry ... continues to represent one of Europe’s major industrial sectors with an annual turnover of 215 billion Euro and a total workforce of 2.6 million”.

The project eLiTA and developed web-based education platform for textiles studies targets the training needs of workers in the European textile sector at operative level. In the Textile sector although there have been a number of job losses, there is a significant demand for new workers due to the age of the workforce. This replacement demand is highlighted in the Skills for Business Working Futures 2004-2014: National Report p.130 “the largest level of replacement demand will arise amongst machine and transport operatives ... on average around a third of the current workforce will need to be replaced over the next 10 years”.

The learning tools used and updated in the eLiTA project have evolved from computer based learning modules originally developed in 1995 in the Department of Textile Industries at the University of Leeds, UK for undergraduate and postgraduate students to study the fundamental principles of textile technology. Subsequently throughout the period 1995 -2008 further modules have been developed [8].

Prior to the eLiTA project four modules, Apparel Technology, Carpet Technology, Dyeing, Printing and Finishing and Hosiery Technology had been produced in Czech, English and French, Hosiery Technology had also been produced in Lithuanian and, Dyeing and Printing, Textile Finishing and Apparel Technology had been produced in Lithuanian and Turkish [8, 9].

The eLiTA project has transferred this innovation to produce these in Greek, Latvian, Portuguese, Romanian and Slovenian to provide further access to these interactive learning tools.

## 3 THE eLiTA PROJECT AND e-LEARNING MATERIALS

In textile education there is a lot of fundamental factual information that the learner needs to acquire, particularly with regard to the principles used in textile processing. These concepts may be difficult to teach to large audiences but readily lend themselves to self-learning through e-learning.

The eLiTA (e-Learning in Textiles and Apparel) project has developed e-learning modules specifically in textiles and apparel for use in education and training in Europe through collaboration between a consortium of the following academic and training organisations and companies in Greece, Latvia, Portugal, Romania, Slovenia and the UK. The project has been supported with funding from the Leonardo da Vinci programme in the European Union.

The two-years project was concluded at the end of September 2010. The project partners were:

- KLITRA Limited, United Kingdom
- Media Innovations Ltd., United Kingdom
- TEI of Piraeus, Department of Textiles, Greece
- Riga Technical University, Institute of Textile Materials Technology and Design, Latvia
- University of Minho, Portugal



- Gheorghe Asachi Technical University of Iasi, Faculty of Textiles and Leather Engineering, Romania
- University of Maribor, Faculty of Mechanical Engineering, Department of Textile Materials and Design, Slovenia

The eLiTA project activities comprehended update, adaptation and translation of original English textual and multimedia materials to national languages of participating partners, i.e., to Greek, Latvian, Portuguese, Romanian and Slovenian language.

The project partners have updated innovative interactive ICT-based learning tools developed in previous Leonardo da Vinci projects. Furthermore, the project adapted the tools so that they can be used in new partner countries compared to those in previous projects [3]. This in turn support lifelong learning within the partner countries to help overcome gaps in provision. The tools provide a user friendly way of learning at a place, pace and time to suit the needs of the individual and extend the opportunity to study in this way to more companies and organisations throughout Europe. The breadth and depth of content make the modules suitable for study at both fundamental and more advanced levels and are intended for use by employees within organisations involved in the design, manufacturing and retailing sectors as well as students at school and further and higher educational institutions. In addition, the tools help to improve the recognition and validation of work-based learning which support career development and lifelong learning within the European Textiles sector.

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Welcome to the Textiles and Apparel elearning Portal

## Textile Education and Training at Your Fingertips

We provide multimedia textile and apparel education and training which gives you the convenience of being able to study at a time and a place to suit you. **The modules use text, graphics, photographs, videos and animations** to describe and explain the principles used in the design and technology involved in the manufacture of textiles and apparel. They also contain **exercises** to allow you to test the knowledge you have gained and to reinforce your learning. A **bibliography** of further reading and a **glossary of terms** provide reference to further information.

The content is available at both fundamental and more advanced levels and is **intended for use by employees within organisations involved in the design, manufacturing and retailing sectors as well as students at school and further and higher educational institutions.**

For more information on the modules available, click on **modules** in the menu above. If you would like training material developed specifically for your needs click on **services**.

Account Login

User Name:

Security Code  
N5vQ6w  
Enter the code shown above in the box below

Password:

☐ Remember Login

Figure 1: Textiles and Apparel web-based e-learning portal



The first computer-based learning modules were developed in 1995 in the Department of Textile Industries at the University of Leeds, UK for undergraduate and postgraduate students to study the fundamental principles of textile technology. This “Introduction to Textiles” suite of modules provided an estimated 80 hours of learning material covering: *Yarn Manufacture, Knitting Technology, Weaving Technology, Woven Structures, Non- Woven Fabric Manufacture, Dyeing, Printing and Finishing Technology, Clothing Technology* and Textile Testing and Quality Assurance. Three additional modules followed in 1996 and another two in 2004. In 2004, the e-learning system was produced in Czech, French, Lithuanian and English language. Important technical breakthrough happened in 2006, when previously CD-ROM-based system became a web-based e-learning system. In this year, two additional partners from Turkey entered the project. All of the e-learning system modules are delivered through the web-based learning portal [www.elearning-textiles.co.uk](http://www.elearning-textiles.co.uk), Figure 1.

Within the eLiTA project, the following four modules:

- Apparel Technology,
- Carpet Technology,
- Dyeing, Printing and Finishing and
- Hosiery Technology

have been updated, converted for internet delivery (Carpet and Hosiery Technology) and translated into Greek, Latvian, Portuguese, Romanian and Slovenian to provide the modern interactive e-learning tools. An important issue the project teams had to solve was connected with the use of appropriate technical terms for knitting technology in their national languages. The opening page of each module presents an overview of the module, Figure 2. The module content and other features are accessed via clickable buttons and selectable text.

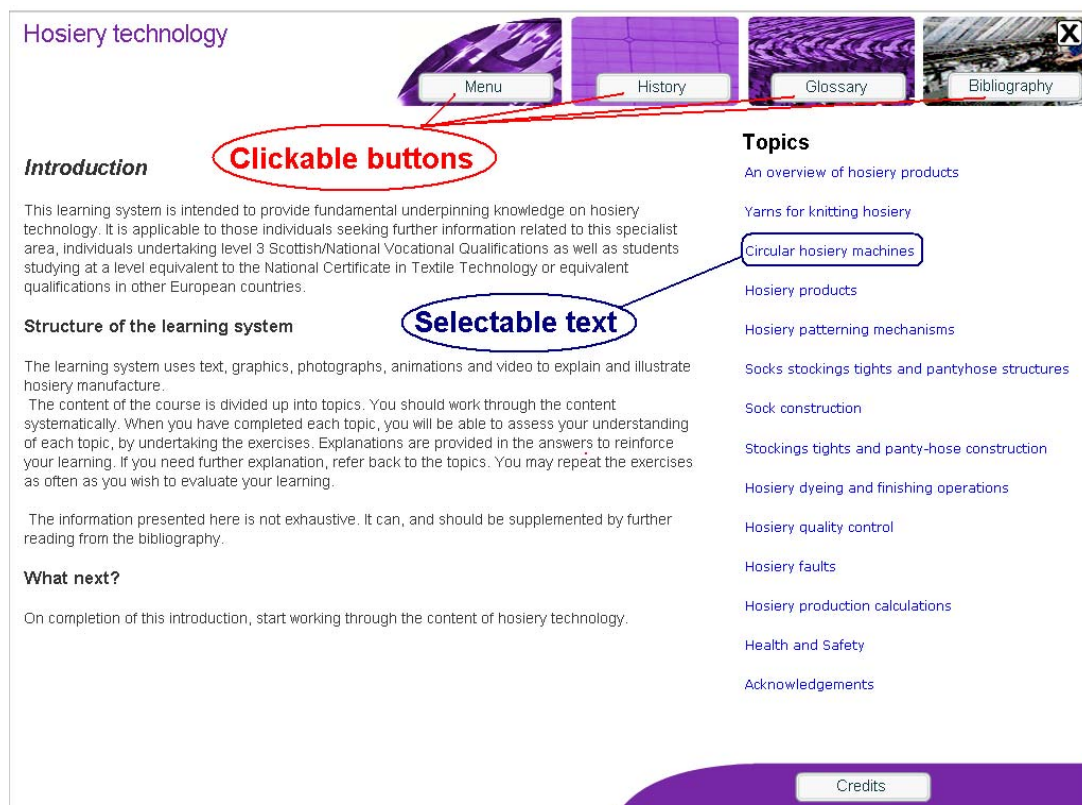


Figure 2: Opening page of Hosiery technology module





A content menu is provided to enable learners to both follow the content in a pedagogically logical sequence and to be able to browse the content for specific information. Each subject is divided into topics. Clicking on a topic reveals a list of pages in the topic that presents the information within each topic in a pedagogically logical sequence. The learner may choose to select the first page in the topic and study each page in succession or click on a specific page and move directly to the page.

All four modules included into eLiTA project have been developed in all national languages of participating project partners. The text has been authored to present information in digestible “chunks” comprising main points that the learner needs to know. Where necessary the learner may use the mouse to click on the “main points” to bring onto the screen “expansion points” which provide supplementary information, descriptions or explanations. Figure 3 shows the Portuguese apparel module and descriptive expansion point.

The screenshot displays the 'Tecnologia da Confeção' (Textile Technology) module interface. The main content area is titled 'Costura e montagem de vestuário' (Sewing and garment assembly). A yellow expansion point box is open, showing text about needle and thread interlacing. To the right, there are two smaller windows: one showing a sewing machine with labels 'Braço de tensão da linha', 'Agulha', 'Arrastador', and 'Calçador'; and another showing diagrams of 'PONTO PRESO PUNTO TIPO 301' with labels for 'Linha da agulha', 'Lima da bobina', and 'Equilibrada'.

Figure 3: Portuguese apparel module - expansion point

Navigation from page to page is simple using forwards and backwards buttons at the bottom of the screen to provide the learner with an interactive controllable learning environment.

This method of learning overcomes the limitation of books in that it enables the learner to view videos and animations that illustrate and demonstrate principles, concepts and applications of the principles explained. Furthermore, the learner can repeatedly play the videos and animations within their own exclusive learning environment until they are satisfied that they have understood the concepts. This contrasts with a formal teaching situation where the presentation is controlled by the teacher within a



time constrained learning environment which cannot guarantee that the learners have learned from the lesson.

In all the modules, the layout of each page has been standardised to show text on the left hand side of the page and graphics, photographs, videos and animations on the right hand side. Special functionality enables the selected graphics to be enlarged and display the content more clearly. The resolution of the screen may also be easily changed using the zoom features provided within commercial internet browsers. Figure 4 shows the page layout; the content relates to circular hosiery machines.

**Hosiery Technology**

**Circular hosiery machines**

**Fabric forming section**

- The fabric forming section is where the yarn is knitted into loops to create the fabric
- All hosiery machines produced commercially employ are revolving cylinder. Some of the early hand operated machines were based on the revolving cambox
- Revolving cylinder
- Revolving cambox

**Revolving cylinder hosiery machine**

Top cylinder

Bottom cylinder

**Double cylinder hosiery machine**

**DOUBLE CYLINDER HOSIERY MACHINE**

Top cylinder

Slider

Sinkers

Double ended latch needle

Fabric

Bottom cylinder

Figure 4: Page layout showing the distribution of textual and graphics elements

Photographs, graphics and video are important parts of the e-learning system. The knitting module itself, for instance, includes together 280 photos, 263 graphics and 91 videos and animations, which clearly present elements and activities of knitting machinery or particular operations, Figures 5 and 6. Numbers of graphic elements and videos in other three modules are approximately the same, which speaks for itself about the complexity and entirety of the web-based education platform.

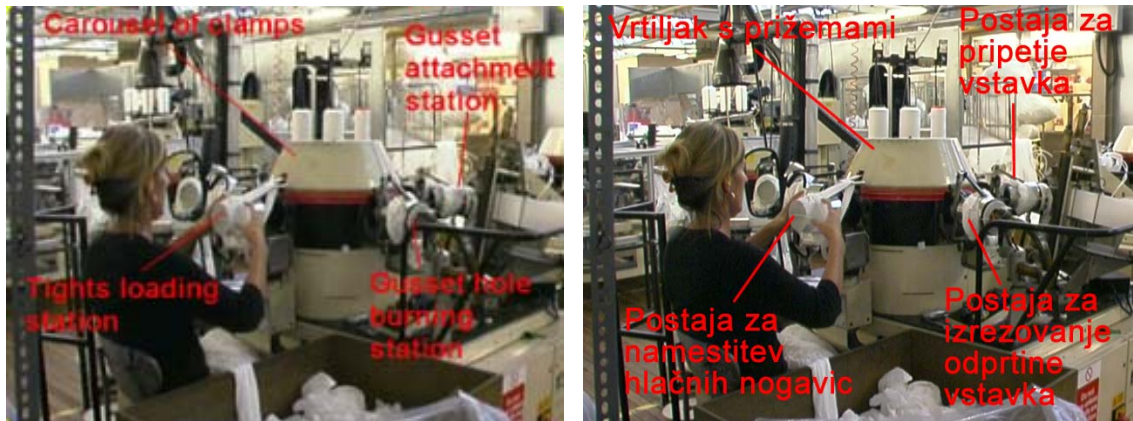


Figure 5: Explanation texts in photo files have been translated into national languages of project partners

Hosiery technology

Menu History Glossary Bibliography

### Stockings technology

#### Semi-Automated sewing

The pioneers in the development of semi-automated machines were the Italian companies (Italy). Machines emerged which have been almost fully automated.

Whilst the machine details are described.

On some machines the process is performed first followed by:

- In semi-automatic toe closing, individual legs are manually loaded, automatically turned inside out, repositioned to align the toe section under the sewing head, sewn, turned and ejected.
- An automated machine has been developed which automatically sets the shape of knee-highs or pop socks.
- In U-seaming or line closing the individual legs are sewn together.
- A gusset may be inserted into the U-seam.

The device comprises a carousel of hollow tubes connected to a suction device that successively carry the hose through a [g] sewing head to close the toes. The operator positions the leg so that the toe end is drawn into the tube whilst the waist end is drawn over the tube, thereby turning the leg inside out. It is repositioned on the tube to align the toe section under the sewing head. The tube then transports the toe beneath the sewing head where it is automatically sewn to [p] close the toe. After sewing, the leg is again turned by sucking the closed toe back down the tube whilst, at the same time pulling the leg off the tube and ejecting it into a box.

and Solis  
ons have  
ed toe closing

00:00 - 00:57

Figure 6: Video supporting the textual explanation and supplementary explanation box

All developed modules were evaluated to determine their suitability as an education and training resource. This was undertaken by the 5 academic partners and KLITRA using a form designed by the external evaluator for the project which was given to workers in the industry, including operatives,





managers, trainee technicians, students and textile teachers. Each was provided with a login to the website and access to modules relevant to their areas of expertise.

Based on the evaluations, there is clear evidence from the strong positive responses to all the questions posed that the learning packages fulfil their learning objectives and provide a good system for the delivery of textile and apparel education and training. The endorsement of the system and the modules developed is that over 90% of the evaluators would or already have recommended the use of the web interface and the learning package. A clear message that emerges from these evaluations, the comments received and the opinions of the developers themselves is the need for support for the learner most notably in the form of a mentor, tutor or adviser who can provide further information, explanations and, above all, act as a motivator to encourage learners.

#### 4 CONCLUSIONS

Within this contribution we presented an overview of the LdV eLiTA project, which has developed tools and e-learning materials incorporated in a web-based educational platform for textile studies in order to provide a convenient, user friendly way of learning. In such a way the web-based system extends the opportunity to more individuals to study in more companies and organisations involved in the design, manufacturing and retailing sectors of the textile industry as well as students at school and further and higher educational institutions throughout Europe.

The project dealt with the design and production of a complex e-learning system, which is projected to cover different areas related to textile and clothing technologies. The web-based education platform was being developed by a consortium of seven partners from the United Kingdom, Greece, Latvia, Portugal, Romania and Slovenia and is supported with funding from the EU Leonardo da Vinci programme.

The scope of the content has been designed to make it suitable for study at both fundamental and more advanced levels. In addition, the tools will help to improve the recognition and validation of work-based learning which will in turn support career development and lifelong learning within the European Textiles sector. E-learning tools and materials such as those in the eLiTA suite of modules, should be further developed if the workforce is to be recruited, educated and trained to the level required to enable companies within the EU compete globally.

#### Acknowledgement

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